Date – 12-27-99

NOTE TO: NRC DOCUMENT CONTROL DESK
MAIL STOP 0-5-D-24

FROM: Virgil Curley, LICENSING ASSISTANT
~~OPERATING LICENSING BRANCH~~ _ REGION I

SUBJECT: OPERATOR LICENSING EXAMINATION ADMINISTERED ON
Jan. 25-29, 1999, AT Baltimore Gas & Elect
DOCKET NOS. 50-317, 50-318

ON Jan. 25-29 1999 OPERATOR LICENSING EXAMINATIONS WERE ADMINISTERED AT THE REFERENCED FACILITY. ATTACHED YOU WILL FIND THE FOLLOWING INFORMATION FOR PROCESSING THROUGH NUDOCS AND DISTRIBUTION TO THE NRC STAFF, INCLUDING THE NRC PDR.

Item #1 a) FACILITY SUBMITTED OUTLINE AND INITIAL EXAM SUBMITTAL DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE A070.

b) AS GIVEN OPERATING EXAMINATION, DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE A070.

Item #2 EXAMINATION REPORT WITH THE AS GIVEN WRITTEN EXAMINATION ATTACHED, DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE IE42.

A070

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NRC EXAMINATION MATERIAL

TO BE OPENED BY ADDRESSEE ONLY

FOR OFFICIAL USE ONLY

EXAM OUTLINES (37 TOTAL PAGES):

RO WRITTEN 8 PAGES	SRO WRITTEN 9 PAGES	SROI JPMS 2 PAGES
RO ADMIN 1 PAGE	SROI ADMIN 1 PAGE	SROU JPMS 1 PAGE
RO JPMS 2 PAGES	SROU ADMIN 1 PAGE	4 SCENARIOS 12 PAGES

A070

~~A040~~

Facility: Calvert Cliffs Unit 1 and 2					Date of Exam: 1/25/99							Exam Level:RO	
					K/A Category Points								
Tier	Group	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	Point Total
1	1	3	3	4				3	2			1	16
Emergency &	2	3	3	5				3	2			1	17
Abnormal	3	1		1					1				3
Plant Evolutions	Tier Totals	7	6	10				6	5			2	36
2	1	3	2	3	1	2	1	2	2	2	4	1	23
Plant	2	3	2	2	1	3	2	3	2	2			20
Systems	3	1	1	1	1	1			2		1		8
	Tier Totals	7	5	6	3	6	3	5	6	4	5	1	51
3. Generic Knowledge and					Cat 1		Cat 2		Cat 3		Cat 4		
Abilities						4		5		2		2	13

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

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E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000005 Inoperable/Stuck Control Rod / I	X						AK101-Operational implications of Axial Power imbalance	3.1	1
000015/17 RCP Malfunctions / IV	X						AK102-Operational implication of consequences of RCP failure	3.7	1
CE/A13 Natural Circ. / IV				X			AA13-Ability to operate/monitor during abnormal/emergency	3.2	1
000024 Emergency Boration / I			X				AK302-Reasons for actions in EOP	4.2	1
000026 Loss of Component Cooling Water / VIII					X		AA206-Ability to determine time before component damage	2.8*	1
000027 Prz Pressure Control Sys malfunction /III				X			AA101-Ability to operate/monitor PZR heaters,spray,PORVs	4	1
000040 CE/E05 Stm Line Rupture/EHT / IV		X					EK21-Interelationship of components and systems during ESD	3.3	1
CE/A11 RCS Overcooling - PTS / IV			X				AK33-Knowledge of responses of required manipulations w/ PTS	3.1	1
000051 Loss of Condenser Vacuum / IV					X		AA202-Ability to determine conditions for Reactor and/or MT Trip	3.9	1
000055 Station Blackout / VI			X				EK302-Reasons for actions in EOP during SBO	4.3	1
000057 Loss of Vital AC Elec. Inst. Bus / VI						X	G449-Immedaite actions required for loss of power	4	1
000062 Loss of Nuclear Service Water (SW) / IV				X			AA107-Ability to monitor component interactions (U1 vs U2)	2.9	1
000067 Plant Fire On-site / IX	X						AK102-Operational implications of fire fighting	3.1	1
000068 Control Room Evac. / VIII									
000069 Loss of CTMT Integrity / V		X					AK203-Interrelationship of access hatchs during event	2.8*	1
000074 Inad. Core Cooling / IV		X					EK206-Interrelationship of TBVs/ADVs during event	3.5*	1
000076 High Reactor Coolant Activity / IX			X				AK305-Reasons for actions due to hi activity in RCS	2.9	1
K/A Category Point Totals:	3	3	4	3	2	1	Group Point Total:		16

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

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E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000001 Continuous Rod Withdrawl / I	X						AK102-Operational implications of SUR during event	3.6	1
000003 Dropped Control Rod / I			X				AK304-Actions contained in AOP for dropped rod	3.8*	1
000007 CE/EO2 Reactor Trip Stable/Recovery / I	X						EK12-Operational implications of procedures for Reactor Trip	3	1
000007 CE/EO2 Reactor Trip Stable/Recovery / I				X			EA12-Monitor characteristics of facility during trip recovery	3.3	1
000009 Small Break LOCA / III					X		EA201-Determine actions based on RCS temp and pressure	4.2	1
000011 Large Break LOCA / III		X					EK202-Interrelationship of pumps during LBLOCA	2.6*	1
000022 Loss of Reactor Coolant Makeup / II									
000025 Loss of SDC (RHR) / IV						X	G449-Immediate actions required for loss of SDC	4	1
000029 ATWS / I			X				EK312-Reasons for actions in EOP for ATWS	4.4	1
000032 Loss of Source Range NI / VIII					X		AA202-Determine count rate response w/ CEA motion w/event	3.6	1
000033 Loss of Intermediate Range NI / VII									
000037 Steam Generator Tube Leak / III				X			AA111-Monitor PZR level during SG Tube leak	3.4	1
000038 Steam Generator Tube Rupture / III			X				EK309-Reasons for ECCS throttling criteria	4.1	1
000054 (CE/E06) Loss of Main Feedwater / IV			X				EK32-Reasons for actions in Loss of Feedwater procedures	3.2	1
000058 Loss of DC Power / VI				X			AA103-Monitor vital battery and components during event	3.1	1
000059 Accidental Liq Waste Release / IX		X					AK201-Interrelationship of monitors during event	2.7	1
000060 Accidental Gaseous Radwaste Rel. / IX	X						AK101-Operational implications of types of radiation during event	2.5	1
000061 ARM System Alarms / VII			X				AK302-Reasons for actions in alarm response for Area Rad Mon	3.4	1
000065 Loss of Instrument Air / VIII									
CE/E09 Functional Recovery		X					EK22-Interrelationship between EOP8 and heat removal systems	3.7	1
K/A Category Point Totals:	3	3	5	3	2	1	Group Point Total:		17

Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000028 Pressurizer Level Malfunction / II									
000036 Fuel Handling Accident / VIII			X				AK303-Reasons for actions in EOP	3.7	1
000056 Loss of Off-site Power / VI	X						AK101-Operational implications of natural convection cooling	3.7	1
000065 Loss of Inst Air / VIII									
CE/A16 Excess RCS Leakage / II					X		AA22-Determine adherence to procedure and License	2.9	1
K/A Category Point Totals:	1		1		1		Group Point Total:		3

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PWR RO Examination Outline
Plant Systems - Tier 2/Group 1

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System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
001 Control Rod Drive					X							K504-Oper implications of insertion limits	4.3	1
001 Control Rod Drive								X				A212-Erroneous ECP	3.6	1
003 Reactor Coolant Pump			X									K302-Effect on S/G from RCP malfunction	3.5	1
004 Chemical and Volume Control		X										K206-power supply for control instrument	2.6*	1
004 Chemical and Volume Control								X				A232-Reactivity changes from new IX	3.4	1
013 Engineered Safety Features Actuation			X									K303-Effect of loss on Containment	4.3	1
013 Engineered Safety Features Actuation				X								K401-Design features of SIS reset	3.9	1
015 Nuclear Instrumentation	X											K101-Cause/effect between NIs and RPS	4.1	1
015 Nuclear Instrumentation		X										K201-power supply for NI channels	3.3	1
017 In-core Temperature Monitoring			X									K301-Cause/effect of malf on nat circ ind	3.5*	1
022 Containment Cooling	X											K101-Cause/effect between CS and SW	3.5	1
022 Containment Cooling							X					A102-Use Cont press to predict CS effect	3.6	1
056 Condensate											X	G446-Alarms consistent w/ plt conditions	3.5	1
059 Main Feedwater									X			A306-auto operation during MFW isolation	3.2*	1
059 Main Feedwater										X		A403-Monitor MFW control w/ power chg	2.9*	1
061 Auxiliary/Emergency Feedwater									X			A301-auto operation during AFW s/u	4.2	1
061 Auxiliary/Emergency Feedwater						X						K601-Effect of loss of controllers	2.5	1
068 Liquid Radwaste	X											K107-Cause/effect from waste sources	2.7	1
068 Liquid Radwaste					X							K504-Implications of hazards of radiation	3.2	1
071 Waste Gas Disposal										X		A427-Monitor operation of WGDT CV	3.0*	1
071 Waste Gas Disposal										X		A429-Limits of samples on WGDT	3.0*	1
072 Area Radiation Monitoring							X					A101-Monitor rad levels w/ Area Rad Mon	3.4	1
072 Area Radiation Monitoring										X		A403-Monitor check source operation	3.1	1
K/A Category Point Totals:	3	2	4	1	2	1	2	2	1	4	1	Group Point Total:		23

Plant Systems - Tier 2/Group 2

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System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
002 Reactor Coolant							X					A101-Prevent exceeding design pressure	3.8	1
006 Emergency Core Cooling	X											K103-Cause/effect between ECCS & RCS	4.2	1
010 Pressurizer Pressure Control		X										K201-Power supplies for PZR heaters	3	1
011 Pressurizer Level Control						X						K604-Loss effect of PZR level controllers	3.1	1
012 Reactor Protection					X							K501-Operational implications of DNB	3.3*	1
012 Reactor Protection						X						K603-Loss effect of trip logic circuits	3.1	1
014 Rod Position Indication							X					A101-Monitor reed switch (LER 98-1)	2.9*	1
016 Non-nuclear Instrumentation									X			A301-Monitor inputs to Digital FW control	2.9*	1
026 Containment Spray								X				A208-Securing CS after actuation	3.2	1
029 Containment Purge	X											K103-Cause/effect between CP and ESF	3.6	1
033 Spent Fuel Pool Cooling				X								K405-Design features for adequate SDM	3.1	1
035 Steam Generator					X							K503-Implications of Shrink and Swell	2.8	1
039 Main and Reheat Steam					X							K501-Implications of steam/water hammer	2.9	1
055 Condenser Air Removal			X									K301-Cause/effect of sys on condenser	2.5	1
062 AC Electrical Distribution	X											K104-Cause/effect from Off-site power	3.7	1
063 DC Electrical Distribution									X			A301-Monitor operation via indications	2.8*	1
064 Emergency Diesel Generator		X										K201-Power supplies for air compressors	2.7*	1
064 Emergency Diesel Generator								X				A205-Determine effect on minimum load	3.1	1
073 Process Radiation Monitoring							X					A101-Predict rad level effect on PRM	3.2	1
075 Circulating Water														
079 Station Air														
086 Fire Protection			X									K301-Effect on redundant equip (App R)	2.7	1
K/A Category Point Totals:	3	2	2	1	3	2	3	2	2			Group Point Total:		20

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System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
005 Residual Heat Removal / SDC														
007 Pressurizer Relief/Quench Tank								X				A201-Predict impact of open RV	3.9	1
008 Component Cooling Water		X										K202-Power supply for pumps	3.0*	1
027 Containment Iodine Removal										X		A401-Operation of CIRS controls	3.3*	1
028 H2 Recombiner and Purge Control					X							K503-Sources of Hydrogen in Cont	2.9	1
034 Fuel Handloing Equipment				X								K402-Design features for fuel movement	2.5	1
041 Steam Dump/Turbine Bypass Control	X											K105-Cause/effect on RCS	3.5	1
045 Main Turbine Generator														
076 Service Water								X				A201-Predict effect of loss (U1 vs U2)	3.5*	1
078 Instrument Air														
103 Containment			X									K301-Effect of loss of integrity (S/D)	3.3*	1
K/A Category Point Totals:	1	1	1	1	1			2		1		Group Point Total:		8

Facility:		Date of Exam	Exam Level:	
Category	K/A #	Topic	Imp	Points
	2.1.1	Actions for RPS logic keyswitch out of position	3.7	1
	2.1.3	Watch relief due to Operator sickness	3	1
Conduct of	2.1.10	10CFR 50.59 screening criteria	2.7	1
Operations	2.1.11	Actions for less than 1 hour TS conditions	3	1
	Total			4
	2.2.3	Knowledge of Unit 1 and 2 MT operational differences	3.1	1
	2.2.11	Bypassing plant annunciator alarms	2.5	1
Equipment	2.2.13	Actions on discovery of improper tagged position	3.6	1
Control	2.2.24	Analyze effect of maintenance on redundant equipment	2.6	1
	2.2.26	Knowledge of Refueling Admin requirements	2.5	1
	Total			5
	2.3.5	Knowlege of use of EPDs (Site specific issue)	2.3	1
	2.3.10	Perform procedure to guard against personnel exposures	2.9	1
Radiation				
Control				
	Total			2
	2.4.20	Knowledge of EOP warnings, cautions and notes	3.3	1
Emergency	2.4.29	Knowledge of emergency plan (personnel emergency)	2.6	1
Procedures				
and Plan				
	Total			2
Tier 3 Target Point Total (RO)				13

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Facility: Calvert Cliffs Examination Level: RO		Date of Examination: 1/25/99 Operating Test Number: 1
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Shift Staffing	K/A 2.1.3//R3.0/S3.4// Shift Turnover - RO turnover Checklist
		K/A 2.1.2 //R3.0/S4.0// Reactor Shutdown- CRO responsibility
	Plant Parameter Verification	K/A 2.1.7//R3.7/S4.4// Evaluate plant heat balance performance
		K/A 2.1.25//R2.8/S3.1// Obtain and interpret reference material for SW Heat Exchangers
A2	Surveillance Testing	K/A 2.2.12//R3.0/S3.4// Knowledge of surveillance required for CEA deviation circuit
		K/A 2.2.13//R3.6/S3.8// Knowledge of Tagging clearance procedures for surveillance test of HPSI pump with LTOP controls in effect
A.3	Control of Radiation Releases	K/A 2.3.10//R2.9/S3.3/ Ability to use SCBAs for Control Room High Airborne Activity
		K/A 2.3.11//R2.7/S3.2// Conditions to secure a liquid waste release
A.4	Emergency Procedures	K/A 2.4.3//R3.5/S3.8// Identify Post Accident Instrumentation
		K/A 2.4.32//R3.3/S3.5// Knowledge of operator response to a loss of all annunciators

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Facility: Calvert Cliffs Units 1 & 2	Date of Examination: January 25, 1999
Examination Level: RO	Operating Test Number: 1

System / JPM Title / Type Codes*	Safety Function	Planned Followup Questions: K/A/G – Importance - Description
1. Control Element Drive System / Recover a Misaligned CEA	I	a. 000001A113 4.0/4.2 Evaluation of PDIL with changes in primary parameters
M S		b. 000001A212 3.6/4.2 Evaluation of ECP
2. Electrical AC / Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power	VI	a. 000062K102 4.1/4.4 Loss of Offsite Power in MODE 5 - evaluation of sources
M A S		b. 000064G112 2.9/4.0 Evaluation of DG OPERABILITY requirements
3. Reactor Protection System / Pre starup checks	VII	a. 000073A402 3.7/3.7 Operation of Main Steam Radiation Monitor
N A S L		b. 00069AK203 2.8*/2.9 Sources of unmonitored leakage
4. Containment Spray/ CSAS Verification	V	a. 000026G132 3.4/3.8 Reason for filling the containment emergency sump
M S		b. 000026G409 3.3/3.9 Use of Containment Spray pumps for SDC
5. Shut Down Cooling / Respond to a loss of SDC with RCS pressurization possible	IV	a. 00024AA206 3.6/3.7 Sources of RCS dilution during startup
D A S L		b. 00025AK101 3.9/4.3 Evalution of "Time to Boil" calculations during Reduced Inventory Operation
6. CVCS / Align Charging header to the Aux HPSI header with RCS leakage greater than one charging pump capacity (isolable leak on Charging header)	II	a. 000004K604 2.8/3.1 Charging pump protection during SIAS/Non-SIAS conditions
D S		b. 000002K201 4.3/4.4 Calculation of RCS leakrate
7. Component Cooling/ Shifting Component Cooling Heat Exchangers	VIII	a. 000003K404 3.1/3.4 RCP component cooling flow requirements
N S		b. 000008A102 2.9/3.1 Component Cooling system temperature control
8. STM DUMP / Lineup for ADV control at 1(2)C43 Safe Shutdown Panel due to Control Room Evacuation	IV	a. 000061K404 3.1/3.4 AFW System flow rate limits
D P		b. 00068AK312 4.1/4.5 Securing CEDM MGs during Control Room Evacuation
9. AC Distribution/ Transfer 120 V Vital bus to the Inverter Backup Bus	VI	a. 00055EK301 2.7/3.4 Battery design limit during SBO

D P		b. 000062K103 3.5/4.0 Sources of DC power
10. Chemical and Volume Control / Isolate Dilution Paths	I	a. 004000A110 3.7/3.9 Determination of dilution that would activate S/D Monitor alarm
D P R		b. 010000G132 3.4/3.8 Limitations on use of Aux. Spray
Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA		

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Facility: Calvert Cliffs Unit 1 and 2					Date of Exam: 1/25/99						Exam Level:SRO		
					K/A Category Points								
Tier	Group	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	Point Total
1	1	5	6	6				3	3			1	24
Emergency &	2	2	1	5				3	4			1	16
Abnormal	3	1	•	1					1				3
Plant Evolutions	Tier Totals	8	6	12				6	9			2	43
2	1	2	1	2	1	2	1	3	2	2	2	1	19
Plant	2	2	1	2	2	2	2	2	1	2	1		17
Systems	3	1	1						2				4
	Tier Totals	5	3	4	3	4	3	5	5	4	3	1	40
3. Generic Knowledge and					Cat 1		Cat 2		Cat 3		Cat 4		
Abilities						5		5		3		4	17

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

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E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000001 Continuous Rod Withdrawl / I	X						AK102-Operational implications of SUR during event	3.9	1
000003 Dropped Control Rod / I			X				AK304-actions contained in AOP for Dropped Rod	4.1*	1
000005 Inoperable/Stuck Control Rod / I	X						AK101-Operational implications of Axial Power imbalance	3.8	1
000011 Large Break LOCA / III		X					EK202-Interrelationship of pumps during LBLOCA	2.7*	1
000015/17 RCP Malfunctions / IV	X						AK102-Operational implication of consequences of RCP failure	4.1	1
CE/A13 Natural Circ. / IV				X			AA13-Ability to operate/monitor during abnormal/emergency	3.8	1
CE/A13 Natural Circ. / IV		X					AK22-Interrelationship between Nat Circ and NSSS heat removal	3.6	1
000024 Emergency Boration / I			X				AK302-Reasons for actions in EOP	4.4	1
000026 Loss of Component Cooling Water / VIII					X		AA206-Ability to determine time before component damage	3.1*	1
000029 ATWS / I			X				EK312-Reasons for actions in EOP for ATWS	4.7	1
000027 Prz Pressure Control Sys malfunction /III				X			AA101-Ability to operate/monitor PZR heaters,spray,PORVs	3.9	1
000040 CE/E05 Stm Line Rupture/EHT / IV		X					EK21-Interelationship of components and systems during ESD	3.6	1
000040 CE/E05 Stm Line Rupture/EHT / IV	X						EK12-Implications of procedures associated with ESD event	3.8	1
CE/A11 RCS Overcooling - PTS / IV			X				AK33-Knowledge of responses of required manipulations w/ PTS	3.5	1
000051 Loss of Condenser Vacuum / IV					X		AA202-Ability to determine conditions for Reactor and/or MT Trip	4.1	1
000055 Station Blackout / VI			X				EK302-Reasons for actions in EOP during SBO	4.6	1
000057 Loss of Vital AC Elec. Inst. Bus / VI						X	G449-Immedaite actions required for loss of power	4	1
000059 Accidental Liq Waste Release / IX		X					AK201-Interrelationship of monitors during event	2.8	1
000062 Loss of Nuclear Service Water (SW) / IV				X			AA107-Ability to monitor component interactions (U1 vs U2)	3	1
000062 Loss of Nuclear Service Water (SW) / IV					X		AA201-Determine location of leak	3.5	1
000067 Plant Fire On-site / IX	X						AK102-Operational implications of fire fighting	3.9	1
000068 Control Room Evac. / VIII			X				AK301-System response during Rx trip	4.2	1
000069 Loss of CTMT Integrity / V		X					AK203-Interrelationship of access hatchs during event	2.9	1
000074 Inad. Core Cooling / IV		X					EK206-Interrelationship of TBVs/ADVs during event	3.6	1

PWR SRO Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

K/A Category Point Totals:	5	6	6	3	3	1	Group Point Total:		24

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

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E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000007 CE/EO2 Reactor Trip Stable/Recovery / I	X						EK12-Operational implications of procedures for Reactor Trip	3.4	1
000007 CE/EO2 Reactor Trip Stable/Recovery / I				X			EA12-Monitor characteristics of facility during trip recovery	3.9	1
000008 Pressurizer Vapor Space Accident / III			X				AK305-ECCS Termination criteria	4.5	1
000009 Small Break LOCA / III					X		EA201-Determine actions based on RCS temp and pressure	4.8	1
000022 Loss of Reactor Coolant Makeup / II					X		AA201-Determine existence of charging line leak	3.8	1
000025 Loss of SDC (RHR) / IV						X	G449-Immediate actions required for loss of SDC	4	1
000027 Pressurizer Press Control Sys Malf / III					X		AA204-Determine tech Spec limits during malfunction	4.3	1
000032 Loss of Source Range NI / VIII					X		AA202-Determine count rate response w/ CEA motion w/event	3.9	1
000033 Loss of Intermediate Range NI / VII									
000037 Steam Generator Tube Leak / III				X			AA111-Monitor PZR level during SG Tube leak	3.3	1
000038 Steam Generator Tube Rupture / III			X				EK309-Reasons for ECCS throttling criteria	4.5	1
000054 (CE/E06) Loss of Main Feedwater / IV			X				EK32-Reasons for actions in Loss of Feedwater procedures	3.7	1
000058 Loss of DC Power / VI				X			AA103-Monitor vital battery and components during event	3.3	1
000060 Accidental Gaseous Radwaste Rel. / IX	X						AK101-Operational implications of types of radiation during event	3.1*	1
000061 ARM System Alarms / VII			X				AK302-Reasons for actions in alarm response for Area Rad Mon	3.6	1
000065 Loss of Instrument Air / VIII			X				AK308-Reasons for actions in procedure for loss of IA	3.9	1
CE/E09 Functional Recovery		X					EK22-Interrelationship between EOP8 and heat removal systems	4.2	1
K/A Category Point Totals:	2	1	5	3	4	1	Group Point Total:		16

Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

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E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topics	Imp.	Points
000028 Pressurizer Level Malfunction / II									
000036 Fuel Handling Accident / VIII			X				AK303-Reasons for actions in AOP	4.1	1
000056 Loss of Off-site Power / VI	X						AK101-Operational implications of natural convection cooling	4.2	1
CE/A16 Excess RCS Leakage / II					X		AA22-Determine adherence to procedure and License	3.7	1
K/A Category Point Totals:	1		1		1		Group Point Total:		3

Plant Systems - Tier 2/Group 1

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System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
001 Control Rod Drive					X							K504-Oper implications of insertion limits	4.7	1
003 Reactor Coolant Pump			X									K302-Effect on S/G from RCP malfunction	3.8	1
004 Chemical and Volume Control								X				A232-Reactivity changes from new IX	3.9	1
013 Engineered Safety Features Actuation				X								K401-Design features of SIS reset	4.3	1
014 Rod Position Indication							X					A101-Monitor reed switch (LER 98-1)	3.1	1
015 Nuclear Instrumentation		X										K201-power supply for NI channels	3.7	1
017 In-core Temperature Monitoring			X									K301-Cause/effect of malf on nat circ ind	3.7*	1
022 Containment Cooling	X											K101-Cause/effect between CS and SW	3.7	1
022 Containment Cooling							X					A102-Use Cont press to predict CS effect	3.8	1
026 Containment Spray								X				A208-Securing CS after actuation	3.7	1
056 Condensate											X	G446-Alarms consistent w/ plt conditions	3.6	1
059 Main Feedwater									X			A306-auto operation during MFW isolation	3.3	1
061 Auxiliary/Emergency Feedwater									X			A301-auto operation during AFW s/u	4.2	1
061 Auxiliary/Emergency Feedwater						X						K601-Effect of loss of controllers	2.8*	1
068 Liquid Radwaste	X											K107-Cause/effect from waste sources	2.9	1
068 Liquid Radwaste					X							K504-Implications of hazards of radiation	3.5	1
071 Waste Gas Disposal										X		A429-Limits of samples on WGDT	3.6*	1
072 Area Radiation Monitoring							X					A101-Monitor rad levels w/ Area Rad Mon	3.6	1
072 Area Radiation Monitoring										X		A403-Monitor check source operation	3.1	1
K/A Category Point Totals:	2	1	2	1	2	1	3	2	2	2	1	Group Point Total:		19

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System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
002 Reactor Coolant							X					A101-Prevent exceeding design pressure	4.1	1
006 Emergency Core Cooling														
010 Pressurizer Pressure Control		X										K201-Power supplies for PZR heaters	3.4	1
011 Pressurizer Level Control						X						K604-Loss effect of PZR level controllers	3.1	1
012 Reactor Protection						X						K603-Loss effect of trip logic circuits	3.5	1
016 Non-nuclear Instrumentation									X			A301-Monitor inputs to Digital FW control	2.9*	1
027 Containment Iodine Removal										X		A401-Operation of CIRS controls	3.3*	1
028 H2 Recombiner and Purge Control														
029 Containment Purge	X											K103-Cause/effect between CP and ESF	3.8	1
033 Spent Fuel Pool Cooling				X								K405-Design features for adequate SDM	3.3	1
034 Fuel Handling Equipment				X								K402-Design features for fuel movement	3.3	1
035 Steam Generator					X							K503-Implications of Shrink and Swell	3.1	1
039 Main and Reheat Steam					X							K501-Implications of steam/water hammer	3.1	1
055 Condenser Air Removal			X									K301-Cause/effect of sys on condenser	2.7	1
062 AC Electrical Distribution	X											K104-Cause/effect from Off-site power	4.2	1
063 DC Electrical Distribution									X			A301-Monitor operation via indications	3.1	1
064 Emergency Diesel Generator								X				A205-Determine effect on minimum load	3.2*	1
073 Process Radiation Monitoring							X					A101-Predict rad level effect on PRM	3.5	1
075 Circulating Water														
079 Station Air														
086 Fire Protection			X									K301-Effect on redundant equip (App R)	3.2	1
K/A Category Point Totals:	2	1	2	2	2	2	2	1	2	1		Group Point Total:		17

PWR SRO Examination Outline
Plant Systems - Tier 2/Group 3

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topics	Imp.	Points
005 Residual Heat Removal / SDC														
007 Pressurizer Relief/Quench Tank								X				A201-Predict impact of open RV	4.2	1
008 Component Cooling Water		X										K202-Power supply for pumps	3.2*	1
041 Steam Dump/Turbine Bypass Control	X											K105-Cause/effect on RCS	3.6	1
045 Main Turbine Generator														
076 Service Water								X				A201-Predict effect of loss (U1 vs U2)	3.7*	1
078 Instrument Air														
K/A Category Point Totals:	1	1						2				Group Point Total:		4

Facility: CCNPP Units 1&2		Date of Exam 1/25/99	Exam:SRO	
Category	K/A #	Topic	Imp	Points
	2.1.1	Actions for RPS logic keyswitch out of position	3.8	1
	2.1.3	Watch relief due to Operator sickness	3.4	1
Conduct of	2.1.10	10CFR 50.59 screening criteria	3.9	1
Operations	2.1.11	Actions for less than 1 hour TS conditions	3.8	1
	2.1.2	Knowledge of Operator responsibilites during Rx S/U	4	1
	Total			5
	2.2.3	Knowledge of Unit 1 and 2 MT operational differences	3.3	1
	2.2.13	Actions on discovery of improper tagged position	3.8	1
Equipment	2.2.24	Analyze effect of maintenance on redundant equipment	3.8	1
Control	2.2.26	Knowledge of Refueling Admin requirements	3.7	1
	2.2.27	FHS evaluation of safe location for fuel	3.5	1
	Total			5
	2.3.5	Knowlege of use of EPDs (Site specific issue)	2.5	1
	2.3.10	Perform procedure to guard against personnel exposures	3.3	1
Radiation	2.3.4	Authorization of increased exposure limits	3.1	1
Control				
	Total			3
	2.4.20	Knowledge of EOP warnings, cautions and notes	4	1
Emergency	2.4.29	Knowledge of emergency plan (personnel emergency)	4	1
Procedures	2.4.18	Knowledge of bases for EOP 8 (Functional Recovery)	3.6	1
and Plan	2.4.4	Recognize abnormal indications which are entry level		
		conditions for emergency/abnormal operating procedures	4.3	1
	Total			4
Tier 3 Target Point Total (SRO)				17

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Facility: Calvert Cliffs Examination Level: SRO-I		Date of Examination: 1/25/99 Operating Test Number: 1
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Shift Turnover	JPM K/A 2.1.3//R3.05:S 3.4// Complete Fuel Handling Supervisor turnover checklist.
	Plant parameter verification	JPM - K/A 2.1.33//R3.4:S4.0// Surveillance Test results review- entry level conditions for Tech Specs
A2	Troubling Shooting - Configuration Control	JPM - K/A 2.20//R2.20:S3.3// - Adiministrative Procedure "Trouble Shooting & Procedure Controlled Activities". MN-1-10
A.3	Control of Radiation Releases	JPM - K/A 2.20//R2.2:S3.3// - Review for approval of Containment Purge release
A.4	Event Classification	JPM - K/A 2.4.41//R2.3: S4.1// - Emergency Response Plan Implementation Procedures - Declare event and make notification(s)

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Facility: Calvert Cliffs Examination Level: SRO-U		Date of Examination: 1/25/99 Operating Test Number: 1
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Shift Turnover	JPM K/A 2.1.3//R3.05:S 3.4// Complete Fuel Handling Supervisor turnover checklist.
	Plant parameter verification	JPM - K/A 2.1.33//R3.4:S4.0// Surveillance Test results review- entry level conditions for Tech Specs
A2	Troubling Shooting - Configuration Control	JPM - K/A 2.20//R2.20:S3.3// - Adiministrative Procedure "Trouble Shooting & Procedure Controlled Activities". MN-1-10
A.3	Control of Radiation Releases	JPM - K/A 2.20//R2.2:S3.3// - Review for approval of Containment Purge release
A.4	Event Classification	JPM - K/A 2.4.41//R2.3: S4.1// - Emergency Response Plan Implementation Procedures - Declare event and make notification(s)

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Facility: Calvert Cliffs Units 1 & 2	Date of Examination: January 25, 1999
Examination Level: SRO-I	Operating Test Number: 1

System / JPM Title / Type Codes*	Safety Function	Planned Followup Questions: K/A/G – Importance - Description
1. Control Element Drive System / Recover a Misaligned CEA	I	a. 001000A113 4.0/4.2 Evaluation of PDIL with changes in primary parameters
M S		b. 001000A212 3.6/4.2 Evaluation of ECP
2. Electrical AC / Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power	VI	a. 062000K102 4.1/4.4 Loss of Offsite Power in MODE 5 - evaluation of sources
M A S		b. 064000G112 2.9/4.0 Evaluation of DG OPERABILITY requirements
3. Reactor Protection System / Pre startup checks	VII	a. 000073A402 3.7/3.7 Operation of Main Steam Radiation Monitor
N A S L		b. 00069AK203 2.8*/2.9 Sources of unmonitored leakage
4. Containment Spray / CSAS Verification	V	a. 026000G132 3.4/3.8 Reason for filling containment emergency sump piping
M S		b. 026000G409 3.3/3.9 Use of Containment Spray Pumps for SDC
5. Shut Down Cooling/ Respond to a loss of SDC with RCS pressurization possible	IV	a. 00024AA206 3.6/3.7 Sources of RCS dilution during startup
D A S L		b. 00025AK101 3.9/4.3 Evaluation of "Time to Boil" calculations during Reduced Inventory Operation
6. CVCS/ Align Charging header to the Aux HPSI header with RCS leakage greater than one charging pump capacity (isolable leak on charging header)	II	a. 000004K604 2.8/3.1 Charging pump protection during SIAS/Non-SIAS conditions
D S		b. 000002K201 4.3/4.4 Calculation of RCS leakrate
7. Component Cooling/ Shifting Component Cooling heat Exchangers	VIII	a. 000003K404 3.1/3.4 RCP component cooling flow requirements
N S		b. 000008A102 2.9/3.1 Component Cooling system temperature control
8. STM DUMP / Lineup for ADV control at 1(2)C43 Safe Shutdown panel due to Control Room evacuation	IV	a. 000061K404 3.1/3.4 AFW Sytem flow rate limits
D P		b. 00068AK312 4.1/4.5 Securing CEDM Mgs during Control Room Evacuation

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9.	AC Distribution/ Transfer 120 V Vital bus to the Inverter Backup Bus D P	VI	a. 00055EK301 2.7/3.4 Battery design limit during SBO
			b. 000062K103 3.5/4.0 Sources of DC power
10.	Chemical and Volume Control / Isolate Dilution Paths D P R	I	a. 004000A110 3.7/3.9 Determination of dilution that would activate S/D Monitor alarm
			b. 010000G132 3.4/3.8 Limitations on use of Aux. Spray

Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA

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Facility: Calvert Cliffs Units 1 & 2	Date of Examination: January 25, 1999
Examination Level: SRO-U	Operating Test Number: 1

System / JPM Title / Type Codes*	Safety Function	Planned Followup Questions: K/A/G – Importance - Description
1. Electrical AC/ Transfer 11/17/ 4KV Bus loads from 1A DG to Offsite power	VI	a. 000062K102 4.1/4.4 Loss of Offsite power in Mode 5 - evaluation of sources
M A S		b. 000064G112 2.9/4.0 Evaluation of DG operability
2. Containment Spray / CSAS Verification	V	a. 026000G132 3.4/3.8 Reason for filling containment emergency sump piping
M S		b. 026000G409 3.3/3.9 Use of Containment Spray Pumps for SDC
3. Reactor Protection System / Pre startup checks	VII	a. 000073A402 3.7/3.7 Operation of Main Steam Radiation Monitor
N A S L		b. 00069AK203 2.8*/2.9 Sources of unmonitored leakage
4. STM DUMP / Lineup for ADV control at 1(2)C43 Safe Shutdown Panel due to Control Room Evacuation	IV	a. 000061K404 3.1/3.4 AFW System flow rate limit
D P		b. 00068AK312 4.1/4.5 Securing CEDM Mgs during Control Room Evacuation
5. Chemical and Volume Control / Isolate Dilution Paths	I	a. 004000A110 3.7/3.9 Determination of dilution that would activate S/D Monitor alarm
D P R		b. 010000G132 3.4/3.8 Limitations on use of Aux. Spray

Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA

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Simulation Facility	Calvert Cliffs	Scenario No.: 1	Op Test No.:	1
Examiners:	____________	Operators:	____________	SRO
	____________		____________	RO
	____________		____________	BOP

Objectives: To evaluate the applicants' ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including 11A Loop Tc instrument, the ADV controller, a leak in CNMNT from CCW, loss of MCC-104R, a S/G tube leak, and to execute the EOPs for a SGTR with B train of SIAS failing to actuate and the 11 HPSI Pp OOS. Following transition to EOP-6, the leaking CCW line ruptures in CNMNT requiring isolating CCW to CNMNT and tripping all RCPs.

Initial Conditions: The plant is at 100% Power, MOC (IC-13)

Danger tag 13 SRW Pp in Pull-To-Lock

Danger tag 11 HPSI Pp in Pull-To-Lock

1 transformer at Waugh Chapel is OOS

11 SGFP Oil Cooler SRW flow is being controlled manually.

Turnover: Present plant conditions: 100% power, MOC; Unit 2 is in MODE 5.

Power history: 100% power for previous 34 days.

Equipment out of service:

1) 13 SRW Pp has grounded motor. Tripped off 6 hours ago and is expected to be returned to service in 2 days.

2) 11 HPSI Pp bearing wiped during STP 2 hours ago. Expected to be returned to service in about 36 hours.

3) 1 of the 3 main transformers at Waugh chapel is OOS.

4) 11 SGFP Oil Cooler SRW flow is being controlled manually.

Surveillances due: STP 0-29 is to be performed by the end of shift.

Instructions for shift:

1) Maintain 100% power.

2) Shift Manager will inform crew when he is ready for them to do the brief and perform STP 0-29.

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Event No.	Malf. No.	Event Type*		Event Description
Preload	SRW003_03 SI002_01 ESFA001_02			13 SRW Pp OOS. 11 HPSI Pp OOS. Failure of SIAS 'B' to actuate.
1	RCS 004_01 (HI)	I	RO	11A Loop Tc fails high. The candidate is expected to evaluate the alarms, refer to the ARM and determine which instrument has failed. The associated TM/LP trip unit (7) shall be bypassed. The candidate is expected to comply with Technical Specification 3.3.1.
2	MS016 (OPEN)	I	BOP	After the T.S. have been reviewed and actions taken, next the Atmospheric Dumps Valves fail open due to the S/G pressure input signal failing high. The CRO shall take manual control of the ADVs and shut them. The crew shall coordinate control of reactor power and turbine load as necessary to maintain/restore reactor power to less than 100% and Tc on program. The crew may refer to AOP-7K due to the excess steam demand.
3	CCW003 (0 to 1% over 2 min)	C	All	Approximately 2 minutes after the plant is stabilized a CCW leak develops in CNMNT. The first indication is a CNMNT sump alarm. The sump may drain the first time enough to clear the alarm but as the leak grows the alarm will not clear. The leak size will remain within the capacity of CCW makeup. The crew should evaluate RCS conditions and determine an RCS leak does not exist. T. S. 3.4.14 should be implemented. The crew may determine a CCW leak exists based on head tank level and if so they should implement AOP-7C. Preparations for a CNMNT entry to locate the source of the leak should be initiated.
4	480V002_01	C	All	Approximately 10 minutes after initiating the CCW leak in CNMNT, a loss of MCC-104R occurs. The crew will determine MCC-104 has been lost and implement AOP-7I, placing 2 Charging Pps in P-T-L, shifting Ch. Pp suction back to the VCT and adjusting turbine load as necessary to maintain Tc on program. Next they will tie 1Y10 to 1Y09. After 1Y10 is reenergized, Ch. Pp suction should be returned to auto from the VCT.
5	MS001_01 (90 gpm)	R N	RO BOP	About 5 minutes after the crew has reenergized 1Y10, a 90 gpm tube leak will begin in 11 S/G. The crew will implement AOP-2A due to the loss of RCS inventory and determine a S/G tube leak is occurring. The crew should commence a power reduction to take the unit off-line per AOP-2A. The boration lineup will be complicated by the loss MCC-104 requiring use of the gravity feed valves. When PZR level reaches 101 inches or Tave is <537°F the unit will be tripped and EOP-0 entered.
6	MS-002_01 (.8 tube)	M	ALL	When the reactor is tripped the tube leak will degrade into a SGTR. The crew will progress through EOP-0. When the SIAS setpoint is reached train 'B' will not actuate and with 11 HPSI Pp already OOS, no HPSI Pps will be running. The crew should manually actuate train 'B' SIAS. The crew should recognize 13 HPSI has no path to inject into the RCS (header MOVs deenergized) and start 12 HPSI. The crew should complete EOP-0 and determine EOP-6 is the correct EOP and implement it.
7	CCW003 (20%)	M	ALL	After the transition is made to EOP-6 and the brief complete, the leaking CCW line in CNMNT ruptures. The crew should note the CCW Head Tank Low alarm (or low pressure) and the CCW Head Tank lowering rapidly or empty, isolate CCW to CNMNT and stop the CCW pumps if cavitating. The RO should stop all RCPs due to no CCW. The cooldown and isolation of 11 S/G will need to be done on natural circulation. Scenario should end when 11 S/G is isolated and S/G level and RCS inventory and subcooling have been stabilized.

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

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SCENARIO 1 OVERVIEW

The candidates will take the shift at 100% power with instructions to maintain power at 100%. STP-029 (CEA Free Movement Test) is to be performed later in the shift.

After taking the watch, 11A Loop Tc fails high. The candidate is expected to evaluate the alarms, refer to the Alarm Manual and determine which instrument has failed. The associated TM/LP trip unit (7) shall be bypassed per OI-6. The candidate is expected to comply with the actions of Technical Specification 3.3.1.

After completing the required actions of Technical Specification 3.3.1, the Atmospheric Dumps Valves fail open due to the S/G pressure input signal failing high. The CRO shall take manual control of the ADVs and shut them. The candidates shall coordinate control of reactor power and turbine load as necessary to maintain/restore reactor power to less than 100% and Tc on program. The crew should implement AOP-7K.

After the plant is stabilized a CCW leak develops in CNMNT. The first indication is a CNMNT sump alarm. The sump may drain enough the first time to clear the alarm but as the leak grows the alarm will not clear. The leak size will remain within the capacity of CCW makeup. The crew should evaluate RCS conditions and determine an RCS leak does not exist. T. S. 3.4.14 should be implemented. The crew may determine a CCW leak exists based on head tank level and if so they should implement AOP-7C. Preparations for a CNMNT entry to locate the source of the leak should be initiated.

After initiating the CCW leak in CNMNT, a loss of MCC-104R occurs. The crew will determine MCC-104 has been lost and implement AOP-7I, placing 2 Charging Pps in P-T-L, shifting Ch. Pp suction back to the VCT and adjusting turbine load as necessary to maintain Tc on program. Next they will tie 1Y10 to 1Y09. After 1Y10 is reenergized, Ch. Pp suction should be returned to auto from the VCT.

About 5 minutes after the crew has reenergized 1Y10, a 90 gpm tube leak begins in 11 S/G. The crew will implement AOP-2A due to the loss of RCS inventory and determine a S/G tube leak is occurring. The crew will commence a power reduction to take the unit off-line per AOP-2A. The boration lineup will be complicated by the loss MCC-104 requiring use of the gravity feed valves.. When PZR level reaches 101 inches or Tave is <537°F the unit will be tripped and EOP-0 entered.

When the reactor is tripped the tube leak will degrade into a SGTR. The crew will progress through EOP-0. When the SIAS setpoint is reached train 'B' will not actuate and with 11 HPSI Pp already OOS, no HPSI Pps will be running. The crew should manually actuate train 'B' SIAS. The crew should complete EOP-0 and determine EOP-6 is the correct EOP and implement it.

After the transition is made to EOP-6 and the brief is complete, the leaking CCW line in CNMNT ruptures. The crew should note the CCW Head Tank Low alarm and the CCW Head Tank lowering rapidly or empty, isolate CCW to CNMNT and stop the CCW Pps if cavitating. The RO should stop all RCPs due to no CCW. The cooldown and isolation of 11 S/G will need to be done on natural circulation. The scenario should end when 11 S/G is isolated and S/G level and RCS inventory and subcooling have been stabilized

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Simulation Facility <u>Calvert Cliffs</u> Scenario No.: 2 Op Test No.: 1

Examiners: ____________ Operators: ____________ <u>SRO</u>

____________ ____________ <u>RO</u>

____________ ____________ <u>BOP</u>

Objectives: To evaluate the applicants' ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including reducing power to remove a SGFP from service, failure of a VCT Level transmitter, malfunction of the Main Generator H2 Cooler SRW Controller, loss of 11 4KV Bus, and loss of the other SGFP. Upon ordering a reactor trip, an ATWS will occur. In EOP-0, a loss of the available AFW Pp results in a loss of all feedwater. In EOP-3, during the rapid cooldown to 465°F, SGIS 'A' fails to block and SGIS actuates. The loss of Condensate Booster Pump Injection capability requires initiation of Once Through Core Cooling.

Initial Conditions: The plant is at approximately 75% power (IC-??). Power increase is in progress.

12 SG has tube leakage of 3 gpd.

23 AFW Pump is OOS.

1 transformer at Waugh Chapel is OOS.

1B DG is OOS.

Turnover: Present plant conditions: 75% power, MOC; Unit 2 is in MODE 5.

Power history: 100% power for previous 60 days then reduced power to 70% 36 hours ago to repair oil leak on 12 SGFP.

Equipment out of service:

1) 12 SG has tube leakage of 3 gpd. Leakage has been constant at 3 gpd for the last 2 weeks.
2) 23 AFW Pp is OOS. Unit 2 has just entered Mode 5 from refueling.
3) 1 of the 3 main transformers at Waugh Chapel is OOS.
4) 1B DG is OOS. It was removed from service due to a fuel rack problem 10 hours ago and is expected to be returned to service within the next 2 hours.

Surveillances due: Perform STP-O-8 on 1B DG following return to service.

Instructions for shift:

1) Continue raising power to 100%.
2) Perform STP-O-8 on 1B DG when it is returned to service.

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Event No.	Malf. No.	Event Type*		Event Description
Preload	DG001_02 RPS005 RPS006 Pnl Override	N/A	N/A	1B DG OOS. ATWS. SGIS 'A' Block Keyswitch in Reset
1	N/A	R N	RO BOP	The candidates receive a report that 12 SGFP is leaking oil badly and reduce power to remove it from service. The crew should reduce power IAW OP-3.
2	CVCS009	I	RO	After power has been reduced, and 12 SGFP removed from service, VCT Level Instrument LT-227 fails low. The candidate should refer to the Alarm Manual, recognize Charging Pump suction has realigned to the RWT and take action to shift suction back to the VCT.
3	TG030_01	I	BOP	Several minutes after suction is realigned to the VCT, TCV-1608 fails shut (SRW to the Main Generator H2 Cooler) due to a failed input signal. Upon receipt of the Generator Status Panel Alarm the candidate should refer to the Alarm Manual, determine TCV-1608 has failed closed, take manual control and restore SRW to the H2 cooler.
4	4KV001_01	C	All	Approximately 2 minutes after the H2 temperature alarm is clear a loss of 11 4KV Bus occurs. The candidates should determine 11 4KV Bus has been lost and that RPS is not calling for a trip. They should take actions to stabilize power and restore Tc to program. They will implement AOP-7I and will tie 1Y09 to 1Y10, start a CCW Pp place 13 SW and SRW Pps on 11 header, 14 4KV Bus. The candidates should consider Tech. Spec. action statements for deenergized equipment.
5	FW004_01	M	All	About 5 minutes after the crew has reenergized 1Y09 and had an opportunity to review the Technical Specifications, a loss of #11 SGFP occurs (if the reactor trips during loss of 11 4KV Bus, 11 SGFP will trip when the reactor trips). The CRO should attempt to reset the SGFP but when it does not reset and the SG LO LVL pretrips are received the CRS should order the reactor tripped and implementation of EOP-0. When the unit receives an auto trip signal or is attempted to be tripped manually it will not trip (ATWS). The RO should then deenergize the CEDM MG Sets and then verify the reactor is tripped.
6	AFW001_01	C	BOP	After the first pass through the EOP-0 Safety Functions, 11 AFW Pump trips. The crew should attempt to start 12 AFW Pump and attempt to reset 11 AFW Pump, both of which will be unsuccessful. The candidates should determine a loss of all feedwater is taking place and implement EOP-3.
7	N/A	M	ALL	After the transition is made to EOP-3, the RCPs should be tripped. Following the brief, the candidates should commence a rapid cooldown to 465°F with the expectation of using Condensate Booster Pump Injection, however, when the SGIS Block permitted is received SGIS 'A' will not block. When SGIS 'A' actuates, Booster Pump Injection will no longer be available so the candidates will have to go to OTCC. The scenario can be terminated once OTCC has been initiated.

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

CONFIDENTIAL

SCENARIO 2 OVERVIEW

The candidates will take the shift at 75% power with instructions to raise power to 100% using OP-3. 12 SGFP has just been returned to service following repair of an oil leak The crew is to perform STP-O-8 on the 1B DG when it is returned to service.

After taking the watch, the candidates receive a report that 12 SGFP is leaking oil badly and reduce power to remove it from service. The crew should reduce power IAW OP-3.

After power has been reduced and 12 SGFP removed from service, VCT Level Instrument LT-227 fails low. The candidate should recognize Charging Pump suction has realigned to the RWT, take action to shift suction back to the VCT and refer to the Alarm Manual. I & C should be notified to investigate/repair.

Several minutes after suction is realigned to the VCT, TCV-1608 fails shut (SRW to the Main Generator H2 Cooler) due to a failed input signal. Upon receipt of the Generator Status Panel Alarm the candidate should refer to the Alarm Manual, determine TCV-1608 has failed closed, take manual control and restore SRW to the H2 cooler. I & C should be notified to investigate/repair.

After the H2 temperature alarm is clear a loss of 11 4KV Bus occurs. The candidates should determine 11 4KV Bus has been lost and that RPS is not calling for a trip. They should take actions to stabilize power and restore Tc to program. They will implement AOP-7I, tie instrument buses 1Y09 to 1Y10, start a CCW Pp place 13 SW and SRW Pps on 11 header, 14 4KV Bus (if the reactor trips during loss of 11 4KV Bus, 11 SGFP will trip when the reactor trips). The candidates should consider Tech. Spec. action statements for deenergized equipment.

About 5 minutes after the crew has reenergized 1Y09 and had an opportunity to review the Technical Specifications, a loss of #11 SGFP occurs. The CRO should attempt to reset the SGFP but when it does not reset and the SG LO LVL pretrips are received the CRS should order the reactor tripped and implementation of EOP-0. When the unit receives an auto trip signal or is attempted to be tripped manually it will not trip (ATWS). The RO should then deenergize the CEDM MG Sets and then verify the reactor is tripped on 1C15.

After the first pass through the EOP-0 Safety Functions, 11 AFW Pump trips. The crew should attempt to start 12 AFW Pump and attempt to reset 11 AFW Pump, both of which will be unsuccessful. The candidates should determine a loss of all feedwater is taking place and implement EOP-3.

After the transition is made to EOP-3, the RCPs should be tripped. Following the brief, the candidates should commence a rapid cooldown to 465°F with the expectation of using Condensate Booster Pump Injection, however, when the SGIS Block permitted is received SGIS 'A' will not block. When SGIS 'A' actuates, Booster Pump Injection will no longer be available so the candidates will have to go to OTCC. The scenario can be terminated once OTCC has been initiated.

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Simulation Facility Calvert Cliffs Scenario No.: 3 Op Test No.: 1

Examiners:	Operators:	
____________	____________	SRO
____________	____________	RO
____________	____________	BOP

Objectives: To evaluate the applicants' ability to initiate a normal plant power decrease; to implement the ARMs, OIs, AOPs, as appropriate, for a malfunctioning control system on a Steam Generator Feed Pump (SGFP), trip of running Boric Acid Pump, failure of a PZR Press instrument high causing PZR Spray valves to open, turbine CV failing partially closed, and turbine trip due to EHC power fault. To execute the EOPs for an ATWS condition following the turbine trip and subsequent pressurizer steam space LOCA due to failed open PORV and the block valve breaker tripping, and take actions for a feedline break in CNMNT requiring use of the Functional Recovery Procedure, EOP-8, and take actions for CIS failing to actuate.

Initial Conditions: The plant is at 80% Power, MOC (IC-??)

Danger tag 11 AFW Pp 1MS-3988 "TRIPPED DO NOT RESET"

Bypass Channel "C" TM/LP with key 7

12 BAST aligned for DIRECT RECIRCULATION IAW OI-2C, 6.3 with Boric Acid Pp 12 running.

1) HS-210 in MANUAL (M/U Mode Selector Switch)
2) HS-2512 in CLOSE (CVC-512)
3) FIC-210Y in MANUAL set to 0%
4) 12 BAST recirculation valve CVC-511-CV open

Turnover: Present plant conditions: 80% power, MOC; Unit 2 is in MODE 6 for refueling

Power history: Decreasing power at 10%/hour to comply with ACTION statement of Technical Specification 3.7.3.

Equipment out of service:

1) 11 AFW Pp has failed turbine blades and is under repair. The pump has been unavailable for 6 1/2 days and may possibly be returned to service within 24 hours. Operations Management decided to initiate a plant shutdown about 2 hours ago to ensure compliance with the Technical Specification ACTION statement.

2) Channel "C" TM/LP trip bypassed at 0235 for troubleshooting.

Surveillances due: 12 BAST is currently on recirculation IAW OI-2C, section 6.3 for 30 minutes for planned sampling.

Instructions for shift:

1) Continue with downpower to HOT STANDBY conditions. A decision will then be made concerning continuing cooldown to HOT SHUTDOWN.

2) 12 BAST may be restored from recirculation after 30 minutes.

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Event No.	Malf. No.	Event Type*		Event Description
Preload	AFW001_01 RPS005 RPS006 ESFA010_01 ,02 Panel Override			Trip of 11 AFW Pump. Failure of automatic reactor trip (ATWS). Failure of MANUAL reactor trip (ATWS). Failure of CIS to automatically actuate. Override PORV Block Valve HS-403 to open.
1	N/A	R N	RO BOP	Continue normal plant shutdown to Hot Standby.
2	Panel Override (Set bias at 2.0)	I	BOP	Approximately 5 minutes after commencing the power decrease and with at least 5% load shed, a malfunction of 12 Steam Generator Feed Pump Bias Controller occurs causing pump speed decrease resulting in 11 SGFP speed increase and SG level decrease. The candidate is expected to recognize that a problem exists with the 12 SGFP. The candidate should take manual control of 12 SGFP. The candidate is expected to implement AOP-3G.
3	CVCS014_02	C	RO	Approximately 2 minutes after completing the required actions of AOP-3G, 12 Boric Acid Pump trips. The candidate is expected to recognize the Boric Acid Pump has failed (may pick up off computer alarm display), and should stop any operations involving use of boric acid. Upon diagnosing the cause, the candidate may select the alternate Boric Acid Pump for operation. The candidate is expected to comply with Technical Specification 3.5.2, and TRM 9.1.2.
4	RCS023_01	I	RO	Approximately 5 minutes after placing the alternate Boric Acid Pump in operation, PZR Pressure Transmitter 1-PT-100X fails high resulting in both PZR Spray Valves going full open. The RO should determine 100X has failed high and that RCS pressure is dropping due to both spray valves being full open. The RO should take manual control of the spray valves and shut them and shift control to channel Y. RCS pressure should be restored to normal and the Alarm Manual referenced.
5	TG024_01 (10%)	C	BOP	Approximately 3 minutes after the actions of the Alarm Manual have been taken Turbine Control Valve #1 fails partially closed. The candidates should notice the loss of load and take action to stabilize the unit by verifying the proper operation of the TBVs and inserting CEAs as necessary or boration to restore Tc to program. The candidate is expected to implement AOP-7F.
6	TG013_01	M	ALL	Approximately 5 minutes after completing the required actions of AOP-7F, a Turbine trip occurs due to an EHC Power Fault. The Reactor does not trip automatically or manually. The candidate is expected to recognize a Turbine trip has occurred and that the Reactor failed to trip. The candidate should attempt to manually trip the Reactor and upon failure to trip, complete contingency actions required to compensate for the ATWS.
7	RCS027_01 Pnl Override (RC-403 red lite off when HS taken to close)	M	ALL	The PORVs open due to the ATWS condition, and ERV-402 fails open. The PORV Block valve (MOV-403) breaker trips when isolation is attempted. The candidate should implement EOP-5 based on Pressurizer steam space LOCA. When the crew attempts to maintain RCS Subcooling IAW EOP-5, Step M, a feedline break in CNMNT occurs.
8	FW009-02 (30%)	M	ALL	The crew recognizes a second event is taking place and implements the Functional Recovery Procedure, EOP-8. The candidates should select Success Paths for the Safety Functions out in EOP-0 and EOP-5. When CNMNT pressure reaches 2.8 psig CIS will fail to actuate automatically and should be manually actuated. The scenario should end after the candidates start performing PIC-3 and HR-3.

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

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SCENARIO 3 OVERVIEW

From 80% power, a normal power decrease at 10%/hr will be conducted IAW OP-3, section 6.4.

Approximately 5 minutes after commencing the power decrease (at least 5%), a malfunction of 12 Steam Generator Feed Pump Bias Controller occurs causing pump speed to decrease resulting in 11 SGFP speed increase and SG level decrease. The candidate is expected to recognize that a problem exists with 12 SGFP. The candidate should take manual control of 12 SGFP. The candidate is expected to implement AOP-3G.

After completing the required actions of AOP-3G, 12 Boric Acid Pump trips. The candidate is expected to recognize the Boric Acid Pump has failed, and should stop any operations involving use of boric acid. Upon diagnosing the cause, the candidate may select the alternate Boric Acid Pump for operation. The candidate is expected to comply with Technical Specification 3.5.2, and TRM 9.1.2.

After placing the alternate Boric Acid Pump in operation, PZR Pressure Transmitter 1-PT-100X fails high resulting in both PZR Spray Valves going full open. The RO should determine 100X has failed high and that RCS pressure is dropping due to both spray valves being full open. The RO should take manual control of the spray valves and shut them and shift control to channel Y. RCS pressure should be restored to normal and the Alarm Manual referenced.

After the actions of the Alarm Manual have been taken, Turbine Control Valve #1 fails partially closed. The candidates should notice the loss of load and take action to stabilize the unit by verifying the proper operation of the TBVs and inserting CEAs as necessary or boration to restore Tc to program. The candidate is expected to implement AOP-7F.

After completing the required actions of AOP-7F, a Turbine trip occurs due to an EHC Power Fault. The Reactor does not trip automatically or manually. The candidate is expected to recognize a Turbine trip has occurred and that the Reactor failed to trip. The candidate should attempt to manually trip the Reactor and upon failure to trip, complete contingency actions required to compensate for the ATWS. The PORVs open due to the ATWS, and ERV-402 fails open. The PORV Block valve (MOV-403) breaker trips when isolation is attempted. The candidate should implement EOP-5 based on Pressurizer steam space LOCA. When the crew attempts to maintain RCS Subcooling IAW EOP-5, Step M, a feedline break in CNMNT occurs.

The crew recognizes a second event is taking place and implements the Functional Recovery Procedure, EOP-8. The candidates should select Success Paths for the Safety Functions out in EOP-0 and EOP-5. When CNMNT pressure reaches 2.8 psig CIS will fail to actuate automatically and should be manually actuated. The scenario should end after the candidates start performing the actions of PIC-3 HR-3.

Simulation Facility	Calvert Cliffs	Scenario No.: **4**	Op Test No.:	1
Examiners:	____________	Operators:	____________	SRO
	____________		____________	RO
	____________		____________	BOP

Objectives: **To evaluate the applicants' ability to initiate a power decrease due to a transformer cooling problem, to implement the ARMs, OIs, AOPs, as appropriate, for a Power Summer failure, a leaking PORV, MFRV Controller Failure, trip of a SRW Pump and SRW rupture in the Turbine Bldg. To evaluate on the reactor trip a stuck out CEA, and PZR instrument line failure resulting in a 300 gpm LOCA. Once in EOP-5 a Main Steam Safety will open on 11 SG requiring the crew to implement the Functional Recovery Procedure.**

Initial Conditions: The plant is at 100% Power, MOC (IC-13)

1. 1 transformer at Waugh Chapel is OOS.
2. 13 CCW Pp is OOS.
3. A moderate earthquake occurred 6 hours ago with the epicenter near Dunkirk.

Turnover: Present plant conditions: 100% power, MOC; Unit 2 is in MODE 6 for refueling

Power history: 100% power for the previous 72 days.

Equipment out of service:

1. 1 of the 3 main transformers at Waugh Chapel is OOS.
2. 13 CCW Pp is OOS.
3. A moderate earthquake occurred 6 hours ago with the epicenter near Dunkirk. The quake registered 3.4 on the Richter scale. A plant inspection for damage is under way. No damage has been identified to this point.

Surveillances due: None.

Instructions for shift:

1. Maintain 100% power.
2. Continue plant inspection for damage due to the earthquake, notify GS-NPO immediately if any damage found.

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Event No.	Malf. No.	Event Type*		Event Description
Preload	CCW002_03 CEDS010_30			Failure of 13 CCW Pp. Stuck CEA.
1	N/A	R N	RO BOP	The System Operator informs the Control Room of a cooling problem on one of the two inservice transformers at Waugh Chapel and requests the Unit reduce to 750 MWe within the next 15 minutes. The candidates will commence a rapid power reduction to 750 MWe per OP-3.
2	NI010_01 (HI)	I	RO	Approximately 5 minutes after commencing the power decrease and with at least 5% load reduction, a Power Summer fails high. The candidates refer to the ARM and determine the power summer has failed. The RPS trip units (1,2,7,8,10) are bypassed per OI-6 and the actions of Tech Spec. 3.3.1 implemented.
3	RCS021 (0-20% over 2 min)	C	RO	Approximately 5 minutes after the RPS channels are bypassed, PORV 402 starts to leak. The candidate refers to the ARM and determines 402 is leaking. PORV-402 is blocked by shutting RC-403. After 403 is closed and the leakage is verified stopped, Tech. Spec. 3.4.11 is implemented.
4	FW018_01 (LO)	I	BOP	Approximately 3 minutes after reviewing the Tech. Spec., 11 MFRV Controller FIC-1111 fails LO. The candidate should note the failure and inform the CRS. The candidates should then implement AOP-3G for the feedwater malfunction. The candidate should place the FRV CONTR HS for the PDI in the MAIN FAIL position and adjust the PDI CONT to maintain level at approximately zero inches.
5	SRW003_02	C	BOP	Approximately 3 minutes after SG level has been stabilized, 12 SRW Pump trips. The ARM is referenced and a check is made for common mode failure. 13 SRW Pump will be started and AOP-7B implemented.
6	SRW002_02 (0-20% over 2 min)	M	ALL	When 13 SRW pump is started a leak that grows into a rupture over 2 minutes will begin in the Turbine Bldg. The candidates will remain in AOP-7B, isolate SRW to the Turbine Bldg. and trip the reactor. On the reactor trip, one CEA will remain stuck out and the candidate will implement EOP-0 and initiate boration for one stuck CEA.
7	RCS023_01 (LO) RCS024_02 (LO) RCS026_01 (HI) RCS002 - 300gpm	M	All	After the first review of the EOP-0 Safety Functions, a PZR reference leg fails and results in a 300 gpm LOCA. The candidates will reassess the Safety Functions and determine a LOCA is taking place apparently from a failed instrument line. The crew will trip 2 RCPs and verify SIAS is initiated when RCS pressure reaches 1725 and 1740 respectively. The crew will implement EOP-5.
8	MS017_02	M	ALL	When the crew implements EOP-5, they will ensure SIAS actuation and RCP trip strategy have been addressed. After a plant cooldown is begun is EOP-5, a Main Steam Safety Valve Fails open on 11 SG. The candidates now recognize a second event is occurring and implement Functional Recovery Procedure, EOP-8. The crew will select the Success Paths for the Safety Functions out in EOP-0 & 5, then implement HR-3 and PIC-3. When HR-3 and PIC-3 are implemented the scenario can be terminated.

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

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SCENARIO 4 OVERVIEW

From 100% power, the System Operator informs the Control Room of a cooling problem on one of the two inservice transformers at Waugh Chapel and requests the Unit reduce to 750 MWe within the next 15 minutes. The candidates will commence a rapid power reduction to 750 MWe per OP-3, section 6.4..

Approximately 5 minutes after commencing the power decrease and with at least 5% load reduction, a Power Range Summer fails high. The candidates refer to the ARM and determine the power range summer has failed. The RPS channels are bypassed per OI-6 and the actions of Tech Spec. 3.3.1 implemented.

Approximately 5 minutes after the RPS channels are bypassed, PORV 402 starts to leak. The candidate refers to the ARM and determines 402 is leaking. PORV-402 is blocked by shutting RC-403. After 403 is closed and the leakage is verified stopped, Tech. Spec. 3.4.11 is implemented.

Approximately 3 minutes after reviewing the Tech. Spec., 11 MFRV Controller FIC-1111 fails LO. The candidate should note the failure and inform the CRS. The candidates should then implement AOP-3G for the feedwater malfunction. The candidate should place the FRV CONTR HS for the PDI in the MAIN FAIL position and adjust the PDI CONT to maintain level at approximately zero inches.

Approximately 3 minutes after SG level has been stabilized, 12 SRW Pump trips. The ARM is referenced and a check is made for common mode failure. 13 SRW Pump will be started and AOP-7B implemented.

When 13 SRW pump is started a leak that grows into a rupture over 2 minutes will begin in the Turbine Bldg. The candidates remain in AOP-7B and will isolate SRW to the Turbine Bldg. and trip the reactor. On the reactor trip, one CEA will remain stuck out and the candidate will implement EOP-0 and initiate boration for one stuck CEA.

After the first review of the EOP-0 Safety Functions, a PZR reference leg fails and results in a 300 gpm LOCA. The candidates will reassess the Safety Functions and determine a LOCA is taking place apparently from a failed instrument line. The crew will trip 2 RCPs and verify SIAS is initiated when RCS pressure reaches 1725 and 1740 respectively. The crew will implement EOP-5.

When the crew implements EOP-5 they will ensure SIAS actuation and RCP trip strategy have been addressed. After a plant cooldown is begun is EOP-5 a Main Steam Safety Valve Fails open on 11 SG. The candidates now recognize a second event is occurring and implement Functional Recovery Procedure, EOP-8. The crew will select the Success Paths for the Safety Functions out in EOP-0 & 5, then implement HR-3 and PIC-3. When HR-3 and PIC-3 are implemented the scenario can be terminated.

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WRITTEN EXAM

STATISTICS

129 Questions in Review format

* Extra question (ECCS 002) as possible replacement for (FIRE PROTECTION 001) SRO and RO Outline T2G2
* 28 Questions SRO only
* Source: 48 Bank, 16 Modified and 65 New
* Cognitive level: 48 Memory, 63 Comprehensive and 18 Application

SRO Exam

* 28 SRO only questions, 72 questions overlap RO test
* Source: 30 Bank, 12 Modified and 58 New
* Cognitive level: 33 Memory, 49 Comprehensive and 18 Application

RO Exam

* Source: 45 Bank, 13 Modified and 42 New
* Cognitive level: 40 Memeory, 49 Comprehensive and 11 Application

1. AC DISTRIBUTION 001/ 000062K104/ 3.7/4.2/ COMP/ BANK/ CRO-48-2/ 4.1/ T2G2/T2G2/ CRO-48-2

1A DG is running under load during periodic testing and is paralleled to 4KV bus 11-17.

What is the DG response to a loss of offsite power?

A. DG output breaker, 152-1703, will remain closed, repower all required loads, and continue to supply power to loads on 4KV bus 17.

B. DG output breaker, 152-1703, will remain closed, attempt to pick up the required loads and trip on overcurrent.

C. DG output breaker, 152-1703, will trip open and remain open until the synch stick is inserted and manually closed by the operator.

✓D. DG output breaker, 152-1703, will trip open and automatically reclose on 4KV bus 17 with normal and alternate feeders open to 4 KV Bus 11.

correct answer is based on the SIAS/UV logic sending a trip signal to 152-1703 and as load shed occurs, both normal and alternate feeder breakers open and load shed verified, 152-1703 will reclose on bus 17 per L/P CRO-48-2 page 40. Distractors are incorrect permutations of the logic sequence.
(edited CRO-48-2-24)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000062K104	3.7/4.2	COMP	BANK	CRO-48-2	4.1	T2G2/T2G2	CRO-48-2

2. ACCD GAS RELEASE 001/ 00060AK101/ XXX/3.1*/ COMP/ NEW/ CRO-134-1/ 6.0/ XXXX/T1G2/ AOP BASIS

Given the following:

* Unit 1 and 2 are at 100%
* Unit 1 is at EOC and had returned to service from a maintenance outage with subsequent indications of 1% failed fuel
* 13 WGDT is in service and full, ABO requests placing 12 WGDT in service

Which ONE of the following describes the expected conditions while shifting the WGDT?

A. 13 WGDT will contain primarily radioactive Xenon and Krypton and dose rates will be slightly elevated above normal.

B. 13 WGDT will contain primarily radioactive Iodine and Argon and dose rates will be slightly elevated above normal.

✓C. 13 WGDT will contain primarily radioactive Xenon and Krypton and dose rates will be substantially elevated above normal.

D. 13 WGDT will contain primarily radioactive Iodine and Argon and dose rates will be substantially elevated above normal.

Correct answer is based on AOP 6C Tech Basis page 3 (UFSAR design basis event) and distractors are incorrect permutations.

12/10/98 edited based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00060AK101	XXX/3.1*	COMP	NEW	CRO-134-1	6.0	XXXX/T1G2	AOP BASIS

3. ACCD GAS RELEASE 002/ 00060AK101/ 2.5/ MEMORY/ BANK/ CRO-219-1/ 8.1/ T1G1/ LESS PLAN

During a Waste Gas discharge, the RMS goes in alarm. Why must the discharge lineup be promptly secured?

A. Prevent damage to the Waste Gas Compressors.

B. Prevent an unmonitored release.

C. Prevent WG header relief from discharging to the Main Vent.

✓D. Prevent WG header relief from discharging to the Surge Tank.

correct answer is based on system design per drawing, distractors are incorrect design (unmonitored release, relief discharge to Main Vent) or result (damage).
edited CRO-219-1-0-35 from CRO Bank

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00060AK101	2.5	MEMORY	BANK	CRO-219-1	8.1	T1G1	LESS PLAN

4. ACCD LIQ RELEASE 001/ 00059AK201/ 2.7/2.8/ COMP/ NEW/ CRO-122-1/ 2.0/ T1G2/T1G1/ AOP 6B

Given the following:
- * Unit 1 is at 100% power
- * Liquid Waste discharge is in progress to Unit 1 Circulating Water
- * RO is preparing to make up the RWT due "11 RWT-LEVEL-TEMP" alarm
- * CRO reports 11 RWT level is decreasing
- * ABO reports that "11 REFUEL WTR STORAGE AREA SUMP LEVEL HI" alarm at 1C63

Which ONE of the following is the proper action for the described conditions?

A. Implement AOP 6B (Accidental Release of Radioactive Liquid Waste) due to the Liquid Waste Discharge in progress.

✓B. Implement AOP 6B (Accidental Release of Radioactive Liquid Release) due to the RWT level change.

C. Direct the ABO to investigate the Liquid Waste Discharge line up.

D. Direct the ABO to investigate the RWT makeup line up.

correct answer is based on the entry conditions and required actions of AOP 6B. Distractors are actions for the wrong event in progress.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00059AK201	2.7/2.8	COMP	NEW	CRO-122-1	2.0	T1G2/T1G1	AOP 6B

5. AREA RAD MONITORING 001/ 000072A101/ 3.4/3.6/ MEMORY/ NEW/ CRO-122-1/ 2.0/ T2G1/T2G1/ ALM MAN

The RCSS reports to the control room and describes a high rad material move from 45 foot truck loading area to the Unit 1 45 foot east penetration room.

Which of the following Area RMS alarm would be expected at 1C22 based on the movement path?

A. "UNIT 1 CC".
B. "DRUM STORAGE RM"
✓C. "UNIT 1 S/G B/D TK AREA"
D. "MISC WASTE EVAP RM"

correct answer is based on the location of the nearest RMS to the planned route for the hi rad move. Distractors are based on wrong area on the 45 foot elevation or wrong Aux Building levels.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000072A101	3.4/3.6	MEMORY	NEW	CRO-122-1	2.0	T2G1/T2G1	ALM MAN

6. AREA RAD MONITORING 002/ 000072A403/ 3.1/3.1/ MEMORY/ NEW/ CRO-122-1/ 2.0/ T2G1/T2G1/ OI 35

The CRS directs you to perform the check source of RMS per OI 35.

Which of the following RMS should NOT have the "check source" test performed per OI 35 due to automatic functions?

A. SFP Platform RI-7025

B. CAR Discharge RI-1752

C. Containment ICI RI-7008

✓D. Liquid Waste RI-2201

correct answer is based on caution on page 14 step 6.4.A.1. Distractors are RMS to be tested per OI 35 section 6.4

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000072A403	3.1/3.1	MEMORY	NEW	CRO-122-1	2.0	T2G1/T2G1	OI 35

7. AREA RAD MONITORS 001/ 00061AK302/ 3.4/3.6/ COMP/ NEW/ CRO-122-1/ 2.0/ T1G2/T1G2/ ALM MAN

Given the following:

* Unit 1 and 2 at 100% power
* "RMS PANEL" alarms at 1C17
* CRO reports that area rad monitor "UNIT 1 SAMPLE RM" is in alarm
* RO reports the VCT level trend indicates an increased leak rate

Which ONE of the following is the sequence of the actions for these plant conditions?

✓A. Notify Rad Safety to perform an area survey, evacuate the immediate area, have Chemistry check sample sink isolation valves shut.

B. Contact Chemistry to check sample sink isolation valves shut, evacuate the immediate area and have Rad Safety perform an area survey.

C. Notify Rad Safety to update the area survey map, evacuate the immediate area, have Chemistry check sample sink isolation valves shut.

D. Contact Chemistry to check sample sink isolation valves shut, evacuate the immediate area, and have Rad Safety update the area survey map.

correct answer is based on actions from the alarm manual for specified alarm.
Distractors are permutations on the incorrect sequence of actions or notifications.
12/10/98 changed distractor based validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00061AK302	3.4/3.6	COMP	NEW	CRO-122-1	2.0	T1G2/T1G2	ALM MAN

8. ATWS 001/ 00029EK312/ 4.4/4.7/ APPLIC/ NEW/ SRO-201-0/ 3.0/ T1G2/T1G1/ EOP 0

Given the following:

* CRS observes 2 out of 4 RPS trip logic for RCS flow tripped with no protective channel trip alarm on Unit 1
* RO observes Reactor power is at 100% at 1C05
* EOP 0 is implemented by the crew
* RO observes prompt drop in NI power and negative SUR while performing his IMMEDIATE ACTIONS for Reactivity Safety Function

Which ONE of the following was the method used to preclude the ATWS event?

A. Deenergizing 11A and 14A 480 Volt busses.

B. Deenergizing 12B and 13B 480 volt busses.

✓C. Depressing Reactor Trip buttons at 1C05.

D. Emergency Boration with all available Charging pumps.

correct answer is based on the normal indications for a manual reactor trip initiated at 1C05. Distractors are permutations of alternate actions, which are not expected indications.

12/10/98 edited based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00029EK312	4.4/4.7	APPLIC	NEW	SRO-201-0	3.0	T1G2/T1G1	EOP 0

9. AUX FEEDWATER 001/ 000061A301/ 4.2/4.2/ MEMORY/ BANK/ CRO-34-1/ 3.5/ T2G1/T2G1/ ALM MAN

Which condition below would cause the AFAS NO FLOW alarm to initiate?

✓A. AFW flow 60 gpm, 60 seconds after an AFAS START signal.

B. AFW flow 90 gpm, 60 seconds after an AFAS START signal.

C. AFW flow 60 gpm, 30 seconds after an AFAS START signal.

D. AFW flow 90 gpm, 30 seconds after an AFAS START signal.

correct answer is based on alarm manual information for WO-3 and WO-4 alarm descriptions (flow < 70gpm and time delay of 60 seconds for AFAS actuation). Distractors are permutations of incorrect setpoints.
(CRO-34-1-3-19)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000061A301	4.2/4.2	MEMORY	BANK	CRO-34-1	3.5	T2G1/T2G1	ALM MAN

10. AUX FEEDWATER 002/ 000061K601/ 2.5/2.8*/ COMP/ MODIFY/ SR0-201-7/ 6.3/ T2G1/T2G1/ EOP 7

Given the following:

* Loss of Offsite power has occurred
* Unit 1 tripped and no DGs are available
* Unit 2 tripped and 2A and 2B DGs are supplying power

Which one of the following describes AFW flow control valves on Unit 1?

A. Override Open the steam driven train block valves for both SGs at 1C43 .

✓B. Align N^2 to the AFW amplifier air system to maintain operation from the control room.

C. Direct the ABO to adjust local handwheel and observe local flow indicator for response.

D. Place the output signal on controllers at 1C43 to 100% value to maintain operation from the control room.

correct answer is based on EOP 7 required actions, distractors are incorrect or unspecified actions.
(modified stem and distractor SRO-201-7-1-08)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000061K601	2.5/2.8*	COMP	MODIFY	SR0-201-7	6.3	T2G1/T2G1	EOP 7

11. COMPONENT COOLING 001/ 000008K202/ 3.0*/3.2*/ MEMORY/ BANK/ CRO-113-5/ 4/ T2G3/T2G3/ OI 27D

The power supply and header lineup of #13 and 23 Component Cooling pumps is:

A. Powered from bus 14A(21B) and aligned to 11(22) CCW headers.

✓B. Powered from bus 14B(24B) and aligned to both CCW headers.

C. Powered from bus 11A(24A) and aligned to 12(21) CCW headers.

D. Powered from bus 11B(21B) and aligned to both CCW headers.

correct answer is based on OI 27D specified lineup, distractors are incorrect permutations of the specified lineup.
(corrected CRO-113-5-5-03)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000008K202	3.0*/3.2*	MEMORY	BANK	CRO-113-5	4	T2G3/T2G3	OI 27D

12. CONDENSATE 001/ 000056G446/ 3.5*/3.6/ MEMORY/ MODIFY/ CRO-103-2/ 1.3/ T2G1/T2G1/ ALM MAN

Given the following:
- * Unit 2 is at 65%
- * 21 and 22 Condensate pumps are running
- * 23 Condensate pump is in standby
- * 21 Condensate pump mechanically seizes, 23 Condensate pump starts

Which ONE of the following is the design feature that resulted in the auto start:

A. 21 Condensate Pump low discharge pressure at 150 PSIG.

B. Main Feedwater Suction header pressure at or below 220 psig.

✓C. Condensate Header discharge pressure at 175 psig.

D. Condensate Booster Pump Suction pressure at or below 20 psig.

correct answer is based on the stated conditions for alarm window C-04 per the 1C03 alarm manual. distractors are incorrect start logic features.
(modified CRO-103-2-4-06 stem and distractor)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000056G446	3.5*/3.6	MEMORY	MODIFY	CRO-103-2	1.3	T2G1/T2G1	ALM MAN

13. CONDENSER AIR REMVL 001/ 000055K301/ 2.5/2.7/ COMP/ NEW/ FUND QUALS/ N/A/ T2G2/T2G2/ OI 13

Given the following:

* Unit 2 is in Mode 5
* Preparations for drawing a Main Condenser vacuum were completed by the previous shift
* CRO starts all 4 CARs
* Shortly thereafter the CRO observes indication of all 4 CARs tripped on 1C13
* TBO reports that all 4 CAR shell stops isolation valves are OPEN and all 4 CAR breakers have tripped on overcurrent and have been reset

Which ONE of the following is the correct action for the condition?

A. Restart the one CAR, wait for Condenser vacuum to reach ~20 inches Hg, start the last 3 CARs.

✓B. Direct the TBO to throttle all CAR Shell Stop Valves to ~25% OPEN, restart CARs

C. Direct the TBO to throttle 2 CAR Shell Stop valve to ~25% OPEN, restart the applicable CARs.

D. Restart 2 CARs, wait for condenser vacuum to reach~ 20 inches Hg, start the last 2 CARs.

correct answer is based on OI 13 startup requirements to prevent overcurrent tripping of the CARs during the drawing of the initial condenser vacuum for plant startup.
can not find a lesson plan that covers this topic, however is part of the qualification manual for SE (4.29) and TBO (3.21) with practical factor to startup CARs per OI 13

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000055K301	2.5/2.7	COMP	NEW	FUND QUALS	N/A	T2G2/T2G2	OI 13

14. CONDUCT OF OPS 001/ 2.1.1/ 3.7/3.8/ APPLIC/ NEW/ CRO-59-1/ 13.1/ G2.1/G2.1/ OI6, TS

Using the provided references
Given the following:
* Unit 1 is at 98% power
* 1-PT-102B transmitter is OOS due to reliability concerns by System Engineering
* CRO bypasses Channnel B RPS trip units 5 and 6 to comply with TS 3.3.1

The CRS directs you to perform a peer check per OI 6, determine the compliance with TS 3.3.1

Which ONE of the following is the proper action based on TS 3.3.1:

A. Notify the CRS that the OI 6 peer check is complete and the correct channel RPS is bypassed.
B. Notify the CRS that the OI 6 peer check is unsat because the wrong channel RPS is bypassed.
C. Notify the CRS that the OI 6 peer check is complete and the correct trip units are bypassed.
✓D. Notify the CRS that the OI 6 peer check is unsat because the wrong trip units are bypassed.

correct answer is based on 1-PT-102B is input to Channel B RPS Trip Units 6 and 7, distractors are permutations of incorrect channels or trip units.
provide OI 6 section 6.4 (Bypassing RPS Channels) and TS 3.3.1
12/10/98 edited based on validation comments

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.1.1	3.7/3.8	APPLIC	NEW	CRO-59-1	13.1	G2.1/G2.1	OI6, TS

15. CONDUCT OF OPS 002/ 2.1.3/ 3.0/3.4/ COMP/ 11/97 MOD/ FUND QUALS/ N/A/ G2.1/G2.1/ N0-1-200

Unit 2 is at 50%. The designated CRO requests a break and requires a temporary relief. The Shift Manager directs the SM Assistant to relieve the CRO.

Which of the following describes the minimum action for the temporary watch relief per NO-1-200?

✓A. Verbally brief the SMA.
B. Walkdown the panels with the SMA.
C. No turnover required, SMA is already sign in.
D. Complete the turnover requirements of NO-1-207 (Shift Turnover)

correct answer is based on NO-1-200 part 5.2.B.2 , distractors are permutations of requirements that are excepted by NO-1-200.
(modified 11/97 question for short term turnover (#3 of review format)) This question is based on the prac fac requirements for licensed operator turnover in the applicable qual manual.
12/10/98 edited question based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.1.3	3.0/3.4	COMP	11/97 MOD	FUND QUALS	N/A	G2.1/G2.1	N0-1-200

16. CONDUCT OF OPS 003/ 2.1.11/ 3.0/ COMP/ MODIFY/ CRO-7-1/ 32.4/ G2.1/ TECH SPEC

Given the following:
* Unit 1 is in Mode 3
* RCS pressure is 1950 PSIA
* RCS temperature is 532°F
* 11A SIT boron concentration is 2325 ppm
* 11A SIT level is 195 inches
* 11A SIT pressure is 195 PSIG
* 11A SIT Outlet isolation 1-SI-614-MOV is OPEN with MCC breaker shut

Which ONE of the following identifies the operability status of 11A SIT that requires correction per TS based on the stated conditions?

A. 11A SIT Outlet MOV power must be removed, open mov breaker within 1 hour .
B. 11A SIT is above the required level, restore to the required level within 1 hour.
✓C. 11A SIT is below the required pressure, restore to the required pressure within 1 hour.
D. 11A SIT boron is below the required concentration, restore concentration within 72 hours.

TS 3.5.1 surveillance requirements require the MOV to be open, but the requirement for power removed is applicable only when pressurizer pressure is >2000 PSIG, distractors are permutations of in spec parameters.
(modified CRO-7-1-9-11)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.1.11	3.0	COMP	MODIFY	CRO-7-1	32.4	G2.1	TECH SPEC

17. CONDUCT OF OPS 004/ 2.1.10/ 2.7/ MEMORY/ BANK/ SR204PR101/ 5.0/ G2.1/ PR-1-101

Which ONE of the following is the responsibility of the Safety Evaluation Screening Preparer?

A. Ensure the reason for the change includes a specific detailed explanation, attaching additional pages if necessary.

B. Ensure that the proposed change will not alter what is to be accomplished by the procedure in a safety significant manner.

✓C. Ensure that the proposed change will not cause equipment operation in a manner that violates the Technical Specifications and UFSAR.

D. Ensure that the proposed change is not a Change of Intent, is consistent with the Tech Specs and does not require a Safety Evaluation.

correct answer is based on PR 1-101 requirements, distractors are admin requirements not part of the safety screening process.
(LOR-032040001-003 of LOR bank)
12/10/98 edited based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.1.10	2.7	MEMORY	BANK	SR204PR101	5.0	G2.1	PR-1-101

18. CONDUCT OF OPS 005/ 2.1.2/ XXX/4/ MEMORY/ NEW/ SRO204-100/ 20.0/ XXXX/G2.1/ OP 2

Unit 2 is in Mode 3 preparing for Unit startup per OP 2.

What are the additional dedicated Operators specified by OP 2?

A. SM to observe startup, a SRO at 2C02 and a licensed operator at 2C05.

✓B. SRO to supervise startup , a licensed operator at 2C02, and a licensed operator at 2C03.

C. SM to supervise startup, a licensed operator at 2C02, and a license operator at 2C03.

D. SRO to observe startup, a SRO at 2C02, and a licensed operator at 2C05.

correct answer is based on the specified requirements in OP 2 section 4.0.G (page 10), distractors are over specified license operator (SM or SRO at 2C02) or at the wrong panel (2C05)

12/10/98 stem modified fron validation comments

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.1.2	XXX/4	MEMORY	NEW	SRO204-100	20.0	XXXX/G2.1	OP 2

19. CONDUCT OF OPS 006/ 2.1.11/ XXX/3.8/ COMP/ NEW/ CRO-203-7/ 3.0/ XXXX/G2.1/ TECH SPEC

Given the following:

* Unit 1 is in Mode 5
* 11, 12 and 13 Charging pumps are in "PTL"
* Nonborated water source tagout in progress
* RCS is being drained to 110 inches after the collapse of the Pressurizer bubble
* At termination of RCS drain, RO reports that LI-103 indicates 80 inches.

Which ONE of the following is the required direction from the CRS?

A. Direct the CRO to compare LI-103 with the Refueling level indicator and write an Issue Report on LI-103.
B. Direct IM to fill the reference leg on 1-LT-103 and compare the Pressurizer level indications.
C. Direct the RO to start all charging pumps to raise Pressurizer level to 110 inches.
✓D. Direct the CRO and RO to verify SDM, RCS level above the bottom of the hot leg and sources of nonborated water less than 88 GPM .

correct answer is based on TS 3.1.1.3 bases, distractors do not implement the required actions.

12/10/98 modified stem and distractors from validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.1.11	XXX/3.8	COMP	NEW	CRO-203-7	3.0	XXXX/G2.1	TECH SPEC

20. CONDUCT OF OPS 007/ 2.1.10/ XXX/3.9/ MEMORY/ NEW/ SR204PR101/ 4.0/ XXXX/G2.1/ EN-1-102

Which ONE of the following describes the intent of the Safety Evaluation Screenings required by PR-1-101 for proposed procedure changes?

A. Evaluate the proposed change for safety significance (industrial and nuclear).

✓B. Evaluate the proposed change for Tech Spec or UFSAR compliance.

C. Evaluate the proposed change for technical accuracy.

D. Evaluate the proposed change for an Unreviewed Safety Question.

Correct answer and distractors are based on PR 1-101 and EN-1-102 (statement in the introduction) or unrelated (USQ).

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.1.10	XXX/3.9	MEMORY	NEW	SR204PR101	4.0	XXXX/G2.1	EN-1-102

21. CONT IODINE REMOVAL 001/ 000027A401/ 3.3*/3.3*/ COMP/ NEW/ CRO-7-1/ 28/ T2G3/T2G2/ ALM MAN

Given the following:

* EOP 5 (Loss of Coolant Accident) is implemented on Unit 2
* RCS pressure is ~ 1000 PSIA
* RCS Subcooling is 25°F
* Containment pressure is 3.2 PSIG and rising
* "22 CNTMT FILT " alarms at 2C09

Which ONE of the following, if any, is the expected action for the CRO due to the condition?

A. Verify handswitch in NORMAL and 22 Iodine Filter Fan starts on CIS at 4.25 PSIG

✓B. Ensure 21 and 23 Iodine Filter Fans have started and attempt to start 22 Iodine Filter Fan.

C. Ensure there is no common mode failure and attempt to start 22 Iodine Filter Fan.

D. Verify handswitch in NORMAL and 22 Iodine Filter Fan starts on CSAS at 4.25 PSIG.

correct answer is based on the alarm manual actions, distractors are non-specified actions or wrong design features info.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000027A401	3.3*/3.3*	COMP	NEW	CRO-7-1	28	T2G3/T2G2	ALM MAN

22. CONT ROD WITHDRAWL 001/ 00001AK102/ 3.6/3.9/ COMP/ MODIFY/ CRO-60-1/ 28/ T1G2/T1G1/ OP 2

Given the following:

* Unit 1 Reactor startup in progress after Refueling Outage per applicable PSTP and OP-2
* All Shutdown groups are fully withdrawn
* RO has completed his first 30 inch CEA pull on Regulating group 1
* RO observes that Regulating Group 1 primary and secondary CEA position indication are increasing

What actions are required for the existing plant conditions?

A. Insert group 1 CEAs to stop the outward motion per OP 2.

✓B. Place the CEDS Control Panel in OFF and implement AOP 1B.

C. Emergency borate with all available Charging pumps per PSTP.

D. Commence a reactor shutdown by inserting all CEAs per OI 42.

correct answer is based on OP 2 requirements for reactor startup with criticality to occur before PDIL limit, distractors are incorrect actions based on inadvertent criticality requirements.
(CRO-60-1-61)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00001AK102	3.6/3.9	COMP	MODIFY	CRO-60-1	28	T1G2/T1G1	OP 2

23. CONTAINMENT 001/ 000103K301/ 3.3*/ COMP/ BANK/ CRO-203-5A/ 5.0/ T2G3/ OP 7

Using the provided OP 7 and AOP 3B figures:

Unit 1 is in Mode 5 with the RCS partially drained and shutdown cooling in service. Outstanding entries exist in the Containment Closure Deviation Log to document unisolated containment penetrations. Additionally, given the following:

* 12A SI loop check valve is removed for maintenance
* 7 days have elapsed since shutdown
* RCS level is at the middle of the hot leg
* Initial RCS temperature is 160°F
* Pressurizer manway is removed

Determine the time available to establish containment closure in the event shutdown cooling is lost:

✓A. 10 minutes
B. 50 minutes
C. 60 minutes
D. 120 minutes

correct answer is based on specified conditions calculated results, distractors are incorrect calculations
(editorial CRO-203-5A-3-16A)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000103K301	3.3*	COMP	BANK	CRO-203-5A	5.0	T2G3	OP 7

24. CONTAINMENT CLG 001/ 000022K101/ 3.5*/3.7/ APPLIC/ BANK/ CRO-7-1/ 32.13/ T2G1/T2G1/ TECH SPEC

Using provided reference:

Unit 1 is in Mode 1 and #11 SRW HDR is OOS for maintenance. What effect does this have on the operability of the Containment Spray and Air Cooling System if #12 Containment Spray Pump is declared OOS?

A. No effect, both Containment Cooling trains of the Containment Air Cooling system remain operable.

B. The inoperable Containment Cooling train must be restored to operable status within 10 days.

✓C. The inoperable Containment Spray train must be restored to operable status within 72 hours.

D. The inoperable Containment Spray train must be restored to operable status within seven (7) days.

correct answer is based on ITS 3.6.6 ,3.7.7 and LCO 3.0.6 requirements, distractors are incorrect application of non-applicable conditions.
(CRO-7-1-5-93)
12/11/98 added Mode status based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000022K101	3.5*/3.7	APPLIC	BANK	CRO-7-1	32.13	T2G1/T2G1	TECH SPEC

25. CONTAINMENT CLG 002/ 000022A102/ 3.6/3.8/ COMP/ MODIFY/ CRO-7-1/ 14.1/ T2G1/T2G1/ EOP ATT

What ESFAS actuation(s) based on plant parameters and circuit logic are required to automatically initiate Containment Spray flow?

A. Containment pressure of 2.8 PSIG for SIAS OR containment pressure of 4.25 PSIG for CSAS.
B. RCS pressure of 1725 PSIA for SIAS AND containment pressure of 2.8 PSIG for CSAS.
C. RCS pressure of 1725 PSIA for SIAS OR containment pressure of 4.25 PSIG for CSAS.
✓D. Containment pressure of 2.8 PSIG for SIAS AND containment pressure of 4.25 PSIG for CSAS.

correct answer is based on design setpoints, distractors are permutations of one or both incorrect design setpoints.
(modified stem and distractors for CRO-7-1-5-22A)

KEY WORDS:

NRC K/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000022A102	3.6/3.8	COMP	MODIFY	CRO-7-1	14.1	T2G1/T2G1	EOP ATT

26. CONTAINMENT PURGE 001/ 000029K103/ 3.6/3.8/ MEMORY/ BANK/ CRO-134-1/ 2.4.F/ T2G2/T2G2/ OP 7

Which instrumentation must be operable to ensure the Containment Purge System will be automatically secured should a fuel handling incident occur inside containment?

A. Containment High Range Monitors (RE-5317 A/B)

✓B. Containment Area Radiation Monitors (RE-5316 A/B/C/D)

C. Main Vent Gaseous Monitor (RE-5415)

D. Wide Range Noble Gas Monitor (RIC-5415)

correct answer is based on OP 7 mode 6 requirements, distractors are unspecified RMS.

(CRO-134-1-5-36)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000029K103	3.6/3.8	MEMORY	BANK	CRO-134-1	2.4.F	T2G2/T2G2	OP 7

27. CONTAINMENT SPRAY 001/ 000026A208/ 3.2/3.7/ COMP/ NEW/ CRO-63-1/ 1.7B/ T2G2/T2G1/ EOP ATT

Given the following:

* Unit 2 has tripped and EOP 5 (LOCA) has been implemented
* RCS Pressure is ~800 PSIA
* SIAS, CSAS and CIS have been verified
* Containment Pressure is at 3.8 PSIG and lowering

What conditions are required to secure Containment Spray?

A. Containment Pressure is maintained <2.8 PSIG by CS flow and SIAS has been RESET .

B. Containment Temperature is maintained <120^{0}F by CACs and SIAS has been RESET.

C. Containment Pressure is maintained <2.8 PSIG by CS flow and SIAS and CSAS have been RESET.

✓D. Containment Temperature is maintained <120^{0}F by CACs and SIAS and CSAS have been RESET.

correct answer is based on EOP specified reset requirements, distractors are permutations of incorrect parameters(containment pressure) or incomplete ESFAS reset(SIAS only).

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000026A208	3.2/3.7	COMP	NEW	CRO-63-1	1.7B	T2G2/T2G1	EOP ATT

28. CONTROL ROD DRIVE 001/ 000001K504/ 4.3/4.7/ MEMORY/ BANK/ SRO-206-1/ 3.0/ T2G1/T2G1/ TECH SPEC

When subcritical in Mode 2, adequate SHUTDOWN MARGIN is determined by:

A. Verifying that CEA Shutdown Group withdrawal is in the correct sequence.

✓B. Verifying that the predicted critical CEA position is within the INSERTION limits of TS 3.1.6

C. Verifying that RCS boron concentration is sufficient to maintain the SHUTDOWN MARGIN requirements of TS 3.1.1

D. Verifying that CEA Regulating Group withdrawal is in the correct sequence.

correct answer is based on TS 3.1.5 (and 3.1.6) bases, distractors are wrong TS requirements related to CEA sequence or wrong SDM mode requirement.
(AOP-1A-06, editorial for ITS)
12/10/98 changed distractor based on validation comment.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000001K504	4.3/4.7	MEMORY	BANK	SRO-206-1	3.0	T2G1/T2G1	TECH SPEC

29. CONTROL ROD DRIVE 002/ 000001A212/ 3.6/ COMP/ BANK/ CRO-203-2/ 1.1/ T2G1/ OP-2

Given the following:
* Reactor startup in progress per OP-2
* Core is at MOC

Select the event that will cause the actual CEA position at criticality to be lower than the calculated position from the Estimated Critical Condition (ECC):

A. The TBV controller setpoint is manually adjusted to 950 PSIA

✓B. Both steam generator levels are raised by 25 inches with AFW flow

C. The pressurizer pressure controller malfunctions to lower RCS pressure to 2000 PSIA

D. A loss of gland sealing steam results in condenser vacuum dropping to 17"Hg

correct answer is based on fundamental knowledge of cause and effects of reactivity related parameters to the actual critical conditions of the reactor, distractors are reverse acting or not directly related to the described effect in the stem.
(reformatted LOR-020600105-006 of OP2.BNK)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000001A212	3.6	COMP	BANK	CRO-203-2	1.1	T2G1	OP-2

30. CR EVACUATION 001/ 00068AK301/ XXX/4.2/ MEMORY/ NEW/ CRO-202-9A/ 1.2.1/ XXXX/T1G1/ AOP 9A

Given the following:

* The fire starts in the control room and AOP 9A is implemented
* Unit 1 RO depresses the Reactor trip pushbuttons at 1CO5 before leaving the control room
* Unit 1 CRO was not in the control room prior to the evacuation

Which ONE of the following actions ensure the Unit is shutdown, with regards to the Main Turbine?

A. AOP 9A directs the CRO to trip the Main Turbine at the front standard.

✓B. AOP 9A directs the RO to trip the Main Turbine at the front standard.

C. AOP 9A directs the TBO to trip the Main Turbine at the front standard.

D. AOP 9A directs the PWS to trip the Main Turbine at the front standard.

correct answer is based on specified actions in AOP 9A, distractors are incorrect permutations.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00068AK301	XXX/4.2	MEMORY	NEW	CRO-202-9A	1.2.1	XXXX/T1G1	AOP 9A

31. CVCS 001/ 000004K206/ 2.6*/ MEMORY/ MODIFY/ CRO-107-1/ 2.11/ T2G1/ AOP 7I

Given the following:
* Unit 1 is at 100% power
* 12 Charging pump is running with 11 and 13 Charging pumps in standby
* a loss of 12 208/120 (1Y10) Volt Instrument bus occurs

Which ONE of the following describes the effect the loss of the instrument bus will have on charging pump operation?

A. 12 Charging pump trips on low suction, 11 and 13 start as backup pumps.
✓B. 11 and 13 Charging pumps start with 12 Charging pump running.
C. Charging pump suction shifts to the BAST's via gravity feeds.
D. Loss of suction to charging pumps due to 1-CVC-501-CV (VCT Outlet) shutting.

correct answer is based on the stated response in AOP 7I, distractors are effects from different buses.
(modified stem and distractors for LOR-006-1-96-003)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000004K206	2.6*	MEMORY	MODIFY	CRO-107-1	2.11	T2G1	AOP 7I

32. CVCS 002/ 000004A232/ 4.3/3.9/ COMP/ NEW/ CRO 107-1/ 2.8/ T2G1/T2G1/ AOP-1A

Given the following:

* Unit 2 at EOC and power reduced to 95% power for waterbox cleaning one hour ago
* Regulating Group 5 CEAs were moved out one step to129 inches for ASI control
* Condenser Water Box cleaning has started and the first waterbox has been returned to service
* 21 CVCS Ion exchanger has been filled with new resin and placed in service
* RO observes RCS temperatures trending upwards for several minutes

Which ONE of the following would explain for the change in RCS temperatures?:

A. Xenon decay from the power reduction for water box cleaning.

B. Starting the Circulating Water pump with clean waterbox.

✓C. Placing an 21CVCS Ion Exchanger in service.

D. Group 5 CEA movement to control the ASI.

correct answer is based on the stated response from AOP 1A, distractors are unrelated parallel plant activities/transients.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000004A232	4.3/3.9	COMP	NEW	CRO 107-1	2.8	T2G1/T2G1	AOP-1A

33. DC DISTRIBUTION 001/ 000063A301/ 2.8*/3.1*/ MEMORY/ BANK/ CRO-202-7J/ 6.1/ T2G2/T2G2/ AOP 7J

An electrical transient has occurred and the following indications are observed at 1C24A:

-- 1Y02 is deenergized
-- 2Y02 is deenergized

Which one of the following buses has been lost?

A. 120 VAC vital bus #12
B. 120 VAC vital bus #22
✓C. 125 VDC vital bus #21
D. 125 VDC vital bus #11

correct answer is based on response stated in AOP 7J, distractors are unrelated electrical busses
(CRO-202-7J-2-02)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000063A301	2.8*/3.1*	MEMORY	BANK	CRO-202-7J	6.1	T2G2/T2G2	AOP 7J

34. DROPPED ROD 001/ 00003AK304/ 3.8*/4.1*/ COMP/ 11/97 NRC/ CRO-202-1B/ 2.0/ T1G2/T1G1/ AOP 1B

Given the following:
* 2 CEAs have dropped into the core
* Pressurizer level decreases to ~195 inches
* Reactor power decreases from 100% to ~85%
* RCS Pressure decreases to ~2225 PSIA

Which ONE of the following is the action required per AOP?

✓A. Trip the Reactor and perform Standard Post Trip Actions.
B. Reduce Turbine load to match Reactor power.
C. Commence a Reactor shutdown to subcritical.
D. Reduce Reactor power to less than 70%.

correct answer is based on stated actions in AOP 1B, distractors are actions for singular CEA misalignments per AOP 1B.
(#81 of 11/97 NRC exam review format)
12/10/98 edited based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00003AK304	3.8*/4.1*	COMP	11/97 NRC	CRO-202-1B	2.0	T1G2/T1G1	AOP 1B

35. ECCS 001/ 000006K103/ 4.2/ COMP/ BANK/ CRO-201-5/ 5.2/ T2G2/ EOP ATT

Using provided reference:

U-1 is at full power when the reactor automatically trips and SIAS actuates. Upon completion of EOP-0 it is determined that a LOCA has occurred. Approximately 10 minutes have elapsed since the event began. RCS pressure has stabilized at 950 PSIA. Actuation of RAS is not imminent.

What is expected HPSI flow in each HPSI injection path assuming SI operates properly and HPSI flow is balanced?

A. 210 gpm
✓B. 225 gpm
C. 240 gpm
D. 255 gpm

correct answer is based on EOP attachment for the stated RCS conditions, distractors are transpositional errors.
(CRO-7-1-5-125)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000006K103	4.2	COMP	BANK	CRO-201-5	5.2	T2G2	EOP ATT

36. ECCS 002/ 000006K302/ 4.3/4.4/ MEMORY/ BANK/ CRO-7-1/ 28.1/ T2G2/T2G2/ FSAR

Which of the following is a design purpose of the Emergency Core Cooling System if concurrent with a LOCA, one vital bus is deenergized?

A. Maintain Peak Cladding Temperature less than 3500°F.

B. Maintain Pressurizer level greater than 101 inches.

C. Limit Cladding Oxidation to 20% of total Cladding Thickness.

✓D. Limit Zr-H_2O reaction to 1% maximum hydrogen generation.

correct answer is based on FSAR and L/P description, distractors are permutations of incorrect limits (3500°F, 20% cladding oxidation) or function (Pzr level>101 inches). (edited CRO bank question SRO-301-15-1-13)
EXTRA QUESTION "Knowledge of the effect that a loss or malfunction of the ECCS will have on the Fuel".

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000006K302	4.3/4.4	MEMORY	BANK	CRO-7-1	28.1	T2G2/T2G2	FSAR

37. EMER PROC ERPIP 002/ 2.4.29/ 2.6*/4.0/ COMP/ NEW/ SRO-217-3/ 3.0/ G2.4/G2.4/ ERPIP 3.0

A call is received on the control room emergency phone extension (911) and the caller identifies himself and reports that a worker in the SFP ventilation room was hurt from a load that pinched his hand and it is cut with heavy bleeding.

The CRS assigns you with making the notification of the appropriate response personnel.

Which ONE of the following is proper notification, per the ERPIP?

A. Activate the Emergency recall pager system for recalling the FST.

B. Sound the emergency alarm for 5 seconds, announce"a personnel emergency exists in the 69 foot Auxiliary Building with a hand injury, Medical department and Decon Team respond". Repeat once.

C. Activate the Emergency Recall pager system for recalling a BGE Physican.

✓D. Sound the emergency alarm for 5 seconds, announce"a personnel emergency exists in the 69 foot SFP ventilation room with a hand injury, First Aid team and Radiation Safety Technician respond". Repeat once.

correct answer is based on ERPIP section 3.0 for notifying plant personnel on a personnel injury in the RCA, distractors are permutations on the time and/or required personnel response.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.4.29	2.6*/4.0	COMP	NEW	SRO-217-3	3.0	G2.4/G2.4	ERPIP 3.0

38. EMER PROC ERPIP 003/ 2.4.20/ 3.3/3.4/ COMP/ NEW/ CRO-107-1/ 2.18.1/ G2.4/G2.4/ EOP BASIS

Given the following:

* Unit 2 has implemented EOP 1 for an uncomplicated trip
* RO observes that VCT pressure is 4 PSIG and VCT level is at 50 inches
* RO commences auto makeup to the VCT per OI 2B

What additional actions are required based on the stated conditions?

A. Verify Pressurizer heaters are ON to equalize boron .

B. Notify Chemistry to sample to BASTs.

✓C. Start or vent any idle charging pumps.

D. Add H^2 to the VCT to maintain 10 to 15 PSIG.

correct answer is based on caution in EOPs to start or vent idle charging pumps to prevent gas binding, distractors are unrelated actions to the caution.
12/10/98 changed 2 distractors based on vlaidation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.4.20	3.3/3.4	COMP	NEW	CRO-107-1	2.18.1	G2.4/G2.4	EOP BASIS

39. EMER PROC ERPIP 004/ 2.4.18/ XXX/3.6/ COMP/ NEW/ SRO-201-8/ 1.1/ XXXX/G2.4/ EOP BASIS

Given the following:

* Unit 1 tripped and EOP 0 is implemented
* The following is the status of the Safety functions as reported by the RO and CRO and reassessed:

  Reactivity -not met,
  RCS Pressure and Inventory-met
  Containment Environment-met
  Vital Auxiliaries- met
  Core/RCS Heat Removal-met
  Rad Levels External to Containment-met

Which ONE of the following is the proper action for the described conditions?

✓A. Direct the RO to determine the success path for Reactivity Safety function using the Resource Assessment Table per EOP 8.

B. Direct the CRO to determine the success paths for all Safety Functions using the Resource Assessment Table per EOP 8.

C. Direct the RO to determine the success paths for Reactivity and direct the CRO to determine the success path for Containment Environment using the Resource Assessment Table per EOP 8.

D. Direct the STA to determine the success paths for Reactivity, Vital Auxiliaries and Core/RCS Heat Removal using the Resource Assessment Table per EOP 8.

correct answer is based on the specified method of EOP 8 implementation introduction, distractors are incorrect implementation permutations.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.4.18	XXX/3.6	COMP	NEW	SRO-201-8	1.1	XXXX/G2.4	EOP BASIS

40. EMER PROC ERPIP 005/ 2.4.4/ XXX/4.3/ COMP/ NEW/ CRO-69-5/ 22/ XXXX/G2.4/ OI 50B

Given the following:
- * Unit 1 at 100% power
- * "UNIT 1 SPDS" alarms at 1C06

Which ONE of the following is the sequence to determine the alarm status?

A. Depress the "ALARM CUTOUT" key, select the alarmed critical safety function box,select the alarm or indication page of the affected critical safety function and the alarmed parameter will be yellow or magenta.

B. Depress the "ALARM ACKNOWLEDGE" pushbutton, select the alarmed critical safety function box,select the alarm or indication page of the affected critical safety function and the alarmed parameter will be blue or green.

✓C. Depress the "ALARM CUTOUT" key, select the alarmed critical safety function box,select the alarm or indication page of the affected critical safety function and the alarmed parameter will be yellow or red.

D. Depress the "ALARM ACKNOWLEDGE" pushbutton, select the alarmed critical safety function box,select the alarm or indication page of the affected critical safety function and the alarmed parameter will be blue or magenta.

correct answer is based on SPDS terminal design, distractors are permutations on the wrong color and/or wrong alarm device.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.4.4	XXX/4.3	COMP	NEW	CRO-69-5	22	XXXX/G2.4	OI 50B

41. EMERGENCY BORATION 001/ 00024AK302/ 4.2/4.4/ COMP/ MODIFY/ SRO-201-6/ 3.0/ T1G1/T1G1/ LESS PLAN

Given the following:
* Unit 2 is in Mode 3 with a SG Tube Rupture event in progress
* EOP 6 is implemented
* RCS is at NOT and NOP

Which ONE of the following is the basis to commence RCS boration prior to lowering RCS temperature below 515°F?

A. Ensures SIAS has initiated properly before the affected SG is isolated.

✓B. Ensures SDM requirements and to compensate for backfill.

C. Ensures the assumed uncontrolled cooldown at 515°F keeps the core subcritical.

D. Ensures RCP trip strategy does not result in diluted areas of RCS.

correct answer is based on the EOP basis description for the boration prior to cooldown to 515°F, distractors are incorrect basis from unrelated events.
(modified stem and distractors SRO-201-6-1-04)
12/10/98 changed distractor based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00024AK302	4.2/4.4	COMP	MODIFY	SRO-201-6	3.0	T1G1/T1G1	LESS PLAN

42. EMERGENCY DG 001/ 000064A205/ 3.1/3.2*/ MEMORY/ BANK/ CRO-48-2/ 18.0/ T2G2/T2G2/ ALM MAN

A recent change to the operation of the 1A DG requires the operator to verify load is greater than the unloaded value to minimize carbon buildup in the cylinders. When the DG is operating in the unloaded range what action is required when this condition is present?

A. An alarm appears on the plant computer CRT near CRO's desk and a cleanout run of at least 2000 KW for 2 hours should be performed.

✓B. A control room alarm is received informing the operator that DG is below minimum load and loads should be started within 8 hours to achieve $\geq$ 1620 KW.

C. Close monitoring by the CRO ensures unloaded operation of the DG does not occur; if minimum load is exceeded the engine must be shutdown and inspected.

D. A control room alarm is received and as long as the time does not exceed 12 hours no further action is required.

correct answer is based on Alarm manual description for alarm SL-53 for window AA01 on 1C18A, distractors are incorrect actions or permutations on the actions of the SL-53 alarm.
(CRO-48-2-23)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000064A205	3.1/3.2*	MEMORY	BANK	CRO-48-2	18.0	T2G2/T2G2	ALM MAN

43. EMERGENCY DG 002/ 000064K201/ 2.7*/ MEMORY/ NEW/ CRO-48-2/ 16/ T2G2/ ALM MAN

Given the following:

* Unit 1 and 2 are at 100% power
* "0C DG" alarms at 1C19
* The CRO directs the OSO respond to the alarm
* OSO reports that "STARTING AIR PRESS LO" alarmed at 0C188 and the indication lights for the compressor handswitch at 0C188 are deenergized.
* The OSO reports the compressor motor appears normal by touch and smell

Which ONE of the following is the correct action?

✓A. Direct the OSO to investigate the breaker trip status at MCC 023.
B. Direct the OSO to investigate the breaker trip status at 07 480 Volt Load Center.
C. Direct the OSO to investigate the breaker trip status at 17 480 Volt Load Center.
D. Direct the OSO to investigate the breaker trip status at MCC 123.

correct answer is based on a spurious breaker trip for the DG air compressor, distractors are permutations of incorrect load center or MCC sources.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000064K201	2.7*	MEMORY	NEW	CRO-48-2	16	T2G2	ALM MAN

44. EQUIPMENT CONTROL 001/ 2.2.3/ 3.1/3.3/ COMP/ NEW/ CRO-102-2/ 4/ G2.2/G2.2/ OI 43A

Given the following:

* Unit 1 turbine startup in progress	* Unit 2 turbine startup in progress
* Unit 1 MT at 1800 RPM	* Unit 2 MT at 560 RPM
* "420 HZ MALFUNCTION" light is on	* "EMERGENCY POWER SUPPLY" light is on

Determine the action required, if any, for each Main Turbine conditions:

✓A. Reset the light on Unit 1, No action required for Unit 2.

B. No action required for Unit 1, reset the light for Unit 2.

C. Trip Unit 1 Main Turbine, trip Unit 2 Main Turbine.

D. Shut down Unit 1 Main Turbine, shut down Unit 2 Main Turbine.

correct answer is based on Unit 1 the light should have been reset as part of MT preps prior to turbine roll and Unit light is normal since the PMG output is not sufficient to provide rated voltage at reduced RPM. Distractors are permutation of the correct answer or wrong actions for indications.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.2.3	3.1/3.3	COMP	NEW	CRO-102-2	4	G2.2/G2.2	OI 43A

45. EQUIPMENT CONTROL 002/ 2.2.13/ 3.6/3.8/ MEMORY/ 11/97 NRC/ SRO204-100/ 22/ G2.2/G2.2/ NO-1-200

During the performance of a routine valve line up while the unit is in Mode 5, a valve listed as OPEN is discovered to be CLOSED.

Which ONE of the following describes the correct action to be taken for this valve line up condition?

A. Since the unit is not in Mode 1 or 2, an entry in the CRO log is required.

✓B. Note the valve position in the "discrepancy section" of the coversheet and notify SRO to evaluate.

C. With concurrence of the CRO, the valve is immediately returned to the recommended position.

D. An abnormal valve position tag is attached to the valve and the step is signed off as completed.

correct answer is based on stated requirements in NO-1-200 section 5.16.H.4, distractors are permutations of incorrect watchstander position or admin requirements. (#2 from 11/97 NRC exam review format)
12/10/98 edited based validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.2.13	3.6/3.8	MEMORY	11/97 NRC	SRO204-100	22	G2.2/G2.2	NO-1-200

46. EQUIPMENT CONTROL 003/ 2.2.24/ 2.6*/3.8/ MEMORY/ BANK/ CRO-63-1-3/ 1.8A/ G2.2/G2.2/ FSAR

Unit 1 is at 100% power when scheduled maintenance on #11 SG Channel C, 1-PT-1013C, will require this transmitter to be taken out of service. Which safety signals, RPS and ESFAS, are affected by the transmitter inoperability?

A. Low SG Pressue trip, AGST(TM/LP) trip and AFW flow to break.

B. Low SG Level trip, SGIS and AFAS.

✓C. Low SG Pressure trip, AGST (TM/LP) trip, SGIS and SGIS Block.

D. Low SG level trip, SGIS and SGIS Block.

correct answer is based on stated PT input to RPS and ESFAS logic, distractors are permutations of incorrect logic input.
(edited CRO-63-1-3-48)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.2.24	2.6*/3.8	MEMORY	BANK	CRO-63-1-3	1.8A	G2.2/G2.2	FSAR

47. EQUIPMENT CONTROL 004/ 2.2.26/ 2.5/ COMP/ BANK/ CRO-113-6/ 7.2/ G2.2/ FH 210

Fuel handling is in progress with a contractor on the refueling machine. The CRO via the RCRO has requested that the FHS immediately investigate a continuous containment sump alarm.

Which ONE of the following represents the correct action?

✓A. Secure fuel handling, move the refueling machine out of the core area,and proceed to the containment basement.

B. Proceed to the containment·basement after directing the refueling machine operator and the RCRO which step to perform.

C. Leave the refueling machine but remain on the 69 foot area of the containment and direct the RFP Upender operator to investigate.

D. Relieve the refueling machine operator and direct him/her to proceed to the containment basement to investigate.

correct answer is based on the admin requirements for FHS overview with non-licensed operator on the refueling machine, distractors are permutations of incorrect actions.

(edited CRO-113-6-4-07)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.2.26	2.5	COMP	BANK	CRO-113-6	7.2	G2.2	FH 210

48. EQUIPMENT CONTROL 005/ 2.2.11/ 2.5/ COMP/ NEW/ SRO204-206/ 5.1/ G2.2/ NO-1-206

Given the following:
- * Unit 1 is in Mode 3, RCS Cooldown to Mode 5 in progress
- * RCS pressure is ~2050 PSIA
- * "CHG HDR *FLOW LO *PRESS LO" alarms repeatedly at 1C07

Which ONE of the following is the proper action for this condition?

A. Notify CRS, remove alarm card and place a yellow dot alarm on alarm window per NO-1-206.

B. Notify CRS, remove alarm card and place a magenta dot on alarm window per NO1-206.

C. Notify CRS, remove alarm card and place a red dot on alarm window per NO-1-206.

✓D. Notify CRS, remove alarm card and place a blue dot alarm window per NO-1-206.

correct answer is based on the requirements of NO-1-206, distractors are permutations of incorrect color dots.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.2.11	2.5	COMP	NEW	SRO204-206	5.1	G2.2	NO-1-206

49. EQUIPMENT CONTROL 006/ 2.2.26/ XXX/3.7/ COMP/ NEW/ CRO-113-6/ 8.1/ XXXX/G2.2/ LESS PLAN

During refueling operations, the Refueling machine operator observes that during the withdrawal of fuel assemblies, the Refueling Machine cable makes noise. Upon closer examination by the FHS, the RFM hoist cable has a few broken strands.

Which ONE of the following must be notified of the adverse condition?

✓A. FHS notifies the Shift Manager and NFM Shift Engineer.

B. FHS notifies the CRS and NFM Shift Engineer.

C. FHS notifies the NFM Shift Engineer and System Engineer.

D. FHS notifies the NFM Shift Engineer and OWC.

The described condition is meant to be indicative of a serious condition that is a immediate fuel safety concern, distractors are notification of persons for non-safety or non-critical concerns.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.2.26	XXX/3.7	COMP	NEW	CRO-113-6	8.1	XXXX/G2.2	LESS PLAN

50. EQUIPMENT CONTROL 007/ 2.2.27/ XXX/3.5/ COMP/ NEW/ CRO-113-6/ 6.3/ XXXX/G2.2/ LESS PLAN

Unit 2 is in Mode 6 with Refueling in progress. The Refueling Machine is at the upender to grapple a spent fuel assembly for insertion into the core. When the Refueling Machine is clear of the upender, the operator starts to lower the upender for transfer to the SFP side. Seconds later, the FHS observes a rapid drop in Refueling pool level and AOP 6E is implemented.

Which ONE of the following is the proper location for the spent fuel assembly on the refueling machine?

A. Continue to the Core area and lower the assembly in its designated location.

B. Continue to the core area and lower the assembly in any open location.

✓C. Stop the Refueling Machine movement and lower the assembly to the bottom of the RFP cavity.

D. Stop the Refueling Machine over the 44 foot ledge and lower the assembly on the ledge.

correct answer is based on the required actions to determine closest and safe location to secure the fuel, distractors are distant locations or locations were fuel would be uncovered by the loss of RFP level.
12/10/98 added "upender" per validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.2.27	XXX/3.5	COMP	NEW	CRO-113-6	6.3	XXXX/G2.2	LESS PLAN

51. ESFAS 001/ 000013K303/ 4.3/ MEMORY/ BANK/ CRO-63-1/ 1.6A/ T2G1/ ALM MAN

The "Containment Pressure Transmitters Isolated" alarm has annunciated on 1C08 due to 1-HS-5313A in the shut position. Which 3 ESFAS signals are potentially affected?

A. SGIS, CSAS, SIAS

B. CVCIS, CSAS, CIS

C. SIAS, SGIS, CIS

✓D. CIS, CSAS, SIAS

correct answer is based on alarm manual description of containment pressure transmitters, distractors are permutations of incorrect logic input or unaffected pressure transmitters.
(CRO-63-1-3-32)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000013K303	4.3	MEMORY	BANK	CRO-63-1	1.6A	T2G1	ALM MAN

52. ESFAS 002/ 000013K401/ 3.9/4.3/ MEMORY/ BANK/ CRO-63-1/ 1.7B/ T2G1/T2G1/ EOP ATT

During recovery from a LOCA on Unit 2, you are directed by the U-2 CRS to reset SIAS from the control room using the EOP procedure. Containment pressure is 2.0 PSIG and Pressurizer pressure is 800 PSIA.

Which ONE of the following is the sequence to properly complete this action?

✓A. Match required handswitches, block PZR Pressure SIAS, and depress both SIAS channel reset pushbuttons.

B. Block PZR Pressure SIAS and depress either SIAS channel reset pushbuttons.

C. Match required handswitches and depress both SIAS channel reset pushbuttons.

D. Block the PZR Pressure SIAS and depress both SIAS channel reset pushbuttons.

correct answer is based on EOP specified sequence, distractors are permutations of the sequence.

(edited CRO-63-1-3-18)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000013K401	3.9/4.3	MEMORY	BANK	CRO-63-1	1.7B	T2G1/T2G1	EOP ATT

53. EXCESS RCS LEAKAGE 001/ CE/A16AA22/ 2.9/ COMP/ BANK/ CRO-202-2A/ 2.0/ T1G3/ AOP-2A

An RCS leak has resulted in implementing AOP-2A (Excess RCS Leakage). What direction from the CRS is provided when RCS leakage exceeds TS 3.4.13 but is within the capacity of one charging pump?

Assume the initial actions to locate the source of leakage has commenced.

A. Evaluate operation of the plant with letdown isolated and operate charging pumps not to exceed a pressurizer level of 225".

✓B. Commence a plant shutdown to COLD SHUTDOWN per OP-3, OP-4, and OP-5.

C. If PZR level cannot be maintained within 15 inches of program level, then trip the reactor and implement EOP-0.

D. Trip the reactor when RCS pressure drops below 2200 PSIA.

correct answer is based on the specified actions in AOP 2A, distractors are unrelated criteria from different parts of the AOP.

(AOP-2A-03)

12/10/98 edited based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
CE/A16AA22	2.9	COMP	BANK	CRO-202-2A	2.0	T1G3	AOP-2A

54. EXCESS RCS LEAKAGE 002/ CE/A16AA22/ XXX/2.9/ COMP/ NEW/ CRO-202-2A/ 2.0/ XXXX/T1G3/ AOP 2A

Given the following:
* Unit 2 is at 100% power
* STP O-27-2 RCS leak rate has been performed with total of 8 GPM
* the source of leakage has been identified

Based on the leakage identification, a power reduction is started to be in Mode 3 in 6 hours per TS 3.4.13 condition B.

Which ONE of the following requires the action of TS 3.4.13 condition B?

A. 2-CVC-515 Letdown isolation body to bonnet gasket leak .

B. PORV-402 leakage to Quench Tank

C. 22 SG primary to secondary leakage at 11 GPD.

✓D. 21 SG tube leakage of .07 GPM

correct answer is based on the AOP 2A required for SG tube leakage of > 100GPD, distractors are leakage that upon being identified are within the Tech Spec limits.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
CE/A16AA22	XXX/2.9	COMP	NEW	CRO-202-2A	2.0	XXXX/T1G3	AOP 2A

55. FIRE PROTECTION 001/ 000086K301/ 2.7/3.2/ APPLIC/ NEW/ NONE/ / T2G2/T2G2/ SA-1-102

Given the following:

* Unit 1 is at 100% power
* IAS 3.7.3 for 13 AFW pump OOS
* Unit 2 is in Mode 5 for planned outage
* Attachment 6 (MEEL) completed for Conduct of Lower Mode Operations with Pressurizer Manway removed

The OWC notifies the Unit 2 control room that 23 AFW pump is to be tagged out for 2 weeks for scheduled maintenance

Which ONE of the following describes the effect this tagout?

A. Unit 1 is effected due to Tech Spec requirements for AFW.

B. Unit 2 is effected due to Tech Spec requirements for AFW.

✓C. Unit 1 will be losing an Appendix R redundant component

D. Unit 2 will be losing an Appendix R redundant component.

correct answer is based on SA-1-102 attachment 3 requirements for redundant Appendix R equipment, distractors are permutations of Tech Spec or wrong unit effect for redundant equipment.

SE and CRO qual cards have no reference to these appendix R requirements

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000086K301	2.7/3.2	APPLIC	NEW	NONE		T2G2/T2G2	SA-1-102

56. FUEL HANDLING ACCD 002/ 00036AK303/ 3.7/ COMP/ NEW/ CRO-113-6/ 6.3/ T1G3/ AOP BASIS

During a pre job brief for a planned Transfer Cask operation (to be moved from the SFP to the cask washdown pit), a review of AOP 6D is performed. It was noted that dropping the Transfer Cask may spill fuel bundles in the Auxiliary Building causing high radiation levels (according to AOP 6D).

Which ONE of the following describes the purpose for the warning in AOP 6D?

A. The Transfer Cask as it is being removed from the SFP is at the design load for the crane until the cask is dewatered in the Cask washdown pit.

B. The Transfer Cask operation can take it over the New Fuel Storage area where a dropped Cask will damage new fuel.

✓C. The Transfer Cask lid may not retain the spent fuel in the Transfer Cask until placed in the Cask washdown pit.

D. The Transfer Cask operation can take it over areas where damage is possible to ESFAS piping and components.

correct answer is based on AOP 6D (warning on page 6), distractors are incorrect travel areas for the planned move or incorrect systems damaged by a dropped cask.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00036AK303	3.7	COMP	NEW	CRO-113-6	6.3	T1G3	AOP BASIS

57. FUEL HANDLING ACCD 003/ 00036AK303/ XXX/4.1/ COMP/ MODIFY/ CRO-134/ 4.0/ XXXX/T1G3/ AOP BASIS

Given the following:

* Unit 2 is in Mode 6 with fuel handling in progress
* The FHS observes the refueling pool level rapidly lowering directs the implementation of AOP 6E (loss of Unit 2 Refueling Pool Level)

Which ONE of the following provides the basis to minimize the containment activity levels and Offsite release to the public?

A. Actuation of CRS to isolate Containment Purge, manually starting 4 CAC in slow speed and opening 4 CAC normal outlet SRW CVs, CIS actuation starting Iodine Filter Fans and Pentration Room Exhaust Fan and operators verify SFP charcoal filters in service.

✓B. Containment Closure, isolation of Containment Purge, manually starting all Iodine Filter Fans, manually starting 4 CAC in fast speed and opening 4 CAC emergency outlet SRW CVs, manually starting both Pentration Room Exhaust Fans.

C. Actuation of CRS to isolate Containment Purge, manually starting 4 CAC in fast speed and opening 4 CAC normal outlet SRW CVs, manually starting Iodine Filter Fans, manually starting a Pentration Room Exhaust Fan and verify SFP charcoal filters in service.

D. Containment Closure, isolation of H^2 Purge, manually starting an Iodine Filter Fan, manually starting 4 CAC in slow speed and opening 4 CAC emergency outlet SRW CVs, manually starting a Pentration Room Exhaust Fan.

correct answer is based on required actions of AOP 6E, distractors are permutations of incorrect actions.
(modified stem and distractors CRO-134-1-5-40)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00036AK303	XXX/4.1	COMP	MODIFY	CRO-134	4.0	XXXX/T1G3	AOP BASIS

58. FUEL HANDLING EQUIP 001/ 000034K402/ 2.5/3.3/ MEMORY/ BANK/ CRO-113-6/ 2.0D/ T2G3/T2G2/ FH 210

To perform movement of fuel assemblies seated within the reactor pressure vessel, the **MINIMUM** refueling pool level per Tech Specs must be at least 23 feet above the top of the fuel seated in the core. This corresponds to an indicated level of_______. Fuel handling and operating procedures require that an alarm band of______ feet from RFP level to warn the control room and FHS of an increase or decrease in RFP level.

A. 57.7 feet, 0 ± 0.2 feet

B. 56.7 feet, 0 ± 0.5 feet

C. 57.7 feet, 0 ± 0.5 feet

✓D. 56.7 feet, 0 ± 0.2 feet

correct answer is based on the stated references, distractors are permutations on the setpoints.
(CRO-113-6-4-09)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000034K402	2.5/3.3	MEMORY	BANK	CRO-113-6	2.0D	T2G3/T2G2	FH 210

59. FUNCTIONAL RECOVERY 001/ CE/E09EK22/ 3.7/4.2/ APPLIC/ NEW/ SRO-201-8/ 2.5/ T1G2/T1G2/ EOP BASIS

Given the following:

* Unit 2 has tripped and EOP 0 implemented
* EOP 0 Safety functions completed were:
  * Reactivity
  * Vital Auxiliaries
  * Rad Level External to Containment
  * All other Safety Functions were not met
* CRS directs implementation of the Functional Recovery Procedure EOP 8

Which ONE of the following is the appropriate implementation method for EOP 8?

✓A. Evaluate PIC, HR and CE Safety functions success paths in order as a minimum.
B. Evaluate HR, PIC and CE Safety functions success paths in order as a minimum.
C. Evaluate All Safety functions success paths in any order as directed by the CRS.
D. Evaluate recommended safety function success paths based on STA input.

correct answer is based on the strategies in EOP 8 basis, distractors are permutations of incorrect strategies.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
CE/E09EK22	3.7/4.2	APPLIC	NEW	SRO-201-8	2.5	T1G2/T1G2	EOP BASIS

60. HI RCS ACTIVITY 001/ 00076AK305/ 2.9/ MEMORY/ BANK/ CRO-7-1/ 7.0/ T1G1/ TECH SPEC

\What is the basis for reducing RCS Tavg to < 500°F if RCS activity limits are exceeded?

A. Prevent the iodine spiking phenomenon

✓B. Lower the saturation pressure of the RCS below the lift setpoint of the ADVs and MSSVs.

C. Minimize fuel damage

D. Allow chemistry to determine extent of fuel damage

correct answer is based on the tech Spec basis description, distractors are unrelated effects.

(SRO-332-1-1-21)

12/10/98 edited based on validation comments

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00076AK305	2.9	MEMORY	BANK	CRO-7-1	7.0	T1G1	TECH SPEC

61. HYDROGEN RECOMBINER 001/ 000028K503/ 2.9/ COMP/ MODIFY/ SRO-201-3/ 12.0/ T2G3/ EOP BASIS

During LOCA (EOP 5), hydrogen generation is a concern in maintaining the containment as a barrier to fission product releases during the event.

Select the time frame and the sources where hydrogen generation occurs:

A. Within minutes of LOCA initiation from aluminum and zinc sources.

✓B. Within a few hours of LOCA initiation from aluminum and zinc sources.

C. Within minutes of LOCA initiation from aluminum and steel sources.

D. Within a few hours of LOCA initiation from aluminum and steel sources.

correct answer is from the EOP basis, distractors are permutations of wrong sources or time frames.
(modified SRO-201-3-1-17)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000028K503	2.9	COMP	MODIFY	SRO-201-3	12.0	T2G3	EOP BASIS

62. INADEQUATE CORE CLG 001/ 00074EK206/ 3.5*/3.6/ MEMORY/ MODIFY/ SRO-201-3/ 2.0/ T1G1/T1G1/ EOP BASIS

Given the following:

* Unit 1 has tripped and EOP 0 has been completed
* EOP 3 has been diagnosed and implemented
* The CRS directs that the RCPs to be tripped

Which one of the following is the reason for tripping all reactor coolant pumps?

A. Prevents RCP cavitation when the RCS reaches saturation conditions from rapid cooldown to Condensate Booster pump injection.

✓B. Reduces RCP heat input to the RCS, increasing the SG water inventory effectiveness.

C. Minimizes RCP seal damage from SIAS isolating bleed off flow to VCT.

D. Reduces RCP motor damage from steam when once-through core cooling is initiated

correct answer is from EOP basis, distractors are unrelated effects.

(SRO-201-3-1-20, added ADV/TBV effects)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00074EK206	3.5*/3.6	MEMORY	MODIFY	SRO-201-3	2.0	T1G1/T1G1	EOP BASIS

63. INCORE TEMP 001/ 000017K301/ 3.5*/3.7*/ MEMORY/ BANK/ CRO-64-1/ 3.1.1/ T2G1/T2G1/ EOP 2

While operating in mode 3 on natural circulation, how many CETs should be read as a minimum to ensure consistency with Th?

A. One per quadrant

B. Two per quadrant

✓C. Two

D. One

correct answer is based on standard note in EOPs, distractors are permutations of incorrect actions.
(CRO-64-1-4-09)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000017K301	3.5*/3.7*	MEMORY	BANK	CRO-64-1	3.1.1	T2G1/T2G1	EOP 2

64. INOP/STUCK ROD 001/ 00005AK101/ 3.1/3.8/ COMP/ NEW/ CRO-302-6/ 1.11/ T1G1/T1G1/ OP 3

Given the following:

* Unit 2 is at EOC and at 85% power and steady
* Regulating Group 5 CEAs are at ~125 inches
* System Engineer discovers and reports Regulating Group 5 CEA #1 is untrippable
* AOP 1B is implemented and a rapid power reduction per OP 3 is commenced

Determine the effect of plant transient on the axial power distribution:

✓A. As Reactor power is decreased, axial power will shift towards the upper region of the core.

B. As Reactor power is decreased, axial power will shift towards the lower region of the core.

C. As Reactor power is decreased, axial power will not change towards either upper or lower region of the core.

D. As Reactor power is decreased, axial power will initially shift to the lower region then shift to the upper region.

correct answer is based on expected effect of power change on the axial power distribution at EOC, distractors are permutations of incorrect expected effects.
Basis of question is tied to LO 1.13 in body of lesson plan

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00005AK101	3.1/3.8	COMP	NEW	CRO-302-6	1.11	T1G1/T1G1	OP 3

65. INSTRUMENTATION 001/ 000016A301/ 2.9*/2.9*/ MEMORY/ BANK/ CRO-103-1/ 1.5/ T2G2/T2G2/ OP 3

Which ONE of the following describes what normally starts to shift the Full Range Digital Feedwater Control System to the High Power Mode of operation during plant startup?

A. When the High Power Mode button is depressed.

✓B. When the average of Reactor Reg Channels X and Y indicate greater than or equal to 17% power.

C. When reactor power has been greater than or equal to 19% power for 5 minutes.

D. When the average of the Wide Range NI channels A thru D indicate greater than 15% power.

correct answer is based on the stated response in OP 3, distractors are permutations of incorrect NI instruments or setpoints.
(CRO-103-1-2-36)
12/10/98 edited based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000016A301	2.9*/2.9*	MEMORY	BANK	CRO-103-1	1.5	T2G2/T2G2	OP 3

66. LARGE BREAK LOCA 001/ 00011EK202/ 2.6*/2.7*/ MEMORY/ BANK/ SRO-201-5/ 1.3/ T1G2/T1G1/ FSAR

Which one of the following describes the design basis core heat removal process during a large break LOCA?

A. HPSI injection provides makeup and heat is removed via natural circulation flow to the S/Gs

✓B. HPSI pumps, LPSI pumps and the SITs provide makeup and heat is removed via flow out the break

C. LPSI pumps and the SITs provide makeup and heat is removed via forced flow to the S/Gs

D. HPSI pumps and CS pumps provide makeup and heat is removed via flow out the break

correct answer is based on EOP basis and FSAR analysis, distractors are permutations on incorrect plant response.
(SRO-201-5-1-06)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00011EK202	2.6*/2.7*	MEMORY	BANK	SRO-201-5	1.3	T1G2/T1G1	FSAR

67. LIQUID RADWASTE 002/ 000068K504/ 3.2/3.5/ COMP/ NEW/ FUND QUALS/ N/A/ T2G1/T2G1/ OI 17C-1

Given the following:
- Unit 1 is at 100%
- Unit 2 is in Mode 3 heating up to 532°F
- 21 Degasifier vacuum pump accumulator level control is erratic
- ABO is filling the Degasifier vacuum pump accumulator per OI 17C -1

Which ONE of the following is the result, if any, of opening the level transmitter vent to atmosphere during the accumulator fill?

A. No effect since the accumulator discharges directly to atmosphere.

✓B. Release of radioactive gases from accumulator vent from the Waste Gas Surge Tank.

C. Release of water from the accumulator during vacuum pump startup during Unit 1 diversion.

D. Release of water from the accumulator during vacuum pump startup during Unit 2 diversion.

correct answer is based on specified actions in OI 17c-1, distractors are permutations of incorrect system responses.
no prac facs are listed for this item in either SE or CRO qual manuals

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000068K504	3.2/3.5	COMP	NEW	FUND QUALS	N/A	T2G1/T2G1	OI 17C-1

68. LIQUID RADWASTE 003/ 000068K107/ 2.7/2.9/ COMP/ NEW/ FUND QUALS/ N/A/ T2G1/T2G1/ OI 17D

Given the following:

* Unit 2 is defueled
* Instrument Air is tagged out for LLRT testing
* 2-SI-4150-CV and 2-SI-4151-CV indicate OPEN
* Both CS pumps are in PTL
* Safety Tagger calls the control room to notify that he will be tagging out and draining Component Cooling to the RCPs
* Shortly thereafter, "CNTMT NORMAL SUMP LVL HI" alarms at 2C10

Which ONE of the following is the correct operator actions per OI 17D for the conditions?

A. Ensure an Operator is stationed in 21 ECCS Pump Room, drain the containment sump using EAD 5462 until drained, shut EAD 5462.

B. Verify 21 ECCS Pp Rm sump pumps in AUTO, drain the containment sump using EAD 5462 and 5463 for at least 5 seconds, shut EAD 5462 and 5463.

C. Ensure an Operator is stationed in 22 ECCS Pump Room, drain the containment sump using EAD 5463 until drained, shut EAD 5463.

✓D. Verify 22 ECCS Pp Rm sump pumps in AUTO, drain the containment sump using EAD 5462 and 5463 for at least 5 seconds, shut EAD 5462 and 5463.

correct answer is based on OI 17 D (section 6.31 memory use), distractors are permutations of incorrect room or using only one drain valve.
12/10/98 edited based on validation comments.
12/11/98 edited based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000068K107	2.7/2.9	COMP	NEW	FUND QUALS	N/A	T2G1/T2G1	OI 17D

69. LOSS OF CCW 001/ 00026AA206/ 2.8*/3.1*/ COMP/ NEW/ CRO-106-1/ 8.0/ T1G1/T1G1/ ALM MAN

Given the following:
- * Unit 1 is at 100% power
- * "RCP AUXILIARIES STATUS PANEL" alarms
- * "CCW FLOW LO" alarms
- * RO reports increasing temperatures on all RCPs from the plant computer trends
- * CRO reports that a CC Containment Cooling isolation CV is SHUT

Which ONE of the following may result in component damage?

✓A. RCP Controlled Bleedoff temperature of 225°F.

B. RCP Upper Guide bearing temperature of 190°F.

C. RCP Downward Thrust bearing temperature of 190°F.

D. RCP Seal cavity temperature of 195°F.

correct answer is based on the alarm manual response, distractors are permutations of in spec parameters

12/10/98 changed question based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00026AA206	2.8*/3.1*	COMP	NEW	CRO-106-1	8.0	T1G1/T1G1	ALM MAN

70. LOSS OF COND VAC 001/ 00051AA202/ 3.9/4.1/ MEMORY/ 11/97 NRC/ CRO-202-7G/ 1.3.1/ T1G1/T1G1/ AOP 7G

A loss of condenser vacuum occurred on Unit 1 with reactor power at 60%. The operators are reducing power and are able to maintain condenser vacuum at 24 inches Hg.

Which ONE of the following indicates the power level at which the turbine will have to be tripped if vacuum can NOT be increased to greater than 25 inches Hg?

A. 88 MWE
B. 176 MWE
✓C. 270 MWE
D. 440 MWE

correct answer is based on AOP 7G specified action, distractors are permutations of unrelated criteria.
(#104 of 11/97 NRC exam review format)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00051AA202	3.9/4.1	MEMORY	11/97 NRC	CRO-202-7G	1.3.1	T1G1/T1G1	AOP 7G

71. LOSS OF CONT INTEG 001/ 00069AK203/ 2.8*/2.9/ APPLIC/ NEW/ FUND QUALS/ N/A/ T1G1/T1G1/ AOP 4A

Given the following:

* Unit 1 is in Mode 4 with heatup to 532°F in progress
* The ABO performing a Containment tour reports the Personnel Airlock interlock mechanism is broken.

Determine the immediate action required based on plant conditions:

A. Direct the ABO to lock the inner Personnel Airlock door and remain in the area until a guard is posted.

✓B. Direct the ABO to verify a Personnel Airlock door is SHUT and maintain one door shut during ingress/egress.

C. Notify the CRS for an operability determination per the Technical Requirements Manual.

D. Notify the CRS for an operability determination per NO-1-114 (Containment Closure)

correct answer is based on the actions of AOP 4a and ITS 3.6.2, distractors are permutations of actions directly related to ITS directed actions within 1 hour (condition B).

new AOP as of 8/98, no lesson plan identified, however ITS requires action within 1 hour.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00069AK203	2.8*/2.9	APPLIC	NEW	FUND QUALS	N/A	T1G1/T1G1	AOP 4A

72. LOSS OF DC 001/ 00058AA103/ 3.1/3.3/ MEMORY/ BANK/ CRO-202-7J/ 4.1/ T1G2/T1G2/ AOP 7J

While operating U-2 at 100% power, a loss of 125 vdc bus #11occurs. Which one of the following actions must be taken to ensure a reactor/turbine trip?

A. No actions are required as the loss of this bus does not affect automatic tripping of the turbine/reactor.

B. The turbine must be manually tripped at 2C02 at the same time the reactor is manually tripped from 2C05.

✓C. The turbine must be tripped from the front standard at the same time the reactor is tripped from 2C05.

D. The turbine must be tripped from the cable spreading room at the same time the reactor is tripped from 2C05.

correct answer is based on specified actions in AOP 7J, distractors are permutations of incorrect locations or logic.

(AOP-7J-03)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00058AA103	3.1/3.3	MEMORY	BANK	CRO-202-7J	4.1	T1G2/T1G2	AOP 7J

73. LOSS OF INST AIR 001/ 00065AK308/ XXX/3.9/ MEMORY/ NEW/ CRO-202-7D/ 6.1/ XXXX/T1G2/ AOP 7D

Given the following:

* Unit 2 is at 100% power
* CRO reports Instrument Air pressure is 80 PSIG and lowering
* When Instrument Air pressure reaches 40 PSIG, The reactor is tripped and EOP 0 is implemented

Which ONE of the following is the basis for the reactor trip?

✓A. Both Main Feedwater Regulating Valves cannot control SG water levels.
B. Both CCW isolation valves to the containment isolated cooling to the RCPs.
C. All SRW Turbine Building isolation valves isolated cooling to the Main Generator
D. Condensate Precoat Bypass valve failed closed isolating condensate flow to CBPs.

correct answer is based on AOP 7D note 2.h (page 5), distractors are components that fail shut on loss of instrument air, but don't require a reactor trip per AOP 7D.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00065AK308	XXX/3.9	MEMORY	NEW	CRO-202-7D	6.1	XXXX/T1G2	AOP 7D

74. LOSS OF MFW 001/ 000054EK32/ 3.2/ COMP/ MODIFY/ CRO-103-1/ 2.3/ T1G2/ EOP 0

Given the following:

* Unit 1 had a loss of MFW which resulted in a automatic reactor trip
* Both SG levels are ~ -100" when MFW capability is restored in EOP 0

Select the reason for AFW to be used to restore SG levels to ~0":

✓A. Prevent a severe water hammer which may occur in the main feed ring.
B. AFW will fill the SGs slower which limits the cooldown of the RCS.
C. MFW can result in an overfeed condition which is a reactivity concern.
D. Prevent a thermal shock to the SG tube sheet to ensure tube integrity.

correct answer is based on specified actions in EOP 0 alternate actions for loss of MFW to prevent a water hammer in the SG feed ring, distractors are permutations of incorrect reasons for AFW system use.
(LOR-020320305-003)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000054EK32	3.2	COMP	MODIFY	CRO-103-1	2.3	T1G2	EOP 0

75. LOSS OF MFW 002/ 000054EK32/ XXX/3.7/ MEMORY/ BANK/ SRO-201-3/ 2.0/ XXXX/T1G2/ EOP BASIS

Assume that a loss of main feedwater flow has resulted in low SG levels. Why must auxiliary feedwater be used to restore SG levels to 0 inches before re-establishing main feedwater flow to the SGs?

✓A. Severe water hammer may occur when steam voids collapse in the main feed ring.
B. Feedwater isolation valves are prevented from opening unless SG level is greater than -26 inches.
C. The SG downcomer must be refilled slowly to avoid thermal shock to the tube sheet.
D. Severe water hammer may result due to thermal shock to the metal of the main feed ring.

correct answer is based on EOP basis document, distractors are permutations of incorrect reasons (thermal shock to tubesheet and feed ring) or design (FW isolation) (LOR-020320305-003)

12/11/98 substituted question (LOSS OF MFW 001) based on validation comments

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000054EK32	XXX/3.7	MEMORY	BANK	SRO-201-3	2.0	XXXX/T1G2	EOP BASIS

76. LOSS OF OFFSITE 002/ 00056AK101/ 3.7/ MEMORY/ BANK/ SRO-201-2/ 8.0/ T1G3/ EOP 2

Which one of the following describes the reason for an assessment of secondary water sources to be performed in EOP 2 when offsite power will not be promptly restored?

A. Tech Spec Action statement for 12 CST may need to be entered.

✓B. Condensate inventory dictates how long a plant cooldown can be delayed.

C. Tech Spec Action statement for AFW system may need to be entered.

D. Condensate inventory is used to determine whether TBVs or ADVs will be used for cooldown.

correct answer is based on the EOP 2 basis, distractors are unrelated actions (Tech Spec) or incorrect logic (use of TBVs (MSIVs are shut in EOP2)).
(editorial changes to SRO-201-2-1-19)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00056AK101	3.7	MEMORY	BANK	SRO-201-2	8.0	T1G3	EOP 2

77. LOSS OF OFFSITE 003/ 00056AK101/ XXX/4.2/ APPLIC/ NEW/ SRO-201-2/ 12.0/ XXXX/T1G3/ EOP 2

Given the following:

* Unit 1 is stabilized at 100% power after completion of Refueling Outage PSTP
* Unit 2 is at 100% power for the past 100 days
* A loss of Offsite power has occurred
* EOP 0 is implemented with a transition to EOP 2 on both Units.
* Block step Maintaining Natural Circualtion Flow Verification is implemented on both Units
* Tc is being controlled manually at 532°F on both Units
* Condenser vacuum is 20 inches Hg on both Units

Which ONE of the following describes the expected plant responses?

A. U1 ADV controller output signal is greater than U2 ADV controller output signal.
B. U1 TBV controller output signal is greater than U2 TBV controller output signal.
✓C. U1 ADV controller output signal is less than U2 ADV controller output signal.
D. U1 TBV controller output signal is less than U2 TBV controller output signal

correct answer is based on the Unit 1 decay heat load is less than Unit 2 decay heat load requires ADV position expected to be less on Unit 1 than Unit 2, distractors are permutations of reversed ADV effects or TBVs are isolated with MSIVs shut in EOP 2.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00056AK101	XXX/4.2	APPLIC	NEW	SRO-201-2	12.0	XXXX/T1G3	EOP 2

78. LOSS OF RC MAKEUP 001/ 00022AA201/ XXX/3.8/ APPLIC/ NEW/ CRO-202-2A/ 1.0/ XXXX/T1G2/ AOP 2A

Given the following:

* AOP 2A on unit 2 is implemented with the following:
  - STA estimated the RCS leak rate to be ~40 gpm
  - Containment environment parameters are steady
  - Preliminary checks have determined no observable SG tube leakage
  - Letdown is isolated with 21 Charging pump running
  - RCS pressure is 2250 PSIA
  - Charging header pressure is 2150 PSIA

Which ONE of the following is the assumed leakage location based on these conditions?

A. Either SG until chemistry reports on the SG sample results.

B. Charging header downstream of 2-CVC-269 MOV (Chg hdr to aux HPSI).

C. RCP pump seal to Component Cooling system.

✓D. Charging header downstream of 21 Charging pump.

correct answer is based on the indications described in AOP 2A for a charging header leak, distractors are incorrect locations based on stated conditions or too specific not supported by the stated conditions (header leak downstream of 2-CVC-183).
12/20/98 modified distractor (MOV-269) based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00022AA201	XXX/3.8	APPLIC	NEW	CRO-202-2A	1.0	XXXX/T1G2	AOP 2A

79. LOSS OF SALT WATER 001/ 00062AA107/ 2.9/3.0/ COMP/ NEW/ CRO-113-2/ 12.0/ T1G1/T1G1/ OI 29

Given the following:
- * Unit 1 and 2 are in Mode 5
- * Unit 1 and 2 Salt Water Systems are lined up on the Emergency Overboard

Which ONE of the following describes the how the minimum/maximum flow requirements for the applicable Salt Water pumps are met?

✓A. Unit 1 automatic operation of 12A/B SRW HX bypass valve, Unit 2 by manual throttling of 22 or 23 SW pump discharge valve.
B. Unit 1 automatic operation of 11A/B SRW HX bypass valve, Unit 2 by manual throttling of 21 or 23 SW pump discharge valve.
C. Unit 1 automatic operation of 12A/B SRW HX bypass valve, Unit 2 by manual throttling of Emergency Overboard Control Valve.
D. Unit 1 automatic operation of 11A/B SRW HX bypass valve, Unit 2 by preset throttling by the Emergency Overboard header orifice.

correct answer is based on the specified actions in OI 29, distractors are permutations of incorrect system design between unit 1 (12 SW Header is the supply header for emergency overboard operation) or throttling the emergency overboard CV (full open).

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00062AA107	2.9/3.0	COMP	NEW	CRO-113-2	12.0	T1G1/T1G1	OI 29

80. LOSS OF SALT WATER 002/ 00062AA201/ XXX/3.5/ COMP/ NEW/ CRO-202-7A/ 3.1/ XXXX/T1G1/ AOP 7A

Given the following:

* Unit 2 is at 100% power
* 21 and 22 Salt Water headers in normal lineup
* "22 SW HDR PRESS LO" alarms at 2C13
* CRO reports that 22 SW header pressure indicates 8 PSIG
* CRS directs the implementation of AOP 7A
* CRO verifies the CC and SRW HX saltwater outlet valves in their normal positions
* OSO verifies the sluice gates on 22 SW pump are open and Emergency Overboard valve is shut.

Which one of the following is the proper action to isolate a suspected leak on 22 SW header?

A. SHUT the CC and SRW HX saltwater outlet valves and observe 22 SW header pressure greater than 10 PSIG.
B. Shift Salt Water lineup to the Emergency Overboard and observe 22 SW header pressure greater than 10 PSIG.
C. Start 23 Salt Water pump, stop 22 Salt Water pump and observe 22 SW header pressure greater that 10 PSIG.
✓D. Stop 22 Salt Water pump to isolate the suspected leak.

correct answer is based on stated actions of AOP 7A, distractors are permutations of unstated actions.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00062AA201	XXX/3.5	COMP	NEW	CRO-202-7A	3.1	XXXX/T1G1	AOP 7A

81. LOSS OF SDC 001/ 000025G449/ 4.0/4.0/ COMP/ BANK/ CRO-203-5A/ 11/ T1G2/T1G2/ AOP 3B

Given the following:

* Unit-1 is in Mode 5
* #11 LPSI pump is in service providing shutdown cooling.
* The shutdown cooling return valves are open.
* The RCS is being drained below the midplane of the hot legs for maintenance.
* 11 LPSI pump amps, discharge pressure and flow are fluctuating.

Which one of the following actions should be taken in this situation?

A. Secure draining of the RCS and raise vessel level until LPSI pump flow comes back up.

B. Place the LPSI pumps in pull-to-lock, drain the vessel to the desired level, then restart a LPSI pump.

✓C. Stop the running LPSI pump and place in pull-to-lock.Secure draining and raise reactor vessel level.Vent and restart a LPSI pump.

D. Stop the running LPSI pump, secure draining the RCS and start the standby LPSI pump.

correct answer is based on the specified actions of AOp 3B, distractors are permutations of incorrect actions.
(AOP-3B-06A

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000025G449	4.0/4.0	COMP	BANK	CRO-203-5A	11	T1G2/T1G2	AOP 3B

82. LOSS OF SR NIS 001/ 00032AA202/ 3.6/3.9/ COMP/ NEW/ CRO-113-6/ 8.1/ T1G2/T1G2/ OP-7

Given the following:

* Unit 2 is in Mode 6 with refueling in progress, core on load is complete
* CEA swaps are being performed per the applicable fuel handling procedure
* RCRO observes that Channel A and B WRNI indicate steady at 10 CPS and Channel C WRNI indicates ~1 CPS and decreasing after a Shutdown CEA insertion

What response is required, if any, to the plant conditions?

A. Channel A and B WRNI are inoperable, notify the CRS.
B. Channel A and B WRNI are operable, no action is needed.
C. Channel C WRNI is seeing the effect of the Shutdown CEA insertion.
✓D. Channel C WRNI has failed, notify the FHS and NFM.

correct answer is based on a qualitative channel check with Channel C failing the check, distractors are permutations on unexpected effects for operable detectors or CEA insertion.

12/10/98 changed distractor based on validation comment

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00032AA202	3.6/3.9	COMP	NEW	CRO-113-6	8.1	T1G2/T1G2	OP-7

83. LOSS OF VITAL AC 001/ 000057G449/ 4.0/4.0/ COMP/ BANK/ CRO-34-1/ 2.0/ T1G1/T1G1/ AOP 7I

Unit 1 is in Mode 1. AFAS Sensor Channel "ZE" has been de-energized for maintenance per the OI. While the maintenance is ongoing, a loss of 120V Vital AC Bus 13 occurs. What best describes the response of AFAS?

A. No effect on system operation other than alarms.

✓B. AFAS "A" and AFAS "B" actuation occurs.

C. Only AFAS "A" actuation occurs.

D. Sensor logic is reduced to 1 out of 2 to generate an AFAS.

correct answer is based on the specified response of AOP 7I, distractors are permutations of effects on unrelated electrical bus malfunctions.
(CRO-34-1-3-28)
12/10/98 edited based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000057G449	4.0/4.0	COMP	BANK	CRO-34-1	2.0	T1G1/T1G1	AOP 7I

84. MAIN FEEDWATER 002/ 000059A403/ 2.9*/ MEMORY/ BANK/ CRO-103-1/ 1.6A/ T2G1/ LESS PLAN

Following a U-1 turbine trip, what is the response of the Main Feed Valves (MFVs)?
Assume reactor power is at 12% when turbine trips

A. MFVs ramp shut at specified rate for 20 seconds and then contact is opened and MFVs shut fully.

B. The Controller output signal is grounded to shut MFVs and after 20 seconds contact opens and MFVs shut fully.

C. Controller output signal goes to maximum to open BFVs fully as steam flow is reduced when main stop valves shut.

✓D. MFVs remain shut with a -5.0 % demand signal and BFVs continue to operate to control SG levels.

correct answer is based on the description in lesson plan CRO-103-1 (handout 12) with control system in the low power mode, distractors are permutations of control system in the high power mode or incorrect logic.
(CRO-103-1-2-07)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000059A403	2.9*	MEMORY	BANK	CRO-103-1	1.6A	T2G1	LESS PLAN

85. MAIN FEEDWATER 003/ 000059A306/ 3.2*/3.3/ MEMORY/ BANK/ CRO-63-1/ 1.7D/ T2G1/T2G1/ EOP ATTCH

Given the following:
- * Unit 1 has tripped and EOP 0 is implemented
- * "ACTUATION SYS SGIS TRIP" and "ACTUATION SYS CSAS TRIP" alarms annunciate at 1C08

Which one of the following plant components receive both a SGIS and CSAS signals from ESFAS?

A. Condensate pumps, Condensate Booster pumps, Heater Drain pumps and MSIVs.
✓B. Heater Drain pumps, SGFPs, MFIVs, and MSIVs.
C. SGFPs, CS pumps, SG Blowdown CVs, and MSIVs.
D. Condensate Booster pumps, SG Blowdown CVs, MFIVs, and SGFPs.

correct answer is based on EOP attachment 3 and 7 for SGIS and CSAS actuated components, distractors have wrong permutations.
(editorial on CRO-63-1-3-44)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000059A306	3.2*/3.3	MEMORY	BANK	CRO-63-1	1.7D	T2G1/T2G1	EOP ATTCH

86. MAIN/RHT STEAM 001/ 000039K501/ 2.9/3.1/ COMP/ NEW/ CRO-203-1/ 2.0/ T2G2/T2G2/ OP 1

Given the following:

* Unit 1 heatup in progress per OP 1
* RCS Tc is 450°F
* RCS Pressure is 1750 PSIA
* Panel 1T22 MS Line Drain handswitches are in the NORMAL operating position per the valve lineup

Describe the actions and effect, if any, with the drain valves in the NORMAL position:

A. None, this is the expected position of the Drain Valves at 1T22 for plant heatup
B. Place drain valves in the STARTUP position to minimize corrosion from air/non-condensible gases
C. OPEN Main Steam Line Drain Valves (1-HS-6622) at 1C02 to continue heatup
✓D. Place drain valves in the STARTUP position to prevent steam/water hammers

correct answer is based on the specified positions in OP 1 to ensure condensate is removed from steam lines during plant heatup, distractors are incorrect effects or incorrect positions.

12/11/98 edited based on validation comments

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000039K501	2.9/3.1	COMP	NEW	CRO-203-1	2.0	T2G2/T2G2	OP 1

87. NATURAL CIRC 001/ CE/A13AA13/ 3.2/ COMP/ NEW/ CRO-103-2/ 4.2/ T1G1/ LESS PLAN

Given the following:

* Unit 2 is in Mode 3 with Total Loss of Feedwater
* EOP 3 is implemented, natural circulation has been verified
* Both SG water levels are -250 inches

Evaluate the effect on RCS temperatures as SG water level continues to lower during natural circulation but before cooldown commences:

A. Tave is constant as Th-Tc increases.

✓B. Tave will increase as Th and Tc increase.

C. Tave is constant as Th-Tc decreases.

D. Tave will decrease as Th and Tc decrease.

correct answer is based on lesson plan (page 46), distractors are incorrect RCS temperature responses to the start of an overheating condition.
12/10/98 edited based on validation comment.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
CE/A13AA13	3.2	COMP	NEW	CRO-103-2	4.2	T1G1	LESS PLAN

88. NATURAL CIRCULATION 001/ CE/A13AA13/ XXX/3.8/ APPLIC/ NEW/ SRO-201-2/ 4.0/ XXXX/T1G1/ EOP 2

Given the following:

* ~ 10 minutes ago a Loss of Offsite power occurred
* EOP 2 is implemented on Unit 1
* MSIVs and SG Blowdown valves have been shut
* Shutdown sequencer loads have been verified
* Establishment of RCS heat sink is in progress
* AFW flow is at the auto initiation setpoint for both SGs
* CRO reports the following parameters:

11 SG pressure is 850 PSIA	12 SG pressure is 925 PSIA
Tc is 532 °F and steady	Tc is 536°F and slowly increasing
11 SG is steady at -30 inches	12 SG is at -100 inches and slowly rising
11 ADV indicates intermediate	12 ADV indicates shut

As CRS, which ONE of the following is the proper direction to the CRO for plant conditions?

A. Direct the CRO to OPEN the TBVs further to balance natural circulation flow in 12 RCS loop with 11 RCS loop.

B. Direct the CRO to increase AFW flow to 12 SG to restore level to balance natural circulation flow in both loops .

C. Direct the CRO to shift the ADV controller to AUTO to maintain SG pressure 850 to 920 PSIA and Tc 525 to 535°F.

✓D. Direct the CRO to shift to local manual operation on 12 ADV and maintain 12 SG balanced with 11 SG pressure and loop Tc.

correct answer is based on the alternate actions required for control room operation of 12 ADV becoming ineffective and restore RCS parameters to stated range, distractors are actions that will not compensate for the impairment of 12 ADV from a common controller or system not used in the stated conditions (TBVs).

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
CE/A13AA13	XXX/3.8	APPLIC	NEW	SRO-201-2	4.0	XXXX/T1G1	EOP 2

89. NATURAL CIRCULATION 002/ CE/A13AK22/ XXX/3.6/ COMP/ 11/97 MOD/ CRO-201-4/ 7/ XXXX/T1G1/ EOP BASIS

Given the following:

* A SBO has occurred
* EOP 7 is implemented on Unit 1 and EOP 8 on Unit 2
* The following parameters exist on both Units:

Unit 1 subcooled margin is 40°F	Unit 2 subcooled margin is 0°F
Loop Tc's are 530°F and lowering	Loop Tc's are 516°F and erratic
PZR level is 110 inches	RVLMS last indicating light is ON
	SIAS actuation has been verified

Which ONE of the following is used to verify sufficient natural circulation flow to maintain Core/RCS Heat Removal safety function for Unit 2?

A. HPSI and LPSI at required flow rate.

B. Steaming the SG with the TBVs.

✓C. CETs indicate less than superheat.

D. Both Th's consistent with CETs.

correct answer is based on stated indications for 2 phase natural circulation flow per EOP 8 basis document, distractors are indications for single phase natural circulation or unstated basis per EOP 8 basis document.
(modified stem and 2 distractors for #105 of 11/97 NRC exam review sheet)
12/10/98 modified RVLMS light to ON and edited Core/RCS based an validation comments

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
CE/A13AK22	XXX/3.6	COMP	11/97 MOD	CRO-201-4	7	XXXX/T1G1	EOP BASIS

90. NUC INSTRUMENTATION 001/ 000015K101/ 4.1/ COMP/ NEW/ CRO-57-1/ 4.1/ T2G1/ FSAR

Given the following:

* Unit 2 is at 95% power
* #22 125 Volt Vital AC Bus is lost due to a ground fault
* EM has determined that the ground was in the Linear Range NI cabinet
* The affected Linear Range NI is electrically isolated
* #22 125 Volt Vital AC Bus is restored

Which ONE of the following is the expected effect from the deenergized Linear Range NI cabinet?

✓A. Channel B RPS Trip Units tripped for Hi power, TM/LP and APD.
B. Channel B RPS Trip Units tripped for Hi power, SUR, TM/LP and APD.
C. Channel B RPS Trip Units tripped for Hi power, TM/LP, APD and loss of 1C05 indication.
D. Channel B RPS Trip Units tripped for Hi power, SUR, TM/LP and loss of 1C05 indication

correct answer is based on FSAR figure 7-2 for loss of NI input to RPS, distractors are permutations of incorrect logic inputs.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000015K101	4.1	COMP	NEW	CRO-57-1	4.1	T2G1	FSAR

91. NUC INSTRUMENTATION 002/ 000015K201/ 3.3/3.7/ MEMORY/ BANK/ CRO-57-1/ 4.8.6.1/ T2G1/T2G1/ LESS PLAN

Which of the following occurs on a loss of high voltage power supply to the LRNIs?

A. HV bistable trip

✓B. Power On light goes off

C. Channel fails to 200%

D. Actuation of the 15 VDC interlock

correct answer is based on lesson plan CRO-57-1 (slide 28), distractors are unrelated actions.

(CRO-57-1-5-36)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000015K201	3.3/3.7	MEMORY	BANK	CRO-57-1	4.8.6.1	T2G1/T2G1	LESS PLAN

92. PLANT FIRE 001/ 00067AK102/ 3.1/ MEMORY/ BANK/ CRO-202-9A/ 1.2/ T1G1/ AOP-9A

A fire has occurred in the control room requiring evacuation. Where will the U-1 RO, U-2 CRS, and OWC (designated STA) proceed to upon "IMMEDIATE" evacuation of the control room?

Assume U-1 is in Mode 1, U-2 is in a defueled mode, and shift manning requirements are being met per NO-1-200

A. U-1 45 Ft. switchgear room, U-2 45 Ft. switchgear room, and Plant Computer Room on 72 Ft.

B. U-2 45 Ft. switchgear room, U-1 45 Ft. switchgear room, and U-1 45 Ft. switchgear room.

✓C. U-1 Main Turbine front standard, U-2 45 Ft. switchgear room, and U-1 45 Ft. switchgear room.

D. U-1 45 Ft. switchgear room, U-2 45 Ft. switchgear room, and Fire Brigade Locker.

correct answer is based on specified actions in AOP 9A, distractors are permutations of incorrect actions.
(CRO-202-9A-2-02)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00067AK102	3.1	MEMORY	BANK	CRO-202-9A	1.2	T1G1	AOP-9A

93. PLANT FIRE 002/ 00067AK102/ XXX/3.9/ APPLIC/ NEW/ SRO-217-3/ 1.0/ XXXX/T1G1/ ERPIP

At 1605 a fire is reported in 45 foot solid waste area and the ERPIP actions are implemented. At 1612 the fire brigade leader informs the Control Room that the fire brigade is on the scene and fire fighting efforts will start momentarily. The fire brigade leader reports at 1621 that the water was applied to the fire in the solid waste area and is extinguished.

Which ONE of the following is correct EAL, if any, based on the described conditions?

A. No EAL is appropriate, since fire was not in a safe shutdown area.
✓B. UNUSUAL EVENT for fire not extinguished within 15 minutes of notification.
C. ALERT for fire not extinguished within 15 minutes of notification in the RCA.
D. NO EAL is appropriate since fire was extinguished within 30 minutes in the Vital Area.

correct response is based on ERPIP 3.0 EAL (1U1), distractors are permutations of incorrect EAL criteria or classification.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00067AK102	XXX/3.9	APPLIC	NEW	SRO-217-3	1.0	XXXX/T1G1	ERPIP

94. PROCESS RAD MON 001/ 000073A101/ 3.2/3.5/ APPLIC/ NEW/ CRO-6A-3/ 4/ T2G2/T2G2/ AOP 6A

Given the following:

* Unit 1 is at 65% and increasing to 100%
* "RADIATION MONITOR LEVEL HI" alarms at 1C07
* Letdown flow is adjusted per the appropriate AOP
* Reactor power is stabilized at 67% power
* Chemistry reports that the RCS specific activity has stabilized below the chemistry action level 1 for Tech Spec 3.4.15

Which ONE of the following is the action taken and the response of the Process Radiation Monitor to the letdown flow adjustment over the next few days?

✓A. Letdown flow is increased in conjunction with the purification IX lineup to obtain maximum purification flow resulting in decreasing activity level on the monitor.

B. Letdown flow is reduced to minimum to allow Rad Con surveys in the 27' East Penetration Room resulting in increasing activity level on the monitor.

C. Letdown flow is increased to allow the diversion to be processed by the Reactor Coolant Waste system IXs resulting in decreasing activity level on the monitor.

D. Letdown flow is secured until the leak in the letdown line can be located and isolated for repairs resulting in increasing activity level on the monitor.

correct answer is based on specified actions in AOP 6A with the RCS activity stabilized below any chemistry action levels, distractors are incorrect Letdown flow actions and/or incorrect activity trends.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000073A101	3.2/3.5	APPLIC	NEW	CRO-6A-3	4	T2G2/T2G2	AOP 6A

95. PZR LEVEL CONTROL 001/ 000011K604/ 3.1/3.1/ MEMORY/ BANK/ CRO-62-1/ 5.0/ T2G2/T2G2/ LESS PLAN

Which of the following describes the plant response if the selected Pressurizer Level control channel fails low at 100% power? **Assume no operator action is taken**

✓A. All heaters deenergize, letdown goes to minimum, standby charging pumps start, actual pressurizer level and pressure increase and reactor trips on High Pressurizer Pressure.

B. All heaters deenergize, actual pressurizer level and pressure decrease and reactor trips on TM/LP.

C. All heaters energize, letdown goes to maximum, only the selected charging pump runs, actual pressurizer level and pressure decrease and reactor trips on TM/LP.

D. All heaters energize, letdown goes to minimum, actual pressurizer level and pressure increase and the reactor trips on High Pressurizer Pressure.

correct answer is based on lesson plan CRO-62-1 (page 14), distractors are permutations of incorrect response.
(CRO-62-1-8-48)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000011K604	3.1/3.1	MEMORY	BANK	CRO-62-1	5.0	T2G2/T2G2	LESS PLAN

96. PZR PRESS CONT MALF 001/ 00027AA204/ XXX/4.3/ COMP/ NEW/ CRO-62-1/ 5.0/ XXXX/T1G2/ TECH SPEC

Given the following:

* Unit 2 has just completed a power reduction to 95%
* Pressurizer Backup heaters were ON for boron equalization
* Pzr Pressure Channel100X was selected as the control channel
* "PZR CH 100 PRESS" alarms at 2C06 and the RO reports the following:

  Pzr pressure alarm is unexpected
  PIC-100X is reading 2250 PSIA and steady
  PIC-100Y is reading 2050 PSIA and steady
  Pressure Recorder 105B shows pressure trended down to 2065 PSIA
  Pressurizer level trended down during the transient and is returned to programmed level

Which ONE of the following is the proper response?

A. Shift PIC-100X to manual, restore RCS pressure, go in TS action for DNB parameters.

✓B. Shift pressure control to Channel 100Y, restore RCS pressure, go in TS for DNB parameters.

C. Declare Pzr pressure Channel 100X OOS due to failed channel check with 100Y per Post Accident Monitoring Tech Spec.

D. Declare Pzr pressure Channel 100Y OOS due to failed channel check with 100X per Post Accident Monitoring Tech Spec.

correct answer is based on PT-110X failed to track during the transient (stuck transmitter), distractors are permutations of incorrect response or wrong Tech Spec (Post Accident Monitoring).

12/10/98 modified from validation comments

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00027AA204	XXX/4.3	COMP	NEW	CRO-62-1	5.0	XXXX/T1G2	TECH SPEC

97. PZR PRESS CONTROL 001/ 00027AA101/ 4.0/3.9/ MEMORY/ BANK/ CRO-202-9A/ 8.1/ T1G1/T1G1/ AOP-9A

Select the statement that describes the operation of the pressurizer heaters from 1(2)C43:

A. Heaters trip 10 minutes after pressurizer level drops below 101" as associated time delay dropout relay actuates.

B. Pressurizer level must be raised above 101" initially to reset low level cutout relay and energize heaters when placing keyswitch in LOCAL at 1(2)C43.

✓C. Operator secures the heaters when pressurizer level drops below 101".

D. Heaters trip on pressurizer low level cutout below 101" as indicated on 1(2)C43.

correct response is based lesson plan CRO-202-9A (page 16), distractors are permutations of incorrect logic or actions.
(CRO-202-9A-2-07)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00027AA101	4.0/3.9	MEMORY	BANK	CRO-202-9A	8.1	T1G1/T1G1	AOP-9A

98. PZR PRESSURE CONTROL 001/ 000010K201/ 3.0/3.4/ MEMORY/ NEW/ CRO-202-7I/ 3.0/ T2G2/T2G2/ AOP 7I

Given the following:

* Unit1 is at 25% power
* "U-1 480V ESF TRIP UNDERVOLTAGE" alarms at 1C19
* CRO reports that 11 4KV Bus is energized
* TBO reports that 15 Battery Charger and MCC 117T are deenergized
* AOP 7I (Loss of 4KV, 480 VOLT or 208/120 VOLT INSTRUMENT BUS POWER) is implemented

Which ONE of the following is also effected by this event?

✓A. 11 Pressurizer Proportional heater bank is deenergized.
B. 12 Charging pump is deenergized.
C. 13 Component Cooling pump is deenergized.
D. 14 Pressurizer Backup bank is deenergized.

correct answer is based on specified response in AOP 7I for a loss of 11A 480 Volt bus, distractors are based on loads from unaffected 480 volt busses.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000010K201	3.0/3.4	MEMORY	NEW	CRO-202-7I	3.0	T2G2/T2G2	AOP 7I

99. PZR RELIEF/QT 001/ 000007A201/ 3.9/4.2/ APPLIC/ 11/97 NRC/ CRO-5-2/ 14.1/ T2G3/T2G3/ STM TABLE

Given the following:

* RCS heatup in progress
* RCS Pressure was 2250 PSIA
* An acoustic monitor for a safety valve indicates valve leakage
* A management decision is made to cooldown the plant for repairs

Which ONE of the following describes the current tailpipe temperature and the response of the tailpipe temperature as RCS pressure is decreased to 500 PSIA in the subsequent plant cooldown?
(assume pressure downstream of the RV is constant)

✓A. Tailpipe temperature will be higher than it was at NOP, as RCS pressure decreases, tailpipe temperature will increase.

B. Tailpipe temperature will be higher than it was at NOP, as RCS pressure decreases, tailpipe temperature will decrease.

C. Tailpipe temperature will be lower than it was at NOP, as RCS pressure decreases, tailpipe temperature will increase.

D. Tailpipe temperature will be lower than it was at NOP, as RCS pressure decreases, tailpipe temperature will decrease.

correct answer is based on use of mollier diagram (2250 PSIA to 20 PSIA ~222°F compared to 500 PSIA to 20 PSIA ~ 320°F), distractors are incorrect permutations of expected response.
(editorial changes for clarification)
12/10/98 edited based on validation comments

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000007A201	3.9/4.2	APPLIC	11/97 NRC	CRO-5-2	14.1	T2G3/T2G3	STM TABLE

100. PZR VAPOR SPACE ACCD 001/ 00008AK305/ XXX/4.5/ MEMORY/ NEW/ SRO-202-5/ 5.1/ XXXX/T1G2/ EOP 5

During a LOCA on the top of the Pressurizer, the RCS inventory is being restored.

Which ONE of the following is the HPSI Throttling criteria?

A. Loop Subcooled Margin >30°F, PZR level <225 inches, 1 SG available for heat removal, RVLMS indicates level above top of hot leg.

B. Loop Subcooled Margin > 30°F, PZR level > 101 inches, 2 SGs available for heat removal, RVLMS indicates level above middle of hot leg.

✓C. CET Subcooled Margin >30°F, PZR level >101 inches, 1 SG available as a heat sink, RVLMS indicates level above the top of hot leg.

D. CET Subcooled Margin > 30°F, PZR level <225 inches, 2 SGs available for heat removal, RVLMS indicates level above middle of hot leg.

correct answer is based on EOP 5 stated HPSI/LPSI Termination criteria, distractors are permutations of incorrect instrument and/or qualitative criteria.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00008AK305	XXX/4.5	MEMORY	NEW	SRO-202-5	5.1	XXXX/T1G2	EOP 5

101. RADIATION CONTROL 001/ 2.3.5/ 2.3/2.5/ COMP/ NEW/ GOT/ 4.0/ G2.3/G2.3/ GOT PART 2

Given the following:

* CRS directs you to assist with the performance of valve line ups in the Auxiliary Building
* After SWP review, RCSS discussion and sign in for the EPD, you go to the 27 foot Valve Alley
* While in the Valve Alley, your EPD alarms continuously

Which ONE of the following is the required actions and basis for the described condition?

✓A. Exit the RCA, report to the Rad Con for evaluation of exceeding dose limit.
B. Exit the Valve Alley, report to the level RST for evaluation of exceeding dose limit.
C. Exit the RCA, report to Dosimetry for evaluation of EPD malfunction.
D. Exit the Valve Alley, report to the level RST for evaluation of EPD malfunction.

correct answer is based on EPD alarm function (continuous alarm), distractors are permutations of incorrect exiting actions or reason for EPD alarm function
(page 22.3 of GOT part 2) Site specific issue.
12/10/98 edited based on validation comments and changed intent to dose alarm.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.3.5	2.3/2.5	COMP	NEW	GOT	4.0	G2.3/G2.3	GOT PART 2

102. RADIATION CONTROL 002/ 2.3.10/ 2.9/3.3/ APPLIC/ NEW/ RP-337-1-0/ 1.6/ G2.3/G2.3/ RPIP TNG

Given the following:

* Unit 1 is in Mode 5 with SDC in operation
* You have been assigned to tag out and drain 11 Charging pump for maintenance
* Your dose limit is 100 mrem/shift per the SWP
* Your present accumulated dose is 70 mrem this shift
* The RST states the expected dose rate in the area is 10 mrem/hr

Which ONE of the following is the calculated time in the area based on CCNPP Admin limits?

A. 60 minutes

✓B. 90 minutes

C. 120 minutes

D. 180 minutes

SWP dose limit is 100 mrem/shift per RPIP Training package for critical rad workers (allowable dose X 85%)/ Dose Rate) or 100 X .85 = 85 (dose limit) 85-70=15/10mrem or 1.5 hours

Site specific issue

12/10/98 changed distractor (180) based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.3.10	2.9/3.3	APPLIC	NEW	RP-337-1-0	1.6	G2.3/G2.3	RPIP TNG

103. RADIATION CONTROL 003/ 2.3.4/ XXX/3.1/ COMP/ 4/98 MOD/ GOT/ 22/ XXXX/G2.3/ RP-1-100

As CRS, you are conducting the prejob brief for a valve operation in the 27 foot Valve Alley. The ABO informs you that he has a yearly dose of 805 mrem. The RST states the job is expected to result in a dose of 100mrem.

Which ONE of the following are the approvals required, if any, for a dose extension?

A. No approval is required since the Operations SWP allows for 100 mrem/shift.

B. Rad Safety reviews the dosimetry record, Shift Manager and S-NO approvals required.

✓C. Rad Safety reviews the dosimetry record, GS-NPO and GS-RS approvals required.

D. High Rad area brief, RCSS and Shift Manager approvals required.

correct answer is based on RP-1-100 and GOT stated requirements, distractors are permutations of incorrect process or management notifications.
(modified stem and distractors for 4/98 bank radiation control 002)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
2.3.4	XXX/3.1	COMP	4/98 MOD	GOT	22	XXXX/G2.3	RP-1-100

104. RCP MALFUNCTION 001/ 15/17AK102/ 3.7/4.1/ COMP/ NEW/ SRO-201-2/ 2.0/ T1G1/T1G1/ LESS PLAN

Given the following:

* Unit 1 is at MOC and 100% power
* Unit 1 trips due loss of Offsite power
* Unit 2 is at MOC and 100% power
* Unit 2 trips due seized rotor on 21A RCP

Evaluate the effect, if any, on each Unit from the described transients:

A. Unit 1 DNB limits are approached more closely compared to the Unit 2 transient effects.

✓B. Unit 2 DNB limits are approached more closely compared to the Unit 1 transient effects.

C. Unit 1 and Unit 2 DNB limits are approached equally for each transient.

D. Unit 1 and Unit 2 DNB limits are not approached due the automatic RPS trip action for each Unit.

correct answer is based on the lesson plan SRO-201-2 (page 41) and FSAR seized RCP Rotor analysis, distractors are incorrect permutations of the analyzed effects. 12/10/98 edited based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
15/17AK102	3.7/4.1	COMP	NEW	SRO-201-2	2.0	T1G1/T1G1	LESS PLAN

105. RCS OVERCOOLING 001/ CE/A11AK33/ 3.1/3.5/ MEMORY/ BANK/ SRO-201-5/ 2.0/ T1G1/T1G1/ EOP BASIS

Which one of the following is the basis for maintaining a maximum of 140°F subcooled margin during EOP-5 implementation?

✓A. prevent a pressurized thermal shock event occurrence
B. minimize pressure across the break thereby reducing the leak rate
C. prevent RCS pressure from increasing to the PORV setpoint
D. maintain an adequate amount of subcooled fluid to remove decay heat

correct answer is based on EOP 5 basis, distractors are incorrect basis relating to pressure effects.
(SRO-201-5-1-15)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
CE/A11AK33	3.1/3.5	MEMORY	BANK	SRO-201-5	2.0	T1G1/T1G1	EOP BASIS

106. REACTOR COOLANT 001/ 000002A101/ 3.8*/4.1/ COMP/ NEW/ CRO-5-2/ 14.3/ T2G2/T2G2/ FSAR

Given the following:

- * Unit 2 is at 100% power
- * IAS 3.4.11 D due to both PORVs are not operable
- * Main Turbine trips due to loss of bearing oil

Which ONE of the following will initially limit the effects of the RCS transient?

A. A single 2500 PSIA setpoint Primary Code Safety valve.

✓B. 2 out of 4 RPS Loss of Load logic trip.

C. Both Primary Code Safety valves.

D. 2 out of 4 RPS High Pressurizer Pressure logic trip.

correct answer is based on LOL design as described in FSAR and lesson plan CRO-5-2 (page 23), distractors are permutations of unexpected component actions based on stated conditions.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000002A101	3.8*/4.1	COMP	NEW	CRO-5-2	14.3	T2G2/T2G2	FSAR

107. REACTOR COOLANT PP 001/ 000003K302/ 3.5*/3.8/ COMP/ NEW/ CRO-5-2/ 14.3/ T2G1/T2G1/ TS BASIS

Given the following:

* Unit 1 is in Mode 5 with RCS temperature at 125°F
* Shutdown Cooling has been secured for plant heatup
* RCS pressure has been raised to 300 PSIA for RCP start
* Pressurizer level at 170 inches
* Preparing to start 11A and 11B RCPs for plant heatup
* ABO reports that 11 and 12 SG temperatures are 165°F
* RCP LTOP Tagout is cleared

Which ONE of the following describes the plant response to starting the first RCP based on stated conditions?

A. RCS pressure will increase, the Pressurizer heaters will deenergize.

B. RCS pressure will decrease, the Pressurizer heaters will energize.

✓C. RCS pressure will increase, PORVs will open from RCS pressure surge.

D. RCS pressure will decrease, PZR backup heaters energize from RCS pressure drop.

correct answer is based on SG temperatures are greater than the Tech Spec limits prior to flow initiation by the RCPs (with Pressurizer level and RCS pressure are at the limits per TS basis 3.4.6, page B3.4.6-2), distractors are incorrect expected magnitude and actions of the RCS pressure change.
12/10/98 changed distractors based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000003K302	3.5*/3.8	COMP	NEW	CRO-5-2	14.3	T2G1/T2G1	TS BASIS

108. REACTOR PROTECTION 001/ 000012K501/ 3.3*/ MEMORY/ BANK/ CRO-212-3/ 1.1/ T2G2/ TS BASIS

Which statement describes the basis for the Axial Power Distribution Trip?

✓A. DNB and peak linear heat rate will not be exceeded

B. DNB SAFDL of 1.25 is not exceeded

C. Tech Spec LCO for linear heat rate is observed

D. Minimize radial redistribution above 15% power

correct answer is based on TS Basis APD trip design (page B 3.3.1-13) and lesson plan CRO-212-3 (page 8), distractors are permutations of incorrect criteria. (CRO-59-1-5-04)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000012K501	3.3*	MEMORY	BANK	CRO-212-3	1.1	T2G2	TS BASIS

109. REACTOR PROTECTION 002/ 000012K603/ 3.1/3.5/ COMP/ MODIFY/ CRO-59-1/ 8.07/ T2G2/T2G2/ FSAR

Given the following:
- * Unit 2 is at 100% power
- * RO reports the Reactor tripped due an overpower transient
- * CRO observes the RPS response

Which ONE of the following is the expected effect on RPS from the Reactor Trip?

A. 2/4 Channels Hi Power trip relays energized, 4 Matrix relays deenergize, trip path paths deenergize, 4 TCBs open.

B. 4/4 Channels SUR trip relays energize, 6 Matrix relays deenergize, trip paths energize, 8 TCBs open.

✓C. 4/4 Channels Hi Power trip relays energize, 6 Matrix relays deenergize, trip paths deenergize, 8 TCBs open.

D. 2/4 Channels SUR trip relays energize, 4 Matrix relays deenergize, trip paths deenergize, 4 TCBs open.

correct answer is based on FSAR description and lesson plan CRO-59-1 (page 42),distractors are permutations of incorrect logic or sequence of components. (Modified stem and distractors CRO-59-1-5-51)
12/10/98 modified distractors based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000012K603	3.1/3.5	COMP	MODIFY	CRO-59-1	8.07	T2G2/T2G2	FSAR

110. REACTOR TRIP STABIL 001/ 0007CEEA12/ 3.3/ MEMORY/ BANK/ CRO-58-1/ 3.1.2/ T1G2/ LESS PLAN

Five (5) minutes following a reactor trip from 100% power, all RCPs were tripped. The following conditions exist during EOP 0 implementation:

-- Thot is 547 F and lowering
-- Tcold is 534 F and lowering
-- RCS pressure is 2050 PSIA and slowly rising

What response would the operator observe on the panel for the ADVs and TBVs with these plant conditions ?

	ADVs	TBVs
A.	Full Shut	Modulated Open
B.	Full Open	Full Open
✓C.	Modulated Open	Modulated Open
D.	Modulated Open	Full Shut

correct answer is based on lesson plan CRO-58-1 (page 9), distractors are incorrect permutations of possible responses
(CRO-58-1-06)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
0007CEEA12	3.3	MEMORY	BANK	CRO-58-1	3.1.2	T1G2	LESS PLAN

111. REACTOR TRIP STABIL 002/ 0007CEEK12/ 3.1/ MEMORY/ BANK/ SRO-201-0/ 5.0/ T1G2/ EOP BASIS

The pressure band of 1850 to 2300 PSIA per EOP-0 is based on the following:

A. Ensuring adequate NPSH for operating RCPs is maintained for all non-LOCA conditions to prevent lifting of SG safety valves.

B. Ensuring RCS fluid is maintained in a subcooled condition following a LOCA for adequate heat removal and time for HPSI injection.

C. Ensuring single phase flow continues which verifies that SGs are available for heat removal (under flow and no-flow conditions).

✓D. Ensuring adequate RCS subcooling and preventing lifting a primary relief or safety valve and representing the values for an uncomplicated "standard" reactor trip.

correct answer is based on lesson plan SRO-201-0 (page 18), distractors are permutations of incorrect reasons.
(SRO-201-0-3-04)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
0007CEEK12	3.1	MEMORY	BANK	SRO-201-0	5.0	T1G2	EOP BASIS

112. REACTOR TRIP STABIL 003/ 000007EK12/ XXX/3.4/ COMP/ NEW/ SRO-210-0/ 11/ XXXX/T1G2/ EOP 0

Given the following:

* An overcooling event occurs resulting in SIAS actuation and HPSI injection, the appropriate procedure is implemented
* RVLMS indicates RCS level above the top of the hot leg
* Affected SG Blowdown is complete
* Pressurizer level is ~160 inches and rising rapidly
* RCS pressure is rising rapidly

Which ONE of the following is the proper response for plant conditions?

A. Restore and maintain subcooling by energizing pressurizer heaters and operation of the charging system.

B. Perform SIAS verification per EOP attachment, block Pressurizer Pressure SIAS, secure the LPSI pumps.

✓C. Cooldown the unaffected SG and maintain subcooling by use of Auxiliary Spray to lower RCS pressure.

D. Perform SIAS verification per EOP attachment, block Containment Pressure SIAS , terminate HPSI flow.

correct answer is based on EOP 4 stated actions distractors are permutations on incorrect actions that will not control the RCS heatup and inventory .

12/10/98 modified stem and answer based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000007EK12	XXX/3.4	COMP	NEW	SRO-210-0	11	XXXX/T1G2	EOP 0

113. REACTOR TRIP STABIL 004/ 000007EA12/ XXX/3.9/ COMP/ NEW/ SRO-201-0/ 11.0/ XXXX/T1G2/ EOP 0

Given the following:
- * Unit 1 is at 100% power
- * Reactor trips due to loss of 500KV Red bus
- * EOP 0 is implemented
- * CRO reports that "Core and RCS heat removal can not be met due to low Tc and SG pressures"

The CRS directs the CRO to perform his alternate actions.

Which ONE of the following is the proper action and basis to be taken by the CRO?

A. Reduce AFW flow due to excess flow from automatic initiation on low SG level.

B. SHUT both MSIVs due to MTCV failure to close on loss of power

C. Reduce AFW flow due to excess flow from automatic start of 13 AFW pump.

✓D. SHUT both MSIVs due to MSR second stage MOVs failed to close on loss of power.

correct answer is based on stated alternate actions for SG pressure < 800 PSIA and loss of power to MSR MOV, distractors are permutations of incorrect actions and/or basis

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000007EA12	XXX/3.9	COMP	NEW	SRO-201-0	11.0	XXXX/T1G2	EOP 0

114. ROD POSITION IND 001/ 000014A101/ 2.9*/3.1/ APPLIC/ NEW/ CRO-60-1/ 21/ T2G2/T2G1/ TRM

Using the provided reference:

Given the following:

* Unit is at 97% with Regulating Group 5 CEAs at 110 inches for NFM testing
* RO observes a difference of 10 inches between the primary and secondary CEA position indications for all Group 5 CEAs
* Initial diagnosis is the primary CEA position indication may be inoperable and the TRM is reviewed by the operators

Which ONE of the following is the expected effect of this condition?

A. Implement Nonconformance A by contingency measure A.2.1 of the TRM.
✓B. Implement Nonconformance B by contingency measure B.1 of the TRM.
C. Implement Nonconformance A by contingency measure A.1 of the TRM.
D. Implement Nonconformance C by contingency measure C.1 of the TRM.

correct answer is based on the requirements of the TRM for the full out position to be used due to the deviation between the primary and secondary position indication circuits, distractors are application of incorrect non conformance conditions.
(refer to LER 98-001 Unit 1)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000014A101	2.9*/3.1	APPLIC	NEW	CRO-60-1	21	T2G2/T2G1	TRM

115. SERVICE WATER 001/ 000076A201/ 3.5*/3.7*/ APPLIC/ NEW/ CRO-113-2/ 2.0/ T2G3/T2G3/ OI29,38A

Given the following:
- * Unit 1 is at 100% power
- * Unit 2 is at 95% power
- * Condenser delta T hourly average is 11.5°F and slowly rising
- * 26 Circulating Water pump is OFF
- * Condenser Water Boxes being cleaned
- * Travelling Screen d/ps are rising on both Units
- * Service Water Heat Exchanger d/ps are rising on both Units

Bay conditions have changed due to a storm coming from the North East which has resulted in large quantities of "grass" migrating into the intake structure. The OSO reports that "grass" is carrying over the travelling screens on both units.

Which ONE of the following is the effect of the described conditions

A. Unit 2 SRW HX strainers will auto back flush, Unit 1 SRW HX will require frequent monitoring per OI 29.

B. Unit 2 Travelling Screens are placed in off for Water Box cleaning, Unit 1 Travelling Screens are left in AUTO.

✓C. Unit 1 SRW HX strainers will auto back flush, Unit 2 SRW HX will require frequent monitoring per OI 29.

D. Unit 1 Travelling Screens are left in AUTO, Unit 2 Travelling Screens are placed in HAND to prevent "grass" carryover

correct answer is based on the description of the auto back flush of the Unit 1 SRW HX strainers (lesson plan CRO-113-2 page 19) and monitoring of SRW HX d/p on Unit 2 per OI 29, distractors are permutations of incorrect system design.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000076A201	3.5*/3.7*	APPLIC	NEW	CRO-113-2	2.0	T2G3/T2G3	OI29,38A

116. SFP COOLING 001/ 000033K405/ 3.1/3.3/ COMP/ NEW/ FUND QUALS/ N/A/ T2G2/T2G2/ FSAR 9.7

Given the following:

* Unit 1 core has been off loaded to the SFP for 10 year ISI Reactor vessel inspection, RFP level is at 63 foot elevation
* Unit 1 RFP boron concentration is at the COLR concentration (2310 PPM) and the SFP boron concentration is at 2450 PPM

Which ONE of the following actions, if any, is required to maintain the design SDM for the stored fuel?

A. No action is required, the SFP boron is above the Tech Spec required concentration of 2300 ppm

B. Borate the RFP to the SFP concentration to prevent the dilution of the required SFP boron concentration.

✓C. No action is required, the SFP Racks are designed for no boron concentration required to maintain the design SDM.

D. Dilute the SFP via transfer to the RFP to conserve boron and minimize the amount of waste generated.

correct answer is based on FSAR design basis that the SFP require no soluble boron to maintain adequate SDM, distractors are permutations of incorrect specifications or actions.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000033K405	3.1/3.3	COMP	NEW	FUND QUALS	N/A	T2G2/T2G2	FSAR 9.7

117. SG TUBE LEAK 001/ 00037AA111/ 3.4/ MEMORY/ BANK/ CRO-64-1/ 5.0/ T1G2/ EOP 6

A SG tube rupture event has occurred with the both RVLMS inoperable. Which condition indicates the presence of a void in the RCS?

✓A. Unexplained rapid increase in PZR level.

B. PZR level steady and subcooled margin of 50°F using CETs.

C. Charging flow greater than letdown flow.

D. Unexplained rapid decrease in PZR level

correct answer is based on the specified actions in EOP 6, distractors are reversed indications from the specified indication response.

(CRO-64-1-4-19)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00037AA111	3.4	MEMORY	BANK	CRO-64-1	5.0	T1G2	EOP 6

118. SG TUBE LEAK 002/ 00037AA111/ XXX/3.3/ APPLIC/ NEW/ CRO-202-2A/ 4/ XXXX/T1G2/ AOP 10, 2A

Given the following:

* Unit 2 is at 100% power
* 21 Charging pump is running, 23 is OOS for maintenance
* CRO reports that Main Steam/ N-16 Rad Monitor indicates leakage in 21 SG at 4 GPD and 22 SG at 8 GPD
* Approximately 30 minutes later the STA reports that calculated RCS leak rate is .064 GPM from the combined SG tube leakage and the MainSteam/ N-16 Rad Monitor indicates leakage in 21 SG at 4 GPD and 22 SG at 88 GPD
* RO reports Pressurizer level is steady with no noticeable trend on VCT level trace

Which ONE of the following is the proper response and basis for plant conditions?

A. Implement AOP 10 (Abnormal Secondary Chemistry Conditions) to respond to a small SG tube leak less than 5 GPD.

B. Implement AOP 2A (Excessive Reactor Coolant Leakage) to respond to a small SG tube leak greater than 100 GPD.

C. Implement AOP 10 (Abnormal Secondary Chemistry Conditions) to respond to a small SG tube leak rate change of greater than 60 GPD.

✓D. Implement AOP 2A (Excessive Reactor Coolant Leakage) to respond to a small SG tube leak rate change of greater than 60 GPD.

AOP 2A is implemented due to greater than 60 GPD change in leak rate as described in both AOP 10 and 2A procedures and basis. Distractors are based solely on the Tech Spec limit for one SG (TS 3.4.13) or criteria to leave AOP 10, if implemented.
12/10/98 deleteduse of reference based on validation comments

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00037AA111	XXX/3.3	APPLIC	NEW	CRO-202-2A	4	XXXX/T1G2	AOP 10, 2A

119. SG TUBE RUPTURE 001/ 00038EK309/ 4.1/ COMP/ NEW/ SRO-201-6/ 2.0/ T1G2/ EOP BASIS

Given the following:

* Unit 2 has tripped and EOP 6 (SG Tube Rupture) has been implemented
* 21A and 22B RCPS are running
* RCS Pressure is ~1050 PSIA and slowly lowering
* RCS Subcooling is 36°F and steady
* Pressurizer level is 105" and rising
* 22 SG is removing heat from the RCS
* RVLMS lights are out

Select the required action based on plant conditions:

A. Depressurize the RCS to minimize the d/p with the affected SG.

B. Commence RCS Boration to ensure SDM is met during current backfill from the affected SG.

C. Commence RCS cooldown to isolate the unaffected SG.

✓D. Commence HPSI termination to prevent a solid pressurizer and RCS repressurization.

correct answer is based on meeting the EOP 6 HPSI termination criteria, distractors are major actions not related to the stated conditions.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00038EK309	4.1	COMP	NEW	SRO-201-6	2.0	T1G2	EOP BASIS

120. SG TUBE RUPTURE 002/ 00038EK309/ XXX/4.5/ APPLIC/ NEW/ SRO-201-6/ 2.0/ XXXX/T1G2/ EOP BASIS

Given the following:

* a SGTR has been diagnosed in 21 SG with EOP 6 implemented
* The applicable block steps for initial response to the event have been completed
* Plant stabilization steps are in progress to depressurize the RCS, maintain 21 SG level and restore 22 SG level to 0 inches
* Block step for HPSI or LPSI throttling/termination criteria has been implemented with 21 HPSI pump the running pump and RCS pressure steady at ~ 650 PSIA and both LPSI pumps are secured
* CETs indicate ~460°F

Why doesn't the RCS inventory control require the LPSI pumps?

A. RCS Subcooling is maintained greater than 20°F.

✓B. RCS pressure is controlled above 200 PSIA.

C. Unaffected 22 SG is maintaining RCS temperature control.

D. 21 SG level backfills the RCS.

correct answer is based on the EOP 6 Basis document that allows securing LPSI pumps is RCS pressure is stabilized > 200PSIA, distractors incorrect criteria (subcooling, temp control) or plant responses(backfill).
12/10/98 modified stem and distractors based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00038EK309	XXX/4.5	APPLIC	NEW	SRO-201-6	2.0	XXXX/T1G2	EOP BASIS

121. SMALL BREAK LOCA 001/ 00009EA201/ 4.2/ COMP/ NEW/ SRO-201-5/ 2.0/ T1G2/ EOP 5

Given the following:

* Unit 1 has tripped and EOP 5 has been subsequently implemented
* RCS pressure is 1720 PSIA and slowly lowering
* RCS Tc is 527°F and slowly lowering
* Containment pressure is 1.0 PSIG and slowly rising

Select the required actions for the plant conditions:

A. Verify SIAS actuation based on containment environment safety function.

B. Verify SIAS actuation with a minimum of 345 GPM HPSI flow.

C. Implement RCP trip strategy with 11A and 12A RCPs running.

✓D. Implement RCP trip strategy with 11B and 12A RCPs running.

correct answer is based on meeting the EOP 5 RCP trip strategy criteria of <1725 PSIA, distractors are incorrect actions or wrong RCP pump trip combinations.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00009EA201	4.2	COMP	NEW	SRO-201-5	2.0	T1G2	EOP 5

122. SMALL BREAK LOCA 002/ 00009EA201/ XXX/4.8/ COMP/ NEW/ SRO-201-5/ 2.0/ XXXX/T1G2/ EOP 5

Using the provided reference:
Given the following:

* EOP 5 has been implemented on Unit 2
* RCS pressure rapidly decreased to 1200 PSIA
* RO has started the RCP trip strategy
* RCS Tc is 515°F
* 21 and 22 Penetration Room Exhaust fans have automatically started
* All automatic safety systems have actuated as designed
* Pressurizer spray Valve RC-100E-CV indicates OPEN

Which ONE of the following is the required action?

✓A. Trip all RCPs.
B. Trip 21B and 22A RCPs.
C. Trip 21A and 22A RCPs.
D. Trip 21A and 21B RCPs.

correct answer is based on CIS actuation as determined by both Penetration Room exhaust fans are running, distractors are correct RCP trip strategy combinations that will not stop spray flow (from 21A RCP), incorrect trip strategies .
12/10/98 added auto start to Pent Fans based on vlaidation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00009EA201	XXX/4.8	COMP	NEW	SRO-201-5	2.0	XXXX/T1G2	EOP 5

123. STATION BLACKOUT 002/ 00055EK302/ 4.3/4.6/ COMP/ MODIFY/ SRO-201-7/ 2.0/ T1G1/T1G1/ EOP 7 AF

Given the following:

* A loss of Offsite power has occurred
* Unit 1 has completed EOP 7
* Unit 2 has implemented EOP 2

Which one of the following conditions must be met to allow transition to the next appropriate procedure for Unit 1?

A. Energizing any 4 KV bus and associated load centers.

✓B. Completing the SFSC final acceptance criteria in EOP 7.

C. TSC determination that sufficient battery capacity exists.

D. Emergency boration has been completed for Mode 5 entry.

correct answer is based on EOP 7 specified actions (step AF, page 62), distractors unrelated steps in the EOP (4KV bus) or permutations of incorrect actions (TSC, emergency boration, ANY 4KV bus).
(modified stem and one distractor for SRO-201-7-1-02)
12/10/98 edited based on validation comments

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
00055EK302	4.3/4.6	COMP	MODIFY	SRO-201-7	2.0	T1G1/T1G1	EOP 7 AF

124. STEAM GENERATOR 001/ 000035K503/ 2.8/3.1/ COMP/ NEW/ CRO-103-1/ 1.11/ T2G2/T2G2/ AOP 3G

Given the following:

* Unit 1 is at 10%, preparing to parallel to the Grid
* AOP 3G (Malfunction of MFW system) is implemented
* 11 BFRV control is in manual due to erratic controller operation
* 11 SG level is -25 inches and 12 SG level is -10 inches
* The CRO raises the bias on the speed controller for 12 SGFP due to low FRV d/p on both 11 and 12 FRVs.
* approximately 15 seconds later, the CRO observes a large feed flow/steam flow mismatch (feed greater than steam)
* Both SG levels are lowering

Which ONE of the following is the correct action for the conditions?

A. Start 13 AFW pump and monitor auto AFW initiation to raise both SG water levels.

✓B. Decrease the SGFP speed bias or lower BFRV controller output, maintain a slight positive feed flow/steam flow.

C. Place 11 MFV controller in manual and open MFV to increase the positive feed flow/ steam flow mismatch to 11 SG.

D. Shut the TBVs to reduce steam flow and raise SG pressure to increase SG water level for the available FW flow.

correct answer is based on the SGFP bias was operated resulting in SG level shrink from too much feed flow, distractors will increase the shrink effect or help only 1 SG level.

12/10/98 edited stem based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000035K503	2.8/3.1	COMP	NEW	CRO-103-1	1.11	T2G2/T2G2	AOP 3G

125. STM DUMP/TURB BYP 001/ 000041K105/ 3.5*/3.6/ COMP/ BANK/ CRO-5-2/ 19/ T2G3/T2G3/ LESS PLAN

The Unit is operating at 80% power when steam demand is increased by 5% due to a turbine bypass valve failing open. How will the Pressurizer spray valves and heaters initially respond?

✓A. Spray valves shut, heaters energized in auto control.
B. Spray valves shut, heater off.
C. Spray valves open, heaters energized in auto control.
D. Spray valves open, heaters off.

correct answer is based on the lesson plan CRO 5-2 (page 28) description, distractors are incorrect permutations.
(CRO-5-2-3-42)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000041K105	3.5*/3.6	COMP	BANK	CRO-5-2	19	T2G3/T2G3	LESS PLAN

126. STM LINE RUPTURE 001/ 0040CEEK21/ 3.3/3.6/ MEMORY/ BANK/ SRO-201-4/ 3.0/ T1G1/T1G1/ FSAR

The plant is at 100% power when a large excess steam demand event occurs. Which of the following RPS and/or ESFAS signals actuates first to prevent violations of DNB or the exceeding of SAFDLs?

A. Low pressurizer pressure

B. High containment pressure

✓C. Low steam generator pressure

D. Low S/G Level Trip

correct answer is based on FSAR analysis and lesson plan SRO-201-4 (page 11), distractors are incorrect RPS trip permutations.
(SRO-201-4-1-03)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
0040CEEK21	3.3/3.6	MEMORY	BANK	SRO-201-4	3.0	T1G1/T1G1	FSAR

127. STM LINE RUPTURE 002/ 000040EK12/ XXX/3.8/ APPLIC/ NEW/ SRO-201-4/ 2.0/ XXXX/T1G1/ EOP BASIS

Given the following:

* A ESDE occurred on Unit 2, implemented EOP 4
* 21 SG pressure is 450 PSIA and decreasing
* 22 SG pressure is 780 PSIA and steady
* CETs indicate 484°F
* SIAS actuated and verified at required flow
* Containment pressure is 3 PSIG

Which one of the following is the required action and basis for the described conditions?

A. Direct the RO perform alternate actions for the Containment Environment safety function to meet containment criteria.

✓B. Direct the CRO to cooldown 22 SG to 680 PSIA to prevent RCS expansion after blowdown is complete.

C. Direct the RO to perform alternate actions and borate to 2300 ppm to met the Reactivity safety function criteria.

D. Direct the CRO to initiate SGIS to isolate 21 SG blowdown and meet the Heat Removal safety function.

correct answer is based on required actions the unaffected SG greater than 25°F than CETs per EOP 4 basis document, distractors are unspecified actions for the stated conditions (alternate actions, initiate SGIS) or wrong criteria (2300 PPM boron) . 12/10/98 changed 22 SG pressure based on validation comments.

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000040EK12	XXX/3.8	APPLIC	NEW	SRO-201-4	2.0	XXXX/T1G1	EOP BASIS

128. WASTE GAS 001/ 000071A429/ 3.0*/3.6*/ MEMORY/ BANK/ CRO-143-1/ 6.0/ T2G1/T2G1/ TRM

What are the oxygen and curie content limits for the waste gas decay tanks?

✓A. Oxygen 4% by volume, 58,500 Curies of noble gas

B. Oxygen 4% by weight, 53,500 Curies of noble gas

C. Oxygen 6% by volume, 58,500 Curies of noble gas

D. Oxygen 6% by weight, 53,500 Curies of noble gas

correct answer is based on TRM 15.11.1 and 15.11.2,distractors are permutations of the limits.

(CRO-219-1-0-06)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000071A429	3.0*/3.6*	MEMORY	BANK	CRO-143-1	6.0	T2G1/T2G1	TRM

129. WASTE GAS 002/ 000071A427/ 3.0*/ MEMORY/ BANK/ CRO-134-1/ 5.0/ T2G1/ ALM MAN

Given the following:

* #12 waste gas decay tank release through the U-1 plant vent in progress
* Waste Gas discharge radiation monitor (RI-2191) alarms

Which valve must be manually shut to prevent a possible waste gas decay tank discharge to the waste gas surge tank?

A. Waste gas discharge isolation (WGS-2191-CV)
B. Waste gas discharge to Unit 1 plant vent (WGS-683)
✓C. Waste gas discharge pressure control (WGS-2191-PCV)
D. Waste gas discharge final filter bypass (WGS-630)

correct answer is based on 1C22 alarm manual response (D1.1) from a auto closure of a waste gas discharge, distractors are permutations of incorrect valves.
(reformatted CRO-219-1-0-34)

KEY WORDS:

NRC k/a	Ro/Sro Imp	Cog Level	Source	Less Plan	Obj #	Ro/Sro Out	Ref
000071A427	3.0*	MEMORY	BANK	CRO-134-1	5.0	T2G1	ALM MAN

#04

TRAINING

CE POWER SYSTEMS

3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

LCO 3.0.1 LCOs shall be met during the MODES or other specified conditions in the Applicability, except as provided in LCO 3.0.2 and LCO 3.0.7.

LCO 3.0.2 Upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met, except as provided in LCO 3.0.5 and LCO 3.0.6.

If the LCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required, unless otherwise stated.

LCO 3.0.3 When an LCO is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS, the unit shall be placed in a MODE or other specified condition in which the LCO is not applicable. Action shall be initiated within 1 hour to place the unit, as applicable, in:

a. MODE 3 within 7 hours;

b. MODE 4 within 13 hours; and

c. MODE 5 within 37 hours.

Exceptions to this Specification are stated in the individual Specifications.

Where corrective measures are completed that permit operation in accordance with the LCO or ACTIONS, completion of the actions required by LCO 3.0.3 is not required.

LCO 3.0.3 is only applicable in MODES 1, 2, 3, and 4.

3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

LCO 3.0.4 When an LCO is not met, entry into a MODE or other specified condition in the Applicability shall not be made except when the associated ACTIONS to be entered permit continued operation in the MODE or other specified condition in the Applicability for an unlimited period of time. This Specification shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shut down of the unit.

Exceptions to this Specification are stated in the individual Specifications.

LCO 3.0.4 is only applicable for entry into a MODE or other specified condition in the Applicability in MODES 1, 2, 3, and 4.

LCO 3.0.5 Equipment removed from service or declared inoperable to comply with ACTIONS may be returned to service under administrative control solely to perform testing required to demonstrate its OPERABILITY or the OPERABILITY of other equipment. This is an exception to LCO 3.0.2 for the system returned to service under administrative control to perform the testing required to demonstrate OPERABILITY.

LCO 3.0.6 When a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered. Only the support system LCO ACTIONS are required to be entered. This is an exception to LCO 3.0.2 for the supported system. In this event, additional evaluations and limitations may be required in accordance with Specification 5.5.15, "Safety Function Determination Program (SFDP)." If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

When a support system's Required Action directs a supported system to be declared inoperable or directs entry into Conditions and Required Actions for a supported system, the applicable Conditions and Required Actions shall be entered in accordance with LCO 3.0.2.

LCO 3.0.7 Special test exception (STE) LCOs in each applicable LCO section allow specified Technical Specification (TS) requirements to be changed to permit performance of special tests and operations. Unless otherwise specified, all other TS requirements remain unchanged. Compliance with STE LCOs is optional. When an STE LCO is desired to be met but is not met, the ACTIONS of the STE LCO shall be met. When an STE LCO is not desired to be met, entry into a MODE or other specified condition in the Applicability shall only be made in accordance with the other applicable Specifications.

3.6 CONTAINMENT SYSTEMS

3.6.6 Containment Spray and Cooling Systems

LCO 3.6.6 Two containment spray trains and two containment cooling trains shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.
MODE 3, except containment spray is not required to be OPERABLE when pressurizer pressure is < 1750 psia.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One containment spray train inoperable.	A.1 Restore containment spray train to OPERABLE status.	72 hours <u>AND</u> 10 days from discovery of failure to meet the Limiting Condition for Operation
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u>	
	B.2 Be in MODE 3 with pressurizer pressure < 1750 psia.	12 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One containment cooling train inoperable.	C.1 Restore containment cooling train to OPERABLE status.	7 days __AND__ 10 days from discovery of failure to meet the Limiting Condition for Operation
D. Two containment cooling trains inoperable.	D.1 Restore one containment cooling train to OPERABLE status.	72 hours
E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Be in MODE 3. __AND__ E.2 Be in MODE 4.	6 hours 12 hours
F. Two containment spray trains inoperable. __OR__ Any combination of three or more trains inoperable.	F.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.6.1	Verify each containment spray manual, power-operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position.	31 days
SR 3.6.6.2	Operate each containment cooling train fan unit for ≥ 15 minutes.	31 days
SR 3.6.6.3	Verify each containment cooling train cooling water flow rate is ≥ 2000 gpm to each fan cooler.	31 days
SR 3.6.6.4	Verify each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program
SR 3.6.6.5	Verify each automatic containment spray valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	24 months
SR 3.6.6.6	Verify each containment spray pump starts automatically on an actual or simulated actuation signal.	24 months
SR 3.6.6.7	Verify each containment cooling train starts automatically on an actual or simulated actuation signal.	24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.6.8	Verify each spray nozzle is unobstructed.	10 years

3.7 PLANT SYSTEMS

3.7.7 Saltwater (SW) System

LCO 3.7.7 Two SW subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SW subsystem inoperable.	A.1 ------- NOTES ------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources-Operating," for emergency diesel generator made inoperable by SW System. 2. Enter application Conditions and Required Actions of LCO 3.4.6, "RCS Loops-MODE 4," for shutdown cooling made inoperable by SW System. -------------------- Restore SW subsystem to OPERABLE status.	 72 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.7.1	-------------------NOTE------------------- Isolation of SW System flow to individual components does not render SW inoperable. -- Verify each SW System manual, power-operated, and automatic valve in the flow path servicing safety-related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.7.2	Verify each SW System automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	24 months
SR 3.7.7.3	Verify each SW System pump starts automatically on an actual or simulated actuation signal.	24 months

TVR 15.1.3.9 Verify the RWT boron concentration is as specified in the COLR.

Frequency 7 days, if in Mode 6 and the RWT is the borated water source

TVR 15.1.3.10 Verify that each manual, power-operated, or automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

Frequency 31 days

15.1.4 CONTROL ELEMENT ASSEMBLY (CEA) POSITION INDICATION

NORMAL CONDITION

TNC 15.1.4 Two CEA position indicator channels shall be operable for each shutdown and regulating CEA.

Any two of the following three CEA position indication channels are allowed to be operable to satisfy this TNC:

a. Control element assembly voltage divider reed switch position indicator channel, capable of determining the absolute CEA position within ± 1.75 inches;

b. Control element assembly "Full Out" or "Full In" reed switch position indicator channel as verified by actuation of the applicable position indicator; and

c. Control element assembly pulse counting position indicator channel.

The only time the CEA "Full In" or "Full Out" reed switch position indicator channels can be utilized for one of the three CEA Position Indicator Channels is when the CEAs are either fully withdrawn or fully inserted.

APPLICABILITY Modes 1 and 2.

CONTINGENCY MEASURES	Nonconformance	A.	One required CEA position indication channel is inoperable for one CEA per group for CEA(s) that are partially inserted.
	Contingency Measures	A.1	Restore the position indicator channel to operable status.
	Restoration Time		6 hours
		OR	
	Contingency Measures	A.2.1	Reduce thermal power to ≤ 70% rated thermal power. If negative reactivity insertion is required to reduce thermal power, boration shall be used.
	Restoration Time		6 hours
			AND
	Contingency Measures	A.2.2.1	Fully withdraw CEA group(s) with inoperable position indicator and verify the CEA to be fully withdrawn via a "Full Out" indicator.
	Restoration Time		10 hours
			OR

<u>Contingency Measures</u>	A.2.2.2	Fully insert CEA group(s) with inoperable position indicator and verify the CEA to be fully inserted via a "Full In" indicator.
<u>Restoration Time</u>		10 hours
	<u>OR</u>	
<u>Contingency Measures</u>	A.3	Be in Mode 3.
<u>Restoration Time</u>		6 hours
	<u>OR</u>	
<u>Contingency Measures</u>	A.4	If the failure existed before entry into Mode 2 or occurs prior to an "all CEAs out" configuration, the CEA group(s) with an inoperable position indicator channel must be moved to the "Full Out" position and verified to be fully withdrawn via a "Full Out" indicator.
<u>Restoration Time</u>		Within 10 hours of entry into Mode 2 <u>AND</u> Prior to exceeding 70% of rated thermal power.

Nonconformance	B.	More than one CEA per group having its CEA pulse counting position indicator channel inoperable and either the "Full Out" or "Full In" position indicator or the voltage divider position indicator channel inoperable.
Contingency Measures	B.1	Operation may continue provided that the following conditions are met for the affected CEAs. (1) The CEA voltage divider reed switch position indicator channels are operable. OR (2) The CEA "Full Out" or "Full In" reed switch position indicator channels are operable and the affected CEAs are fully withdrawn or inserted as verified by actuation of the appropriate reed switch indicator.
Restoration Time		24 hours
Nonconformance	C.	Contingency measures and associated restoration times of Nonconformance B are not met.
Contingency Measures	C.1	Be in Mode 3.
Restoration Time		6 hours

VERIFICATION REQUIREMENTS

TVR 15.1.4.1 Verify CEA position indicator channels agree within 4.5 inches.

Frequency: Every 12 hours

AND

Every 4 hours when deviation circuit is inoperable

This shall be accomplished by the following:

(1) Verifying the CEA pulse counting position indicator channels and the CEA voltage divider reed switch position indicator channels agree within 4.5 inches; or

(2) Verifying the CEA pulse counting position indicator channels and the CEA "Full Out" or "Full In" reed switch position indicator channels agree within 4.5 inches; or

(3) Verifying the CEA voltage divider reed switch position indicator channels and the CEA "Full Out" or "Full In" reed switch position indicator channels agree within 4.5 inches.

CALVERT CLIFFS NUCLEAR POWER PLANT
TECHNICAL PROCEDURE

UNIT ONE

ATTACHMENTS

REVISION 8

Safety Related

Approval Authority: 4/30/98
signature/date

Effective Date: 5/18/98

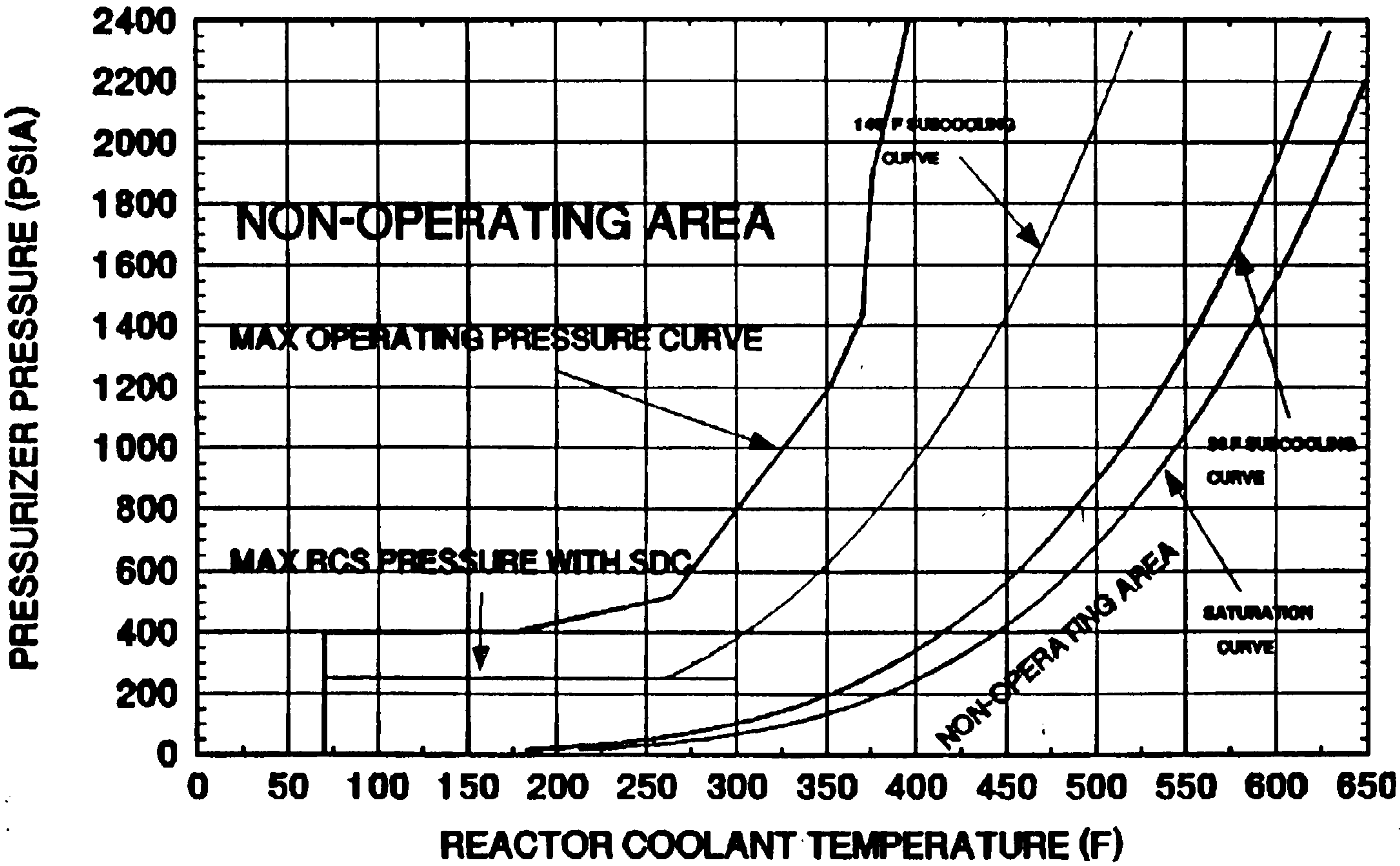
LIST OF EFFECTIVE PAGES

ATTACHMENT	PAGE NUMBERS	REVISION
1	1 - 7	8
2	1 - 5	8
3	1	8
4	1-2	8
5	1	8
6	1	8
7	1	8
8	1	8
9	1-3	8
10	1	8
11	1	8
12	1	8
13	1	8
14	1	8
15	1	8
16	1-2	8
17	1	8

PROCEDURE ALTERATIONS

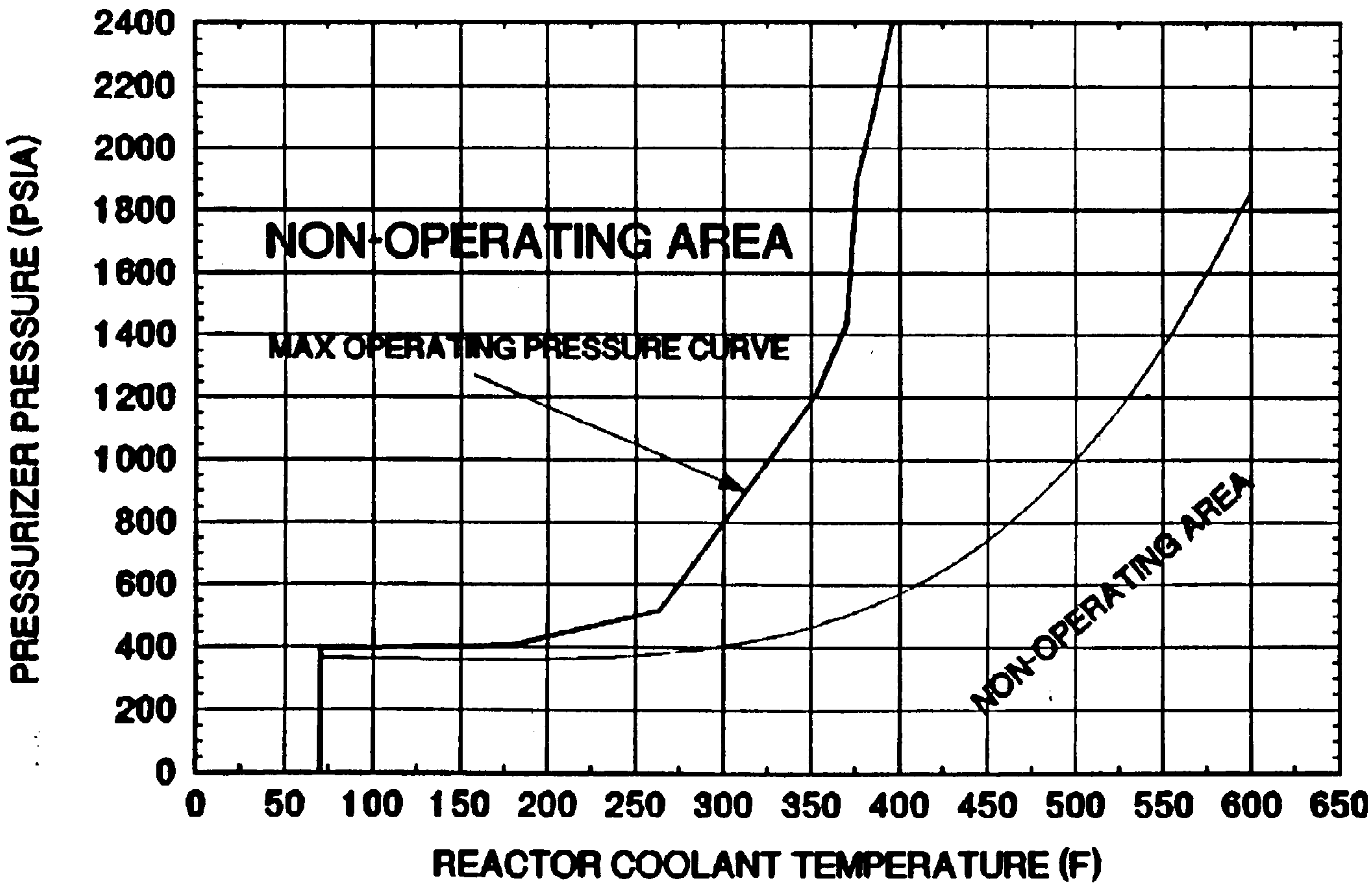
REVISION/CHANGE	PAGE NUMBERS
0800	Attachment 2, page 5 Attachment 6, page 1
0801	Attachment 2, page 2 Attachment 5, page 1

RCS PRESSURE/TEMPERATURE LIMITS

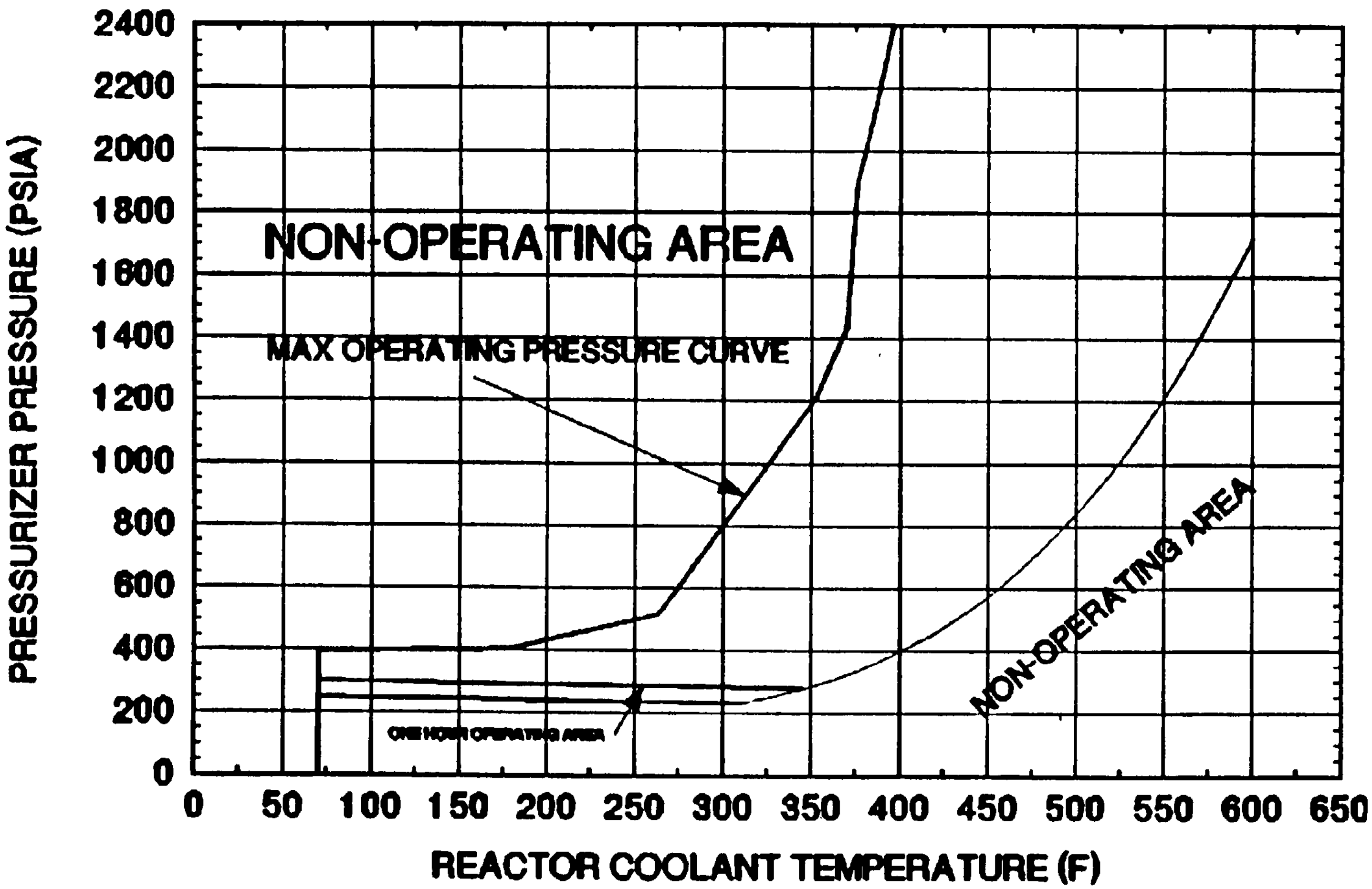


ONE RCP EACH LOOP OPERATING LIMITS

RCS PRESSURE/TEMPERATURE OPERATING LIMITS
11A or 11B and 12A or 12B RCP



RCS PRESSURE/TEMPERATURE COOLDOWN LIMITS
11 A and 11 B RCPs

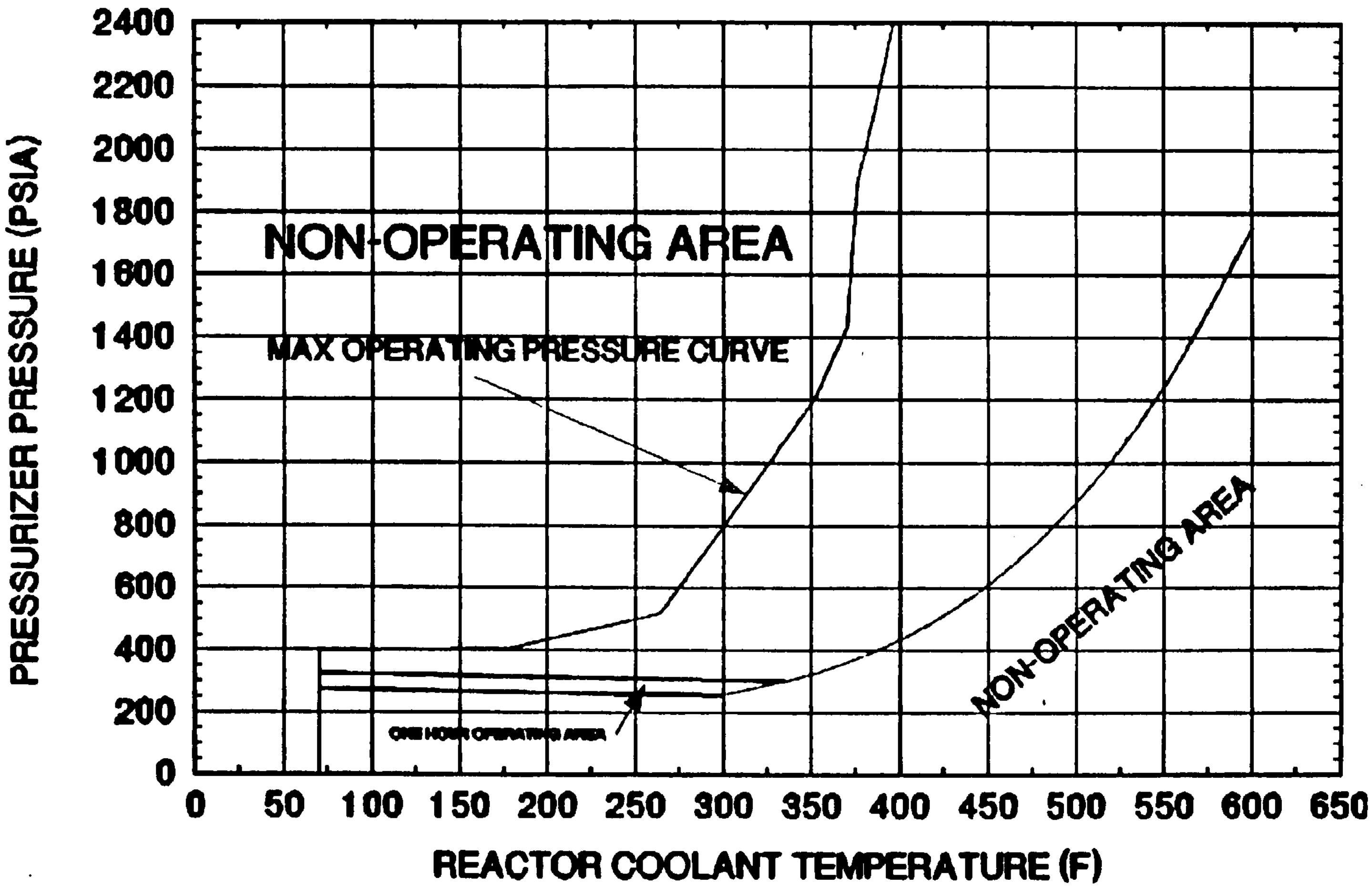


11A AND 11B RCPs OPERATING LIMITS

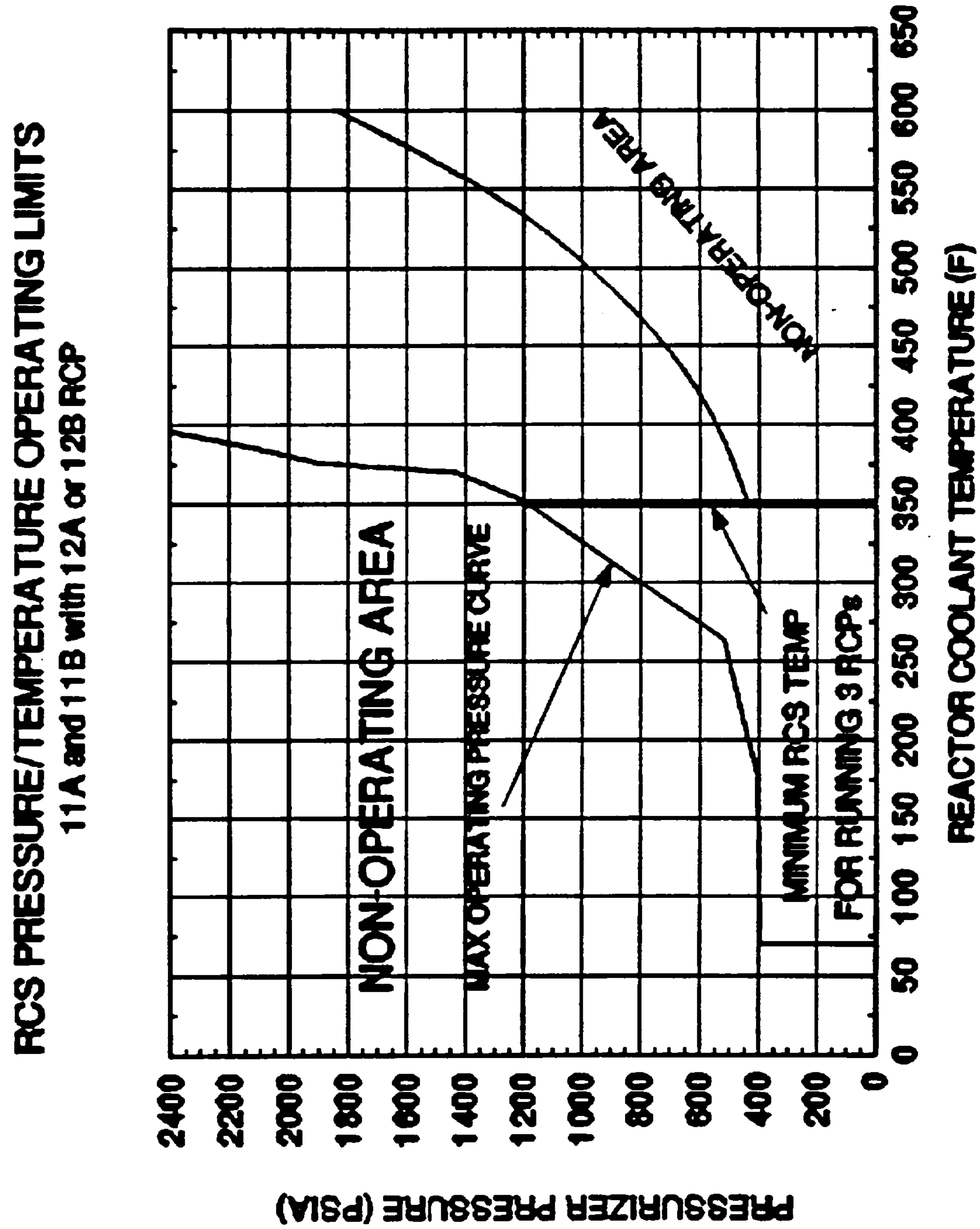
12A AND 12B RCPs OPERATING LIMITS

RCS PRESSURE/TEMPERATURE OPERATING LIMITS

12A and 12B RCPs

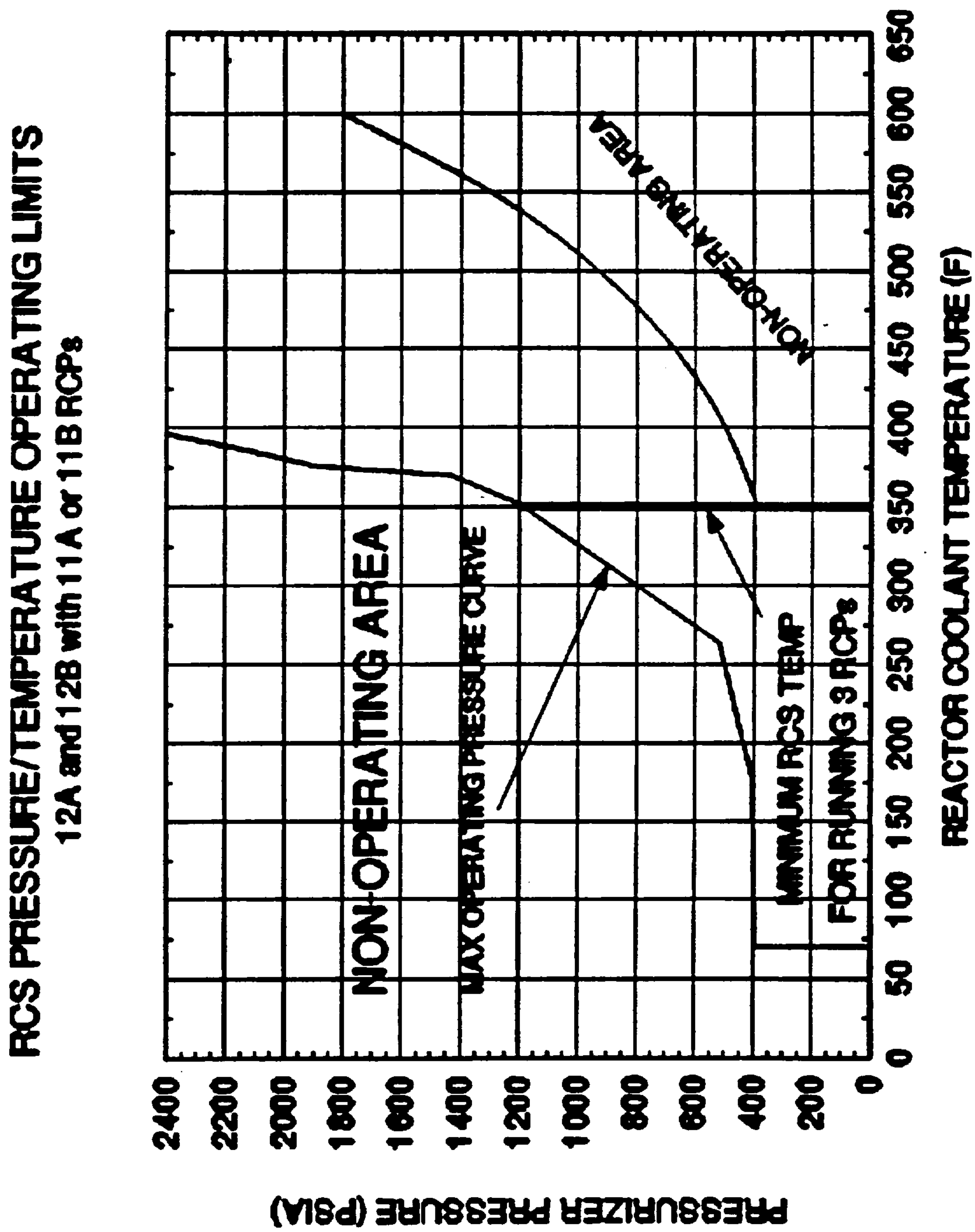


11A AND 11B WITH 12A OR 12B RCPs OPERATING LIMITS



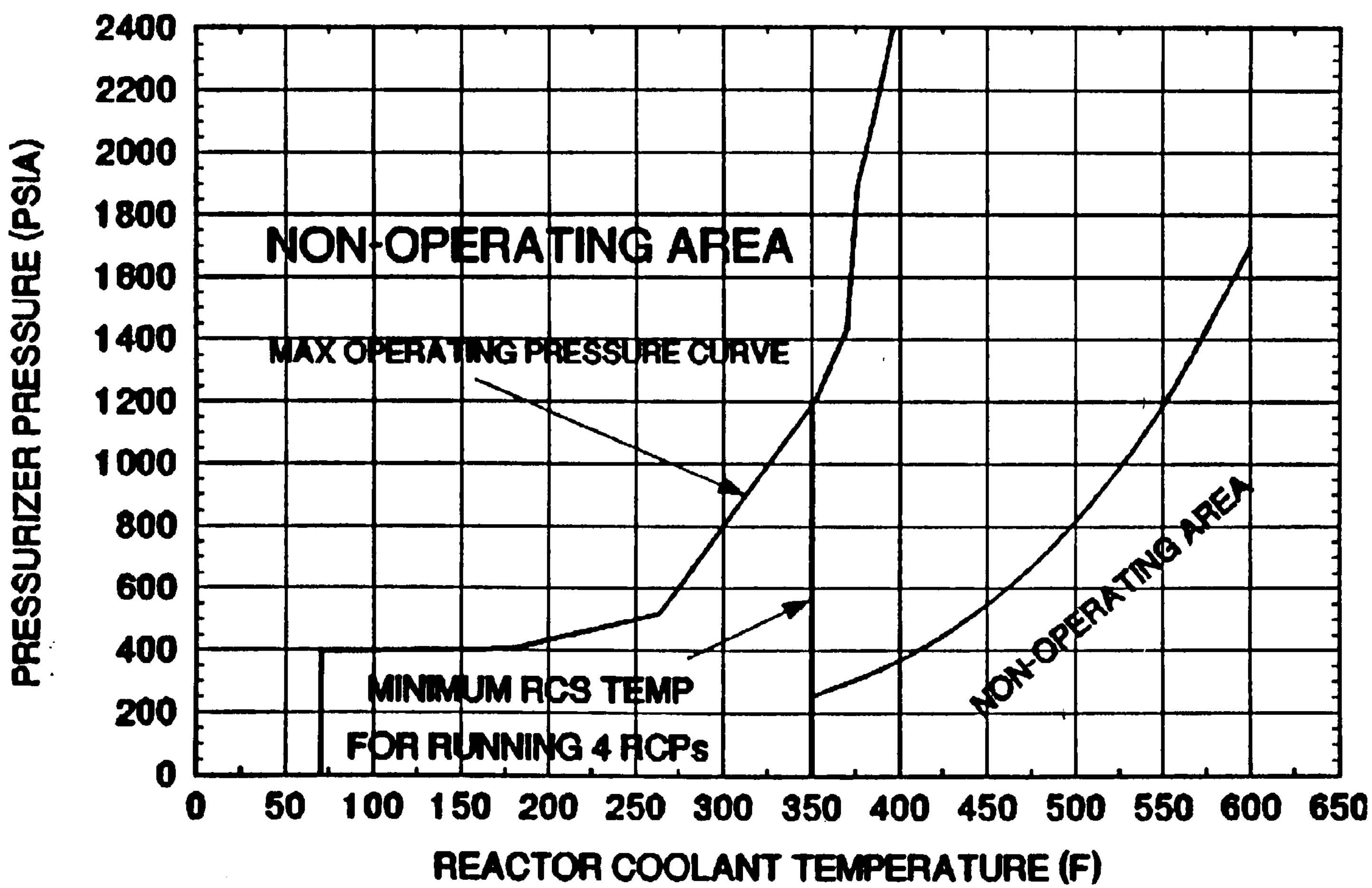
ATTACHMENT (1)
Page 6 of 7

12A AND 12B WITH 11A OR 11B RCPs OPERATING LIMITS



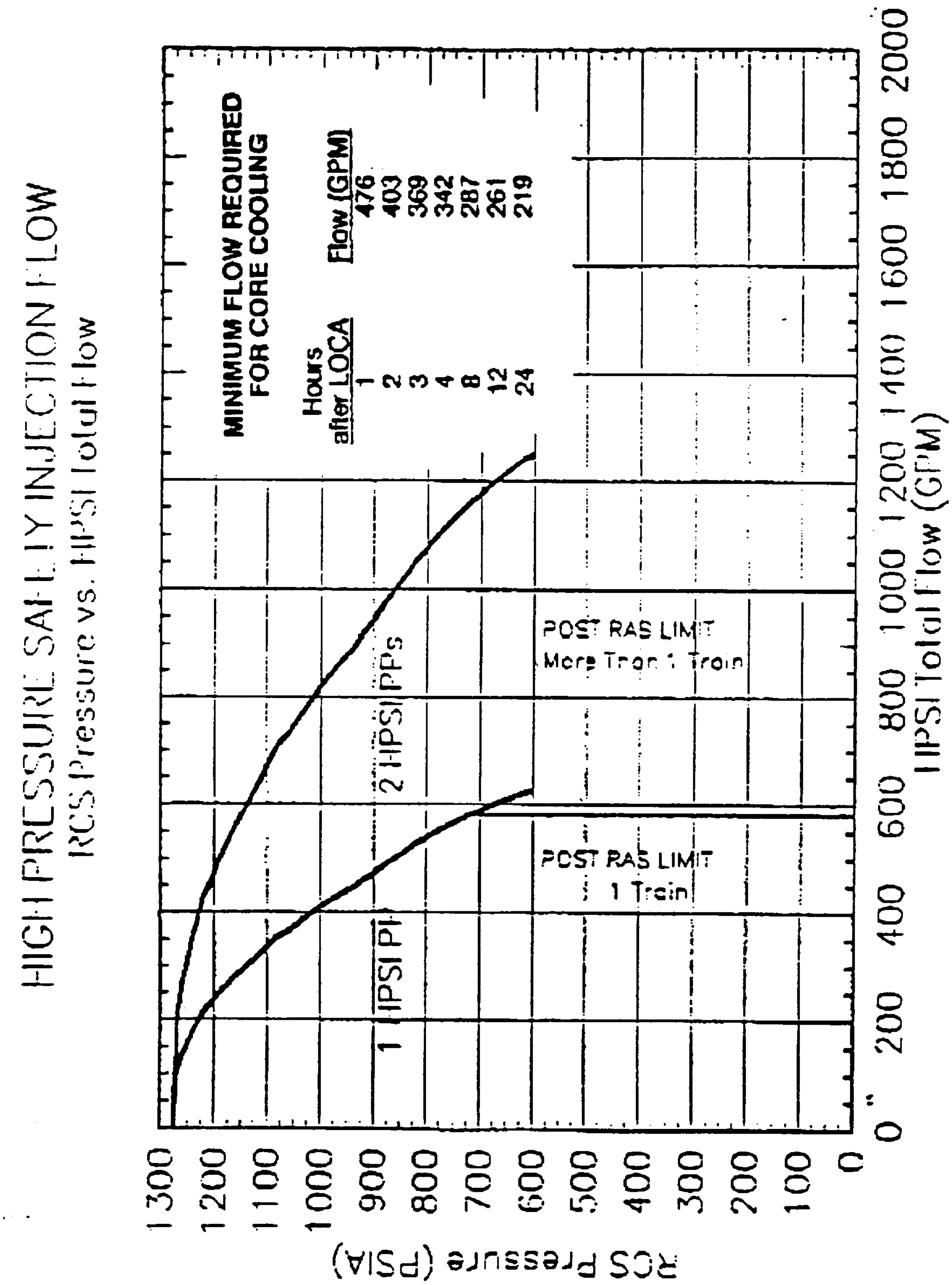
4 RCPs OPERATING LIMITS

RCS PRESSURE/TEMPERATURE OPERATING LIMITS
4 RCP OPERATION



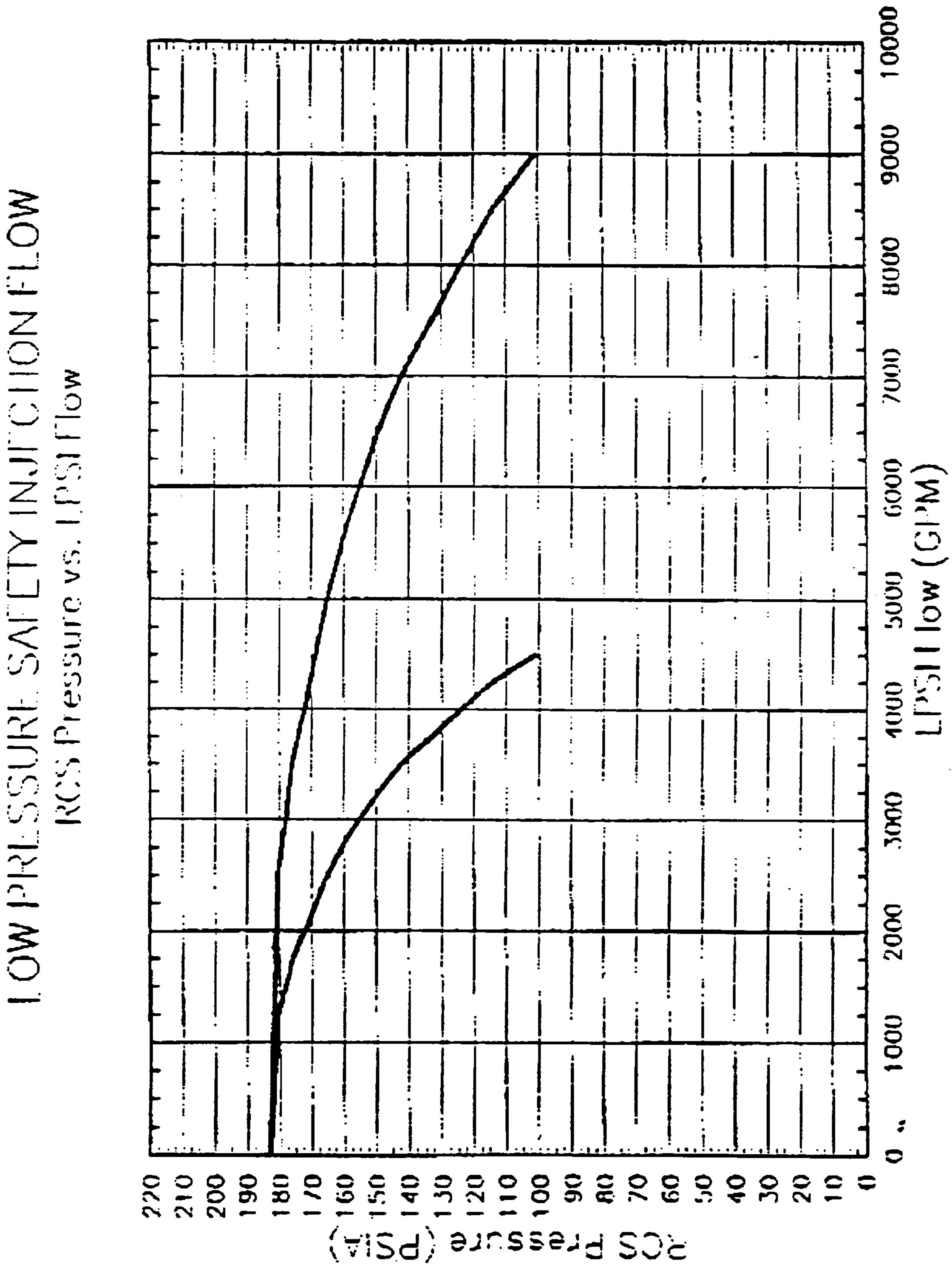
ATTACHMENT (10)
Page 1 of 1

HIGH PRESSURE SAFETY INJECTION FLOW



ATTACHMENT (11)
Page 1 of 1

LOW PRESSURE SAFETY INJECTION FLOW



CALVERT CLIFFS NUCLEAR POWER PLANT

UNIT ONE

OP-7

SHUTDOWN OPERATIONS

REVISION 11

SAFETY RELATED

CONTINUOUS USE

APPROVAL AUTHORITY: ____________

EFFECTIVE DATE: 8/28/98

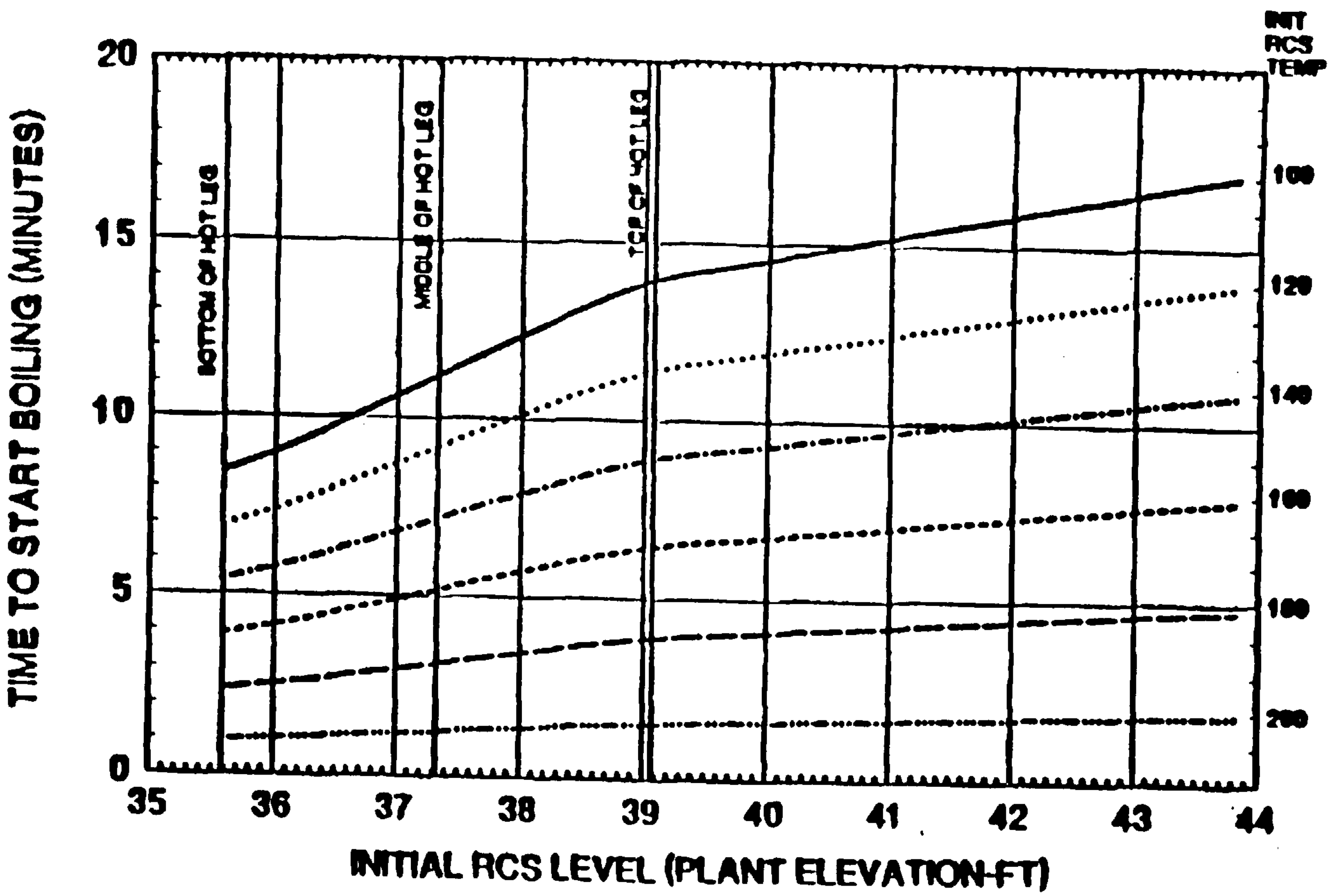
TIME TO START BOILING OR CORE UNCOVERY MULTIPLIER [B0072]

DAYS AFTER S/D	MULTIPLIER	DAYS AFTER S/D	MULTIPLIER
1	1.000	50	4.823
2	1.234	55	5.042
3	1.400	60	5.284
4	1.561	70	5.834
5	1.718	80	6.242
6	1.845	90	6.718
7	1.977	100	7.146
8	2.085	110	7.588
9	2.197	120	8.011
10	2.296	150	8.985
15	2.711	180	10.465
20	3.084	210	11.712
25	3.390	240	13.027
30	3.624	270	13.687
35	3.891	300	14.470
40	4.202	330	15.390
45	4.567	365	16.680

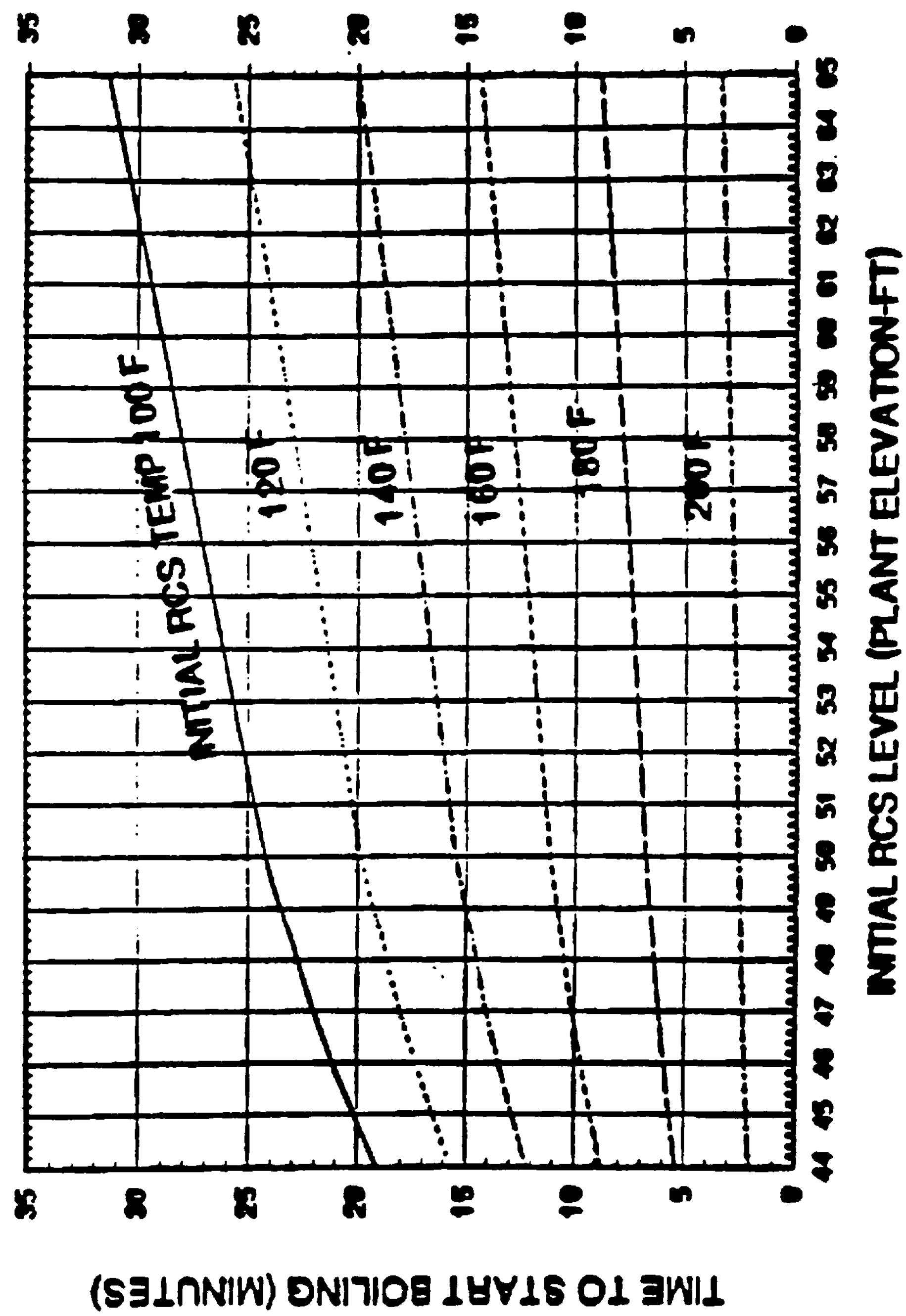
NOTE
Good for a core reload with 84 or more new assemblies.

Post Refueling Multiplier is 1.36 times the "normal" multiplier. (Use only until new fuel is irradiated)

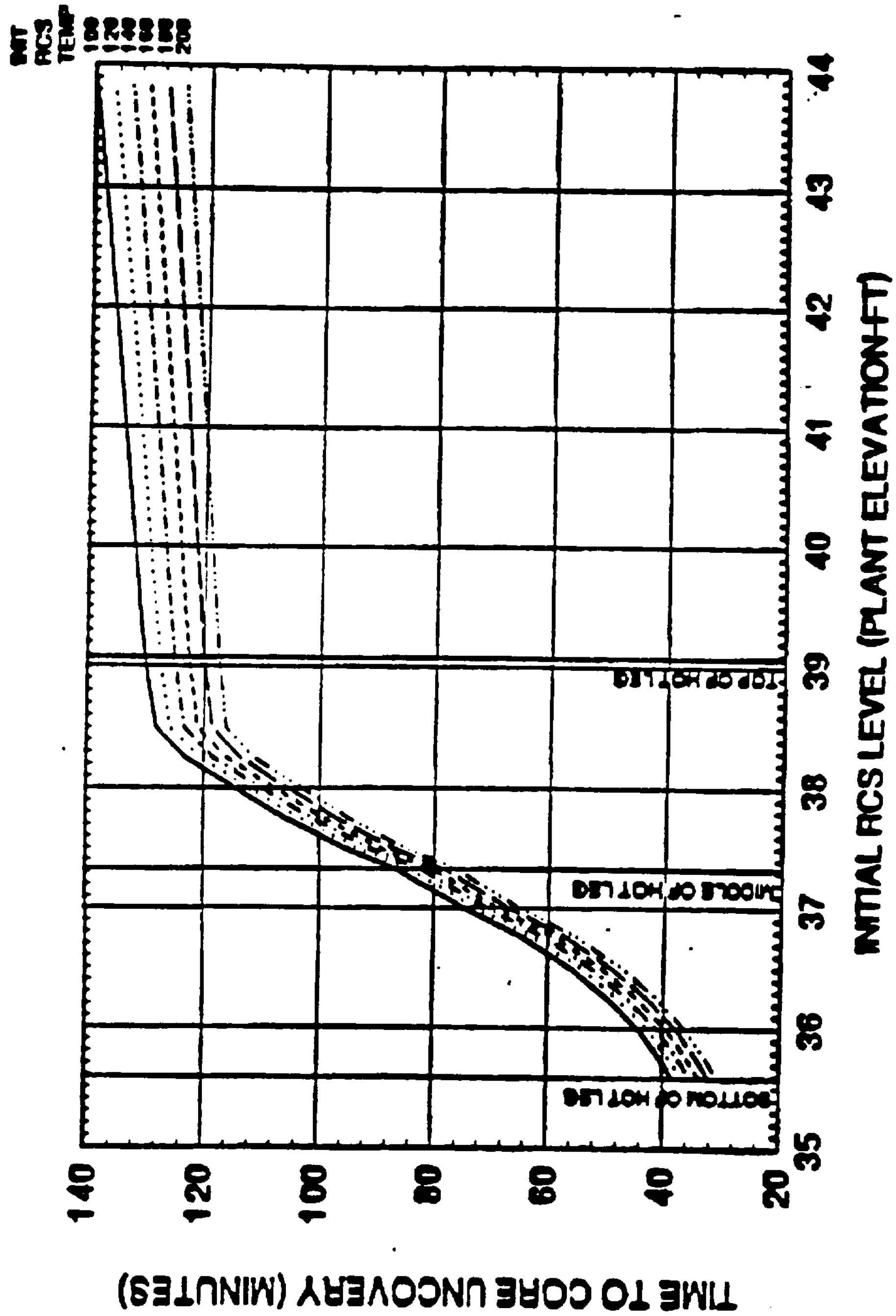
TIME TO START BOILING AFTER LOSS OF SDC, 24 HOURS AFTER SHUTDOWN [B0072]



TIME TO START BOILING AFTER LOSS OF SDC, 24 HOURS AFTER SHUTDOWN WITH S/G TUBES FULL [B0072]

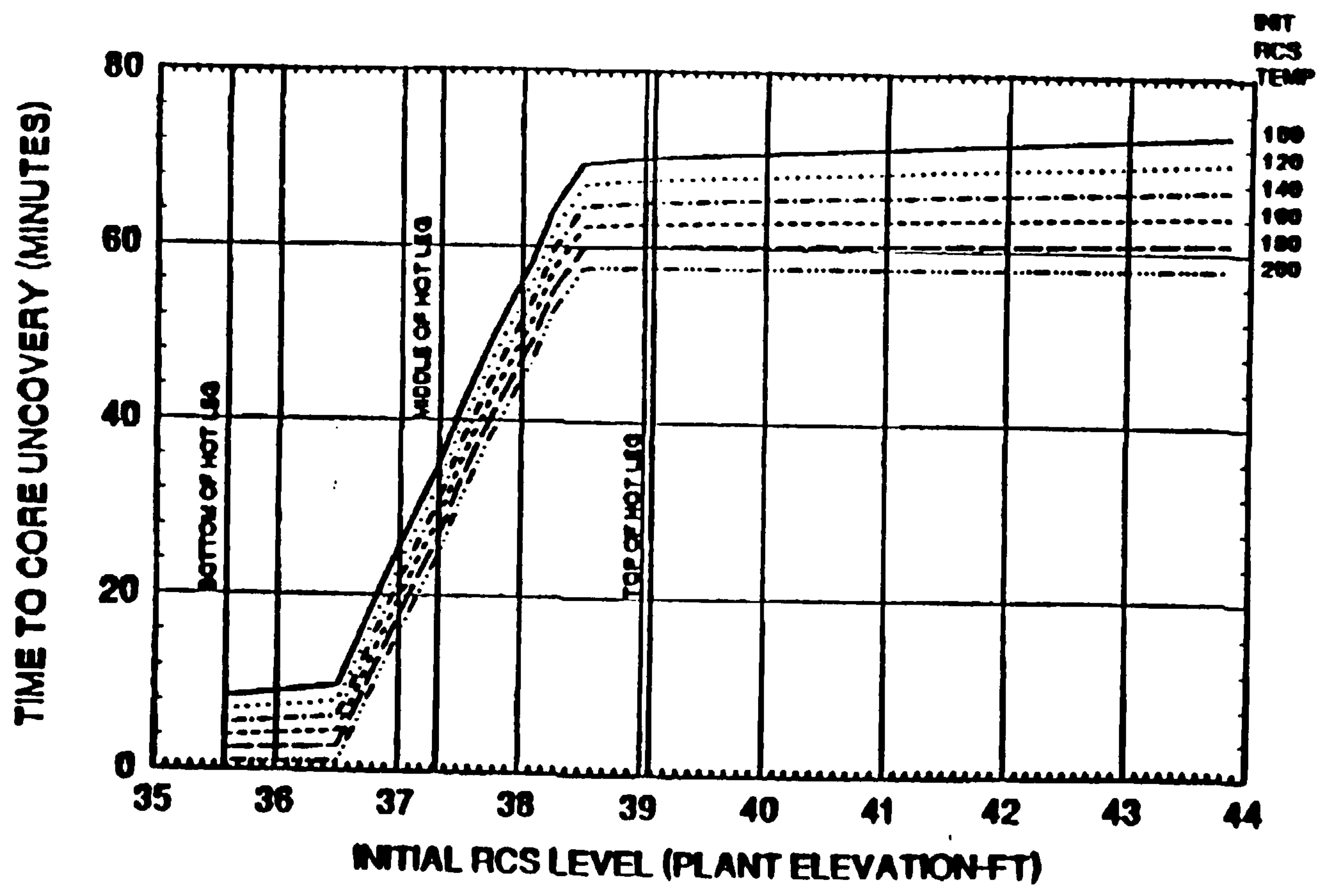


TIME TO CORE UNCOVERY AFTER LOSS OF SDC, 24 HOURS AFTER SHUTDOWN [B0072]



TIME TO CORE UNCOVERY AFTER LOSS OF SDC, 24 HOURS AFTER SHUTDOWN WITH NOZZLE DAMS, NO INJECTION, COLD LEG HOLES

[B0072]



6.4 BYPASSING RPS TRIP UNITS FOR MAINTENANCE OR TESTING [MEMORY USE]

A. Initial Conditions

1. CRS has given approval to bypass affected Trip Units.

B. Procedure

1. **REVIEW** ITS 3.3.1, 3.3.2, 3.3.3, 3.3.12, 3.9.2 AND take required actions.

2. **INSERT** the bypass key in the Trip Unit to be bypassed:

TRIP UNIT	BYPASS KEY
HI POWER	1
HI RATE	2
LO FLOW	3
LO LEVEL SG	4
LO PRES SG	5
HI PZR PRES	6
TM/LO PRES	7
LOSS LOAD	8
HI CONT PRESS	9
AXIAL PWR	10

3. **TURN** the bypass key clockwise to BYPASS.

NOTE
An illuminated BYPASS light indicates that the trip for that Trip Unit is bypassed and the trip logic for that parameter is reduced to 2-out-of-3.

4. **CHECK** the BYPASS light illuminates.

5. **REPEAT** steps 1 through 4 until all required Trip Units on that channel have been bypassed.

6. **PERFORM** a licensed operator independent verification that all required Trip Units on that channel are bypassed.

CALVERT CLIFFS NUCLEAR POWER PLANT

UNIT ONE AND TWO

OI-6

REACTOR PROTECTION SYSTEM

REVISION 11

SAFETY RELATED

MULTIPLE USE

Approval Authority: KJ Neit

Effective Date: 5/1/98

WALK-THRU - as initially submitted

SCENARIOS - as initially submitted

CONFIDENTIAL

JAN 1999 CCNPP INITIAL LICENSE OPERATOR

OPERATING EXAMINATION MATERIAL

TO BE OPENED BY ADDRESSEE ONLY

FOR OFFICIAL USE ONLY

TAB I

Simulation Facility	Calvert Cliffs	Scenario No.: 1	Op Test No.:	1
Examiners:	__________	Operators:	__________	SRO
	__________		__________	RO
	__________		__________	BOP

Objectives: To evaluate the applicants' ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including 11 Loop Th instrument, the ADV controller, a leak in CNMNT from CCW, loss of MCC-104R, a S/G tube leak, and to execute the EOPs for a SGTR with B train of SIAS failing to actuate and the 11 HPSI Pp OOS. Following transition to EOP-6, the leaking CCW line ruptures in CNMNT requiring isolating CCW to CNMNT and tripping all RCPs.

Initial Conditions: The plant is at 100% Power, MOC (IC-13)

Danger tag 13 SRW Pp in Pull-To-Lock

Danger tag 11 HPSI Pp in Pull-To-Lock

1 transformer at Waugh Chapel is OOS

11 SGFP Oil Cooler SRW flow is being controlled manually using 1-SRW-446, CV-1622 bypass valve.

Turnover: Present plant conditions: 100% power, MOC; Unit 2 is in MODE 5.

Power history: 100% power for previous 34 days.

Equipment out of service:

1) 13 SRW Pp has grounded motor. Tripped off 6 hours ago and is expected to be returned to service in 2 days.

2) 11 HPSI Pp bearing wiped during STP 2 hours ago. Expected to be returned to service in about 36 hours. IAS T.S. 3.5.2.

3) 1 of the 3 main transformers at Waugh chapel is OOS.

4) 11 SGFP Oil Cooler SRW flow is being controlled manually using 1-SRW-446, CV-1622 bypass valve.

Surveillances due: STP 0-29 is to be performed by the end of shift.

Instructions for shift:

1) Maintain 100% power.

2) Shift Manager will inform crew when he is ready for them to do the brief and perform STP 0-29.

Event No.	Malf. No.	Event Type*		Event Description
Preload	SRW003_03 SI002_01 ESFA001_02			13 SRW Pp OOS. 11 HPSI Pp OOS. Failure of SIAS 'B' to actuate.
1	RCS 004_09 (HI)	I	RO	11 Loop Th fails high. The candidate is expected to evaluate the alarms, refer to the ARM and determine which instrument has failed. The associated Channel A Trip units (1,7,10) shall be bypassed. The candidate is expected to comply with Technical Specification 3.3.1.
2	MS016 (OPEN)	I	BOP	After the T.S. have been reviewed and actions taken, next the Atmospheric Dumps Valves fail open due to the S/G pressure input signal failing high. The CRO shall take manual control of the ADVs and shut them. The crew shall coordinate control of reactor power and turbine load as necessary to maintain/restore reactor power to less than 100% and Tc on program. The crew may refer to AOP-7K due to the excess steam demand.
3	CCW003 (0 to 1% over 2 min)	C	All	Approximately 2 minutes after the plant is stabilized a CCW leak develops in CNMNT. The first indication is a CNMNT sump alarm. The sump may drain the first time enough to clear the alarm but as the leak grows the alarm will not clear. The leak size will remain within the capacity of CCW makeup. The crew should evaluate RCS conditions and determine an RCS leak does not exist. T. S. 3.4.14 should be implemented. The crew may determine a CCW leak exists based on head tank level and makeup valve position, and if so they should implement AOP-7C. Preparations for a CNMNT entry to locate the source of the leak should be initiated.
4	480V002_01	C	All	Approximately 10 minutes after initiating the CCW leak in CNMNT, a loss of MCC-104R occurs. The crew will determine MCC-104 has been lost and implement AOP-7I, placing 2 Charging Pps in P-T-L, shifting Ch. Pp suction back to the VCT and adjusting turbine load as necessary to maintain Tc on program. Next they will tie 1Y10 to 1Y09. After 1Y10 is reenergized, Ch. Pp suction should be returned to auto from the VCT.
5	MS001_01 (90 gpm)	R N	RO BOP	About 5 minutes after the crew has reenergized 1Y10, a 90 gpm tube leak will begin in 11 S/G. The crew will implement AOP-2A due to the loss of RCS inventory and determine a S/G tube leak is occurring. The crew should commence a power reduction to take the unit off-line per AOP-2A. The boration lineup will be complicated by the loss MCC-104 requiring use of the gravity feed valves. When PZR level reaches 101 inches or Tave is <537°F the unit will be tripped and EOP-0 entered.
6	MS002_01 (.8 tube)	M	ALL	When the reactor is tripped the tube leak will degrade into a SGTR. The crew will progress through EOP-0. When the SIAS setpoint is reached train 'B' will not actuate and with 11 HPSI Pp already OOS, no HPSI Pps will be running. The crew should manually actuate train 'B' SIAS. The crew should recognize 13 HPSI has no path to inject into the RCS (header MOVs deenergized) and start 12 HPSI. The crew should complete EOP-0, determine EOP-6 is the correct EOP and implement it.
7	CCW003 (20%)	C	ALL	After the transition is made to EOP-6 and the brief complete, the leaking CCW line in CNMNT ruptures. The crew should note the CCW Low pressure alarm and the CCW Head Tank empty, isolate CCW to CNMNT and stop the CCW pumps if cavitating. The RO should stop all RCPs due to no CCW. The cooldown and isolation of 11 S/G will need to be done on natural circulation. Scenario should end when 11 S/G is isolated and S/G level and RCS inventory and subcooling have been stabilized.

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

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SCENARIO 1 OVERVIEW

The candidates will take the shift at 100% power with instructions to maintain power at 100%. STP-029 (CEA Free Movement Test) is to be performed later in the shift.

After taking the watch, 11 Loop Th fails high. The candidate is expected to evaluate the alarms, refer to the Alarm Manual and determine which instrument has failed. The associated Channel A Trip Units (1,7,10) shall be bypassed per OI-6. The candidate is expected to comply with the actions of Technical Specification 3.3.1.

After completing the required actions of Technical Specification 3.3.1, the Atmospheric Dumps Valves fail open due to the S/G pressure input signal failing high. The CRO shall take manual control of the ADVs and shut them. The candidates shall coordinate control of reactor power and turbine load as necessary to maintain/restore reactor power to less than 100% and Tc on program. The crew should implement AOP-7K.

After the plant is stabilized a CCW leak develops in CNMNT. The first indication is a CNMNT sump alarm. The sump may drain enough the first time to clear the alarm but as the leak grows the alarm will not clear. The leak size will remain within the capacity of CCW makeup. The crew should evaluate RCS conditions and determine an RCS leak does not exist. T. S. 3.4.14 should be implemented. The crew may determine a CCW leak exists based on head tank level and makeup valve position, and if so they should implement AOP-7C. Preparations for a CNMNT entry to locate the source of the leak should be initiated.

After initiating the CCW leak in CNMNT, a loss of MCC-104R occurs. The crew will determine MCC-104 has been lost and implement AOP-7I, placing 2 Charging Pps in P-T-L, shifting Ch. Pp suction back to the VCT and adjusting turbine load as necessary to maintain Tc on program. Next they will tie 1Y10 to 1Y09. After 1Y10 is reenergized, Ch. Pp suction should be returned to auto from the VCT.

About 5 minutes after the crew has reenergized 1Y10, a 90 gpm tube leak begins in 11 S/G. The crew will implement AOP-2A due to the loss of RCS inventory and determine a S/G tube leak is occurring. The crew will commence a power reduction to take the unit off-line per AOP-2A. The boration lineup will be complicated by the loss MCC-104 requiring use of the gravity feed valves. When PZR level reaches 101 inches or Tave is <537°F the unit will be tripped and EOP-0 entered.

When the reactor is tripped the tube leak will degrade into a SGTR. The crew will progress through EOP-0. When the SIAS setpoint is reached train 'B' will not actuate and with 11 HPSI Pp already OOS, no HPSI Pps will be running. The crew should manually actuate train 'B' SIAS. The crew should complete EOP-0, determine EOP-6 is the correct EOP and implement it.

After the transition is made to EOP-6 and the brief is complete, the leaking CCW line in CNMNT ruptures. The crew should note the CCW Low Pressure alarm and the CCW Head Tank or empty, isolate CCW to CNMNT and stop the CCW Pps if cavitating. The RO should stop all RCPs due to no CCW. The cooldown and isolation of 11 S/G will need to be done on natural circulation. The scenario should end when 11 S/G is isolated and S/G level and RCS inventory and subcooling have been stabilized.

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Scenario No:	1	Event No.	1	Page 4 of 15
Event Description:	11 Loop Th fails high.			

Time	Position	Applicant's Actions or Behavior
	CUE	Annunciator Alarms - PROT CH TRIP, TM/LP CH PRE-TRIP, NUCLEAR ΔT POWER CH DEVIATION, TM/LP TRIP SETPOINT, 11 RC LOOP MARGIN TO SATURATION LO.

	RO	• Identifies and reports Alarms.
		• Refers to Alarm Response Manual for various alarms.
		  • Determines trip units 1,7,10 for Channel A have tripped.
		  • Determines Loop 11 Loop Th has failed high.

	SRO	• Acknowledges report of malfunction. • Refers to Tech. Spec. 3.3.1 and determines Channel A Trip Units 1,7,10 need to be bypassed. • Directs BOP (or RO) to bypass RPS Channel A Trip Units 1,7,10 per OI-6.
	BOP	• Acknowledges request, refers to OI-6 and obtains bypass keys for Trip Units 1,7,10. • Bypasses trip units per OI-6 and request RO (or BOP) to perform a peer check.
	RO	• Performs peer check of bypass of trip units per OI-6.
	SRO	• Contacts OMC/I&C to investigate failure of 11 Loop Th.

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Scenario No: 1	Event No. 2	Page 5 of 15

Event Description: Atmospheric Dump Valves Fail Open.

Time	Position	Applicant's Actions or Behavior
	CUE:	Audible steam dump to atmosphere occurring. Open indication of both ADVs.
	BOP	• Identify and report both ADVs have gone full open, recommends taking to manual and closing.

	SRO	• Identifies/acknowledges report of open ADVs.
		• Directs BOP to take ADV controller to manual and shut ADVs.
		• Implements AOP-7K, OVER COOLING EVENT IN MODE ONE OR TWO.
		  • Determines a reactor trip is not required.
		  • Monitors reactor power:
		    • Directs RO to insert CEAs or borate to maintain reactor power to less than 100%.
		    • Directs BOP to reduce/adjust turbine load as necessary to restore/maintain Tc on program.

	RO	• Monitors reactor power and borates or inserts CEAs if necessary to maintain power less than 100%.
	BOP	• Takes ADV controller to manual and verifies both ADVs go closed. • Adjusts turbine load as necessary to maintain Tc on program.
	SRO	• Contacts OMC/I&C to investigate failure of ADV Controller.

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Scenario No: 1		Event No. 3 Page 6 of 15
Event Description:		CCW Leak in CNMNT.
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator Alarm - CNMNT NORMAL SUMP LVL HI
	BOP	• Identify and report CNMNT sump alarm, refers to ARM and drains sump.
	SRO	• Identify/acknowledge report of CNMNT sump alarm.
	BOP	• Secures draining and reports sump alarm did not clear.

	SRO	• Determines a leak is occurring inside CNMNT:
		  • Directs BOP to evaluate CNMNT environment parameters (temp, press, humidity).
		  • Directs RO to evaluate RCS inventory for leakage.

	RO	• Reports no leakage from RCS.
	BOP	• Reports no change in CNMNT environment parameters and concludes leakage is not from RCS, Feed or Steam.
	SRO	• Determines leakage from not from a hot system. • Directs BOP to monitor SRW and CCW for leakage.
	BOP	• Checks head tank levels, pump amps, pressures for SRW and CCW systems. • Directs ABO to check make-up CVs for SRW and CCW head tanks. • Reports SRW and CCW show no signs of leakage but CCW is making up (may report, suspect leakage from CCW system, head tank level will be low but not in alarm).
	SRO	• If CCW leakage is suspected may implement AOP-7C, LOSS OF COMPONENT COOLING WATER (not required). • Directs rad safety to prepare for a CNMNT entry to identify the source of the leakage. • Refers to T.S. 3.4.14 for CNMNT Sump Alarm being out of service.

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Scenario No: 1	Event No. 4	Page 7 of 15
Event Description:	Loss of MCC-104R.	

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm - Numerous. Loss of CEA position indication. Loss of various control board indications. 1-CVC-504-MOV RWT CHG PP SUCT valve open light lit. 1-CVC-501-MOV VCT OUT valve closed light lit.
	CREW	• Determines a loss of power has occurred and a reactor trip is not required. • Diagnoses the power loss to be loss of MCC-104R.

	SRO	• Directs the RO to place 2 Charging Pps in Pull-To-Lock and shift Charging Pp suction back to the VCT.
		• Directs the BOP to reduce turbine load as necessary to maintain Tc on program.
		• Implements AOP-7I, LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER:
		• Reviews preliminary section and transitions to Section XXV, REACTOR MCC-104R.
		  • Directs RO to maintain PZR level within 15 inches of program not to exceed 225 inches.
		  • Directs BOP to have plant operator tie 1Y10 to 1Y09.

	RO/BOP	• Perform actions directed by SRO.

	SRO	• After 1Y10 is reenergized:
		  • Directs RO to restore charging and letdown per OI-2A, Chemical and Volume Control System.
		  • Directs RO to return VCT Outlet and RWT Outlet valves to auto.
		  • Directs BOP to verify 11 SWGR A/C is in service.

	RO/BOP	• Perform actions directed by SRO.
	SRO	• Reviews T.S. for loss of MCC (3.8.9 and 3.6.3). Note - this is not required prior to proceeding to the next event.
	SRO	• Contact electricians to investigate Loss of MCC-104R.

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Scenario No: 1	Event No. 5	Page 8 of 15
Event Description:	SG Tube Leak/Power Reduction.	

Time	Position	Applicant's Actions or Behavior
	CUE	Lowering PZR level and pressure. Various RMS alarms - Condenser Offgas, N-16.
	RO/BOP	• Identify and report lowering PZR level. • Acknowledge/Identify and report RMS alarms, reports alarm on 11 S/G.

	SRO	• Directs implementation of AOP-2A, <u>EXCESSIVE REACTOR COOLANT LEAKAGE</u>:
		
		  • Contacts Chemistry and Radcon.
		  • Determines leakage exceeds the capacity of one charging pump.
		  • Verifies a reactor trip is not required.
		  • Since Charging Pumps are not maintaining level, directs the RO to isolate letdown.
		  • Checks for and determines a SG tube leak exists.
		  • Directs BOP to verify SG Blowdown is isolated.

	RO/BOP	• Perform actions directed by SRO.

	SRO	Directs RO and BOP to begin power reduction to take the unit offline.
		
		• Briefs RO/BOP on plant status and plan of action (downpower).
		
		• Reviews trip criteria:
		  • Tave less than 537°F
		  • PZR level can NOT be maintained > 101 inches
		  • PZR pressure reaches TM/LP pretrip setpoint
		
		• Directs RO to borate as follows:
		  • Start all available Charging Pumps
		  • Perform one minute boration from Gravity Feed (due to loss of MCC-104R)
		  • Shift suction to the RWT
		  • Adjust CEAs or boration rate if necessary
		
		• Directs BOP to reduce turbine load as necessary to maintain SG pressure between 800 and 825 PSIA.

	RO	Commences boration as follows: • Starts all Charging Pumps • Opens BAST Gravity Feed Valves • Shuts VCT outlet Valve • Borates for one minute from BAST • Opens RWT Outlet Valve • Closes BAST Gravity Feed Valves • Coordinates power reduction with BOP • Monitors reactor power, PZR level, Tave, RCS pressure

Scenario No: 1	Event No. 5	Page 9 of 15
Event Description: SG Tube Leak/Power Reduction.		

Time	Position	Applicant's Actions or Behavior
	BOP	• Coordinates power reduction with RO. • When SG pressure reaches 800-825 PSIA, reduces turbine load to maintain SG pressure in this band.
	RO	• Reports when Reactor trip criteria are met (PZR level <101 inches, or Tave <537°F)
	SRO	• Directs RO to trip the reactor and for RO and BOP to implement EOP-0, POST-TRIP IMMEDIATE ACTIONS.
	RO	• Trips reactor and implements EOP-0.

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Scenario No:	1	Event No.	6	Page 10 of 15
Event Description:	Reactor Trip with SG Tube Rupture.			

Time	Position	Applicant's Actions or Behavior
	CUE:	Manual Reactor Trip initiated.

	RO	Perform Post-Trip Immediate Actions:
		
		• Depresses ONE set of Manual RX TRIP buttons
		
		• Checks reactor tripped-
		  • Prompt drop in NI power
		  • Negative SUR
		
		• Checks ALL CEAs fully inserted
		
		• Verifies demin water makeup to RCS is secured
		  • 11 & 12 RCMU pumps secured
		  • VCT M/U valve 1-CVC-512-CV is shut
		  • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut (1-CVC-501-MOV must be opened first)
		
		Informs SRO Reactivity Safety Function is complete.

	BOP	• Checks reactor has tripped
		
		• Ensures Turbine has tripped:
		  • Depresses Turbine TRIP button.
		  • Checks the Turbine MAIN STOP VALVES shut.
		  • Checks Turbine SPEED drops
		  • Verifies turbine generator output breakers open:
		
		    • 11 GEN BUS BKR, 0-CS-552-22
		    • 11 GEN TIE BKR, 0-CS-552-23
		
		  • Verifies 11 GEN and EXCITER FIELD BKRs 1-CS-41 and 1-CS-41E are open.
		
		Informs SRO the Turbine is Tripped.

	BOP	• Checks 11 OR 14 4KV Vital Bus energized • Checks 125 VDC and 120 VAC busses energized • Verifies CCW flow to RCPs • Verifies Switchgear Ventilation in service Informs SRO Vital Auxiliaries Safety Function is complete.

Scenario No:	1	Event No.	6	Page 11 of 15

Event Description:	Reactor Trip with SG Tube Rupture.

Time	Position	Applicant's Actions or Behavior

	RO	• Ensures PZR pressure stabilizes between 1850 psia and 2300 psia and is trending to 2250 psia
		
		• Determines PZR pressure is continuing to drop
		• Manually operates heaters and sprays to attempt to restore pressure
		• When PZR pressure falls to 1725 psia, verifies SIAS actuates
		
		  • Notes SIAS 'B' fails to actuate, informs SRO and manually actuates SIAS 'B'.
		  • Informs SRO that with 11 HPSI OOS and loss of MCC-104, no HPSI path exists to RCS and starts 12 HPSI. (May also dispatch an operator for manual HPSI HDR valve operations)
		
		• Performs RCP Trip Strategy:
		
		  • When pressure drops to 1725 psia, trips either
		
		    • 11A and 12B RCPs OR
		    • 11B and 12A RCPs
		
		• Determines PZR level is not stabilizing between 80 and 180 inches or trending to 160 inches
		
		• Ensures RCS subcooling GREATER THAN 30°F
		
		Informs SRO that RCS Pressure and Inventory Safety Function can NOT be met due to low PZR pressure and PZR level.

	BOP	• Verifies Turbine Bypass Valves or ADVs operating to maintain:
		
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		
		• Checks at least one SG available for controlled heat removal
		
		  • SG level between -170 and +30 inches
		  • Main or Aux Feedwater operating to maintain level
		
		• Checks at least one RCP operating in loop with available SG
		
		• If any RCP operating, check Thot minus Tcold LESS THAN 10°F in loop with available SG
		
		Informs SRO Core and RCS Heat Removal Safety Function is complete.

Scenario No:	1	Event No.	6	Page 12 of 15

Event Description:	Reactor Trip with SG Tube Rupture.

Time	Position	Applicant's Actions or Behavior

	CREW	• Checks Containment pressure less than 0.7 psig
		
		• Checks Containment temperature less than 120°F
		
		• Checks containment radiation monitor alarms CLEAR with NO unexplained trends
		
		• Checks RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		
		• Determines a valid CNDSR OFF-GAS alarm exists and verifies S/G Blowdown secured
		
		Informs SRO that CNMNT environment is complete and Rad Levels External to CNMNT can NOT be met due to CNDSR OFF-GAS alarm.

	SRO	• Conducts EOP-0 mid-brief and directs operators to reverify Safety Function

	SRO	• Determines Recovery Procedure per Diagnostic Flowchart:
		
		  • NO for RCS press/inv safety function
		  • NO SG pressure <800 psia
		  • YES SG B/D or Offgas RMS alarm
		  • Consider EOP-6 (SGTR)
		
		  • NO for Rad levels external to CNMNT
		  • YES valid S/G B/D or Offgas RMS alarm
		  • Consider EOP-6 (SGTR)
		
		• All Safety Functions met - NO
		• Single Event Diagnosis - EOP-6
		
		• Directs transition to EOP-6.

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Scenario No:	1	Event No.	7	Page 13 of 15

Event Description:	EOP-6, SGTR.

Time	Position	Applicant's Actions or Behavior
	SRO	• Briefs crew prior to EOP-6 implementation • Directs actions per EOP-6

	CREW	• If PZR pressure LESS THAN OR EQUAL TO 1725 psia verify SIAS actuation
		• Determines maximum safety injection flow does not exist - 11 HPSI is tagged out and 13 can NOT provide injection due to loss of MCC (header MOVs deenergized shut).
		  • Safety Injection is not maximized:
		    • Starts 12 HPSI (If not done in EOP-0)
		    • Verifies SIAS lineup per Attachment 2

	RO	• Performs RCP Trip Strategy: (If not done in EOP-0)
		  • When pressure drops to 1725 psia, trips either
		    • 11A and 12B RCPs OR
		    • 11B and 12A RCPs
		• Monitors RCS temp and pressure limits per ATTACHMENT 1 for minimum pump operating pressure for running RCPs

	CREW	• Notes CC PP(S) DISCH PRESS LO annunciator • Checks CCW head tank level and notes level is empty • Checks running CCW pump(s) for cavitation, amps

	SRO	• Directs BOP to:
		  • Isolate CCW to CNMNT
		  • Stop the running CCW pump(s) if cavitating and if not monitor pump amps and system pressure until head tank level is restored and place 13 CCW Pp in P-T-L
		• Directs RO to stop all RCPs

	RO/BOP	• Perform actions directed by the SRO
	BOP	• Determines isolating CCW to CNMNT has isolated the leak
	RO	• Commences RCS Boration (verifies occurring by SIAS actuation)

	BOP	• Commences RCS Cooldown
		  • When SGIS Block permitted alarms are received, blocks SGIS
		  • Commences a rapid cooldown to <515°F Th on natural circulation
		    • Uses TBVs until loss of vacuum
		    • Uses ADVs and records time ADVs open
		  • Establishes AFW flow using 13 AFW pump to both S/Gs

Scenario No:	1	Event No.	7
Event Description:	EOP-6, SGTR.		

Time	Position	Applicant's Actions or Behavior
	BOP	• Identify, Isolate and Confirm the Affected S/G • Identifies affected S/G (11) by: • Mismatch in feed flow prior to trip • Unexplained S/G level rise pre or post trip • Main Steam Line RMS • S/G chemistry samples • When Th is less than 515°F, isolates the affected S/G by: • Shutting 11 MSIV • Verifying the MSIV bypass is shut • Shifting 11 ADV to 1C43 and verifying shut • Shutting 11 S/G FW Isolation valve • Shutting 11 AFW Block valves • Verifying 11 S/G B/D valves shut • Shutting the Main Steam Upstream Drain valves • Dispatches a plant operator to observe locally from the Aux. Bldg. Roof the S/G Safeties are shut • Verifies the correct S/G is isolated
	BOP	• When Th is <515°F continue the RCS cooldown to less than 300°F as follows: • Reduces cooldown rate to approximately 35°F/hr (due to natural circulation) • Verifies flow in the affected loop by: • Affected loop Tc trend consistent with the affected loop Tc • Tc greater than Th • Directs a plant operator to disable 11A and 11B RCPs by removing the close fuses
	RO	• Evaluates the need to throttle HPSI flow • When the following conditions are met: • At least 25°F subcooling based on CETs • PZR level > 101 inches • At least one S/G available for heat removal • RVLMS indicates level is above the top of the hot leg • Throttles HPSI flow by throttling HPSI HDR valves and/or stopping 12 HPSI PP to: • Maintain subcooling between 25 and 140°F based on CETs • PZR level between 101 and 180 inches • With PZR pressure >200 PSIA and constant stops both LPSI pumps • If the HPSI throttle criteria can not be maintained, reinitiates full flow

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Event Description: EOP-6, SGTR.

Time	Position	Applicant's Actions or Behavior

	RO	• Depressurizes the RCS to reduce subcooling and maintain PZR level
		
		• Uses Aux. Spray to depressurize the RCS as follows to maintain the following:
		  • Reduce RCS pressure to approximately affected S/G pressure
		  • at least 25°F
		  • RCS pressure as close to NPSH limit of Attachment 1 as possible
		
		• Records PZR water temp and Charging outlet temp
		• Opens Aux Spray valve
		• Operates charging loop stop valves as necessary to adjust Aux. Spray flow
		• Shifts PZR Spray control to manual
		• Shuts normal PZR Spray valves
		• Maintains PZR cooldown <200°F per hour
		
		• Controls Aux Spray flow to maintain the following
		  • Reduce RCS pressure to approximately affected S/G pressure
		  • at least 25°F
		  • RCS pressure as close to NPSH limit of Attachment 1 as possible
		
		• Controls RCS subcooling by the following methods:
		  • Controlling (securing) Aux Spray flow
		  • Operating (securing) PZR heaters
		  • Raising or lowering RCS cooldown rate
		  • Throttling or raising HPSI flow
		  • Use of PZR vent valves
		
		• When backflow is anticipated and HPSI throttle criteria are met and a bubble exists in the PZR maintains PZR level between 101 and 120 inches until backflow is initiated
		
		NOTE: Due to subcooling SG level may have to be maintained by use of the Miscellaneous Waste Sys.

	BOP	Maintains affected S/G level between -24 and +50 inches. When 11 S/G is isolated and S/G level and RCS inventory and subcooling have been stabilized terminate the scenario.

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SCENARIO #1 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicants' ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including 11 Loop Th instrument, the ADV controller, a leak in CNMNT from CCW, loss of MCC-104R, a S/G tube leak, and to execute the EOPs for a SGTR with B train of SIAS failing to actuate and the 11 HPSI Pp OOS. Following transition to EOP-6, the leaking CCW line ruptures in CNMNT requiring isolating CCW to CNMNT and tripping all RCPs.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-13. Draft Spin #805

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

5. Enter Malfunctions

____ a. SRW Pp Trip
SRW003_03 at time zero

____ b. 11 HPSI Pp Trip
SI002_01 at time zero

____ c. Failure of SIAS Actuation Channel 'B'
ESFA001_02 at time zero

____ d. 11 Loop Th Fails High
RCS004_09 on F1

____ e. Atmospheric Dump Valves Fail Open
MS016 on F2

____ f. CCW Leak in CNMNT
CCW003 0 to 1% ramp over 2 minutes on F3

____ g. Loss of MCC-104R
480V002_01 on F4

____ h. 11 S/G Tube Leak
MS001_01 set to 90 gpm on F5

____ i. 11 S/G Tube Rupture
MS002_01 set to .8 tube on F6

____ j. CCW leak in CNMNT
CCW003 after the transition to EOP-6 brief is complete, modify this malfunction to 20 %.

SCENARIO #1 SETUP

6. Enter Panel Overrides

   a. 11 HPSI Pump Green Light Out on 1C08 at time zero

   b. 11 HPSI AUTO START BLOCKED Annunciator H17 OFF

   c. 13 SRW Pump Green Light Out on 1C13 at time zero

   d. 13 SRW AUTO START BLOCKED Annunciator K15 OFF

7. Enter Remote Functions / Administrative

   a. Place 13 SRW Pump in PTL and danger tag.

   b. Place 11 HPSI Pump in PTL and danger tag.

8. Set simulator time to real time, then place simulator in CONTINUE.

9. Give crew briefing.

a.	Present plant conditions:	100% power - MOC/8,400 MWD/MTU. Unit 2 is in Mode 5. RCS Boron - 679 PPM.
b.	Power history:	100% for previous 34 days.
c.	Equipment out of service:	13 SRW Pump out of service due to grounded motor. Tripped off 6 hours ago expected to be returned to service in 2 days. 11 HPSI Pump bearing wiped during the STP 2 hours ago. Expected to be returned to service in about 36 hours. IAS T.S. 3.5.2.
d.	Abnormal conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. 11 SGFP Oil Cooler SRW flow is being controlled manually using 1-SRW-446, CV-1622 Bypass Valve.
e.	Surveillances due:	STP-O-29 is to be performed by the end of shift.
f.	Instructions for shift:	Maintain 100% power. Shift Manager will inform the crew when he is ready for them to do the brief and perform STP-O-29.

10. Allow crew 3-5 minutes to acclimate themselves with their positions.

SCENARIO #1 SETUP

___ 11. Instructions for the Booth Operator.

a. Activate Malfunctions F1-F6 when each is cued by the lead evaluator.

b. After the transition to EOP-6 brief is complete, modify malfunction CCW003 to 20 %.

SCENARIO #1 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	OMC/I&C investigate failure of 11 loop Th.	Acknowledge request.
2.	OMC/I&C investigate failure of the ADV Controller.	Acknowledge request.
3.	ABO check make-up CVs for CCW and SRW.	After 2-3 minutes report the CCW Head Tank CV is fully open and the SRW CV is shut.
4.	Rad Safety make preparations for a CNMNT entry.	Acknowledge request.
5.	PWS tie 1Y10 to 1Y09.	After approximately 3 minutes tie 1Y10 to 1Y09 and report action to the Control Room.
6.	Electricians investigate the loss of MCC-104R.	Acknowledge request.
7.	Contacts chemistry to sample both SGs and Rad con to inform them of potentially changing rad levels in the Aux. Bldg.	Acknowledge request. After about 15 minutes chemistry reports qualitative SG samples indicate RCS leakage into 11 SG.
8.	Directs ABO to verify Switchgear ventilation is in service.	After 3 minutes report 11 switchgear ventilation is in service.
9.	TBO shift #11 ADV to 1C43.	After 3 minutes report #11 ADV has been shifted to 1C43 with zero % output.
10.	ABO verify from the Aux. Bldg. roof all SG safeties are shut.	After 3 minutes report that from the Aux. Bldg. roof, all SG safeties are shut.

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SCENARIO #1 SETUP

SHIFT TURNOVER

I.	Present Plant Conditions	100%
II.	Burnup:	8400 MWD/MTU (MOC)
III.	Power History	100% for previous 34 days.
IV.	Equipment out of Service:	13 SRW Pump out of service due to grounded motor. Tripped off 6 hours ago expected to be returned to service in 2 days. 11 HPSI Pump bearing wiped during the STP 2 hours ago. Expected to be returned to service in about 36 hours. IAS T.S. 3.5.2.
V.	Abnormal Conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. 11 SGFP Oil Cooler SRW flow is being controlled manually using 1-SRW-446, CV-1622 Bypass Valve.
VI.	Surveillances Due:	STP-O-29 is to be performed by the end of shift.
VII.	Instructions for Shift	Maintain 100% power. Shift Manager will inform the crew when he is ready for them to do the brief and perform STP-O-29.
VIII.	U2 Status and Major Equipment OOS:	Mode 5.

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TAB 2

Simulation Facility: Calvert Cliffs	Scenario No.: 2	Op Test No.:	1
Examiners: ____________		Operators: ____________	SRO
____________		____________	RO
____________		____________	BOP

Objectives: To evaluate the applicant's ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including reducing power to remove a SGFP from service, failure of a VCT Level transmitter, malfunction of the Main Generator H2 Cooler SRW Controller, loss of 11 4KV Bus, and loss of the other SGFP. Upon ordering a reactor trip, an ATWS will occur. In EOP-0, a loss of the available AFW Pp results in a loss of all feedwater. In EOP-3, during the rapid cooldown to 465°F, SGIS 'A' fails to block and SGIS actuates. The loss of Condensate Booster Pump Injection capability requires initiation of Once Through Core Cooling.

Initial Conditions: The plant is at approximately 85% power (IC-67). Power increase is in progress.

12 SG has tube leakage of 3 gpd.

23 AFW Pump is OOS.

1 transformer at Waugh Chapel is OOS.

1B DG is OOS.

Turnover: Present plant conditions: 85% power, MOC; Unit 2 is in MODE 5.

Power history: 100% power for previous 60 days then reduced power to 70% 36 hours ago to repair a control oil leak on 12 SGFP.

Equipment out of service:

1) 12 SG has tube leakage of 3 gpd. Leakage has been constant at 3 gpd for the last 2 weeks.
2) 23 AFW Pp is OOS. Unit 2 has just entered Mode 5 from refueling.
3) 1 of the 3 main transformers at Waugh Chapel is OOS.
4) 1B DG is OOS. It was removed from service due to a fuel rack problem 10 hours ago and is expected to be returned to service within the next 2 hours. IAS T.S. 3.8.1.

Surveillances due: Perform STP-O-8 on 1B DG following return to service.

Instructions for shift:

1) Continue raising power to 100% per OP-3, currently at Step 6.1.i.2.
2) Perform STP-O-8 on 1B DG when it is returned to service.

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Event No.	Malf. No.	Event Type*		Event Description
Preload	DG001_02 RPS005 RPS006 Pnl Override	N/A	N/A	1B DG OOS. ATWS. SGIS 'A' Block Keyswitch in Reset
1	N/A	R N	RO BOP	The candidates receive a report that 12 SGFP is leaking oil badly and reduce power to remove it from service. The crew should reduce power IAW OP-3.
2	CVCS009	I	RO	After power has been reduced, and 12 SGFP removed from service, VCT Level Instrument LT-227 fails low. The candidate should refer to the Alarm Manual, recognize Charging Pump suction has realigned to the RWT and take action to shift suction back to the VCT.
3	TG030_01	I	BOP	Several minutes after suction is realigned to the VCT, TCV-1608 fails shut (SRW to the Main Generator H2 Cooler) due to a failed input signal. Upon receipt of the Generator Status Panel Alarm the candidate should refer to the Alarm Manual, determine TCV-1608 has failed closed, take manual control and restore SRW to the H2 cooler.
4	4KV001_01	C	All	Approximately 2 minutes after the H2 temperature alarm is clear a loss of 11 4KV Bus occurs. The candidates should determine 11 4KV Bus has been lost and that RPS is not calling for a trip. They should take actions to stabilize power and restore Tc to program. They will implement AOP-7I and will tie 1Y09 to 1Y10, start a CCW Pp, place 13 SW and SRW Pps on 11 header, 14 4KV Bus. The candidates should consider Tech. Spec. action statements for deenergized equipment.
5	FW004_01	M	All	About 5 minutes after the crew has reenergized 1Y09 and had an opportunity to review the Technical Specifications, a loss of #11 SGFP occurs (if the reactor trips during loss of 11 4KV Bus, 11 SGFP will trip when the reactor trips). The CRO should attempt to reset the SGFP but when it does not reset and the SG LO LVL pre-trips are received the CRS should order the reactor tripped and implementation of EOP-0. When the unit receives an auto trip signal or is attempted to be tripped manually it will not trip (ATWS). The RO should then deenergize the CEDM MG Sets and then verify the reactor is tripped.
6	AFW001_01	C	BOP	After the first pass through the EOP-0 Safety Functions, 11 AFW Pump trips. The crew should attempt to start 12 AFW Pump and attempt to reset 11 AFW Pump, both of which will be unsuccessful. The candidates should determine a loss of all feedwater is taking place and implement EOP-3.
7	N/A	M	ALL	After the transition is made to EOP-3, the RCPs should be tripped. Following the brief, the candidates should commence a rapid cooldown to 465°F with the expectation of using Condensate Booster Pump Injection, however, when the SGIS Block permitted is received SGIS 'A' will not block. When SGIS 'A' actuates, Booster Pump Injection will no longer be available so the candidates will have to go to OTCC. The scenario can be terminated once OTCC has been initiated.

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

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SCENARIO 2 OVERVIEW

The candidates will take the shift at approximately 80% power with instructions to raise power to 100% using OP-3. 12 SGFP has just been returned to service following repair of an oil leak The crew is to perform STP-O-8 on the 1B DG when it is returned to service.

After taking the watch, the candidates receive a report that 12 SGFP is leaking oil badly and reduce power to remove it from service. The crew should reduce power IAW OP-3.

After power has been reduced and 12 SGFP removed from service, VCT Level Instrument LT-227 fails low. The candidate should recognize Charging Pump suction has realigned to the RWT, take action to shift suction back to the VCT and refer to the Alarm Manual. I & C should be notified to investigate/repair.

Several minutes after suction is realigned to the VCT, TCV-1608 fails shut (SRW to the Main Generator H2 Cooler) due to a failed input signal. Upon receipt of the Generator Status Panel Alarm the candidate should refer to the Alarm Manual, determine TCV-1608 has failed closed, take manual control and restore SRW to the H2 cooler. I & C should be notified to investigate/repair.

After the H2 temperature alarm is clear a loss of 11 4KV Bus occurs. The candidates should determine 11 4KV Bus has been lost and that RPS is not calling for a trip. They should take actions to stabilize power and restore Tc to program. They will implement AOP-7I, tie instrument buses 1Y09 to 1Y10, start a CCW Pp place 13 SW and SRW Pps on 11 header, 14 4KV Bus (if the reactor trips during loss of 11 4KV Bus, 11 SGFP will trip when the reactor trips). The candidates should consider Tech. Spec. action statements for deenergized equipment.

About 5 minutes after the crew has reenergized 1Y09 and had an opportunity to review the Technical Specifications, a loss of #11 SGFP occurs. The CRO should attempt to reset the SGFP but when it does not reset and the SG LO LVL pre-trips are received the CRS should order the reactor tripped and implementation of EOP-0. When the unit receives an auto trip signal or is attempted to be tripped manually it will not trip (ATWS). The RO should then deenergize the CEDM MG Sets and then verify the reactor is tripped on 1C15.

After the first pass through the EOP-0 Safety Functions, 11 AFW Pump trips. The crew should attempt to start 12 AFW Pump and attempt to reset 11 AFW Pump, both of which will be unsuccessful. The candidates should determine a loss of all feedwater is taking place and implement EOP-3.

After the transition is made to EOP-3, the RCPs should be tripped. Following the brief, the candidates should commence a rapid cooldown to 465°F with the expectation of using Condensate Booster Pump Injection, however, when the SGIS Block permitted is received SGIS 'A' will not block. When SGIS 'A' actuates, Booster Pump Injection will no longer be available so the candidates will have to go to OTCC. The scenario can be terminated once OTCC has been initiated.

Event Description:	Power Reduction to Remove 12 SGFP from Service.

Time	Position	Applicant's Actions or Behavior
	CUE	The Control Room receives a report from the PWS that 12 SGFP is leaking oil badly and needs to be removed from service promptly.

	SRO	• Briefs crew on plan of action to remove 12 SGFP.
		• Directs crew to begin a rapid power reduction per OP-3 Appendix B.
		• Instructs crew on reactor trip criteria:
		  • Any valid low S/G pressure pre-trip
		  • Any valid high PZR pressure pre-trip
		  • Any valid TM/LP pre-trip
		  • S/G level approaching +50 or -45 inches
		• Informs system operator of power reduction
		• Informs chemistry if power reduction is greater than 15% in one hour

	RO	• Initiates PZR spray flow to equalize RCS Boron: (may already be in progress)
		  • Energize all PZR backup heater banks
		  • Adjust PZR Pressure Controller setpoint to maintain 2250 psia
		• Commences boration from the BASTs followed by shifting suction to the RWT:
		  • Opens BA direct makeup valve
		  • Verifies two charging pumps running
		  • Runs a BA pump for 30 seconds
		  • After BA Pump is secured, shuts BA direct makeup valve
		  • Opens RWT outlet valve
		  • Shuts VCT outlet
		• Inserts CEAs if necessary and maintains ASI within the limits of the COLR
		• Requests Peer checks for reactivity manipulations

	BOP	• Lowers TBV controller setpoint to 885 PSIA and requests peer check
		• If power is reduced below 70%, opens the LP FW heater HI LVL Dumps
		• Reduces turbine load to maintain Tc within 5°F of program (Maintains Main Steam header pressure 850-880 psia)
		• Monitors turbine parameters not to exceed
		  • 150°F/hr rate of change of 1st stage shell inner metal temperature (Point 6 on TR-4404)
		  • 75°F 1st stage shell metal temperature differential (Diff between Points 6 & 7 on TR-4404)
		  • Unloading rate of 10% step change or 5%/min
		• Biases down 12 SGFP and biases up 11 to shift the load to 11 SGFP and maintains:
		  • 11 SGFP suction flow rate <18,000 gpm
		  • 11 SGFP suction pressure> 250 psig
		  • 11 SGFP speed is < 5350 rpm
		• When 11 SGFP is carrying all the load, informs SRO and recommends tripping 12 SGFP

Scenario No:	2	Event No.	1	Page 5 of 13
Event Description:	Power Reduction to Remove 12 SGFP from Service.			

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs BOP to trip 12 SGFP and secure oil pumps except emergency oil pump • Directs RO to shift Charging suction back to the VCT • Directs RO/BOP to stabilize the unit at current power level
	RO/BOP	• Performs actions directed by SRO
	SRO	• Contacts OMC/Maintenance to investigate oil leak on 12 SGFP

Scenario No: 2	Event No. 2	Page 6 of 13

Event Description: VCT level transmitter 1-LT-227 fails LOW.

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm 1C07 F-46 CHG PP SUCT FROM RWT • 1-CVC-504-MOV RWT CHG PP SUCT valve open light lit • 1-CVC-501-MOV VCT OUT valve closed light lit
	RO	• Identifies and reports charging pump suction swap to RWT • Diagnoses boration of RCS and affect on power (rapid shutdown)
	SRO	• Acknowledges charging pump suction swap to RWT
	RO	• Verifies VCT level normal on 1-LT-226 • Determines and reports failure of 1-LT-227
	SRO	• Directs realignment to VCT by taking HS to open for 1-CVC-501-MOV and HS to shut for 1-CVC-504-MOV. • Directs BOP to reduce turbine load if necessary to maintain Tc on program
	RO/BOP	• Performs actions directed by SRO and refer to Alarm Response Manual
	SRO	• Contacts OMC/I&C to investigate failure of 1-LT-227

Scenario No: 2		Event No. 3
Event Description:		SRW Flow Controller for Main Generator H2 Cooler fails closed
Time	**Position**	**Applicant's Actions or Behavior**
	CUE	Annunciator alarm - GEN MON STATUS PANEL TCV-1608 fully shut

	BOP	• Acknowledges/reports alarm
		  • Determines alarm is COOLANT FLO PRESS TEMP alarm on status panel
		  • Refers to Alarm Response Manual (ARM)
		  • Reviews possible causes and determines a temperature control valve malfunction exists.
		  • Reports findings to SRO

	SRO	• Acknowledges report
		  • Directs BOP to manual control of TCV and restore SRW flow to H2 cooler
		  • Requests I&C investigate problem with TCV-1608 controller
		  • Directs BOP to monitor Main Generator H2 temperature

	BOP	• Takes manual control of TCV and manually opens TCV to reduce Main Generator H2 temperature • Monitors temperature and throttles TCV to maintain temperature

Scenario No: 2	Event No. 4	

Event Description: Loss of 11 4KV

Time	Position	Applicant's Actions or Behavior
	CUE	Annunciator alarms - various Zero volts on 11 4KV Bus White Bus power on light out
	Crew	• Determines a loss of power has occurred and a reactor trip is not required. • Diagnoses the power loss to be loss of 11 4KV Bus
	SRO	• Implements AOP-7I, LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER: • Directs RO to reduce power to a level consistent with feedflow (Cond and Cond Booster Pump mini flows fail open) • Directs BOP to reduce turbine load to restore Tc to program (FW heater high level dumps fail open) • Informs crew if S/G level approaches -50 inches, the reactor will be tripped
	RO/BOP	Perform actions directed by SRO

	SRO	• Directs BOP to:
		  • Start 12 or 13 CCW Pp
		  • Verify 13 and 14 CACs are maintaining CNMNT temp <120°
		  • Place all FW heater hi level dump HSs in Open

	BOP	Performs actions directed by SRO
	SRO	• Contacts Electricians investigate loss of 11 4KV Bus • Directs plant operator to tie instrument bus 1Y09 to 1Y10 • Directs plant operators align 13 Charging pump to 14 Bus • Directs plant operators to align 13 SW and 13 SRW Pumps to 11 headers
	SRO	• Directs BOP to instruct the Outside Operator to take the 1A DG to LOCAL and shut it down • Directs the BOP to verify 12 cavity cooling fan is running • Directs BOP to start 12 Main Exhaust Fan and verify 12 CR HVAC and 12 SWGR A/C are in service
	BOP	• Performs actions directed by SRO
	SRO	• When 13 SW and SRW Pumps are align to 14 4KV Bus and 11 header, directs the BOP to start 13 SW and 13 SRW Pumps • Refers to T.S. 3.8.1, 3.8.9
	BOP	• When directed by the SRO, starts 13 SW and 13 SRW Pumps

Scenario No:	2	Event No.	5	Page 9 of 13

Event Description:	Trip of 11 SGFP/Reactor Trip/ATWS

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm - 11 SGFPT TRIP Lowering SG levels Reduced Feedwater flow Trip light for 11 SGFP
	BOP	• Identify and report trip of 11 SGFP
	SRO	• Identify/acknowledge trip of 11 SGFP
	SRO	• Direct action of AOP-3G MALFUNCTION OF MAIN FEEDWATER SYSTEM • Informs crew if SG level approaches -50 inches OR SG level is < -26 AND Main Feedwater is NOT established, Trip the reactor • Directs BOP to attempt to reset 11 SGFP

	BOP	• Attempt to start tripped SGFP
		  • Verify shut the HP and LP stop valves
		  • Check the DEMAND MIN indicator is illuminated at OCS
		  • Reset the SGFP Vacuum trip and Turbine trip
		  • Depress DIRECT GOV VLV pushbutton at OCS
		  • Depress and hold the "up" SPEED arrow to obtain governor valve position approx. 3% to 5% above pre-trip governor valve position
		  • Shift OCS to HIC control as desired:
		
		• When the SGFP does not reset or as level approaches -26 inches or S/G level lo , informs the SRO

	SRO	• Directs RO to trip the reactor • Directs the RO and BOP to implement EOP-0, POST-TRIP IMMEDIATE ACTIONS

	RO	• Depresses one set of manual reactor trip pushbuttons
		  • Notes reactor failed to trip (should also note reactor failed to trip automatically if an auto trip signal was generated)
		  • Informs SRO of ATWS condition
		
		• Deenergizes CEDM Motor Generator sets:
		  • Opens 12A 480V Bus FDR (52-1201)
		  • Opens 13A 480V Bus FDR (52-1301)
		  • Opens 12A/12B 480V Bus TIE (52-1212)
		  • Opens 13A/13B 480V Bus Tie (52-1312)
		  • Reenergizes 12A and 13A 480V Buses by closing ANY breakers opened above
		• Checks ALL CEAs fully inserted
		  • Reports unable to verify due to loss of bus
		• Verifies demin water makeup to RCS is secured
		  • 11 & 12 RCMU pumps secured
		  • VCT M/U valve 1-CVC-512-CV is shut
		  • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut
		
		Reports Reactivity Control Safety Function is complete

Scenario No:	2	Event No.	6	Page 10 of 13

Event Description:	EOP-0, POST-TRIP IMMEDIATE ACTIONS

Time	Position	Applicant's Actions or Behavior
		NOTE: Actions of EOP-0 continued from Event 5 **Safety Function reports may include consideration for loss of 11 4KV Bus**

	BOP	• Checks reactor has tripped
		
		• Ensures turbine has tripped:
		  • Depresses U-1 MAIN TURB TRIP button
		  • Checks Turbine Throttle valves shut
		  • Checks turbine speed drops
		  • Verifies turbine generator output breakers open:
		    • 11 GEN BUS BKR, 0-CS-552-22
		    • 11 GEN TIE BKR, 0-CS-552-23
		  • Verifies 11 GEN FIELD BKR 1-CS-41 is open
		  • Verifies 11 GEN EXCITER FIELD BKR 1-CS-41E is open
		
		Reports the turbine is tripped

	BOP	• Checks 11 OR 14 4KV Vital Bus energized • Depresses 0C DG Emergency Start Pushbutton • Checks 125 VDC and 120 VAC busses energized • Verifies CCW flow to RCPs • Verifies Switchgear Ventilation in service Reports Vital Auxiliaries Safety Function is complete.
	RO	• Ensures PZR pressure stabilizes between 1850 psia and 2300 psia AND is trending to 2250 psia • Ensures PZR level stabilizes between 80 and 180 inches and is trending to 160 inches • Ensures RCS subcooling GREATER THAN 30°F Reports RCS Pressure and Inventory Safety Function is Complete

	BOP	• Verifies turbine bypass valves or ADVs operating to maintain:
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		
		• Check at least one SG available for controlled heat removal
		  • SG level between -170 and +30 inches
		  • Main or Aux Feedwater are operating to maintain level
		
		• Check at least one RCP operating in loop with available SG
		
		• If any RCP operating, check Thot minus Tcold LESS THAN 10°F in loop with available SG
		
		Reports Core and RCS heat removal is complete

Scenario No:	2	Event No.	6	Page 11 of 13

Event Description:	EOP-0, POST-TRIP IMMEDIATE ACTIONS

Time	Position	Applicant's Actions or Behavior

	CREW	• Checks Containment pressure less than 0.7 psig
		
		• Check Containment temperature less than 120°F
		
		• Check containment radiation monitor alarms CLEAR with NO unexplained trends:
		
		• Check RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		
		Reports CNMNT Environment and Rad Levels External to CNMNT complete (may report can not assess due to loss of power)

	SRO	• Conducts EOP-0 mid-brief and directs RO/BOP to reverify safety functions
	CREW	• On reverification, all safety functions reported as met with the exception of Core and RCS Heat Removal

	BOP	Reverification of Core and RCS Heat Removal
		
		• Verifies Turbine Bypass Valves or ADVs operating to maintain:
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		
		• Check at least one SG available for controlled heat removal
		  • SG level between -170 and +30 inches
		  • Notes no Main or Aux Feedwater operating
		  • Reports to SRO, 11 AFW Pump has tripped and taking alternate actions for loss of feed
		  • Trips both SGFPs
		  • Shuts the SG FW isolation valves
		  • Notes no AFW pumps available to start and dispatches plant operator to reset 11/12 AFW Pumps
		
		• Check at least one RCP operating in loop with available SG
		• Directs TBO/PWS to reset 12 or 11 AFW Pump
		• If any RCP operating, check Thot minus Tcold LESS THAN 10°F in loop with available SG
		
		Reports Core and RCS heat removal not met due to no main or auxiliary feedwater

	SRO	• Determines Recovery Procedure per Diagnostic Flowchart:
		  • NO for CORE and RCS Heat Removal
		  • NO for at least one S/G has feed flow
		• Consider EOP-3 (LOAF)
		
		• All Safety Functions met - NO
		• Single Event Diagnosis - EOP-3
		
		• Directs transition to EOP-3.

Event Description:	EOP-3, LOSS OF ALL FEEDWATER

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs RO to stop all RCPs
	RO	• Stops all RCPs
	SRO	• Conducts EOP-3 entrance brief and directs implementation of EOP-3 • Directs plant operators/maintenance support to restore AFW pumps
	BOP	• Shuts S/G B/D isolation valves (may already be shut)

	RO	**Note - Not all components in this step will have power**
		
		• Commences RCS boration
		  • Shuts 1-CVC-512-CV VCT M/U valve
		  • Opens 1-CVC-514-MOV BA DIRECT M/U valve
		  • Opens BAST GRAVITY FD valves
		    • 1-CVC-508-MOV
		    • 1-CVC-509-MOV
		
		  • Verifies the M/U Mode Sel Sw in manual
		  • Starts 12 BA Pump
		  • Shuts 1-CVC-501-MOV VCT OUT valve
		  • Ensures 12 and 13 Charging Pumps running
		
		• Records time boration started
		
		• Records BAST levels:
		  • 11 BAST
		  • 12 BAST
		
		• Continue boration until ONE condition met:
		  • Shutdown Margin requirements met per NEOPs
		  • BAST level lowered a total of 71 inches
		  • Boration has been in progress for:
		    • 35 minutes with THREE charging pumps running
		    • 53 minutes with TWO charging pumps running
		    • 105 minutes with ONE charging pump running

	SRO	• Directs crew to commence natural circ cooldown to less than 465°F
		  • Informs crew if both S/G levels fall below -350 inches or Tc rises uncontrollably 5°F then OTCC must be initiated
		  • Informs crew that when SGIS block permitted alarms come in SGIS will be blocked

	BOP	• Commences natural circ cooldown to < 465°F
		
		  • Uses TBVs to commence C/D
		  • When SGIS Block Permitted alarms are received, informs SRO and takes block keyswitches to BLOCK
		  • Notes SGIS A fails to block and informs SRO

<table>
<tr><td>Scenario No:</td><td>2</td><td>Event No.</td><td>7</td><td></td></tr>
<tr><td>Event Description:</td><td colspan="4">EOP-3, LOSS OF ALL FEEDWATER</td></tr>
</table>

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td></td><td>SRO</td><td>
May direct BOP to stop or slow the cooldown while a attempt is made to block SGIS locally
Directs PWS to try to block SGIS A locally at ESFAS cabinets
When reported SGIS can not be blocked locally, directs BOP to continue rapid cooldown to <465°F
Determines SGIS actuation will prevent the use of Condensate Booster Pump Injection
</td></tr>
<tr><td></td><td>BOP</td><td>
Performs actions directed by SRO
When SGIS occurs, verifies SGIS and continues rapid cooldown using the ADVs
Can Not establish AFW or Cond. Bstr Pp Inj. to SGs
</td></tr>
<tr><td></td><td>CREW</td><td>
Continues efforts to establish a feed source
Monitors S/G level and Tc and when OTCC initiation criteria are met perform the following actions:

Shifts L/D throttle valve controller to manual and shuts L/D control valves
Starts all available charging pumps (12 and 13)
Opens the main and aux HPSI header valves (only main header has power)
Starts available HPSI pumps (12 and 13)

Dispatches plant operator to locally open HPSI Hdr crossconnect valve
Aligns 13 HPSI to 14 4KV Bus and starts it
Places all PZR heaters in off
Opens the CAC emergency outlet valves
Starts all available CACs in high

Opens both PORVs as follows:

When PZR Press Block Permitted Alarm is received, then blocks SIAS
Verifies both PORV block valves are open (1-RC-403-MOV will be deenergized open)
Pulls two High PZR Pressure trip units on RPS
Verifies PORV 404 is open (may consider stripping and tying MCC-104 and 114 to open other PORV)
Verifies reduced OTCC lineup is maintaining CET temperatures constant or lowering

When RCS pressure is <1270, verifies OTCC
If CNMNT pressure reaches 2.8 psig then verifies SIAS and CIS

After OTCC has been initiated the scenario may be terminated.</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

SCENARIO #2 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicant's ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including reducing power to remove a SGFP from service, failure of a VCT Level transmitter, malfunction of the Main Generator H2 Cooler SRW Controller, loss of 11 4KV Bus, and loss of the other SGFP. Upon ordering a reactor trip, an ATWS will occur. In EOP-0, a loss of the available AFW Pp results in a loss of all feedwater. In EOP-3, during the rapid cooldown to 465°F, SGIS 'A' fails to block and SGIS actuates. The loss of Condensate Booster Pump Injection capability requires initiation of Once Through Core Cooling.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-67. Draft Spin #805

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

5. Enter Malfunctions

____ a. 1B DG Start Failure
DG001_02 at time zero

____ b. Automatic Trip Failure
RPS005 at time zero

____ c. Manual Trip Failure
RPS006 at time zero

____ d. VCT Level Transmitter Fails Lo
CVCS009 fails low on F1

____ e. 1-TIC-1608 Fails Shut SRW to H2 Cooler
TG030_01 on F2

____ f. Loss of 11 4KV Bus
4KV001_01 on F3

____ g. 11 SGFP Trips
FW004_01 on F4

____ h. Trip of 11 AFW Pump
AFW001_01 on F5

____

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SCENARIO #2 SETUP

6. Enter Panel Overrides

____ a. SGIS 'A' Block Keyswitch in RESET at time zero.

7. Enter Remote Functions/Administrative

____ a. Place 1B DG Output Breaker, 152-1403 in PTL and Danger Tag.

____ b. Place a Caution Tag on 1B DG Start pushbutton.

____ 8. Set simulator time to real time, then place simulator in CONTINUE.

____ 9. Give crew briefing.

a.	Present plant conditions:	Approximately 83% power, MOC - 8,400 MWD/MTU. Unit 2 is in Mode 5. RCS Boron - 734 PPM.
b.	Power history:	100% for previous 60 days then reduced power to 70% 36 hours ago to repair a control oil leak on 12 SGFP.
c.	Equipment out of service:	1B DG was removed from service due to a fuel rack problem 10 hours ago and is expected to be returned to service within the next 2 hours. IAS T.S. 3.8.1. 23 AFW Pump is OOS for motor replacement. Expected to be returned to service in 2 days.
d.	Abnormal conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. 12 SG has tube leakage of approximately 3 gpd. Leakage has been constant at 3 gpd for the last two weeks.
e.	Surveillances due:	STP-O-8 on 1B DG when it is returned to service.
f.	Instructions for shift:	Continue raising power to 100% per OP-3, Step 6.1.I.2. Perform STP-O-8 on 1B DG when maintenance is complete.

____ 10. Allow crew 3-5 minutes to acclimate themselves with their positions.

____ 11. Instructions for the Booth Operator.

a. When cued by the lead evaluator, as PWS, report 12 SGFP Control Oil leak has restarted and is worse than before. The pump needs to be removed from service as quickly as possible but does not have to be tripped.

b. Activate malfunctions F1-F5 as each is cued by the lead evaluator.

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SCENARIO #2 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	OMC/Maintenance to investigate oil leak on 12 SGFP.	Acknowledge request.
2.	OMC/I&C investigate failure of VCT level transmitter LT-227.	Acknowledge request.
3.	OMC/I&C investigate failure of TCV-1608.	Acknowledge request.
4.	Electricians investigate loss of 11 4KV Bus.	Acknowledge request. After 8 minutes report there appears to be a ground fault on the bus.
5.	PWS tie 1Y10 to 1Y09.	After approximately 3 minutes tie 1Y10 to 1Y09 and report action to the Control Room.
6.	Directs plant operators to align 13 Charging Pump to 14 Bus.	After about 4 minutes align 13 Charging Pump to 14 Bus and inform the Control Room.
7.	Directs plant operators to align 13 SW and 13 SRW Pumps to 11 headers.	After about 3 minutes align the pumps to the 11 headers and report action to the Control Room.
8.	OSO take 1A DG to Local and shut it down.	After 5 minutes take 1A DG to LOCAL and stop it and report actions to the Control Room.
9.	Directs ABO to verify Switchgear ventilation is in service.	After 3 minutes report 12 switchgear ventilation is in service.
10.	TBO/PWS attempt to reset 12 and/or 11 AFW Pumps.	After 3 minutes report cannot get 12 AFW pump reset. Two minutes later report unable to reset 11 AFW Pump either.
11.	Requests maintenance support to restore an AFW pump to service.	Acknowledge request.
12.	PWS go to ESFAS cabinets and attempt to block SGIS A.	After about 4 minutes report SGIS will not block at the cabinet.
13.	ABO strip selected MCC-104 and 114 loads and tie MCCs to power both PORVS.	Acknowledge request.

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SCENARIO #2 SETUP

SHIFT TURNOVER

I.	Present Plant Conditions	Approximately 83%
II.	Burnup:	8400 MWD/MTU (MOC) - Boron 734 PPM
III.	Power History	100% for previous 60 days then reduced power to 70% 36 hours ago to repair a control oil leak on 12 SGFP.
IV.	Equipment out of Service:	1B DG was removed from service due to a fuel rack problem 10 hours ago and is expected to be returned to service within the next 2 hours. IAS T.S 3.8.1.
V.	Abnormal Conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. 12 SG has tube leakage of approximately 3 gpd. Leakage has been constant at 3 gpd for the last two weeks.
VI.	Surveillances Due:	STP-O-8 on 1B DG when it is returned to service.
VII.	Instructions for Shift	Continue raising power to 100% per OP-3, Step 6.1.I.2. Perform STP-O-8 on 1B DG when maintenance is complete.
VIII.	U2 Status and Major Equipment OOS:	Mode 5. 23 AFW Pump is OOS for motor replacement. Expected to be returned to service in 2 days.

TAB-3

Simulation Facility	Calvert Cliffs	Scenario No.: **3**	Op Test No.:	**1**
Examiners:	______________	Operators:	______________	SRO
	______________		______________	RO
	______________		______________	BOP

Objectives: To evaluate the applicant's ability to initiate a normal plant power decrease; to implement the ARMs, OIs, AOPs, as appropriate, for a malfunctioning control system on a Steam Generator Feed Pump (SGFP), trip of running Boric Acid Pump, failure of a PZR Press instrument high causing PZR Spray valves to open, turbine CV failing partially closed, and Main Generator trip due to EHC power fault. To execute the EOPs for an ATWS condition following the turbine trip and subsequent pressurizer steam space LOCA due to failed open PORV and the block valve breaker tripping, and take actions for a feedline break in CNMNT requiring use of the Functional Recovery Procedure, EOP-8, and take actions for CIS failing to actuate.

Initial Conditions: The plant is at 80% Power, MOC (IC-67)

Danger tag 11 AFW Pp 1-MS-3988 "TRIPPED DO NOT RESET"

Bypass Channel "C" TM/LP with key 7

12 BAST aligned for DIRECT RECIRCULATION IAW OI-2C, 6.3 with Boric Acid Pp 12 running.

1) HS-210 in MANUAL (M/U Mode Selector Switch)
2) HS-2512 in CLOSE (CVC-512)
3) FIC-210Y in MANUAL set to 0%
4) 12 BAST recirculation valve CVC-511-CV open

Turnover: Present plant conditions: 80% power, MOC; Unit 2 is in MODE 6.

Power history: Decreasing power at 10%/hour to comply with ACTION statement of Technical Specification 3.7.3.

Equipment out of service:

1) 11 AFW Pp has failed turbine blades and is under repair. The pump has been unavailable for 9 1/2 days and may possibly be returned to service within 24 hours. 12 AFW Pp is aligned for auto start. Operations Management decided to initiate a plant shutdown about 2 hours ago to ensure compliance with the Technical Specification ACTION statement.

2) Channel "C" TM/LP trip bypassed at 0235 for troubleshooting.

Surveillances due: 12 BAST is currently on recirculation IAW OI-2C, section 6.3 for 30 minutes for planned sampling.

Instructions for shift:

1) Continue with downpower to HOT STANDBY conditions at 10% per hour.

2) 12 BAST may be restored from recirculation after 30 minutes.

Event No.	Malf. No.	Event Type*		Event Description
Preload	AFW001_01 RPS005 RPS006 ESFA010_01 ,02 Panel Override			Trip of 11 AFW Pump. Failure of automatic reactor trip (ATWS). Failure of MANUAL reactor trip (ATWS). Failure of CIS to automatically actuate. Override PORV Block Valve HS-403 to open.
1	N/A	R N	RO BOP	Continue normal plant shutdown to Hot Standby.
2	Panel Override (Set bias at 2.0)	I	BOP	Approximately 5 minutes after commencing the power decrease and with at least 5% load shed, a malfunction of 12 Steam Generator Feed Pump Bias Controller occurs causing pump speed decrease resulting in 11 SGFP speed increase and SG level decrease. The candidate is expected to recognize that a problem exists with the 12 SGFP. The candidate should take manual control of 12 SGFP. The candidate is expected to implement AOP-3G.
3	CVCS014_02	C	RO	Approximately 2 minutes after completing the required actions of AOP-3G, 12 Boric Acid Pump trips. The candidate is expected to recognize the Boric Acid Pump has failed (may pick up off computer alarm display), and should stop any operations involving use of boric acid. Upon diagnosing the cause, the candidate may select the alternate Boric Acid Pump for operation. The candidate is expected to comply with Technical Specification 3.5.2 (Charging System not required < 80% power), and TRM 15.1.2.
4	RCS023_01 (HI)	I	RO	Approximately 5 minutes after placing the alternate Boric Acid Pump in operation, PZR Pressure Transmitter 1-PT-100X fails high resulting in both PZR Spray Valves going full open. The RO should determine 100X has failed high and that RCS pressure is dropping due to both spray valves being full open. The RO should take manual control of the spray valves and shut them and shift control to channel Y. RCS pressure should be restored to normal and the Alarm Manual referenced.
5	TG024_01 (10%)	C	BOP	Approximately 3 minutes after the actions of the Alarm Manual have been taken Turbine Control Valve #1 fails partially closed. The candidates should notice the loss of load and take action to stabilize the unit by verifying the proper operation of the TBVs and inserting CEAs as necessary or boration to restore Tc to program. The candidate is expected to implement AOP-7F.
6	TG013_01	M	ALL	Approximately 5 minutes after completing the required actions of AOP-7F, a Generator trip occurs due to an EHC Power Fault. The Reactor does not trip automatically or manually. The candidate is expected to recognize a Main Generator trip has occurred and that the Reactor and Turbine failed to trip. The candidate should attempt to manually trip the Reactor and upon failure to trip, complete contingency actions required to compensate for the ATWS. The BOP should close the MSIVs.
7	RCS027_01 Pnl Override (RC-403 red lite off when HS taken to close)	M	ALL	The PORVs open due to the ATWS condition, and ERV-402 fails open. The PORV Block valve (MOV-403) breaker trips when isolation is attempted. The candidate should implement EOP-5 based on Pressurizer steam space LOCA. When the crew attempts to maintain RCS Subcooling IAW EOP-5, Step M, a feedline break in CNMNT occurs.
8	FW0010-02 (30%)	M	ALL	The crew recognizes a second event is taking place and implements the Functional Recovery Procedure, EOP-8. The candidates should select Success Paths for the Safety Functions out in EOP-0 and EOP-5. When CNMNT pressure reaches 2.8 psig CIS will fail to actuate automatically and should be manually actuated. The scenario should end after the candidates start performing PIC-3 and HR-3.

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

SCENARIO 3 OVERVIEW

From 80% power, a normal power decrease at 10%/hr will be conducted IAW OP-3, section 6.4.

Approximately 5 minutes after commencing the power decrease (at least 5%), a malfunction of 12 Steam Generator Feed Pump Bias Controller occurs causing pump speed to decrease resulting in 11 SGFP speed increase and SG level decrease. The candidate is expected to recognize that a problem exists with 12 SGFP. The candidate should take manual control of 12 SGFP. The candidate is expected to implement AOP-3G.

After completing the required actions of AOP-3G, 12 Boric Acid Pump trips. The candidate is expected to recognize the Boric Acid Pump has failed and should stop any operations involving use of boric acid. Upon diagnosing the cause, the candidate may select the alternate Boric Acid Pump for operation. The candidate is expected to comply with Technical Specification 3.5.2 (Charging System not required < 80% power), and TRM 15.1.2.

After placing the alternate Boric Acid Pump in operation, PZR Pressure Transmitter 1-PT-100X fails high resulting in both PZR Spray Valves going full open. The RO should determine 100X has failed high and that RCS pressure is dropping due to both spray valves being full open. The RO should take manual control of the spray valves and shut them and shift control to channel Y. RCS pressure should be restored to normal and the Alarm Manual referenced.

After the actions of the Alarm Manual have been taken, Turbine Control Valve #1 fails partially closed. The candidates should notice the loss of load and take action to stabilize the unit by verifying the proper operation of the TBVs and inserting CEAs as necessary or boration to restore Tc to program. The candidate is expected to implement AOP-7F.

After completing the required actions of AOP-7F, a Generator trip occurs due to an EHC Power Fault. The Reactor does not trip automatically or manually. The candidate is expected to recognize a Main Generator trip has occurred and that the Reactor and Turbine failed to trip. The candidate should attempt to manually trip the Reactor and upon failure to trip, complete contingency actions required to compensate for the ATWS. The BOP should close the MSIVs. The PORVs open due to the ATWS, and ERV-402 fails open. The PORV Block valve (MOV-403) breaker trips when isolation is attempted. The candidate should implement EOP-5 based on Pressurizer steam space LOCA. When the crew attempts to maintain RCS Subcooling IAW EOP-5, Step M, a feedline break in CNMNT occurs.

The crew recognizes a second event is taking place and implements the Functional Recovery Procedure, EOP-8. The candidates should select Success Paths for the Safety Functions out in EOP-0 and EOP-5. When CNMNT pressure reaches 2.8 psig CIS will fail to actuate automatically and should be manually actuated. The scenario should end after the candidates start performing the actions of PIC-3 HR-3.

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Scenario No:	3	Event No.	1
Event Description:	Normal plant shutdown to Hot Standby from 80% power.		

Time	Position	Applicant's Actions or Behavior
	CREW	Review Prerequisites and Precautions associated with OP-3 NORMAL POWER OPERATION

	SRO	• Directs load decrease per OP-3 Section 6.4:
		
		• Reviews guidelines for LRNIs:
		  • RPS Delta-T power is primary power indication
		  • Comparisons should be made periodically between the FOUR RPS channels and plant computer for secondary calorimetric
		  • NI power should be used for trending purposes only
		
		• Method of reducing reactor power
		  • Insertion of control rods.
		(NOTE: Boration is NOT available per OI-2C, when the BAST is set up for direct recirculation)

	RO	• Ensures Pressurizer spray flow: • Verifies PZR backup heater banks energized • Verifies PZR Pressure Controller setpoint to maintain 2250 psia • Reduces reactor power to maintain Tc within 2 °F of program • Inserts control rods (NOTE: Boration is NOT available per OI-2C, when the BAST is set up for direct recirculation)
	BOP	• Decreases turbine generator load to maintain Tc within 2 °F of program • (In LOAD LIMIT) Decreases the load by decreasing the load limit setpoint in small increments and maintain LOAD SET no higher than 100 MWe above actual load **OR** • (In LOAD SET) Decreases load by momentarily depressing the LOAD SELECTOR DECREASE button AND maintain LOAD LIMIT no higher than 100 MWe above actual load

	CREW	• Ensures requirements of APPENDIX D are met
		
		• If Tc deviates > 2°F from program Tc, notify CRS and initiate corrective actions to restore
		• Reduces MSR 2nd stage pressure in no more than 50 psig increments per Figure 2 (local)
		• Notifies Chemistry to sample RCS if power is changed by > 15% in one hour
		• Do NOT exceed turbine limits
		  • 150°F/hr rate of change of 1st stage shell inner metal temperature (Point 6 on TR-4404)
		  • 75°F 1st stage shell metal temperature differential (Diff between Points 6 & 7 on TR-4404)
		  • Unloading rate of 10% step change or 5%/min
		
		• Periodically compare all indications of power
		  • If unexplained difference exist between NI, Delta-T, or calorimetric power and plant conditions do NOT require expeditious shutdown, stabilize reactor power until discrepancy is resolved
		
		• Periodically ZERO the Voltage Regulator Transfer meter
		• Maintain ASI within limits of COLR
		• Periodically verify PZR Program Level is within acceptable PZR level band per Figure (3)
		• Periodically monitor ASI to ensure oscillations will NOT reach the ASI pre-trip value

Scenario No: 3	Event No. 2	Page 5 of 17
Event Description:	12 SG Feed Pump (SGFP) bias controller fails.	

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarms - 11/ 12 SG FW CONTR CH LVL Lowering S/G levels Decreasing 12 SGFP speed Increasing 11 SGFP speed Decreasing FW flow
	BOP	• Identify and report lowering 12 SGFP speed
	SRO	Directs actions of AOP-3G MALFUNCTION OF MAIN FEEDWATER SYSTEM Section VII: • If SG level approaches -50 inches OR SG level is < -26 and Main Feedwater is NOT established, Trip the reactor If ALL conditions maintained, operation with ONE SGFP above 440 MWE is permitted: • SGFP suction flow rate <18,000 gpm • SGFP suction pressure> 250 psig • SGFP speed is < 5350 rpm

	BOP	• Attempts to manually control 12 SGFP speed.
		
		Performs actions of AOP-3G
		• If SGFP controller fails:
		  • Verifies SGFP control mode has shifted to MAN or DIRECT GOVNR VLV at OCS
		  • Adjusts SGFP speed to maintain:
		    • Minimum of 50 psid across FRVs
		    • SG levels between -24 inches and +30 inches
		  • Balances load between 11 & 12 SGFPs by adjusting SGFPT SPD CONTR output in MANUAL on 12 SGFP

	RO/BOP	• Adjust power as necessary to maintain
		  • Tcold on program
		  • SGFP suction pressure > 250 psig

	SRO	• Contact OMC/I&C to investigate problem with 12 SGFP speed control

Scenario No: 3		Event No. 3	Page 6 of 17
Event Description:		The 12 Boric Acid pump trips.	

Time	Position	Applicant's Actions or Behavior
	CUE:	Boric Acid pump status lights de-energize (1C07) Plant computer alarm display
	RO	• Identifies and reports trip of the 12 Boric Acid Pump
	SRO	• Identifies/acknowledges trip of 12 Boric Acid Pump.
	RO	• Directs operator to locally check pump breaker 52-10406 • Aligns system for makeup from 11 Boric Acid Pump per OI-2C
	SRO	• Recognizes potential applicability of T.S. and TRM: • T.S. 3.5.2 - ECCS Operating - Charging System only required if > 80% power • TRM 15.1.2 - Boration Flowpaths - Operating
	SRO	• Contacts OMC to check breaker 52-10406 and/or 12 Boric Acid pump.

Scenario No: 3	Event No. 4	Page 7 of 17
Event Description:	PZR Pressure Transmitter 1-PT-100X fails high	

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm 1C06 - E-29 PZR CH 100 PRESS Both PZR Spray valves come full open
	RO	• Acknowledges alarm, identifies and reports PT-100X has failed high • Refers to the ARM • Notes both PZR spray valves are open

	SRO	• Acknowledges report and directs RO to:
		  • Shift PZR pressure control to channel Y
		  • Verify the PZR spray valves go closed or take 1-HIC-100 to manual and close them
		  • Restore RCS pressure to normal

	RO	• Perform actions as directed by SRO
	SRO	• Determines no T.S. are applicable
	SRO	• Contacts OMC/I&C to investigate failure of 1-PT-100X.

Scenario No: 3		Event No. 5	Page 8 of 17

Event Description:	Turbine Control Valve #1 fails partially closed

Time	Position	Applicant's Actions or Behavior
	CUE	Rising RCS temperature Rising PZR level and pressure Lowering MWe
	CREW	• Identifies rising RCS temperature, PZR level and pressure and lowering MWe
	BOP	• Diagnoses TCV#1 being partially closed as cause of the loss of load • Informs SRO

	SRO	• Directs actions of AOP-7F <u>LOSS OF LOAD</u> and concurrently implements AOP-7E, <u>MAIN TURBINE MALFUNCTIONS</u>, Section XIV, <u>Turbine Valve Failures</u>
		
		• Determines a reactor trip is not imminent
		
		• Directs the BOP/RO to stabilize the plant as follows:
		  • BOP to verify proper operation of the TBVs
		  • RO to lower reactor power to restore Tc to program by inserting CEAs or borating
		  • BOP not to adjust the turbine
		  • RO to verify PZR level and pressure are returning to their normal range
		  • BOP to verify S/G levels are restoring to normal
		
		• Refers to T.S. 3.2.5, 3.4.1, 3. 1.6, 3.4.9, as applicable.

	RO/BOP	• Perform actions directed by SRO
	SRO	• Contacts the system engineer for assistance

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Scenario No:	3	Event No.	6	Page 9 of 17
Event Description:	Turbine trip due to EHC power fault. The reactor fails to trip automatically or manually(ATWS).			

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm 1C01 A-49 MAIN GEN EXCTR FIELD BKR TRIP 1C01 A-51 MAIN GEN EXCTR AUTO TO MANUAL TRANSFER 1C05 D-5 PROT CH TRIP EHC Panel deenergized MWe are zero
	BOP	• Reports the Main Generator has tripped but no Turbine Tripped alarm
	SRO	• Acknowledges report, directs the RO to trip the reactor
	RO	• Trips reactor by depressing manual reactor trip pushbuttons. • Identifies and reports failure of reactor to trip on manual actuation of trip pushbuttons • Reports failure of reactor to trip manually or automatically (high PZR pressure)
	BOP	• Identifies and reports the turbine has not tripped
	SRO	• Directs the implementation of EOP-0, <u>POST-TRIP IMMEDIATE ACTIONS</u>

	RO	• Depresses one set of manual reactor trip pushbuttons
		  • Notes reactor failed to trip (should also note reactor failed to trip automatically)
		  • Informs SRO of ATWS condition
		
		• Deenergizes CEDM Motor Generator sets:
		  • Opens 12A 480V Bus FDR (52-1201)
		  • Opens 13A 480V Bus FDR (52-1301)
		  • Opens 12A/12B 480V Bus TIE (52-1212)
		  • Opens 13A/13B 480V Bus Tie (52-1312)
		  • Checks the reactor has tripped by:
		    • Prompt drop in NI power
		    • Negative SUR
		  • Reenergizes 12A and 13A 480V Buses by closing ANY breakers opened above
		• Checks ALL CEAs fully inserted
		• Verifies demin water makeup to RCS is secured
		  • 11 & 12 RCMU pumps secured
		  • VCT M/U valve 1-CVC-512-CV is shut
		  • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut
		
		Reports Reactivity Control Safety Function is complete

Scenario No:	3	Event No.	6	Page 10 of 17
Event Description:	Turbine trip due to EHC power fault. The reactor fails to trip automatically or manually (ATWS).			

Time	Position	Applicant's Actions or Behavior

	BOP	• Checks reactor has tripped
		
		• Ensures turbine has tripped:
		  • Depresses U-1 MAIN TURB TRIP button
		  • Checks Turbine Throttle valves shut (unable to verify due to EHC panel deenergized)
		  • Checks turbine speed drops (unable to verify due to EHC panel deenergized)
		  • With no turbine trip alarm and with first stage pressure and no EHC panel indications, closes the MSIVs
		  • Verifies turbine generator output breakers open:
		    • 11 GEN BUS BKR, 0-CS-552-22
		    • 11 GEN TIE BKR, 0-CS-552-23
		  • Verifies 11 GEN FIELD BKR 1-CS-41 is open
		  • Verifies 11 GEN EXCITER FIELD BKR 1-CS-41E is open
		
		Reports the turbine is not tripped and have closed the MSIVs

	BOP	• Checks 11 OR 14 4KV Vital Bus energized • Checks 125 VDC and 120 VAC busses energized • Verifies CCW flow to RCPs • Verifies Switchgear Ventilation in service Reports Vital Auxiliaries Safety Function is complete
		NOTE: Actions of EOP-0 continue in Event 7

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Scenario No:	3	Event No.	7	

Event Description:	PORV 402 fails open and Block Valve 403 breaker trips

Time	Position	Applicant's Actions or Behavior
	CUE	Annunciator alarm - 1C06 E-22 PORV/SAFETY VLV ACOUSTIC MON RCS pressure decrease Quench Tank level, pressure and temperature increase (until rupture)

	RO	• Reports RCS pressure is lowering and PORV 402 is open (due to proximity of acoustic sensors, may be unable to determine if it is the PORV or Safety Valve lifting)
		• Determines PZR pressure is continuing to drop and not stabilizing
		• Manually operates heaters and sprays to attempt to restore pressure
		
		• When PZR pressure falls to 1725 psia, verifies SIAS actuates
		
		• Performs RCP Trip Strategy:
		  • When pressure drops to 1725 psia, trips either
		    • 11A and 12B RCPs OR
		    • 11B and 12A RCPs
		
		• If CIS actuates, trips ALL RCPs
		• Monitors Attachment 1 for RCP NPSH requirements
		
		• Determines PZR level is not stabilizing between 80 and 180 inches or trending to 160 inches and operates Charging and letdown to attempt to restore
		
		• Ensures RCS subcooling GREATER THAN 30°F
		
		Informs SRO RCS Pressure and Inventory Safety Function can NOT be met due to low PZR pressure, high PZR level and low subcooling.

	SRO	• Directs RO to close PORV Block Valve, 1-RC-403-MOV
	RO	• Attempts to close 403 - reports to SRO block valve 403 breaker appears to have tripped
	SRO	• May direct RO to take PORV 402 to override close • Directs electricians to investigate problem with block valve 403
	RO	• If directed, takes PORV 402 to Override Close and reports to SRO PORV did not close

Scenario No:	3	Event No.	7
Event Description:	PORV 402 fails open and Block Valve 403 breaker trips		

Time	Position	Applicant's Actions or Behavior

	BOP	• Verifies ADVs operating to maintain:
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		
		• Checks at least one SG available for controlled heat removal
		  • SG level between -170 and +30 inches
		  • Main or Aux Feedwater are operating to maintain level
		    • Trips both SGFPs
		    • Shuts the SG FW isolation valves
		    • Starts an AFW Pump
		    • Operates AFW to restore SG levels to -170 to +30 inches
		
		• Checks at least one RCP operating in loop with available SG
		• If any RCP operating, checks Thot minus Tcold LESS THAN 10°F in loop with available SG
		
		Reports Core and RCS heat removal is complete (if all RCPs are off then not met due to no RCPs)

	CREW	• Checks Containment pressure less than 0.7 psig
		  • If pressure exceeds 0.7 psig:
		    • Verifies ALL available CACs operating
		    • Opens CAC EMERGENCY OUT valves for operating CACs
		  If pressure exceeds 2.8 psig, verifies actuation
		    • SIAS (already actuated due to low PZR Pressure)
		    • CIS
		    • Note CIS failed to actuate automatically, informs the SRO and manually actuates CIS
		  • If CIS actuated, trips ALL RCPs
		  • If pressure exceeds 4.25. psig, verifies CSAS actuation
		
		• Checks Containment temperature less than 120°F
		  • If temperature exceeds 120°F:
		    • Verifies ALL available CACs operating
		    • Opens CAC EMERGENCY OUT valves for operating CACs
		
		• Checks containment radiation monitor alarms CLEAR with NO unexplained trends:
		  • If alarm received, starts the IODINE FILT FANS
		
		• Checks RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		
		Reports CNMNT Environment Safety Function can NOT be met due to high CNMNT temperature and pressure
		
		Reports Radiation levels external to CNMNT Safety Function is complete

Scenario No:	3	Event No.	7	Page 13 of 17
Event Description:	PORV 402 fails open and Block Valve 403 breaker trips			

Time	Position	Applicant's Actions or Behavior

	SRO	• Determines Recovery Procedure per Diagnostic Flowchart:
		  • NO for RCS press/inv safety function
		  • NO SG pressure <800 psia
		  • NO SG B/D or Offgas RMS alarm
		  • NO to SG level response mismatch
		• Consider EOP-5 (LOCA)
		  • NO for Cont Envir safety function
		  • NO SG pressure <800 psia
		  • YES PZR pressure or level low
		• Consider EOP-5 (LOCA)
		• Single Event Diagnosis - EOP-5

	SRO	• Directs transition to EOP-5, LOSS OF COOLANT ACCIDENT • Conducts EOP-5 pre-implementation brief

	CREW	• If PZR pressure <1725 psia or CNTMT pressure > 2.8 psig:
		  • Verifies SIAS actuation (done previously)
		• Determines maximum safety injection flow exists:
		  • 11 and 13 HPSI pumps running
		  • HPSI flow per ATTACHMENT (10) when pressure below 1270 psia
		  • 11 and 12 LPSI pumps running
		  • All charging pumps running

	RO	• Performs RCP Trip Strategy:
		  • Monitors RCS pressure for minimum head requirements per Attachment 1 if any RCPs running
		• If CIS actuates or Component Cooling flow to RCPs can NOT be verified, trips ALL RCPs
		• Attempts leak isolation:
		  • Verifies L/D CNTMT Isol. shut
		    • 1-CVC-515-CV
		    • 1-CVC-516-CV
		  • Checks PORV leakage (may still be unable to determine if PORV or Safety)
		    • Quench Tank parameters
		    • PORV disch temp, computer points:
		      • T107
		      • T108
		    • Acoustic Monitor indication
		• Reports to SRO still unable to isolate PORV 402 via its block valve
		  • Shuts 1-PS-5464-CV RCS SAMPLE ISOL
		  • Shuts RXV Vent valves:
		    • 1-RC-103-SV
		    • 1-RC-104-SV
		  • Shuts PZR VENT valves:
		    • 1-RC-105-SV
		    • 1-RC-106-SV

Scenario No:	3	Event No.	7
Event Description:	PORV 402 fails open and Block Valve 403 breaker trips		

Time	Position	Applicant's Actions or Behavior

	RO (cont)	• Determines NO leakage into CC System by:
		  • Alarm clear on rad monitor 1-RI-3819 with NO rising trend
		  • CCW HEAD TK LVL alarm (1C13 K-17) clear
		• Determines leak is inside CNTMT

	CREW	• Observe CNTMT Sump level rises as RWT level drops

	RO	• With SIAS actuated, verifies boration in progress:
		  • 1-CVC-512-CV VCT M/U valve shut
		  • 1-CVC-514-MOV BA DIRECT M/U valve open
		  • BAST GRAVITY FD valves open:
		    • 1-CVC-508-MOV
		    • 1-CVC-509-MOV
		  • ALL available (11 BA Pump only) BA pumps running
		  • 1-CVC-501-MOV VCT OUT valve shut
		  • ALL available charging pumps running
		• Records time boration started
		• Records BAST levels:
		  • 11 BAST
		  • 12 BAST
		• Continues boration until ONE condition met:
		  • Shutdown Margin requirements met per NEOPs
		  • BAST level lowered a total of 71 inches
		  • Boration has been in progress for:
		    • 35 minutes with THREE charging pumps running
		    • 53 minutes with TWO charging pumps running
		    • 105 minutes with ONE charging pump running

	BOP	• If pressure exceeds 2.8 psig, verifies actuation
		  • SIAS (already verified)
		  • CIS
		• If CIS actuated. trips ALL RCPs (may already be tripped)
		• Verifies SRW Pump Room Ventilation per OI-15
		• If pressure exceeds 4.25. psig, verifies CSAS actuation and spray flow is ≈ 1350 gpm per pump:
		  • 1-FI-4148 (11 CS hdr flow)
		  • 1-FI-4149 (12 CS hdr flow)
		• Directs Chemistry to place Hydrogen Monitors in service
		• If hydrogen conc rises to 0.5%, OR hydrogen conc can NOT be determined, directs Hydrogen Recombiners be placed in service per OI-41A

Scenario No:	3	Event No.	7	Page 15 of 17
Event Description:	PORV 402 fails open and Block Valve 403 breaker trips			

Time	Position	Applicant's Actions or Behavior

	BOP	• Determines Main Feedwater is not available
		  • Verifies AFW flow is established and SG FW isolation valves shut
		    • Verifies AFW Pp Room ventilation is in service
		
		  • Establishes SG levels between +10 and +50 inches
		  • Ensures cooldown does not exceed 100°F/hr
		
		  • Secures the Main Feed System
		    • Trips SGFPs (previously done)
		    • Places Cond, Cond Bstr, and Heater Drain Pps in P-T-L
		    • Shuts the hotwell to CST dump CV

	CREW	• With Tcold > 300°F:
		  • When SGIS A and B BLOCK PERMITTED alarms are received, blocks SGIS
		  • Conducts a rapid cooldown to 300°F using ADVs NOT to exceed 100°F in any one hour

	CREW	• Evaluate need for HPSI/LPSI Throttling/Termination:
		
		  • When following conditions can be maintained:
		    • At least 30°F subcooling (CETs)
		    • PZR level > 101 inches [141 inches if CNTMT pressure > 4.25 psig]
		    • At least ONE SG available for heat removal
		    • RVLMS indicates level > top of hot leg
		
		  • HPSI flow can be reduced by throttling HPSI HDR valves OR stopping one HPSI pump at a time:
		    • Maintain RCS subcooling between 30°F and 140°F (CETs)
		    • Maintain PZR level between 101 inches and 180 inches [141 and 190 inches]
		
		  • If PZR pressure > 200 psia and either constant or rising, stop operating LPSI pumps
		
		  • If criteria can NOT be maintained after pumps are throttled or secured, restart appropriate pumps and restore full flow

	CREW	• Maintain RCS subcooling and PZR level
		
		  • If bubble exists in PZR or reactor vessel head, restore and maintain subcooling between 30°F and 140°F (CETs):
		    • Raise subcooling by ANY of following:
		      • Operate PZR heaters
		      • Raise RCS cooldown rate NOT to exceed 100°F in any ONE hour
		      • If HPSI flow has been reduced, raise HPSI flow
		
		    • Lower subcooling by ANY of following:
		      • Deenergize PZR heaters
		      • Lower RCS cooldown rate
		      • Throttle or secure HPSI/Charging flow
		      • Initiate Aux Spray
		
		  • If bubble exist in PZR AND HPSI flow secured, restore and maintain PZR level between 101 and 180 inches [141 and 190 inches] by operating charging and letdown

Scenario No:	3	Event No.	7	Page 16 of 17
Event Description:	PORV 402 fails open and Block Valve 403 breaker trips			

Time	Position	Applicant's Actions or Behavior
	CUE	• Rapidly rising CNMNT pressure, temperature, RCS cooldown rate and lowering level in 12 S/G • Increasing delta T in 12 loop
	CREW	• Notes rapidly rising CNMNT pressure, temperature, RCS cooldown rate and lowering level in 12 S/G • Determine a second events is occurring • Notes CIS has failed to actuate and informs the SRO • If CSAS had not previously actuated, then verifies CSAS
	SRO	• Directs transition to and implementation of EOP-8 • Directs RO/BOP to manually initiate CIS

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Scenario No:	3	Event No.	8	
Event Description:	Feedline Break in CNMNT/EOP-8			

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs Chemistry to sample both S/Gs for activity and place the H2 monitors in service • Directs RO to determine Success Path for RCS Pressure and Inventory • Directs BOP to determine Success Paths for Core and RCS Heat Removal and for CNMNT Environment
	RO	• Evaluates RAT, selects PIC-3 as appropriate Success Path and informs SRO
	BOP	• Evaluates RAT, selects HR-3 and CE-3 as appropriate Success Paths and informs SRO
	SRO	• Directs RO/BOP to implement selected Success Paths PIC-3 and HR-3
	RO/BOP	• Commence PIC-3 and HR-3 This scenario may be terminated once the RO and BOP implement PIC-3 and HR-3

SCENARIO #3 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicant's ability to initiate a normal plant power decrease; to implement the ARMs, OIs, AOPs, as appropriate, for a malfunctioning control system on a Steam Generator Feed Pump (SGFP), trip of running Boric Acid Pump, failure of a PZR Press instrument high causing PZR Spray valves to open, turbine CV failing partially closed, and Main Generator trip due to EHC power fault. To execute the EOPs for an ATWS condition following the turbine trip and subsequent pressurizer steam space LOCA due to failed open PORV and the block valve breaker tripping, and take actions for a feedline break in CNMNT requiring use of the Functional Recovery Procedure, EOP-8, and take actions for CIS failing to actuate.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-67. Draft Spin #805

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

5. Enter Malfunctions

____ a. 11 AFW Pump Trip
AFW001_01 at time zero

____ b. Automatic Trip Failure
RPS005 at time zero

____ c. Manual Trip Failure
RPS006 at time zero

____ d. Failure of CIS to Automatically Actuate
ESFA010_01, 02 at time zero

____ e. 12 Boric Acid Pump Trip
CVCS014_02 on F1

____ f. 1-PT-100X Pressurizer Pressure Fails High
RCS023_01 HI on F2

____ g. Turbine CV-1 Failure
TG024_01 set to 10% on F3

____ h. Unit 1 Turbine Trip EHC Power Fault
TG013_01 on F4

________ i. PORV 402 Fails Open
RCS027_01 on F5

SCENARIO #3 SETUP

____ j. 11 Feedline Rupture in CNMNT
FW010_02 set to 30% on F6

6. Enter Panel Overrides

____ a. PORV-402 Block Valve, 1-RC-403-MOV Handswitch, to OPEN

7. Enter Remote Functions/Administrative

____ a. Align 12 AFW Pump for auto start (reset Stop Valve 1-MS-3988).

____ b. Danger Tag 11 AFW Pump "Tripped Do Not Reset".

____ c. Bypass Channel "C" TM/LP Trip Unit.

____ d. Align 12 BAST for Direct Recirculation IAW OI-2C, 6.3 using 12 BA Pump.
1) HS-210 in MANUAL (M/U Mode Selector Switch)
2) HS-2512 in CLOSE (CVC-512)
3) FIC-210Y in MANUAL set to 0%
4) 12 BAST recirculation valve CVC-511-CV open

____ 8. Set simulator time to real time, then place simulator in CONTINUE.

____ 9. Give crew briefing.

a.	Present plant conditions:	Approximately 83% power, MOC - 8,400 MWD/MTU. Unit 2 is in Mode 6. RCS Boron - 734 PPM.
b.	Power history:	Decreasing power at 10%/hour from 100% to comply with ACTION statement of Technical Specification 3.7.3.
c.	Equipment out of service:	11 AFW Pp has failed turbine blades and is under repair. The pump has been unavailable for 9 1/2 days and may possibly be returned to service within 24 hours. Operations Management decided to initiate a plant shutdown about 2 hours ago to ensure compliance with the Technical Specification ACTION statement. Channel "C" TM/LP trip bypassed at 0235 for troubleshooting.
d.	Abnormal conditions:	12 AFW Pp is aligned for auto start.
e.	Surveillances due:	12 BAST is currently on recirculation IAW OI-2C, section 6.3 for 30 minutes for planned sampling.

f. Instructions for shift: Continue with downpower to HOT STANDBY conditions at 10% per hour.

12 BAST may be restored from recirculation after 30 minutes.

____ 10. Allow crew 3-5 minutes to acclimate themselves with their positions.

____ 11. Instructions for the Booth Operator.

a. When directed by the lead evaluator, using a panel override, set 12 SGFP Bias Adjust to 2.0.

b. Activate malfunctions F1-F6 as each is cued by the lead evaluator.

c. When the RO attempts to close 1-RC-403-MOV, panel override the red open light to OFF.

SCENARIO #3 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	OMC/I&C investigate 12 SGFP speed controller malfunction.	Acknowledge request.
2.	ABO checkout 12 BA Pump and also checkout its supply breaker 52-10406.	Acknowledge request. After about 4 minutes report the breaker is tripped and nothing observed to be wrong with the pump.
3.	OMC investigate trip of 12 BA Pump.	Acknowledge request.
4.	OMC/I&C investigate failure of 1-PT-100X.	Acknowledge request.
5.	PWS/TBO locally check turbine CV-1.	After approximately 3 minutes report the valve is nearly shut and no sign of any leaks.
6.	System Engineer investigate problem with turbine CV-1.	Acknowledge request. If asked for a recommendation on turbine load change, recommend not moving turbine load.
7.	Directs ABO to verify Switchgear ventilation is in service.	After 3 minutes report 12 switchgear ventilation is in service.
8.	Electricians investigate trip of 1-RC-403-MOV breaker.	After about 10 minutes report tripped on overload and are investigating.
9.	Chemistry place the Hydrogen Monitors in service.	Acknowledge request.
10.	Chemistry sample both SGs for activity.	Acknowledge request.

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SCENARIO #3 SETUP

SHIFT TURNOVER

I.	Present Plant Conditions	Approximately 83%
II.	Burnup:	8400 MWD/MTU (MOC) - Boron 734 PPM
III.	Power History	100% for previous 96 days. Decreasing power at 10%/hour to comply with ACTION statement of Technical Specification 3.7.3.
IV.	Equipment out of Service:	11 AFW Pp has failed turbine blades and is under repair. The pump has been unavailable for 9 1/2 days and may possibly be returned to service within 24 hours. Operations Management decided to initiate a plant shutdown about 2 hours ago to ensure compliance with the Technical Specification ACTION statement. Channel "C" TM/LP trip bypassed at 0235 for troubleshooting.
V.	Abnormal Conditions:	12 AFW Pp is aligned for auto start. 12 SG has tube leakage of approximately 3 gpd. Leakage has been constant at 3 gpd for the last two weeks.
VI.	Surveillances Due:	12 BAST is currently on recirculation IAW OI-2C, section 6.3 for 30 minutes for planned sampling.
VII.	Instructions for Shift	Continue with downpower to HOT STANDBY conditions at 10% per hour. 12 BAST may be restored from recirculation after 30 minutes.
VIII.	U2 Status and Major Equipment OOS:	Mode 6.

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TAB-4

Simulation Facility Calvert Cliffs	Scenario No.: **4**	Op Test No.:	**1**
Examiners: ____________		Operators: ____________	SRO
____________		____________	RO
____________		____________	BOP

Objectives: To evaluate the applicants' ability to initiate a power decrease due to a transformer cooling problem, to implement the ARMs, OIs, AOPs, as appropriate, for a Power Summer failure, a leaking PORV, MFRV Controller Failure, trip of a SRW Pump and SRW rupture in the Turbine Bldg. To evaluate on the reactor trip, a stuck out CEA, and PZR instrument line failure resulting in a 300 gpm LOCA. Once in EOP-5, a Main Steam Safety will open on 11 SG requiring the crew to implement the Functional Recovery Procedure.

Initial Conditions: The plant is at 100% Power, MOC (IC-13)

1. 1 transformer at Waugh Chapel is OOS.
2. 13 CCW Pp is OOS.
3. A moderate earthquake occurred 6 hours ago with the epicenter near Dunkirk.

Turnover: Present plant conditions: 100% power, MOC; Unit 2 is in MODE 6 for refueling

Power history: 100% power for the previous 72 days.

Equipment out of service:

1. 1 of the 3 main transformers at Waugh Chapel is OOS.
2. 13 CCW Pp is OOS.
3. A moderate earthquake occurred 6 hours ago with the epicenter near Dunkirk. The quake registered 3.1 on the Richter scale. No ERPIP declaration was deemed necessary. A plant inspection for damage is under way. No damage has been identified to this point.

Surveillances due: None.

Instructions for shift:

1. Maintain 100% power.
2. Continue plant inspection for damage due to the earthquake, notify GS-NPO immediately if any damage found.

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Event No.	Malf. No.	Event Type*		Event Description
Preload	CCW002_03 CEDS010_30			Failure of 13 CCW Pp. Stuck CEA.
1	N/A	R N	RO BOP	The System Operator informs the Control Room of a cooling problem on one of the two inservice transformers at Waugh Chapel and requests the Unit reduce to 750 MWe within the next 15 minutes. The candidates will commence a rapid power reduction to 750 MWe per OP-3.
2	NI010_01 (HI)	I	RO	Approximately 5 minutes after commencing the power decrease and with at least 5% load reduction, a Power Range Summer fails high. The candidates refer to the ARM and determine the power summer has failed. The RPS trip units (1,2,7,8,10) are bypassed per OI-6 and the actions of Tech Spec. 3.3.1 implemented.
3	RCS021 (0-20% over 2 min)	C	RO	Approximately 5 minutes after the RPS channels are bypassed, PORV 402 starts to leak. The candidate refers to the ARM and determines 402 is leaking. PORV-402 is blocked by shutting RC-403. After 403 is closed and the leakage is verified stopped, Tech. Spec. 3.4.11 is implemented.
4	FW018_01 (LO)	I	BOP	Approximately 3 minutes after reviewing the Tech. Spec., 11 MFRV Controller FIC-1111 fails LO. The candidate should note the failure and inform the CRS. The candidates should then implement AOP-3G for the feedwater malfunction. The candidate should place the FRV CONTR HS for the PDI in the MAIN FAIL position and adjust the PDI CONT to maintain level at approximately zero inches.
5	SRW003_02	C	BOP	Approximately 3 minutes after SG level has been stabilized, 12 SRW Pump trips. The ARM is referenced and a check is made for common mode failure. 13 SRW Pump will be started and AOP-7B implemented.
6	SRW002_02 (0-20% over 2 min)	M	ALL	When 13 SRW pump is started a leak that grows into a rupture over 2 minutes will begin in the Turbine Bldg. The candidates will remain in AOP-7B, isolate SRW to the Turbine Bldg. and trip the reactor. On the reactor trip, one CEA will remain stuck out and the candidate will implement EOP-0 and initiate boration for one stuck CEA.
7	RCS023_01 (LO) RCS024_02 (LO) RCS026_01 (HI) RCS002 - 300gpm	M	All	After the first review of the EOP-0 Safety Functions, a PZR reference leg fails and results in a 300 gpm LOCA. The candidates will reassess the Safety Functions and determine a LOCA is taking place apparently from a failed instrument line. The RO should also note 2 Charging Pumps stopped due to the failed high PZR level instrument and select channel Y. The crew will trip 2 RCPs and verify SIAS is initiated when RCS pressure reaches 1725 and 1740 respectively. The crew will implement EOP-5.
8	MS017_02	M	ALL	When the crew implements EOP-5, they will ensure SIAS actuation and RCP trip strategy have been addressed. After a plant cooldown is begun is EOP-5, a Main Steam Safety Valve Fails open on 11 SG. The candidates now recognize a second event is occurring and implement Functional Recovery Procedure, EOP-8. The crew will select the Success Paths for the Safety Functions out in EOP-0 & 5, then implement HR-3 and PIC-3. When HR-3 and PIC-3 are implemented the scenario can be terminated.

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

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SCENARIO 4 OVERVIEW

From 100% power, the System Operator informs the Control Room of a cooling problem on one of the two inservice transformers at Waugh Chapel and requests the Unit reduce to 750 MWe within the next 15 minutes. The candidates will commence a rapid power reduction to 750 MWe per OP-3, section 6.4..

Approximately 5 minutes after commencing the power decrease and with at least 5% load reduction, a Power Range Summer fails high. The candidates refer to the ARM and determine the power range summer has failed. The RPS channels are bypassed per OI-6 and the actions of Tech Spec. 3.3.1 implemented.

Approximately 5 minutes after the RPS channels are bypassed, PORV 402 starts to leak. The candidate refers to the ARM and determines 402 is leaking. PORV-402 is blocked by shutting RC-403. After 403 is closed and the leakage is verified stopped, Tech. Spec. 3.4.11 is implemented.

Approximately 3 minutes after reviewing the Tech. Spec., 11 MFRV Controller FIC-1111 fails LO. The candidate should note the failure and inform the CRS. The candidates should then implement AOP-3G for the feedwater malfunction. The candidate should place the FRV CONTR HS for the PDI in the MAIN FAIL position and adjust the PDI CONT to maintain level at approximately zero inches.

Approximately 3 minutes after SG level has been stabilized, 12 SRW Pump trips. The ARM is referenced and a check is made for common mode failure. 13 SRW Pump will be started and AOP-7B implemented.

When 13 SRW pump is started a leak that grows into a rupture over 2 minutes will begin in the Turbine Bldg. The candidates remain in AOP-7B, isolate SRW to the Turbine Bldg. and trip the reactor. On the reactor trip, one CEA will stick out and the candidate will implement EOP-0 and initiate boration for one stuck CEA.

After the first review of the EOP-0 Safety Functions, a PZR reference leg fails and results in a 300 gpm LOCA. The candidates will reassess the Safety Functions and determine a LOCA is taking place apparently from a failed instrument line. The RO should also note 2 Charging Pumps stopped due to the failed high PZR level instrument and select channel Y. The crew will trip 2 RCPs and verify SIAS is initiated when RCS pressure reaches 1725 and 1740 respectively. The crew will implement EOP-5.

When the crew implements EOP-5 they will ensure SIAS actuation and RCP trip strategy have been addressed. After a plant cooldown is begun is EOP-5 a Main Steam Safety Valve Fails open on 11 SG. The candidates now recognize a second event is occurring and implement Functional Recovery Procedure, EOP-8. The crew will select the Success Paths for the Safety Functions out in EOP-0 & 5, then implement HR-3 and PIC-3. When HR-3 and PIC-3 are implemented the scenario can be terminated.

Scenario No:	4	Event No.	1	Page 4 of ~~18~~ 16
Event Description:	Power reduction to 750 MWe.			

Time	Position	Applicant's Actions or Behavior
	CUE	The System Operator informs the Control Room of a cooling problem on one of the two inservice transformers at Waugh Chapel and requests the Unit reduce to 750 MWe gross within the next 15 minutes.

	SRO	• Directs crew to begin a rapid power reduction per OP-3 Appendix B.
		• Instructs crew on reactor trip criteria: (may have been covered previously in a brief)
		  • Any valid low S/G pressure pre-trip
		  • Any valid high PZR pressure pre-trip
		  • Any valid TM/LP pre-trip
		  • S/G level approaching +50 or -45 inches
		
		• Informs chemistry if power reduction is greater than 15% in one hour

	RO	• Initiates PZR spray flow to equalize RCS Boron:
		  • Energize all PZR backup heater banks
		  • Adjust PZR Pressure Controller setpoint to maintain 2250 psia
		
		• Commences boration from the BASTs followed by shifting suction to the RWT:
		  • Opens BA direct makeup valve
		  • Verifies two charging pumps running
		  • Runs a BA pump for 30 seconds
		  • After BA Pump is secured, shuts BA direct makeup valve
		  • Opens RWT outlet valve
		  • Shuts VCT outlet
		
		• Inserts CEAs if necessary and maintains ASI within the limits of the COLR
		
		• Requests Peer checks for reactivity manipulations

	BOP	• Lowers TBV controller setpoint to 885 PSIA and requests peer check
		• If power is reduced below 70%, opens the LP FW heater HI LVL Dumps
		• Reduces turbine load to maintain Tc within 5°F of program (Maintains Main Steam header pressure 850-880 psia)
		
		• Monitors turbine parameters not to exceed
		  • 150°F/hr rate of change of 1st stage shell inner metal temperature (Point 6 on TR-4404)
		  • 75°F 1st stage shell metal temperature differential (Diff between Points 6 & 7 on TR-4404)
		  • Unloading rate of 10% step change or 5%/min

	SRO	• When the Unit reaches 750 MWe:
		  • Directs RO to shift Charging suction back to the VCT
		  • Directs RO/BOP to stabilize the unit at current power level

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Scenario No:	4	Event No.	2	Page 5 of ~~18~~ 16

Event Description:	Power Range Summer Fails High.

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm - D-5, PROT CH TRIP D-12, POWER LVL CH PRE-TRIP Various other alarms
	RO	• Notes alarms on 1C05 and Channel A trip units tripped on RPS and informs SRO • Refers to ARM • Determines the channel A summer has failed high
	SRO	• Acknowledges report of malfunction. • Concurs with diagnosis of Power Range Summer failure • Refers to Tech. Spec. 3.3.1 and determines Trip Units 1,2,7,8, and 10 need to be bypassed. • Directs BOP (or RO) to bypass RPS Channel A Trip Units 1,2,7,8 and 10 per OI-6.
	BOP	• Acknowledges request, refers to OI-6 and obtains bypass keys for Trip units. • Bypasses trip units per OI-6 and requests RO (or BOP) to perform a peer check.
	RO	• Performs peer check of bypass of trip units per OI-6.
	SRO	• Contacts OMC/I&C to investigate failure of Channel A Power Range Summer.

Scenario No:	4	Event No.	3	Page 6 of ~~18~~ 16

Event Description:	PORV 402 Leakage.

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator Alarm - E-1, Quench TK TEMP LVL PRESS Acoustic Monitor indication of leakage
	RO	• Notes alarms on 1C06 and informs SRO • Refers to ARM • Determines, based on acoustic monitor indications that PORV 402 or Safety RV-200 is leaking
	SRO	• Acknowledges report and concurs with the ROs diagnosis. • Directs RO to close PORV 402 block valve 1-RC-403 (may direct RO to take PORV 402 to Override Close)
	RO	• Performs action as directed by the SRO • When Block valve 403 is closed informs the SRO PORV leakage to the Quench Tank has stopped
	SRO	• Directs RO to return Quench Tank parameters to normal per OI-1B, <u>Quench Tank Operations</u> • Refers to T.S. 3.4.11
	RO	• Performs actions directed by SRO

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Scenario No:	4	Event No.	4	

Event Description:	11 Main FRV Controller FIC-1111 Fails Low

Time	Position	Applicant's Actions or Behavior
	CUE:	SG 11 FW SYSTEM TROUBLE on alarm display FIC-1111 indicates "**F**"
	BOP	• Identifies and reports failure of FIC-1111 to the SRO

	SRO	• Acknowledges report and concurs with the BOP diagnosis
		• Directs implementation of AOP-3G, MALFUNCTION OF MAIN FEEDWATER SYSTEM
		  • Directs the BOP to place the HS for the PDI in the "Main Fail" position
		  • Directs BOP to adjust the affected PDI Controller to maintain SG level approximately zero inches

	BOP	• Performs actions directed by SRO • Restores/maintains SG level approximately zero inches
	SRO	• Contacts OMC/I&C to investigate failure of 1-FIC-1111

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Scenario No: 4		Event No. 5 Page 8 of ~~18~~
Event Description:		Trip of 12 SRW Pump.
Time	Position	Applicant's Actions or Behavior
	CUE	Annunciator alarm - 12 SRW HDR PRESS LO U-1 4KV ESF MOTOR OVERLOAD Loss of 12 SRW header pressure
	BOP	• Identifies and reports loss of 12 SRW Pp • Refers to ARM
	SRO	• Acknowledges report and directs BOP to check for common mode failure
	BOP	• Checks for Motor overload alarm, 12 SRW Head tank level and 11 SRW header parameters • Reports no common mode failure cause exists to SRO

	SRO	• Directs 12 SRW Pump be placed in P-T-L
		• Directs BOP to start 13 SRW Pump
		• Implements AOP-7B, LOSS OF SERVICE WATER
		  • Directs monitoring of Turbine/Generator parameters
		  • Directs Main Generator MVARs be reduced to zero (may not since 13 SRW Pump is started)

	CREW	• Perform actions directed by the SRO
		  • Verifies normal parameters on the 12 SRW header
		  • Verifies component temperatures return to normal

	SRO	• Contacts Electricians to investigate trip of 12 SRW Pump

Scenario No:	4	Event No.	6	
Event Description:	SRW Header Rupture in the Turbine Bldg.			

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm 1C13 12 SRW HEAD TK LVL 12 SRW Head Tank level
	BOP	• Acknowledges alarm and reports lowering level in 12 SRW Head tank. • Dispatches a plant operator to check SRW Head Tank makeup CV is open

	SRO	• Acknowledges report and refers to the beginning of AOP-7B
		• Directs the crew to:
		  • Monitor turbine/generator temperatures
		  • Reduce MVARs to zero

	CREW	• Perform actions as directed by SRO • Determines SRW Head Tank level is lowering rapidly (may initially attempt some isolation/leak locations actions as long as head tank level exists)

	SRO	• Briefs crew on plan of action
		• Directs crew to:
		  • Isolate SRW to the Turbine Bldg
		  • Stop 13 SRW Pump
		  • Start of the SWACs
		  • Trip the Reactor
		  • Implement EOP-0, <u>POST TRIP IMMEDIATE ACTIONS</u>

	RO/BOP	• Perform actions as directed by SRO
		NOTE: EOP-0 actions continued in event 7

Scenario No:	4	Event No.	7	Page 10 of ~~18~~ 16
Event Description:	Reactor Trip and SBLOCA.			

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs the implementation of EOP-0, <u>POST-TRIP IMMEDIATE ACTIONS</u>

	RO	• Depresses one set of Manual RX TRIP buttons
		
		• Checks reactor tripped:
		  • Prompt drop in NI power
		  • Negative SUR
		
		• Checks ALL CEAs fully inserted
		  • Notes one CEA failed to insert
		  • Informs SRO
		  • Commences RCS Boration as follows:
		    • Shuts VCT Outlet
		    • Opens BA Direct Makeup Valve
		    • Opens BAST Gravity Feed Valves
		    • Verifies M/U Mode Sel SW in Manual
		    • Starts a BA Pump
		    • Starts all available Charging Pumps
		
		• Verifies demin water makeup to RCS is secured
		  • 11 & 12 RCMU pumps secured
		  • VCT M/U valve 1-CVC-512-CV is shut
		  • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut
		
		Reports Reactivity Control Safety Function is complete

	BOP	• Checks reactor has tripped
		
		• Ensures Turbine has tripped:
		  • Depresses Turbine TRIP button.
		  • Checks the Turbine MAIN STOP VALVES shut.
		  • Checks Turbine SPEED drops
		  • Verifies turbine generator output breakers open:
		
		    • 11 GEN BUS BKR, 0-CS-552-22
		    • 11 GEN TIE BKR, 0-CS-552-23
		
		  • Verifies 11 GEN and EXCITER FIELD BKRs 1-CS-41 and 1-CS-41E are open.
		
		Informs SRO the Turbine is Tripped.

Scenario No: 4	Event No. 7	Page 11 of ~~18~~ 16
Event Description:	Reactor Trip and SBLOCA.	

Time	Position	Applicant's Actions or Behavior
	BOP	• Checks 11 OR 14 4KV Vital Bus energized • Checks 125 VDC and 120 VAC busses energized • Verifies CCW flow to RCPs • Verifies Switchgear Ventilation in service Informs SRO Vital Auxiliaries Safety Function is complete.
	RO	• Ensures PZR pressure stabilizes between 1850 psia and 2300 psia AND is trending to 2250 psia • Ensures PZR level stabilizes between 80 and 180 inches and is trending to 160 inches • Ensures RCS subcooling GREATER THAN 30°F Reports RCS Pressure and Inventory Safety Function is Complete

	BOP	• Verifies Turbine Bypass Valves or ADVs operating to maintain-
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		
		• Check at least one SG available for controlled heat removal
		  • SG level between -170 and +130 inches
		  • Main or Aux Feedwater are operating to maintain level
		
		• Check at least one RCP operating in loop with available SG
		
		• If any RCP operating, check Thot minus Tcold LESS THAN 10°F in loop with available SG
		
		Reports Core and RCS heat removal is complete

	CREW	• Checks Containment pressure less than 0.7 psig
		
		• Check Containment temperature less than 120°F
		
		• Check containment radiation monitor alarms CLEAR with NO unexplained trends-
		
		• Check RMS alarms CLEAR with NO unexplained trends-
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		
		Reports CNMNT Environment and Rad Levels External to CNMNT complete

	SRO	• Conducts EOP-0 mid-brief and directs RO/BOP to reverify safety functions
	CUE	Various annunciators associated with PZR level and pressure Lowering RCS pressure and PZR level

Scenario No:	4	Event No.	7	Page 12 of ~~18~~ 16
Event Description:	Reactor Trip and SBLOCA.			

Time	Position	Applicant's Actions or Behavior

	RO	• Notes PZR level and Pressure alarms and lowering PZR pressure and level
		• Informs SRO
		
		• Notes loss of 2 Ch. Pps due to failed PZR Level high
		• Selects Channel Y for failed instruments and verifies all Ch. Pps running
		
		• On reverification of RCS Pressure and Inventory:
		
		• Determines PZR pressure is continuing to drop
		• Manually operates heaters and sprays to attempt to restore pressure
		• If PZR pressure falls to 1725 psia, verifies SIAS actuates
		
		• Performs RCP Trip Strategy:
		  • If pressure drops to 1725 psia, trips either
		    • 11A and 12B RCPs OR
		    • 11B and 12A RCPs
		
		• Determines PZR level is not stabilizing between 80 and 180 inches or trending to 160 inches
		• Ensures RCS subcooling GREATER THAN 30°F
		
		Informs SRO that RCS Pressure and Inventory Safety Function can NOT be met due to low PZR pressure and PZR level.

	BOP	• On reverification of CNMNT Environment:
		
		• Checks Containment pressure less than 0.7 psig
		  • If pressure exceeds 0.7 psig:
		    • Verifies ALL available CACs operating
		    • Opens CAC EMERGENCY OUT valves for operating CACs (may not open 12 SRW HDR valves)
		• Checks Containment temperature less than 120°F
		  • If temperature exceeds 120°F:
		    • Verifies ALL available CACs operating
		    • Opens CAC EMERGENCY OUT valves for operating CACs (may not open 12 SRW HDR valves)
		
		• Checks containment radiation monitor alarms CLEAR with NO unexplained trends:
		  • If alarm received, starts the IODINE FILT FANS
		
		• Checks RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		
		Reports CNMNT Environment Safety Function can NOT be met due to high CNMNT temperature and pressure
		
		Reports Radiation levels external to CNMNT Safety Function is complete

Scenario No:	4	Event No.	7	Page 13 of ~~15~~ 16
Event Description:	Reactor Trip and SBLOCA.			

Time	Position	Applicant's Actions or Behavior

	SRO	• Determines Recovery Procedure per Diagnostic Flowchart:
		  • NO for RCS press/inv safety function
		  • NO SG pressure <800 psia
		  • NO SG B/D or Offgas RMS alarm
		  • NO to SG level response mismatch
		• Consider EOP-5 (LOCA)
		  • NO for Cont Envir safety function
		  • NO SG pressure <800 psia
		  • YES PZR pressure or level low
		• Consider EOP-5 (LOCA)
		• Single Event Diagnosis - EOP-5

Scenario No:	4	Event No.	8	Page 14 of ~~18~~ 16
Event Description:	SBLOCA and Main Steam Safety Valve Fails Open.			

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs transition to EOP-5, <u>LOSS OF COOLANT ACCIDENT</u> • Conducts EOP-5 pre-implementation brief

	CREW	• If PZR pressure <1725 psia or CNTMT pressure > 2.8 psig:
		  • Verifies SIAS actuation or
		  • If SIAS has not yet actuated, then manually aligns SI System Pps and valves and blocks SIAS
		
		• Determines maximum safety injection flow exists:
		  • 11 and 13 HPSI pumps running
		  • HPSI flow per ATTACHMENT (10) when pressure below 1270 psia
		  • 11 and 12 LPSI pumps running
		  • LPSI flow per ATTACHMENT (11) when pressure below 185 psia
		  • All charging pumps running

	RO	• Performs RCP Trip Strategy:
		  • When pressure drops to 1725 psia, trip either
		    • 11A AND 12B RCPs or
		    • 11B and 12A RCPs
		
		• If CIS actuates or Component Cooling flow to RCPs can NOT be verified, trips ALL RCPs
		
		• Monitors RCS pressure for minimum head requirements per Attachment 1 if any RCPs running
		
		• Attempts leak isolation:
		  • Verifies L/D CNTMT Isol. shut
		    • 1-CVC-515-CV
		    • 1-CVC-516-CV
		  • Checks PORV leakage
		    • Quench Tank parameters
		    • PORV disch temp, computer points:
		      • T107
		      • T108
		    • Acoustic Monitor indication
		
		  • Shuts 1-PS-5464-CV RCS SAMPLE ISOL
		  • Shuts RXV Vent valves:
		    • 1-RC-103-SV
		    • 1-RC-104-SV
		  • Shuts PZR VENT valves:
		    • 1-RC-105-SV
		    • 1-RC-106-SV
		
		  • Determine NO leakage into CC System by:
		    • Alarm clear on rad monitor 1-RI-3819 with NO rising trend
		    • CCW HEAD TK LVL alarm (1C13 K-17) clear
		  • Determines leak is inside CNTMT

Scenario No: 4	Event No. 8	Page 15 of ~~18~~ 16
Event Description:	SBLOCA and Main Steam Safety Valve Fails Open.	

Time	Position	Applicant's Actions or Behavior
	CREW	• Observe CNTMT Sump level rises as RWT level drops

	RO	• With SIAS actuated, verifies boration in progress:
		  • 1-CVC-512-CV VCT M/U valve shut
		  • 1-CVC-514-MOV BA DIRECT M/U valve open
		  • BAST GRAVITY FD valves open:
		    • 1-CVC-508-MOV
		    • 1-CVC-509-MOV
		  • ALL available (11 BA Pump) BA pumps running
		  • 1-CVC-501-MOV VCT OUT valve shut
		  • ALL available charging pumps running
		• Records time boration started
		• Records BAST levels:
		  • 11 BAST
		  • 12 BAST
		• Continues boration until ONE condition met:
		  • Shutdown Margin requirements met per NEOPs
		  • BAST level lowered a total of 71 inches
		  • Boration has been in progress for:
		    • 35 minutes with THREE charging pumps running
		    • 53 minutes with TWO charging pumps running
		    • 105 minutes with ONE charging pump running

	BOP	• If pressure exceeds 2.8 psig, verifies actuation
		  • SIAS
		  • CIS
		• If CIS actuated, trips ALL RCPs
		• Verifies SRW Pump Room Ventilation per OI-15
		• Directs Chemistry to place Hydrogen Monitors in service
		• If hydrogen conc rises to 0.5%, OR hydrogen conc can NOT be determined, directs Hydrogen Recombiners be placed in service per OI-41A

	BOP	• Determines Main Feedwater is not available (loss of SRW to Turbine Bldg.)
		  • Verifies AFW flow is established and SG FW isolation valves shut
		    • Verifies AFW Pp Room ventilation is in service
		  • Establishes SG levels between +10 and +50 inches
		  • Ensures cooldown does not exceed 100°F/hr
		  • Secures the Main Feed System
		    • Trips SGFPs (previously done)
		    • Places Cond, Cond Bstr, and Heater Drain Pps in P-T-L
		    • Shuts the hotwell to CST dump CV

Scenario No: 4	Event No. 8	Page 16 of ~~18~~ 16
Event Description:	SBLOCA and Main Steam Safety Valve Fails Open.	
Time	**Position**	**Applicant's Actions or Behavior**

	CREW	• With Tcold > 300°F:
		  • When SGIS A and B BLOCK PERMITTED alarms are received, blocks SGIS
		  • Conducts a rapid cooldown to 300°F using ADVs, NOT to exceed 100°F in any one hour

	CUE	Audible Steam release taking place Rapidly lowering RCS temperature and pressure
	CREW	• Notes steam release and changing plant parameters • Determines a second event is occurring
	SRO	• Directs implementation of EOP-8

	SRO	• Performs RCP Trip Strategy:
		  • When pressure drops to 1725 psia, trip either
		    • 11A AND 12B RCPs or
		    • 11B and 12A RCPs
		
		• If CIS actuates or Component Cooling flow to RCPs can NOT be verified, trips ALL RCPs
		• Monitors RCS pressure for minimum head requirements per Attachment 1 if any RCPs running
		
		• Directs Chemistry to sample both S/Gs for activity and place the H2 monitors in service
		• Directs RO to determine Success Path for RCS Pressure and Inventory
		• Directs BOP to determine Success Paths for Core and RCS Heat Removal and for CNMNT Environment

	CREW	• Notes SGIS Block Permitted Alarm and verifies SGIS (SRO may have directed MSIVs closed previously)
	CREW	• Determines 11 SG has the failed open Safety valve
	SRO	• Directs the BOP to isolate AFW to 11 SG
	BOP	• Isolates AFW to 11 SG
	RO	• Evaluates RAT, selects PIC-3 as appropriate Success Path and informs SRO
	BOP	• Evaluates RAT, selects HR-3 and CE-3 as appropriate Success Paths and informs SRO
	SRO	• Directs RO/BOP to implement selected Success Paths PIC-3 and HR-3
	RO/BOP	• Commence PIC-3 and HR-3 This scenario may be terminated once the RO and BOP implement PIC-3 and HR-3

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SCENARIO #4 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicant's ability to initiate a power decrease due to a transformer cooling problem, to implement the ARMs, OIs, AOPs, as appropriate, for a Power Summer failure, a leaking PORV, MFRV Controller Failure, trip of a SRW Pump and SRW rupture in the Turbine Bldg. To evaluate on the reactor trip, a stuck out CEA, and PZR instrument line failure resulting in a 300 gpm LOCA. Once in EOP-5, a Main Steam Safety will open on 11 SG requiring the crew to implement the Functional Recovery Procedure.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-13. Draft Spin #805

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

5. Enter Malfunctions

____ a. 13 CCW Pump Breaker Failure
CCW002_03 at time zero

____ b. CEA 30 Fails to Insert on Trip
CEDS010_30 at time zero

____ c. Power Summer Fails HIGH
NI010_01 High on F1

____ d. PORV 402 Seat Leakage
RCS021 ramp 0 to 20 % over 2 minutes on F2

____ e. 11 SGFP MFRV Controller 1-FIC-1111 Fails LOW
FW018_01 LO on F3

____ f. 12 SRW Pump Breaker Failure
SRW003_02 on F4

____ g. 12 SRW Header Leak in the Turbine Bldg.
SRW002_02 ramp 0 to 20% over 2 minutes on F5

____ h. 1-PT-100X Pressurizer Pressure Fails LOW
RCS023_01 LO on F6

____ i. 1-PT-102B Pressurizer Pressure Fails LOW
RCS024_02 LO on F7

j. 1-LT-110X Pressurizer Level Fails HIGH
RCS026_01 HI on F8

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SCENARIO #4 SETUP

k. RCS Leak
RCS002 - 300 gpm on F9

l. 11 SG Safety Valve Fails Open
MS017_02 on F10

6. Enter Panel Overrides

____ a. 13 CCW Pump AUTO START BLOCKED Alarm, to OFF.

____ b. 13 CCW Pump Green Light Out on 1C13 at time zero

7. Enter Remote Functions/Administrative

____ a. Place 13 CCW Pump in PTL and Danger Tag.

____ 8. Set simulator time to real time, then place simulator in CONTINUE.

____ 9. Give crew briefing.

a.	Present plant conditions:	Approximately 100% power, MOC - 8,400 MWD/MTU. Unit 2 is in Mode 6. RCS Boron - 679 PPM.
b.	Power history:	100% for previous 72 days.
c.	Equipment out of service:	13 CCW Pp is OOS due to a cracked pump shaft. 3 days until returned to service.
d.	Abnormal conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. A moderate earthquake occurred 6 hours ago with the epicenter near Dunkirk. The quake registered 3.1 on the Richter scale. No ERPIP declaration was deemed necessary. A plant inspection for damage is under way. No damage has been identified to this point.
e.	Surveillances due:	None.
f.	Instructions for shift:	Maintain 100% power. Continue plant inspection for damage due to the earthquake, notify GS-NPO immediately if any damage found.

____ 10. Allow crew 3-5 minutes to acclimate themselves with their positions.

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SCENARIO #4 SETUP

____ 11. Instructions for the Booth Operator.

a. When directed by the lead evaluator, call as the System Operator and inform the Control Room that there is a cooling problem on one of the two in service main transformers at Waugh Chapel and Unit 1 needs to reduce load to 750 MWe within the next 15 minutes.

b. Activate malfunctions F1-F5 as each is cued by the lead evaluator.

c. When cued by the lead evaluator, activate malfunction F6-F9 as rapidly as possible.

d. Activate malfunction F-10 in EOP-5 when cued by the lead evaluator.

SCENARIO #4 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	OMC/I&C investigate power range channel A summer failure.	Acknowledge request.
2.	OMC/I&C investigate failure of 11 MFRV Controller, 1-FIC-1111.	Acknowledge request.
3.	Electricians investigate trip of 12 SRW Pump.	Acknowledge request. After 10 minutes report the pump appears to have tripped on overcurrent.
4.	ABO check SRW Head Tank CV is making up.	After approximately 2 minutes report the SRW CV is fully open.
5.	TBO/PPO attempt to locate the source of the leak.	Acknowledge request.
6.	OSO isolate starting air to 1B DG.	After about 5 minutes enter malf. DG001_02, 1B DG Start Failure and report to the Control Room that starting air has been isolated.
7.	Directs ABO to verify Switchgear ventilation is in service.	After 3 minutes report 12 switchgear ventilation is in service.
8.	Chemistry place the Hydrogen Monitors in service.	Acknowledge request.
9.	Chemistry sample both SGs for activity.	Acknowledge request.

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SCENARIO #4 SETUP

SHIFT TURNOVER

I.	Present Plant Conditions:	Approximately 100%.
II.	Burnup:	8400 MWD/MTU (MOC) - Boron 679 PPM.
III.	Power History:	100% for previous 72.
IV.	Equipment out of Service:	13 CCW Pp is OOS due to a cracked pump shaft. 3 days until returned to service.
V.	Abnormal Conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. A moderate earthquake occurred 6 hours ago with the epicenter near Dunkirk. The quake registered 3.1 on the Richter scale. No ERPIP declaration was deemed necessary. A plant inspection for damage is under way. No damage has been identified to this point.
VI.	Surveillances Due:	STP-O-8 on 1B DG when it is returned to service.
VII.	Instructions for Shift:	Maintain 100% power. Continue plant inspection for damage due to the earthquake, notify GS-NPO immediately if any damage found.
VIII.	U2 Status and Major Equipment OOS:	Mode 6.

JPM Revision Justification

SROI and SROU Admin Topics:

* Changed Topics A2 and A3 from 1 JPM in each topic to 2 questions per topic

  Reason: The Administrative procedures that applied to the original outline are too specific and checklist driven.

JPMs:

* Editorial changes on JPMs 1 (N),6 (RCS), and 7(A)
* Changed JPM 9 due to original was used in audit exam
* JPM 3 and 4 changed to followup question K/As more appropriate to System

Facility: Calvert Cliffs Examination Level: RO		Date of Examination: 1/25/99 Operating Test Number: 1
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Shift Staffing	K/A 2.1.3//R3.0/S3.4// Shift Turnover - RO turnover Checklist
		K/A 2.1.2 //R3.0/S4.0// Reactor Shutdown- CRO responsibility
	Plant Parameter Verification	K/A 2.1.7//R3.7/S4.4// Evaluate plant heat balance performance
		K/A 2.1.25//R2.8/S3.1// Obtain and interpret reference material for SW Heat Exchangers
A2	Surveillance Testing	K/A 2.2.12//R3.0/S3.4// Knowledge of surveillance required for CEA deviation circuit
		K/A 2.2.13//R3.6/S3.8// Knowledge of Tagging clearance procedures for surveillance test of HPSI pump with LTOP controls in effect
A.3	Control of Radiation Releases	K/A 2.3.10//R2.9/S3.3/ Ability to use SCBAs for Control Room High Airborne Activity
		K/A 2.3.11//R2.7/S3.2// Conditions to secure a liquid waste release
A.4	Emergency Procedures	K/A 2.4.3//R3.5/S3.8// Identify Post Accident Instrumentation
		K/A 2.4.32//R3.3/S3.5// Knowledge of operator response to a loss of all annunciators

Facility: Calvert Cliffs		Date of Examination: 1/25/99
Examination Level: SRO-U		REVISED 12/20/98 Operating Test Number: 1
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Shift Turnover	JPM K/A 2.1.3//R3.5:S 3.4// Complete Fuel Handling Supervisor turnover checklist.
	Plant parameter verification	JPM - K/A 2.1.33//R3.4:S4.0// Surveillance Test results review- entry level conditions for Tech Specs
A2	Troubling/Shooting - Configuration Control	K/A 2.2.20//R2.20:S3.3// - Administrative Procedure "Trouble Shooting & Procedure Controlled Activities". MN-1-10
		K/A 2.2.19//R2.1:S3.1// - Knowledge of Maintenance Order process for unscheduled work
A.3	Control of Radiation Releases	K/A 2.3.6//R2.1:S3.1// - Review for approval of Containment Purge release
		K/A 2.3.11//R2.7/S3.2// - Ability to control release during SGTR event
A.4	Event Classification	JPM - K/A 2.4.41//R2.3: S4.1// - Emergency Response Plan Implementation Procedures - Declare event and make notification(s)

Facility: Calvert Cliffs | Date of Examination: 1/25/99
Examination Level: SRO-I | REVISED 12/20/98 | Operating Test Number: 1

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Shift Turnover	JPM K/A 2.1.3//R3.5:S 3.4// Complete Fuel Handling Supervisor turnover checklist.
	Plant parameter verification	JPM - K/A 2.1.33//R3.4:S4.0// Surveillance Test results review- entry level conditions for Tech Specs
A2	Troubling Shooting - Configuration Control	K/A 2.2.20//R2.20:S3.3// - Administrative Procedure "Trouble Shooting & Procedure Controlled Activities". MN-1-10
		K/A 2.2.19//R2.1/S3.1// - Knowledge of Maintenance Order process for unscheduled work
A.3	Control of Radiation Releases	K/A 2.3.20//R2.1:S3.1// - Review for approval of Containment Purge release
		K/A 2.3.11//R2.7/S3.2// - Ability to control release during SGTR event
A.4	Event Classification	JPM - K/A 2.4.41//R2.3: S4.1// - Emergency Response Plan Implementation Procedures - Declare event and make notification(s)

Facility: Calvert Cliffs Units 1 & 2 Date of Examination: January 25, 1999
Examination Level: RO REVISED 12/20/98 Operating Test Number: 1

System / JPM Title / Type Codes*	Safety Function	Planned Followup Questions: K/A/G – Importance - Description
1. Control Element Drive System / Recover a Misaligned CEA	I	a. 000001A113 4.0/4.2 Evaluation of PDIL with changes in primary parameters
N S		b. 000001A212 3.6/4.2 Evaluation of ECP
2. Electrical AC / Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power	VI	a. 000062K102 4.1/4.4 Loss of Offsite Power in MODE 5 - evaluation of sources
M A S		b. 000064G112 2.9/4.0 Evaluation of DG OPERABILITY requirements
3. Reactor Protection System / Pre starup checks	VII	a. 000012K401 3.7/4.0 Design features of trip logic with 1 channel OOS
N S L		b. 000012K604 3.3/3.6 Effect from loss of Block circuit
4. Containment Spray/ CSAS Verification	V	a. 000027A403 3.3/3.2 Containment Iodine Removal design flow rate
N A S		b. 000022K402 3.1/3.4 Containment Air Cooler design speeds
5. Shut Down Cooling / Respond to a loss of SDC with RCS pressurization possible	IV	a. 00024AA206 3.6/3.7 Sources of RCS dilution during startup
D A S L		b. 00025AK101 3.9/4.3 Evalution of "Time to Boil" calculations during Reduced Inventory Operation
6. RCS / Align Charging header to the Aux HPSI header with RCS leakage greater than one charging pump capacity (isolable leak on Charging header)	II	a. 000004K604 2.8/3.1 Charging pump protection during SIAS/Non-SIAS conditions
M S		b. 000002K201 4.3/4.4 Calculation of RCS leakrate
7. Component Cooling/ Shifting Component Cooling Heat Exchangers	VIII	a. 000003K404 3.1/3.4 RCP component cooling flow requirements
N A S		b. 000008A102 2.9/3.1 Component Cooling system temperature control
8. STM DUMP / Lineup for ADV control at 1(2)C43 Safe Shutdown Panel due to Control Room Evacuation	IV	a. 000061K404 3.1/3.4 AFW System flow rate limits
D P		b. 00068AK312 4.1/4.5 Securing CEDM MGs during Control Room Evacuation
9. AC Distribution/ Tie Vital MCCs (1Y09 and 1Y10)	VI	a. 00055EK301 2.7/3.4 Battery design limit during SBO
		b. 000062K103 3.5/4.0 Sources of DC power

may not
have proper
[illegible]

D P		
10. Chemical and Volume Control / Isolate Dilution Paths	I	a. 004000A110 3.7/3.9 Determination of dilution that would activate S/D Monitor alarm
D P R		b. 010000G132 3.4/3.8 Limitations on use of Aux. Spray

Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA

Facility: Calvert Cliffs Units 1 & 2		Date of Examination: January 25, 1999
Examination Level: SRO-U	REVISED 12/20/98	Operating Test Number: 1

System / JPM Title / Type Codes*	Safety Function	Planned Followup Questions: K/A/G – Importance - Description
1. Electrical AC/ Transfer 11/17/ 4KV Bus loads from 1A DG to Offsite power	VI	a. 000062K102 4.1/4.4 Loss of Offsite power in Mode 5 - evaluation of sources
M A S		b. 000064G112 2.9/4.0 Evaluation of DG operability
2. Containment Spray / CSAS Verification	V	a. 000027A403 3.3/3.2 Containment Iodine Removal design flow rate
N A S		b. 000022K402 3.1/3.4 Containment Air Cooler design speed
3. Reactor Protection System / Pre startup checks	VII	a. 000012K401 3.7/4.0 Design features of trip logic with 1 channel OOS
N S L		b. 000012K604 3.3/3.6 Effect of loss of Block circuit
4. STM DUMP / Lineup for ADV control at 1(2)C43 Safe Shutdown Panel due to Control Room Evacuation	IV	a. 000061K404 3.1/3.4 AFW System flow rate limit
D P		b. 00068AK312 4.1/4.5 Securing CEDM Mgs during Control Room Evacuation
5. Chemical and Volume Control / Isolate Dilution Paths	I	a. 004000A110 3.7/3.9 Determination of dilution that would activate S/D Monitor alarm
D P R		b. 010000G132 3.4/3.8 Limitations on use of Aux. Spray

Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA

Facility: Calvert Cliffs Units 1 & 2		Date of Examination: January 25, 1999
Examination Level: SRO-I	REVISED 12/20/98	Operating Test Number: 1

System / JPM Title / Type Codes*	Safety Function	Planned Followup Questions: K/A/G – Importance - Description
1. Control Element Drive System / Recover a Misaligned CEA	I	a. 001000A113 4.0/4.2 Evaluation of PDIL with changes in primary parameters
N S		b. 001000A212 3.6/4.2 Evaluation of ECP
2. Electrical AC / Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power	VI	a. 062000K102 4.1/4.4 Loss of Offsite Power in MODE 5 - evaluation of sources
M A S		b. 064000G112 2.9/4.0 Evaluation of DG OPERABILITY requirements
3. Reactor Protection System / Pre startup checks	VII	a. 000012K401 3.7/4.0 Design features of trip logic with 1 channel OOS
N S L		b. 000012K604 3.3/3.6 Effect of loss of Block circuit
4. Containment Spray / CSAS Verification	V	a. 000027A403 3.3/3.2 Containment Iodine Removal design flow rate
N A S		b. 000022K402 3.1/3.4 Containment Air Cooler design speed
5. Shut Down Cooling/ Respond to a loss of SDC with RCS pressurization possible	IV	a. 00024AA206 3.6/3.7 Sources of RCS dilution during startup
D A S L		b. 00025AK101 3.9/4.3 Evaluation of "Time to Boil" calculations during Reduced Inventory Operation
6. RCS/ Align Charging header to the Aux HPSI header with RCS leakage greater than one charging pump capacity (isolable leak on charging header)	II	a. 000004K604 2.8/3.1 Charging pump protection during SIAS/Non-SIAS conditions
M S		b. 000002K201 4.3/4.4 Calculation of RCS leakrate
7. Component Cooling/ Shifting Component Cooling heat Exchangers	VIII	a. 000003K404 3.1/3.4 RCP component cooling flow requirements
N A S		b. 000008A102 2.9/3.1 Component Cooling system temperature control
8. STM DUMP / Lineup for ADV control at 1(2)C43 Safe Shutdown panel due to Control Room evacuation	IV	a. 000061K404 3.1/3.4 AFW Sytem flow rate limits
D P		b. 00068AK312 4.1/4.5 Securing CEDM Mgs during Control Room Evacuation
9. AC Distribution/ Tie vital MCCs (1Y09 and 1Y10)	VI	a. 00055EK301 2.7/3.4 Battery design limit during SBO

D P		b.	000062K103 3.5/4.0 Sources of DC power
10. Chemical and Volume Control / Isolate Dilution Paths	I	a.	004000A110 3.7/3.9 Determination of dilution that would activate S/D Monitor alarm
D P R		b.	010000G132 3.4/3.8 Limitations on use of Aux. Spray

Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA

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JOB PERFORMANCE MEASURE AOP-1B

TASK: 020600311 Recover a Misaligned CEA

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the Control Element Drive System.

EVALUATION LOCATION:

_____ PLANT __X__ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
15 MINUTES	____ MINUTES	NO

TASK LEVEL:

NO TRAIN

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

AOP-1B

TASK STANDARDS:

This JPM is complete when CEA 6 is returned to greater than 129 inches and within ± 4 inches of remaining CEAs in its Shutdown Group B.

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JOB PERFORMANCE MEASURE AOP-1B

TASK: 020600311 Recover a Misaligned CEA

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedures or personnel injury. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

5. Questions should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1B

TASK: 020600311 Recover a Misaligned CEA

DIRECTIONS TO TRAINEE:

1. To complete the task successfully, you must:

   - perform each critical element correctly. You must inform the evaluator of the indications you are monitoring. Where necessary, consider the evaluator to be the CRS.

   - comply with industrial safety practices, radiation safety practices and use of event free tools. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

2. Initial Conditions:

   a. The unit is stabilized at ___ % power. RCS [B] – XXXX ppm.

   b. CEA 6 during movement for STP O-29-1 became misaligned by 10 inches from the remaining CEAs in its Group.

   c. Actions of AOP-1B have been completed through Section IV.A.7.

   d. The cause of the misalignment has been determined and repaired.

   e. The total time for misalignment is 10 minutes.

   f. All applicable Tech Spec actions reviewed and required actions identified

3. Initiating Cue: The CRS has directed you to attempt to realign the CEA per AOP-1B, Section IV.A.8 Are there any questions? You may begin.

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JOB PERFORMANCE MEASURE AOP-1B

ELEMENT (* = CRITICAL STEP)		STANDARD

TIME START _____

NOTE: Operator may review prior steps of AOP-1B.

____		Identify AOP-1A, Section IV.A. step 8	Same as element
*____	8.	**IF** ANY CEA is misaligned by greater than 7.5 inches, OR ANY Shutdown CEA is withdrawn less than 129 inches, **THEN** determine the appropriate section: d. **IF**. one or more CEAs are misaligned by greater than 7.5 inches but less than or equal to 15 inches, **THEN PROCEED** to Section VII., <u>ONE OR MORE CEAs MISALIGNED BT GREATER 7.5 INCHES BUT LESS THAN</u>, Page 32.	Determines step 8.d is appropriate section and proceeds to section VII, page 32

CUE: CEA misalignment cause has been determined by the system engineer and CRS directs realignment.

CAUTION

CEA movement should be minimized until the cause of the misalignment has been determined.

CUE: CEA has been misaligned for 10 minutes.

NOTE

Per ITS 3.1.4, CEA realignment time is 1 hour for this condition

____	Identify AOP-1A, Section VII.A. step 1	Same as element

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JOB PERFORMANCE MEASURE AOP-1B

ELEMENT (* = CRITICAL STEP)	STANDARD
CUE: Reactor Power is stable with boration completed as necessary.	
____ 1. Attempt to realign the affected CEA(s):	
____ a. Maintain Reactor Power as required by: Boration per OI-2B, CVCS BORATION DILUTION AND MAKEUP OPERATIONS OR Adjust Regulating CEAs	Determines CEA Regulating Group motion or boration NOT required.
*____ b. Select the desired group.	Selects and depresses GROUP SELECTION - Shutdown B.
*____ c. Select the desired CEA.	Selects and depresses INDIVIDUAL CEA SELECTION - Shutdown B "6".
*____ d. Select the Manual Individual CEA control mode.	Selects and depresses MANUAL INDIVIDUAL - MI.
*____ e. IF CMI is in effect, THEN override CMI as follows: **NOTE** **CMI will be bypassed to the affected group and applied to all other groups, and CMI Bypass annunciator will alarm.**	Determines CMI is IN effect.
*____ (1) Depress the Group Inhibit Bypass pushbutton.	Depress and release Group B Inhibit Bypass pushbutton.
*____ (2) Depress and hold the Motion Inhibit Bypass pushbutton for at least 5 seconds before AND 5 seconds after CEA motion.	Same as element.

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JOB PERFORMANCE MEASURE AOP-1B

ELEMENT (* = CRITICAL STEP)			STANDARD

CUE:	Reactor Power was stablized at ____% in PRELIMINARY Step A.2.

CAUTION

Do NOT allow Reactor Power to rise above the power the unit was stabilized at in Section IV., PRELIMINARY, Step A.2 while the CEA is being realigned. Turbine load shall NOT be raised until the CEA is within its alignment requirements.

* ____	f.	Realign the CEA:	
		(1) IF the CEA must be withdrawn, THEN withdraw the CEA using the "PULL and WAIT" method:	
____		(a) For Shutdown CEAs, pull 10 seconds and wait 10 seconds.	Determines IS applicable.
____		(b) For regulating CEAs, pull 10 seconds and wait 15 seconds.	Determines NOT applicable.
____		(2) IF the CEA must be inserted. THEN insert the CEA.	Determines NOT applicable.
____	g.	REMOVE CMI override.	Removes CMI override by releasing Motion Inhibit Bypass and depressing and releasing Group B Inhibit Bypass.

TIME STOP _____

TERMINATING CUE:	This JPM is complete when CEA 6 is withdrawn greater than 129 inches and is within ± 4 inches of remaining CEAs in Shutdown Group B. No further actions are required.

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CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1B

TASK: 020600311 Recover a Misaligned CEA

Document below any instances of failure to comply with industrail safety practices, radiation safety practices and use of event free tools. __NOTE:__ **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

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Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Recover A Misaligned CEA

K/A 001000A113 [4.0/4.2]

Question a:
Given the following information for Unit 2 power reduction:

	Reactor Power	Tcold	PZR Pressure
Prior to CEA insertion	100%	547.8	2250 psia
After CEA insertion	56%	540.2	2250 psia

How does the CEA Group Insertion Limits change?

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

Recover A Misaligned CEA

K/A 001000A113 [4.0/4.2]

Question a:
Given the following information for Unit 2 power reduction:

	Reactor Power	Tcold	PZR Pressure
Prior to CEA insertion	100%	547.8	2250 psia
After CEA insertion	56%	540.2	2250 psia

How does the CEA Group Insertion Limits change?

Answer

Prior to CEA motion, limit was Group 5 at 35%(±0%) insertion
(88.4 inches withdrawn (± 3%))

136 inches X (100% - 35%) = 88.4 inches

Following the CEA motion the limit changed to Group 4 at 50% (± 0%)
(68 inches withdrawn (± 3%))

136 inches X (100% - 50%) = 68 inches

Reference Use Allowed? YES

Reference 1 Calvert Cliffs, Cycle 12 COLR Rev. 3 Figure 3.1.6, page 10

Reference 2

Comments:
Supply copy of graph for examiners.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Recover A Misaligned CEA

K/A 001000A212 [3.6/4.2]

Question b:
Given ECC attachment 2A complete the ECC section, the ECC tolerance band section, evaluate and provide corrective actions, if applicable.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

#________

Attachment 2A, ESTIMATED CRITICAL CONDITION - Estimated Critical Boron (ECB)

Previous Critical Conditions

6.2.A.1.a Unit: 2 Cycle: 12
6.2.A.1.b Date:________ Time:________
6.2.A.1.c Burnup: 18825 MWD/MTU

Estimated Critical Condition

6.2.A.2 Excess Reactivity:________% Δρ
6.2.A.3 Date:________
Time:________
6.2.A.4 Time After Shutdown: >84 hrs
6.2.A.5 Xenon Worth:________% Δρ
6.2.A.7 CEA Position (Inches)
Grp 3: ARO Grp 4: 90" Grp 5: 0"
CEA Worth:________% Δρ
6.2.A.8 Corrected HZP IBW:________ppm/%Δρ
6.2.A.9 Critical Boron Worth: (6.2.A.2)-[(6.2.A.7)+(6.2.A.5)] = ________%Δρ
6.2.A.10 Estimated Critical Boron Concentration: (6.2.A.9)*(6.2.A.8) = ________ ppm

ECC Tolerance Band

6.2.A.11 ECC Lower Bound: (6.2.A.7) + (0.5) = ________%Δρ
6.2.A.12 ECC Lower Bound CEA Position (Inches): Grp 3:____ Grp 4:____ Grp 5:____
6.2.A.14 ECC Upper Bound: (6.2.A.7) - (0.5) = ________%Δρ
6.2.A.15 ECC Upper Bound CEA Position (Inches): Grp 3:____ Grp 4:____ Grp 5:____
6.2.A.17 Prepared by:________
Date/Time: /

Review and Approval

6.2.A.23 SRO Review:________
Date/Time: /

NOTE: Obtain a sequence number from the Attachment Log Sheet, Attachment 1.

Title
Recover A Misaligned CEA

K/A 001000A212 [3.6/4.2]

Question b:
Given ECC attachment 2A complete the ECC section, the ECC tolerance band section, evaluate and provide corrective actions, if applicable.

Answer

Critical Boron Concentration is 460 PPM See attached answer worksheet.

Reference Use Allowed? YES

Reference 1 NEOP-302 ESTIMATED CRITICAL CONDITION, Rev. 1

Reference 2 NEOP-23 Technical Data Book, Rev. 8

Comments:
Supply ECC form for candidates and examiner **CUES** candidate that B10 correction factor is **.921**.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

#________

Attachment 2A,
ESTIMATED CRITICAL CONDITION - Estimated Critical Boron (ECB)

Previous Critical Conditions

6.2.A.1.a Unit: 2 Cycle: 12

6.2.A.1.b Date:________ Time:________

6.2.A.1.c Burnup: 18825 MWD/MTU

Estimated Critical Condition

6.2.A.2 Excess Reactivity: 5.958 % Δρ ± .1

6.2.A.3 Date:________

Time:________

6.2.A.4 Time After Shutdown: >84 hrs

6.2.A.5 Xenon Worth: 0 % Δρ ± 0

6.2.A.7 CEA Position (Inches)

Grp 3: ARO Grp 4: 90" Grp 5: 0

CEA Worth: 1.005 % Δρ ± .025

6.2.A.8 Corrected HZP IBW: 92.957 ppm/%Δρ ± 1 (100.93)(.921)

6.2.A.9 Critical Boron Worth: (6.2.A.2)-[(6.2.A.7)+(6.2.A.5)] = 4.953 %Δρ ± .1

6.2.A.10 Estimated Critical Boron Concentration: (6.2.A.9)*(6.2.A.8) = 460 ppm ± 2

ECC Tolerance Band

6.2.A.11 ECC Lower Bound: (6.2.A.7) + (0.5) = 1.505 %Δρ ± 0

6.2.A.12 ECC Lower Bound CEA Position (Inches): Grp 3: ARO Grp 4: 30.75 Grp 5: 0 ± 2

6.2.A.14 ECC Upper Bound: (6.2.A.7) - (0.5) = .505 %Δρ ± 0

6.2.A.15 ECC Upper Bound CEA Position (Inches): Grp 3: ARO Grp 4: 131.25 Grp 5: 41.25 ± 2

6.2.A.17 Prepared by:________

Date/Time: /

Review and Approval

6.2.A.23 SRO Review:________

Date/Time: /

NOTE: Obtain a sequence number from the Attachment Log Sheet, Attachment 1.

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FIGURE 2-II.A.2
INVERSE BORON WORTH vs. BURNUP
NO BORON-10 DEPLETION CORRECTION APPLIED
Unit 2 Cycle 12
(Page 1 of 3)

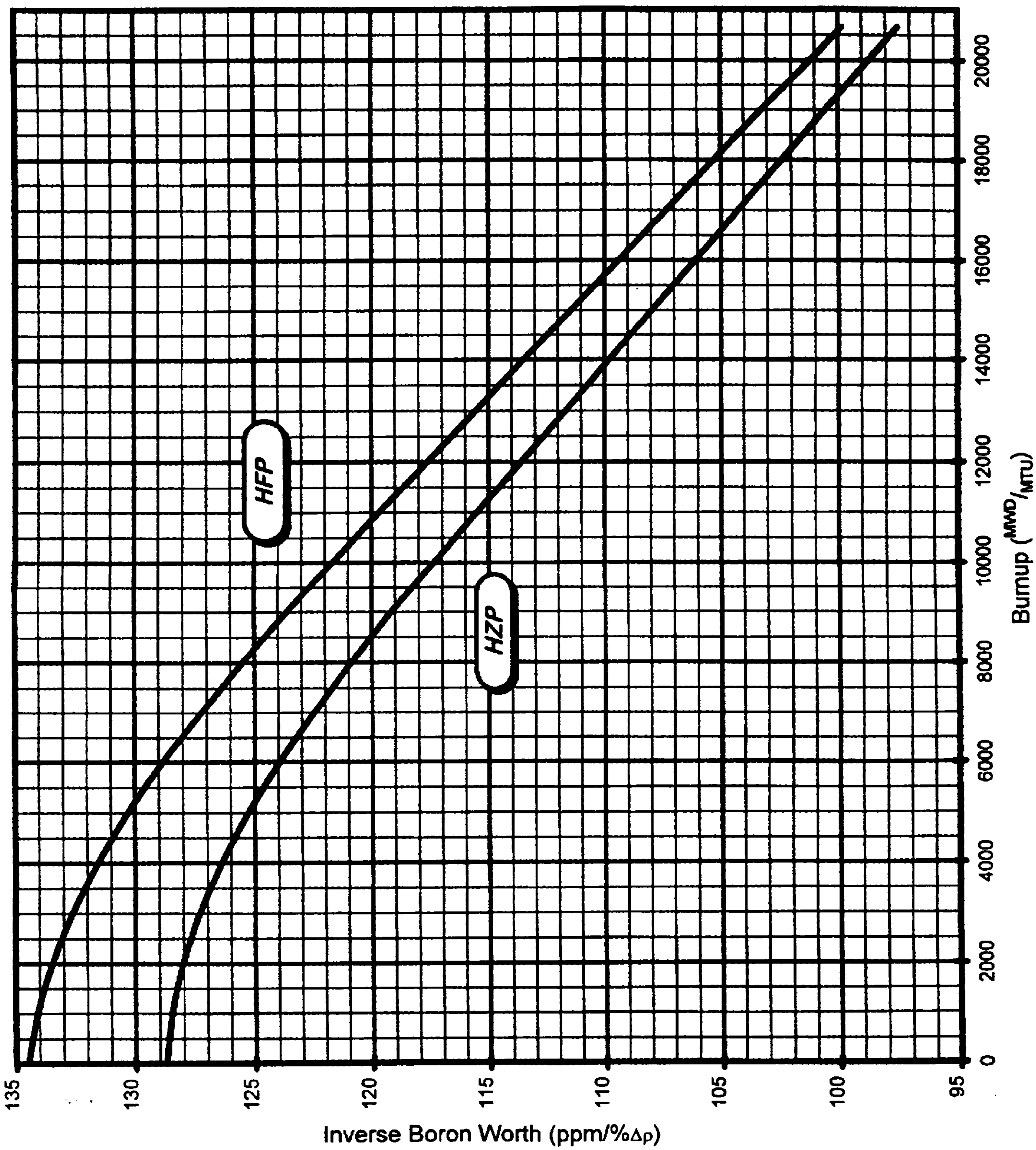

FIGURE 2-II.A.2
INVERSE BORON WORTH vs. BURNUP
NO BORON-10 DEPLETION CORRECTION APPLIED
Unit 2 Cycle 12
(Page 2 of 3)

Burnup (MWD/MTU)	HZP Inverse Boron Worth (ppm/%Δρ)	HFP Inverse Boron Worth (ppm/%Δρ)
0	128.72	134.48
100	128.70	134.44
200	128.68	134.41
300	128.66	134.37
400	128.64	134.34
500	128.62	134.30
600	128.59	134.26
700	128.57	134.22
800	128.54	134.17
900	128.51	134.13
1000	128.48	134.08
1100	128.45	134.03
1200	128.41	133.98
1300	128.37	133.93
1400	128.33	133.87
1500	128.28	133.81
1600	128.24	133.75
1700	128.19	133.68
1800	128.14	133.61
1900	128.08	133.54
2000	128.02	133.47
2100	127.96	133.40
2200	127.90	133.32
2300	127.84	133.24
2400	127.77	133.16
2500	127.70	133.08
2600	127.63	132.99
2700	127.55	132.90
2800	127.48	132.81
2900	127.40	132.72
3000	127.32	132.62
3100	127.24	132.52
3200	127.15	132.42
3300	127.06	132.32
3400	126.97	132.22
3500	126.88	132.11
3600	126.79	132.00
3700	126.69	131.89
3800	126.59	131.78
3900	126.49	131.67
4000	126.39	131.55
4100	126.28	131.43
4200	126.18	131.31
4300	126.07	131.19
4400	125.96	131.07
4500	125.85	130.94
4600	125.73	130.81
4700	125.62	130.68
4800	125.50	130.55
4900	125.38	130.42
5000	125.26	130.28

Burnup (MWD/MTU)	HZP Inverse Boron Worth (ppm/%Δρ)	HFP Inverse Boron Worth (ppm/%Δρ)
5100	125.13	130.15
5200	125.01	130.01
5300	124.88	129.87
5400	124.75	129.72
5500	124.62	129.58
5600	124.49	129.43
5700	124.36	129.29
5800	124.22	129.14
5900	124.09	128.99
6000	123.95	128.84
6100	123.81	128.68
6200	123.67	128.53
6300	123.52	128.37
6400	123.38	128.21
6500	123.23	128.05
6600	123.08	127.89
6700	122.93	127.73
6800	122.78	127.56
6900	122.63	127.40
7000	122.48	127.23
7100	122.32	127.06
7200	122.17	126.89
7300	122.01	126.72
7400	121.85	126.55
7500	121.69	126.38
7600	121.53	126.20
7700	121.37	126.03
7800	121.21	125.85
7900	121.04	125.67
8000	120.88	125.49
8100	120.71	125.31
8200	120.54	125.13
8300	120.37	124.95
8400	120.20	124.76
8500	120.03	124.58
8600	119.86	124.39
8700	119.69	124.20
8800	119.51	124.02
8900	119.34	123.83
9000	119.16	123.64
9100	118.99	123.45
9200	118.81	123.25
9300	118.63	123.06
9400	118.45	122.87
9500	118.27	122.67
9600	118.09	122.48
9700	117.91	122.28
9800	117.73	122.09
9900	117.54	121.89
10000	117.36	121.69
10100	117.18	121.49

FIGURE 2-II.A.2
INVERSE BORON WORTH vs. BURNUP
NO BORON-10 DEPLETION CORRECTION APPLIED
Unit 2 Cycle 12
(Page 3 of 3)

Burnup (MWD/MTU)	HZP Inverse Boron Worth (ppm/%Δρ)	HFP Inverse Boron Worth (ppm/%Δρ)
10200	116.99	121.29
10300	116.81	121.09
10400	116.62	120.89
10500	116.43	120.69
10600	116.25	120.49
10700	116.06	120.29
10800	115.87	120.09
10900	115.68	119.88
11000	115.49	119.68
11100	115.31	119.47
11200	115.12	119.27
11300	114.93	119.07
11400	114.74	118.86
11500	114.54	118.65
11600	114.35	118.45
11700	114.16	118.24
11800	113.97	118.04
11900	113.78	117.83
12000	113.59	117.62
12100	113.39	117.41
12200	113.20	117.21
12300	113.01	117.00
12400	112.82	116.79
12500	112.62	116.58
12600	112.43	116.38
12700	112.24	116.17
12800	112.05	115.96
12900	111.85	115.75
13000	111.66	115.54
13100	111.47	115.34
13200	111.29	115.13
13300	111.10	114.93
13400	110.92	114.72
13500	110.73	114.52
13600	110.54	114.31
13700	110.36	114.10
13800	110.17	113.90
13900	109.99	113.69
14000	109.80	113.49
14100	109.61	113.28
14200	109.43	113.08
14300	109.24	112.87
14400	109.06	112.67
14500	108.87	112.46
14600	108.69	112.26
14700	108.50	112.05
14800	108.32	111.85
14900	108.13	111.64
15000	107.95	111.44
15100	107.76	111.23
15200	107.57	111.03
15300	107.39	110.82
15400	107.20	110.62
15500	107.02	110.41
15600	106.83	110.21

Burnup (MWD/MTU)	HZP Inverse Boron Worth (ppm/%Δρ)	HFP Inverse Boron Worth (ppm/%Δρ)
15700	106.65	110.00
15800	106.46	109.80
15900	106.28	109.59
16000	106.09	109.39
16100	105.91	109.18
16200	105.72	108.98
16300	105.54	108.77
16400	105.36	108.57
16500	105.17	108.36
16600	104.99	108.16
16700	104.80	107.95
16800	104.62	107.75
16900	104.43	107.54
17000	104.25	107.34
17100	104.06	107.13
17200	103.88	106.93
17300	103.69	106.72
17400	103.51	106.52
17500	103.32	106.31
17600	103.14	106.11
17700	102.96	105.90
17800	102.77	105.70
17900	102.59	105.49
18000	102.40	105.29
18100	102.22	105.08
18200	102.03	104.88
18300	101.85	104.67
18400	101.66	104.47
18500	101.48	104.26
18600	101.30	104.06
18700	101.11	103.85
18800	100.93	103.65
18900	100.74	103.44
19000	100.56	103.24
19100	100.38	103.04
19200	100.19	102.83
19300	100.01	102.63
19400	99.82	102.42
19500	99.64	102.22
19600	99.45	102.01
19700	99.27	101.81
19800	99.09	101.60
19900	98.90	101.40
20000	98.72	101.19
20100	98.53	100.99
20200	98.35	100.78
20300	98.17	100.58
20400	97.98	100.37
20500	97.80	100.17
20600	97.61	99.96
20656	97.51	99.85

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FIGURE 2-II.A.7
EXCESS REACTIVITY vs. BURNUP
HZP, ARO, NO XENON, EQUILIBRIUM SAMARIUM
Unit 2 Cycle 12
(Page 2 of 2)

Burnup (MWD/MTU)	HZP Excess Reactivity (%Δρ)	Burnup (MWD/MTU)	HZP Excess Reactivity (%Δρ)	Burnup (MWD/MTU)	HZP Excess Reactivity (%Δρ)	Burnup (MWD/MTU)	HZP Excess Reactivity (%Δρ)
0	16.442	5200	13.912	10400	11.328	15600	8.173
100	16.364	5300	13.868	10500	11.274	15700	8.106
200	16.286	5400	13.823	10600	11.220	15800	8.039
300	16.208	5500	13.779	10700	11.165	15900	7.972
400	16.131	5600	13.734	10800	11.110	16000	7.905
500	16.053	5700	13.689	10900	11.055	16100	7.837
600	15.975	5800	13.644	11000	11.000	16200	7.770
700	15.897	5900	13.598	11100	10.945	16300	7.702
800	15.819	6000	13.553	11200	10.890	16400	7.634
900	15.742	6100	13.507	11300	10.835	16500	7.566
1000	15.664	6200	13.461	11400	10.780	16600	7.498
1100	15.622	6300	13.414	11500	10.725	16700	7.430
1200	15.581	6400	13.368	11600	10.669	16800	7.362
1300	15.541	6500	13.321	11700	10.614	16900	7.293
1400	15.500	6600	13.274	11800	10.558	17000	7.224
1500	15.460	6700	13.227	11900	10.503	17100	7.156
1600	15.419	6800	13.180	12000	10.447	17200	7.087
1700	15.379	6900	13.132	12100	10.392	17300	7.017
1800	15.338	7000	13.084	12200	10.336	17400	6.948
1900	15.298	7100	13.036	12300	10.280	17500	6.879
2000	15.257	7200	12.987	12400	10.225	17600	6.809
2100	15.217	7300	12.939	12500	10.169	17700	6.739
2200	15.176	7400	12.890	12600	10.113	17800	6.669
2300	15.135	7500	12.840	12700	10.057	17900	6.599
2400	15.094	7600	12.791	12800	10.002	18000	6.528
2500	15.053	7700	12.741	12900	9.946	18100	6.458
2600	15.013	7800	12.691	13000	9.890	18200	6.387
2700	14.972	7900	12.641	13100	9.826	18300	6.316
2800	14.930	8000	12.591	13200	9.760	18400	6.245
2900	14.889	8100	12.540	13300	9.695	18500	6.173
3000	14.848	8200	12.490	13400	9.629	18600	6.102
3100	14.807	8300	12.439	13500	9.563	18700	6.030
3200	14.765	8400	12.388	13600	9.497	18800	5.958
3300	14.724	8500	12.336	13700	9.432	18900	5.885
3400	14.682	8600	12.285	13800	9.366	19000	5.813
3500	14.641	8700	12.233	13900	9.300	19100	5.740
3600	14.599	8800	12.181	14000	9.234	19200	5.667
3700	14.557	8900	12.129	14100	9.169	19300	5.594
3800	14.515	9000	12.077	14200	9.103	19400	5.520
3900	14.473	9100	12.024	14300	9.037	19500	5.446
4000	14.430	9200	11.971	14400	8.971	19600	5.372
4100	14.388	9300	11.919	14500	8.905	19700	5.298
4200	14.346	9400	11.866	14600	8.839	19800	5.223
4300	14.303	9500	11.813	14700	8.772	19900	5.149
4400	14.260	9600	11.759	14800	8.706	20000	5.073
4500	14.217	9700	11.706	14900	8.640	20100	4.998
4600	14.174	9800	11.652	15000	8.574	20200	4.922
4700	14.131	9900	11.599	15100	8.507	20300	4.847
4800	14.087	10000	11.545	15200	8.441	20400	4.770
4900	14.044	10100	11.491	15300	8.374	20500	4.694
5000	14.000	10200	11.437	15400	8.307	20600	4.617
5100	13.956	10300	11.383	15500	8.240	20656	4.574

FIGURE 2-II.A.7
EXCESS REACTIVITY vs. BURNUP
HZP, ARO, NO XENON, EQUILIBRIUM SAMARIUM
Unit 2 Cycle 12
(Page 1 of 2)

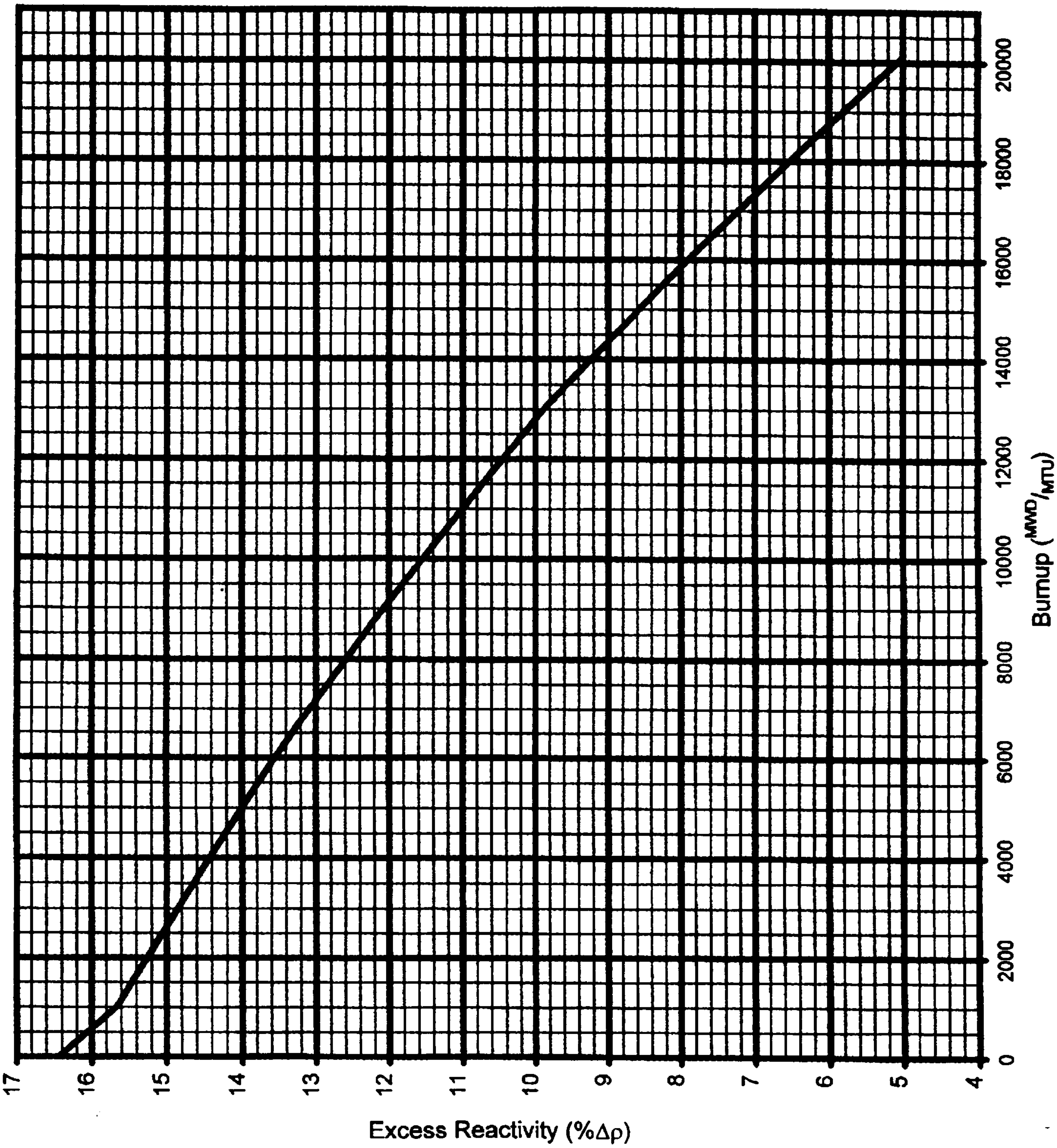

FIGURE 2-II.B.1
HZP INTEGRAL CEA WORTH WITH OVERLAP
16,500 MWD/MTU to EOC
Regulating Bank Worth = 3.699 %Δρ
Unit 2 Cycle 12
(Page 1 of 5)

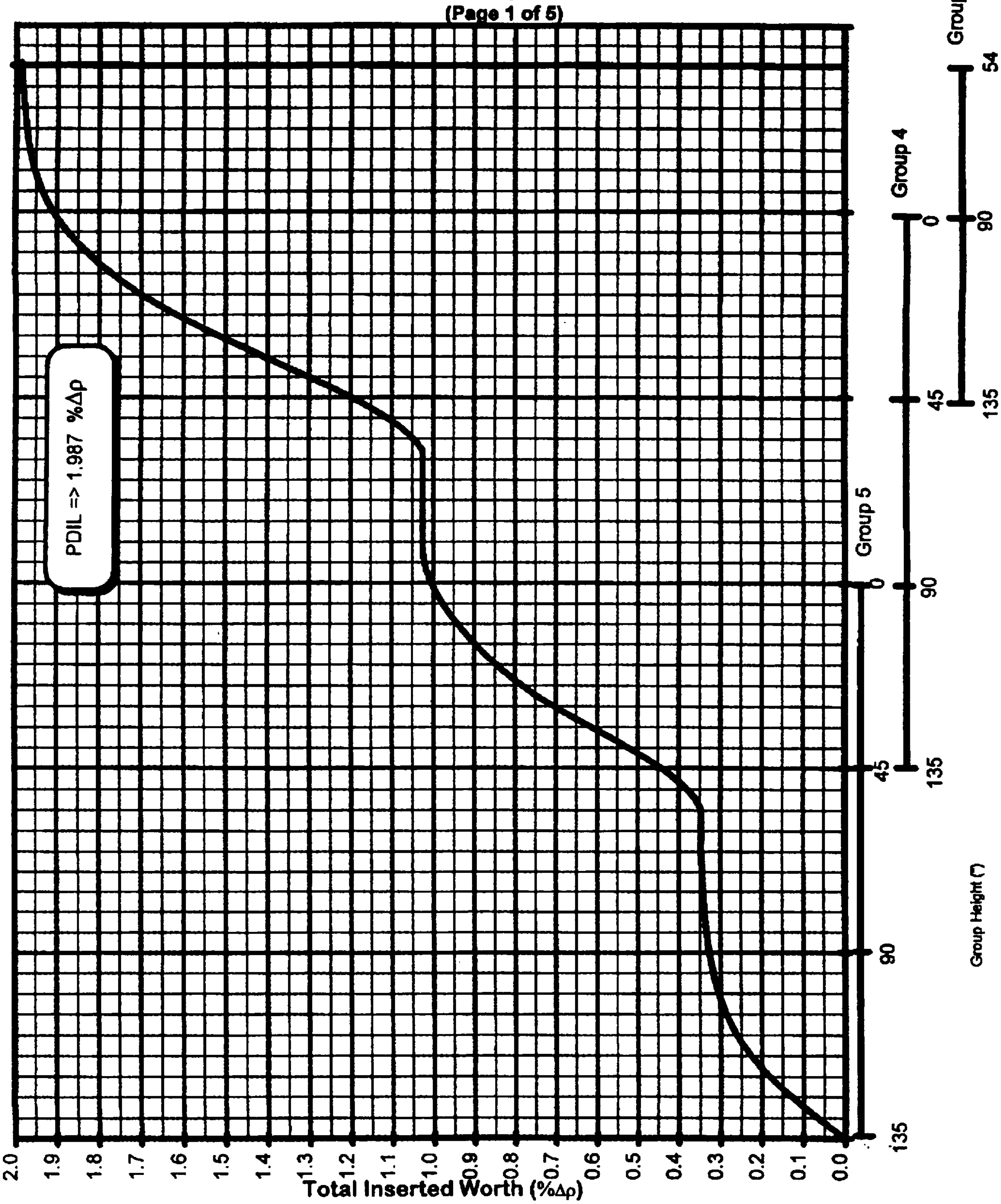

FIGURE 2-II.B.1
HZP INTEGRAL CEA WORTH WITH OVERLAP
16,500 $^{MWD}/_{MTU}$ TO EOC
Regulating Bank Worth = 3.699 %$\Delta\rho$
Unit 2 Cycle 12
(Page 2 of 5)

Group 5 (inches W/D)	Group 4 (inches W/D)	Group 3 (inches W/D)	HZP Integral CEA Worth (%$\Delta\rho$)
135.00			0.000
134.25			0.010
133.50			0.020
132.75			0.030
132.00			0.040
131.25			0.050
130.50			0.059
129.75			0.069
129.00			0.079
128.25			0.088
127.50			0.097
126.75			0.107
126.00			0.116
125.25			0.125
124.50			0.133
123.75			0.142
123.00			0.150
122.25			0.158
121.50			0.166
120.75			0.174
120.00			0.181
119.25			0.189
118.50			0.196
117.75			0.203
117.00			0.209
116.25			0.216
115.50			0.222
114.75			0.228
114.00			0.233
113.25			0.239
112.50			0.244
111.75			0.249
111.00			0.254
110.25			0.259
109.50			0.263
108.75			0.268
108.00			0.272
107.25			0.276
106.50			0.279
105.75			0.283
105.00			0.286
104.25			0.289
103.50			0.292
102.75			0.295
102.00			0.298
101.25			0.300
100.50			0.303
99.75			0.305
99.00			0.307
98.25			0.310
97.50			0.312
96.75			0.313
96.00			0.315
95.25			0.317
94.50			0.319
93.75			0.320
93.00			0.322
92.25			0.323
91.50			0.325
90.75			0.326
90.00			0.327
89.25			0.328
88.50			0.329
87.75			0.330
87.00			0.331
86.25			0.332
85.50			0.333
84.75			0.334
84.00			0.335
83.25			0.336
82.50			0.337
81.75			0.337
81.00			0.338
80.25			0.339
79.50			0.339
78.75			0.340
78.00			0.341
77.25			0.341
76.50			0.342
75.75			0.342
75.00			0.342
74.25			0.343
73.50			0.343
72.75			0.343
72.00			0.344
71.25			0.344
70.50			0.344
69.75			0.344
69.00			0.345
68.25			0.345
67.50			0.346
66.75			0.346
66.00			0.347
65.25			0.347
64.50			0.347
63.75			0.347
63.00			0.347
62.25			0.347
61.50			0.347
60.75			0.347
60.00			0.347
59.25			0.347

FIGURE 2-II.B.1
HZP INTEGRAL CEA WORTH WITH OVERLAP
16,500 MWD/MTU TO EOC
Regulating Bank Worth = 3.699 %Δρ
Unit 2 Cycle 12
(Page 3 of 5)

Group 5 (inches W/D)	Group 4 (inches W/D)	Group 3 (inches W/D)	HZP Integral CEA Worth (%Δρ)
58.50			0.347
57.75			0.347
57.00			0.347
56.25			0.347
55.50			0.347
54.75			0.348
54.00			0.351
53.25			0.356
52.50			0.359
51.75			0.365
51.00			0.371
50.25			0.378
49.50			0.385
48.75			0.393
48.00			0.402
47.25			0.411
46.50			0.421
45.75			0.432
45.00	135.00		0.442
44.25	134.25		0.454
43.50	133.50		0.465
42.75	132.75		0.477
42.00	132.00		0.490
41.25	131.25		0.502
40.50	130.50		0.515
39.75	129.75		0.528
39.00	129.00		0.542
38.25	128.25		0.555
37.50	127.50		0.569
36.75	126.75		0.582
36.00	126.00		0.596
35.25	125.25		0.610
34.50	124.50		0.624
33.75	123.75		0.637
33.00	123.00		0.651
32.25	122.25		0.664
31.50	121.50		0.678
30.75	120.75		0.691
30.00	120.00		0.704
29.25	119.25		0.717
28.50	118.50		0.729
27.75	117.75		0.741
27.00	117.00		0.753
26.25	116.25		0.764
25.50	115.50		0.775
24.75	114.75		0.786
24.00	114.00		0.796
23.25	113.25		0.806
22.50	112.50		0.816
21.75	111.75		0.825
21.00	111.00		0.835

Group 5 (inches W/D)	Group 4 (inches W/D)	Group 3 (inches W/D)	HZP Integral CEA Worth (%Δρ)
20.25	110.25		0.843
19.50	109.50		0.852
18.75	108.75		0.860
18.00	108.00		0.868
17.25	107.25		0.876
16.50	106.50		0.884
15.75	105.75		0.891
15.00	105.00		0.898
14.25	104.25		0.905
13.50	103.50		0.912
12.75	102.75		0.918
12.00	102.00		0.925
11.25	101.25		0.931
10.50	100.50		0.937
9.75	99.75		0.943
9.00	99.00		0.949
8.25	98.25		0.955
7.50	97.50		0.960
6.75	96.75		0.966
6.00	96.00		0.971
5.25	95.25		0.976
4.50	94.50		0.980
3.75	93.75		0.985
3.00	93.00		0.989
2.25	92.25		0.994
1.50	91.50		0.998
0.75	90.75		1.001
0.00	90.00		1.005
	89.25		1.008
	88.50		1.011
	87.75		1.014
	87.00		1.016
	86.25		1.018
	85.50		1.020
	84.75		1.022
	84.00		1.023
	83.25		1.024
	82.50		1.025
	81.75		1.025
	81.00		1.025
	80.25		1.025
	79.50		1.025
	78.75		1.025
	78.00		1.025
	77.25		1.025
	76.50		1.025
	75.75		1.025
	75.00		1.025
	74.25		1.025
	73.50		1.025
	72.75		1.025

FIGURE 2-II.B.1
HZP INTEGRAL CEA WORTH WITH OVERLAP
16,500 MWD/MTU TO EOC
Regulating Bank Worth = 3.699 %Δρ
Unit 2 Cycle 12
(Page 4 of 5)

Group 5 (inches W/D)	Group 4 (inches W/D)	Group 3 (inches W/D)	HZP Integral CEA Worth (%Δρ)
	72.00		1.025
	71.25		1.025
	70.50		1.025
	69.75		1.025
	69.00		1.025
	68.25		1.025
	67.50		1.025
	66.75		1.025
	66.00		1.025
	65.25		1.025
	64.50		1.025
	63.75		1.025
	63.00		1.025
	62.25		1.025
	61.50		1.025
	60.75		1.025
	60.00		1.025
	59.25		1.025
	58.50		1.025
	57.75		1.027
	57.00		1.032
	56.25		1.037
	55.50		1.044
	54.75		1.051
	54.00		1.059
	53.25		1.067
	52.50		1.076
	51.75		1.086
	51.00		1.097
	50.25		1.108
	49.50		1.119
	48.75		1.131
	48.00		1.144
	47.25		1.157
	46.50		1.170
	45.75		1.184
	45.00	135.00	1.198
	44.25	134.25	1.213
	43.50	133.50	1.228
	42.75	132.75	1.243
	42.00	132.00	1.258
	41.25	131.25	1.274
	40.50	130.50	1.290
	39.75	129.75	1.306
	39.00	129.00	1.322
	38.25	128.25	1.339
	37.50	127.50	1.355
	36.75	126.75	1.371
	36.00	126.00	1.388
	35.25	125.25	1.405
	34.50	124.50	1.421
	33.75	123.75	1.437
	33.00	123.00	1.454
	32.25	122.25	1.470
	31.50	121.50	1.486
	30.75	120.75	1.502
	30.00	120.00	1.518
	29.25	119.25	1.533
	28.50	118.50	1.549
	27.75	117.75	1.564
	27.00	117.00	1.578
	26.25	116.25	1.593
	25.50	115.50	1.607
	24.75	114.75	1.620
	24.00	114.00	1.634
	23.25	113.25	1.647
	22.50	112.50	1.660
	21.75	111.75	1.672
	21.00	111.00	1.684
	20.25	110.25	1.696
	19.50	109.50	1.708
	18.75	108.75	1.719
	18.00	108.00	1.730
	17.25	107.25	1.740
	16.50	106.50	1.751
	15.75	105.75	1.761
	15.00	105.00	1.770
	14.25	104.25	1.780
	13.50	103.50	1.789
	12.75	102.75	1.798
	12.00	102.00	1.806
	11.25	101.25	1.815
	10.50	100.50	1.823
	9.75	99.75	1.831
	9.00	99.00	1.838
	8.25	98.25	1.845
	7.50	97.50	1.852
	6.75	96.75	1.859
	6.00	96.00	1.866
	5.25	95.25	1.872
	4.50	94.50	1.878
	3.75	93.75	1.884
	3.00	93.00	1.889
	2.25	92.25	1.894
	1.50	91.50	1.900
	0.75	90.75	1.904
	0.00	90.00	1.909
		89.25	1.914
		88.50	1.918
		87.75	1.922
		87.00	1.926
		86.25	1.929

FIGURE 2-II.B.1
HZP INTEGRAL CEA WORTH WITH OVERLAP
16,500 MWD/MTU TO EOC
Regulating Bank Worth = 3.699 %Δρ
Unit 2 Cycle 12
(Page 5 of 5)

Group 5 (inches W/D)	Group 4 (inches W/D)	Group 3 (inches W/D)	HZP Integral CEA Worth (%Δρ)
		85.50	1.933
		84.75	1.936
		84.00	1.939
		83.25	1.942
		82.50	1.945
		81.75	1.948
		81.00	1.951
		80.25	1.953
		79.50	1.955
		78.75	1.957
		78.00	1.959
		77.25	1.961
		76.50	1.963
		75.75	1.965
		75.00	1.966
		74.25	1.968
		73.50	1.969
		72.75	1.970
		72.00	1.971
		71.25	1.972
		70.50	1.973
		69.75	1.974
		69.00	1.975
		68.25	1.976
		67.50	1.977
		66.75	1.978
		66.00	1.979
		65.25	1.979
		64.50	1.980
		63.75	1.981
		63.00	1.981
		62.25	1.982
		61.50	1.982
		60.75	1.983
		60.00	1.983
		59.25	1.984
		58.50	1.984
		57.75	1.985
		57.00	1.985
		56.25	1.986
		55.50	1.986
		54.75	1.987
		54.40	1.987
		54.00	1.987

6.1 Plant Computer ECC (Continued)

I. **IF** the Upper CEA Bound is **GREATER** than 135 inches withdrawn on Reg Group 5, **THEN PERFORM** step 6.1.E - 6.1.H again with the CEA critical position inserted further into the core.

J. **REVIEW** the ECC for acceptability.

K. **IF** the ECC is acceptable, **THEN SIGN** the ECC form **AND SUBMIT** the ECC to a Shift SRO for review and approval.

L. **VERIFY** that the ECC Upper and Lower CEA Bounds are between 135 inches withdrawn on Reg Group 5 and zero power PDIL, AND that the ECC date and time are within the allowable range.

M. **IF** an error is found, **THEN INSTRUCT** the preparer to make the necessary corrections, **AND REPEAT** the review.

N. **IF** the ECC is acceptable, **THEN** the reviewing Shift SRO shall **SIGN** the print-out and issue it an Attachment 2 sequence number from Attachment 1, Attachment Log Sheet.

O. **CONTINUE** the startup **PER** OP-2.

6.2 MANUAL ECC CALCULATION

NOTE:
If a procedure step requires an entry on an attachment the entry blank will have the same number as the procedure step.

* A. Estimated Critical Boron (ECB)

1. **COMPLETE** the previous critical conditions section of Attachment 2A.

   a. **RECORD** the unit and cycle numbers.

   b. **RECORD** the date and time the unit shut down.

   c. **RECORD** the current burnup for the cycle from the plant computer point "CEBURNUP".

2. **RECORD** the excess reactivity from Figure 1-II.A.7 of NEOP-13 (Figure 2-II.A.7 of NEOP-23) on Attachment 2A.

CAUTION:
The actual time of criticality **MUST** be within four hours of the estimated time (TS 3.1.1.6). IF the actual time of criticality **WILL NOT** be within 4 hours of the estimated time, another ECC **MUST** be calculated with a more accurate time. IF the actual time of criticality will be within 84 hours of the previous shutdown, the actual time of criticality **MUST** be within 2 hours of the estimated time. IF the actual time of criticality **WILL NOT** be within 2 hours of the estimated time for this situation, another ECC **MUST** be calculated with a more accurate time.

3. **RECORD** the estimated date and time of reactor criticality for the ECC, on ATTACHMENT 2A.

6.2.A Estimated Critical Boron (ECB) (Continued)

4. **RECORD** the elapsed time from reactor shutdown to the estimated time of criticality on Attachment 2A.

   a. **IF** the elapsed time is greater than 84 hours **THEN USE** "> 84" hours for 6.2.A.4.

5. **DETERMINE** the post shutdown xenon worth.

   a. **IF** the elapsed time is less than 84 hours, **THEN DETERMINE** the post shutdown xenon worth at the estimated time of criticality using the plant computer **OR** the XENON RHO Report, **AND RECORD** on Attachment 2A.

   b. **IF** the elapsed time is greater than 84 hours, **THEN RECORD** the post shutdown xenon worth as zero (0) on Attachment 2A.

6. **PLACE** the hard copy XENON RHO Report with Attachment 2A, if used.

7. **RECORD** the desired CEA criticality position and the associated CEA reactivity inserted using Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23) on Attachment 2A.

8. **RECORD** the Corrected HZP IBW from the XENON RHO Report on Attachment 2A,

   OR

   X **CALCULATE AND RECORD** on Attachment 2A the Corrected HZP IBW using Figure 1-II.A.2 of NEOP-13 (Figure 2-II.A.2 of NEOP-23) and the formula:

   Corrected HZP IBW = (HZP IBW)/B10 Correction Factor.

9. **CALCULATE** the Critical Boron Worth by using the formula below **AND RECORD** on Attachment 2A.

   Excess Reactivity - (CEA Worth + Xenon Worth) = Critical Boron Worth

10. **MULTIPLY** the Critical Boron Worth by the Corrected HZP IBW, **AND RECORD** on Attachment 2A. This is the Estimated Critical Boron Concentration.

11. **ADD** the ECC Tolerance (0.5 %ρ) to the estimated CEA Worth from step 6.2.A.7 **AND RECORD** on Attachment 2A. This result will be used to determine the ECC Lower CEA Bound.

12. **DETERMINE** the ECC Lower CEA Bound by finding the CEA position from Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23) associated with the reactivity worth found in step 6.2.A.11 **AND RECORD** on Attachment 2A.

6.2.A Estimated Critical Boron (ECB) (Continued)

13. **IF** the Lower CEA Bound is **LESS** than the Zero Power Dependent Insertion Limit, **THEN PERFORM** step 6.2.A again with the CEA critical position further out of the core.

14. **SUBTRACT** the ECC Tolerance (0.5 %Δρ) from the estimated CEA Worth from step 6.2.A.7 **AND RECORD** on Attachment 2A. This result will be used to determine the ECC Upper CEA Bound.

15. **DETERMINE** the ECC Upper CEA Bound by finding the CEA position from Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23), associated with the reactivity worth found in step 6.2.A.14 **AND RECORD** on Attachment 2A.

16. **IF** the Upper CEA Bound is **GREATER** than 135 inches withdrawn on Reg Group 5, **THEN PERFORM** step 6.2.A again with the CEA critical position inserted further into the core.

17. **SIGN** the ECC form **AND SUBMIT** the ECC to a Shift SRO for review and approval.

18. **VERIFY** that the previous critical condition is correct. [B-8]

19. **VERIFY** that the ECC date and time are within the allowable range.

20. **VERIFY** that the ECC was calculated correctly.

21. **VERIFY** that the ECC Upper and Lower CEA Bounds were calculated correctly and are between 135 inches withdrawn on Reg Group 5 and zero power PDIL.

22. **IF** an error is found, **THEN INSTRUCT** the preparer to make the necessary corrections, **AND REPEAT** the review.

23. **IF** the calculation is acceptable, **THEN** the reviewing Shift SRO shall **SIGN** the attachment.

24. **CONTINUE** the startup **PER** OP-2.

> **NOTE:**
> If a procedure step requires an entry on an attachment the entry blank will have the same number as the procedure step.

B. Estimated Critical Position (ECP)

1. **COMPLETE** the previous critical conditions section of Attachment 2B.

   a. **RECORD** the unit and cycle numbers.

   b. **RECORD** the date and time the unit shut down.

   c. **RECORD** the current burnup for the cycle from the plant computer point "CEBURNUP".

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6.2.B Estimated Critical Position (ECP) (Continued)

2. **RECORD** the excess reactivity from Figure 1-II.A.7 of NEOP-13 (Figure 2-II.A.7 of NEOP-23) on ATTACHMENT 2B.

> **CAUTION:**
>
> The actual time of criticality MUST be within four hours of the estimated time (TS 3.1.1.1.e). IF the actual time of criticality WILL NOT be within 4 hours of the estimated time, another ECC MUST be calculated with a more accurate time. IF the actual time of criticality will be within 84 hours of the previous shutdown, the actual time of criticality MUST be within 2 hours of the estimated time. IF the actual time of criticality WILL NOT be within 2 hours of the estimated time for this situation, another ECC MUST be calculated with a more accurate time.

3. **RECORD** the estimated date and time of reactor criticality for the ECC, on ATTACHMENT 2B.

4. **RECORD** the elapsed time from reactor shutdown to the estimated time of criticality on Attachment 2B.

   a. **IF** the elapsed time is greater than 84 hours **THEN USE** "> 84" hours for 6.2.B.4.

5. **DETERMINE** the post shutdown xenon worth.

   a. **IF** the elapsed time is less than 84 hours, **THEN DETERMINE** the post shutdown xenon worth at the estimated time of criticality using the plant computer **OR** the XENON RHO Report, **AND RECORD** on Attachment 2B.

   b. **IF** the elapsed time is greater than 84 hours, **THEN RECORD** the post shutdown xenon worth as zero (0) on Attachment 2B.

6. **PLACE** the hard copy XENON RHO Report with Attachment 2B, if used.

7. **RECORD** the desired Critical Boron Concentration on Attachment 2B.

8. **RECORD** the Corrected HZP IBW from the XENON RHO Report on Attachment 2B,

   OR

   CALCULATE AND RECORD on Attachment 2B the Corrected HZP IBW using Figure 1-II.A.2 of NEOP-13 (Figure 2-II.A.2 of NEOP-23) and the formula:

   Corrected HZP IBW = (HZP IBW)/B10 Correction Factor.

9. **CALCULATE** the Critical Boron Worth by using the formula below **AND RECORD** on Attachment 2B.

   Critical Boron Concentration/Corrected HZP IBW = Critical Boron Worth

6.2.B Estimated Critical Position (ECP) (Continued)

10. **CALCULATE** the Critical CEA Worth by using the formula below **AND RECORD** on Attachment 2B.

    Excess Reactivity - (Critical Boron Worth + Xenon Worth) = Critical CEA Worth

11. **DETERMINE** the Critical CEA Position associated with the Critical CEA Worth using Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23) **AND RECORD** on Attachment 2B.

12. **ADD** the ECC Tolerance (0.5 %$\Delta\rho$) to the Critical CEA Worth from step 6.2.B.10 **AND RECORD** on Attachment 2B. This result will be used to determine the ECC Lower CEA Bound.

13. **DETERMINE** the ECC Lower CEA Bound by finding the CEA position from Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23) associated with the reactivity worth found in step 6.2.B.12 **AND RECORD** on Attachment 2B.

14. **IF** the Lower CEA Bound is **LESS** than the Zero Power Dependent Insertion Limit, **THEN PERFORM** step 6.2.B again with a higher Critical Boron Concentration.

15. **SUBTRACT** the ECC Tolerance (0.5 %$\Delta\rho$) from the Critical CEA Worth from step 6.2.B.10 **AND RECORD** on Attachment 2B. This result will be used to determine the ECC Upper CEA Bound.

16. **DETERMINE** the ECC Upper CEA Bound by finding the CEA position from Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23), associated with the reactivity worth found in step 6.2.B.15 **AND RECORD** on Attachment 2B.

17. **IF** the Upper CEA Bound is **GREATER** than 135 inches withdrawn on Reg Group 5, **THEN PERFORM** step 6.2.B again with a lower Critical Boron Concentration.

18. **SIGN** the ECC form **AND SUBMIT** the ECC to a Shift SRO for review and approval.

19. **VERIFY** that the previous critical condition is correct. [B-8]

20. **VERIFY** that the ECC date and time are within the allowable range.

21. **VERIFY** that the ECC was calculated correctly.

22. **VERIFY** that the ECC Upper and Lower CEA Bounds were calculated correctly and are between 135 inches withdrawn on Reg Group 5 and zero power PDIL.

23. **IF** an error is found, **THEN INSTRUCT** the preparer to make the necessary corrections, **AND REPEAT** the review.

24. **IF** the calculation is acceptable, **THEN** the reviewing Shift SRO shall **SIGN** the attachment.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

TASK: 020590505 RPS Startup Test

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the Engineered Safety Feature Actuation System.

EVALUATION LOCATION:

_____ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEL:

TRAIN

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

STP O-6-1

TASK STANDARDS:

This JPM is complete when one Turbine Loss of Load Channel Test has been conducted per STP O-6-1 Section 6.2.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

TASK: 020590505 RPS Startup Test

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **<u>NOTE:</u> Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

8. Setup instructions:

   a. Reset to IC-9.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 020590505

DIRECTIONS TO TRAINEE:

1. To complete the task successfully, you must:

   - perform each critical element correctly. You must inform the evaluator of the indications you are monitoring. Where necessary, consider the evaluator to be the CRS.

   - comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

2. Initial Conditions:

   a. Unit 1 is in Mode 3.

   b. You are performing the duties of a spare licensed operator.

3. Initiating Cue: The CRS directs you to perform Section 6.2 of STP O-6-1. Are there any questions? You may begin.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

ELEMENT (* = CRITICAL STEP)			STANDARD

TIME START ____

CUE:	STP is complete through section 6.1. Begin at 6.2.A.

____		Identify and locate STP O-6-1, Section 6.2	Same as element

CUE:	All CEAs inserted, count rate 18 CPS.

____	A.	**VERIFY** Reactor is shutdown	Checks all CEAs inserted and Reactor Power level on 1C05 or 1C15.
		1. <u>**IF**</u> Low Pressure S/G Trip Units (TU-5) are tripped, <u>**THEN**</u> **PLACE** the LOW S/G PRESSURE trip bypass keyswitch for Channels A, B, C and D to BYPASS. (N/A if Trip Units are <u>**NOT**</u> tripped.)	N/A
		2. <u>**IF**</u> Low Flow and TM/LP Trip Units are tripped, <u>**THEN**</u> **PLACE** the ZERO POWER MODE trip bypass keyswitch for Channels A, B, C and D to BYPASS. (N/A if Trip Units are <u>**NOT**</u> tripped.)	N/A
____	B.	**INITIATE** the Turbine Loss of Load Channel Test by performing steps <u>C through J</u> for a single RPS Channel. When completed, repeat steps <u>C through J</u> for each of the remaining RPS Channels to be tested.	

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

ELEMENT (* = CRITICAL STEP)		STANDARD
CUE:	Turbine Tripped Annunciator ON. STOP valves closed.	
____ C.	**VERIFY** the Turbine Generator tripped.	Checks "TURB TRIP" Annunciator on 1C02 and Turbine Stop valve position.
*____ D.	**PLACE** the LINEAR POWER CHANNEL, OPERATOR/TEST switch in the TEST position.	Places switch in Test position.
CUE:	Level 2 light energizes.	
*____ E.	**ROTATE** Lower Subchannel TEST level potentiometer until the amber LEVEL 2 light energizes.	Rotates switch until Level 2 light energizes.
CUE:	Loss of load trip unit trips, and 3 matrix lights are on, and 1C05 "PROT CH TRIP" Annunciator is on.	
____ F.	**VERIFY** the Loss of Load Trip Unit (TU-8) TRIPS <u>AND</u>:	Verifies Loss of load Trip unit trips.
	1. Loss of Load Trip Unit red TRIP light and three (3) matrix lights energized.	Verifies red trip light and three matrix lights are energized.
	2. 1C05 "PROT CH TRIP" Annunciator alarms. (N/A if any other Trip Unit tripped)	Verifies "PROT CH TRIP" Annunciator is in Alarm on 1C05. (N/A if other trip units are tripped.)
*____ G.	**ROTATE** Lower Subchannel TEST level potentiometer fully in the counter-clockwise direction.	Rotates potentiometer fully counter-clockwise.
*____ H.	**PLACE the LINEAR POWER CHANNEL, OPERATE/TEST** switch in the OPERATE position.	Places switch in OPERATE.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

ELEMENT (* = CRITICAL STEP)			STANDARD
CUE:	Loss of load trip unit resets and 1C05 "PROT CH TRIP" Annunciator is off (Annunciator N/A if other trip units tripped).		
____	I.	**RESET** the Loss of Load Trip Unit (TU-8).	Resets Loss of Load Trip Unit
	1.	**CHECK** 1C05 "PROT CH TRIP" Annunciator clear. (N/A if any other Trip Unit tripped.)	Checks "PROT CH TRIP" Annunciator clear. (N/A if other trip units are tripped.)

TIME STOP _____

TERMINATING CUE:	This task is complete when the Channel A has been tested (through Step I). No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

020590505 RPS Startup Test

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

CALVERT CLIFFS NUCLEAR POWER PLANT
SURVEILLANCE TEST PROCEDURE
UNIT ONE

STP O-6-1

RPS STARTUP TEST

REVISION 22

SAFETY RELATED

CONTINUOUS USE

Approval Authority: 11/2/98
Signature/Date

Effective Date: 11/3/98

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SURVEILLANCE TEST PROCEDURES ADDITIONAL COVER SHEET INFORMATION

A. Test Performance

Permission to perform test: ______________________ / ______
Shift Manager Date

B. Test completion, results review and approval (Circle appropriate answer)

Accept. Criteria in spec?	YES NO N/A	Adjustments made?	YES NO N/A
As found results in spec?	YES NO N/A	IR submitted?	YES NO N/A
As left results in spec?	YES NO N/A	Malfunctions indicated?	YES NO N/A

REMARKS: ____

Test completed by: ______________________ / ______
Date

Analysis of results: ____

Shift Manager review: ______________________ / ______
Date

Analysis/Comments: ____

Functional Surveillance
Test Coordinator: ______________________ Date: ______

EQSE (if required): ______________________ Date: ______

* POSRC Meeting No.: ______________________ Date: ______

* Plant General Manager: ______________________ Date: ______

* Required only if completed test on SR and designated NSR structures, systems and components (per Q List) identified a malfunction or were out of specification.

Attach a separate sheet, if necessary, to document additional comments.

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PROCEDURE ALTERATIONS

REVISION/CHANGE	PAGES
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1.0 PURPOSE

A. To ensure that prior to a reactor startup the RPS will provide protective actions upon receipt of a trip signal in excess of a predetermined setpoint.

2.0 APPLICABILITY/SCOPE

A. Completion of this STP satisfies, in part, the surveillance requirements of ITS SR 3.3.1.6, 3.3.1.7, 3.3.2.2, 3.3.2.3, 3.3.3.3, 3.3.12.2, and 3.4.16.2. 22/00

B. This STP tests one channel at a time and assumes that no other RPS testing is in progress or is to be performed concurrently.

C. IF any unexpected conditions are observed during the test, THEN stop the test and have the SRO review the test as required prior to continuing.

D. Test Performance Requirements:

1. This STP shall be performed in the order written, in a step by step manner, unless specifically called out for in the procedure. Each step shall be initialed immediately after it is completed and prior to performing the next step. Each step shall be initialed by either the licensed operator directing the STP or the operator performing the applicable step.

2. Each step should be read in its entirety prior to performance to ensure that the expected response is obtained.

3. A sufficient number of operators shall be used to perform this test in order to preclude the use of artificial means to maintain pushbuttons, switches or contacts depressed. The use of any such device is strictly forbidden.

4. This test shall be performed by individuals qualified on the watch stations for the affected equipment.

5. The Shift Manager shall determine if a pretest briefing is required and direct the SRO accordingly.

2.0 APPLICABILITY/SCOPE (Continued)

E. **INDICATE** the reason(s) for performing this STP:

- ☐ Scheduled Surveillance.
- ☐ Operability Verification.
- ☐ Post Maintenance Verification. (Enter sections to be performed in Pre-surveillance Remarks)
  MO/IR numbers: ______________________________

Pre-surveillance
remarks: ______________________________

____

____

____

____

Determination made by: ______________________________
(SRO)

3.0 REFERENCES

A. Procedures

1. OI-6, Reactor Protection System
2. EN-4-104, Surveillance Test Program
3. RM-1-101, Regulatory Reporting

B. Codes and Standards

1. Technical Manual 12-129-49, Reactor Protective System.
2. Technical Manual 12-023-23, Neutron Flux Monitoring Systems.
3. Technical Specifications.

4.0 PREREQUISITES

INITIALS

A. The RPS is aligned for normal operation **PER** OI-6, Reactor Protection System. ________

4.0 PREREQUISITES (Continued) **INITIALS**

B. Administrative Requirements:

1. **PERFORM** a pretest page check of this STP. ______

2. A pretest briefing has been held. (N/A if Shift Manager determined briefing NOT required) ______

5.0 PRECAUTIONS

A. Only one channel shall be tested at a time.

6.2 TURBINE LOSS OF LOAD CHANNEL TEST

INITIALS

A. **VERIFY** Reactor is shutdown. ______

1. IF Low Pressure S/G Trip Units (TU-5) are tripped, THEN **PLACE** the LOW S/G PRESSURE trip bypass keyswitch for Channels A, B, C and D to BYPASS. (N/A if Trip Units are NOT tripped) ______

2. IF Low Flow and TM/LP Trip Units are tripped, THEN **PLACE** the ZERO POWER MODE trip bypass keyswitch for Channels A, B, C and D to BYPASS. (N/A if Trip Units are NOT tripped) ______

B. **INITIATE** the Turbine Loss of Load Channel Test by performing steps C through J for a single RPS Channel. When completed, repeat steps C through J for each of the remaining RPS Channels to be tested.

C. **VERIFY** the Turbine Generator tripped. __ __ __ __ (A B C D)

D. **PLACE** the LINEAR POWER CHANNEL, OPERATE/TEST switch in the TEST position.

E. **ROTATE** Lower Subchannel TEST level potentiometer until the amber LEVEL 2 light energizes. __ __ __ __ (A B C D)

F. **VERIFY** the Loss of Load Trip Unit (TU-8) TRIPS AND: __ __ __ __ (A B C D)

1. Loss of Load Trip Unit red TRIP light and three (3) matrix lights energized. __ __ __ __ (A B C D)

2. 1C05 "PROT CH TRIP" annunciator alarms. (N/A if any other Trip Unit tripped) __ __ __ __ (A B C D)

G. **ROTATE** Lower Subchannel TEST level potentiometer fully in the counter-clockwise direction. __ __ __ __ (A B C D)

H. **PLACE** the LINEAR POWER CHANNEL, OPERATE/TEST switch in the OPERATE position.

I. **RESET** the Loss of Load Trip Unit (TU-8). __ __ __ __ (A B C D)

1. **CHECK** 1C05 "PROT CH TRIP" annunciator clear. (N/A if any other Trip Unit tripped) __ __ __ __ (A B C D)

J. **REPEAT** steps C through H for the remaining channels to be tested. __ __ __

6.2 TURBINE LOSS OF LOAD CHANNEL TEST (Continued) **INITIALS**

> **CAUTION**
> The previous steps must be satisfactorily completed for all channels tested prior to continuing.

K. **RETURN** the LOW S/G PRESSURE bypass keyswitch for Channels A, B, C and D to OFF. (N/A if NOT in BYPASS) ______

L. **RETURN** the ZERO POWER MODE trip bypass keyswitch for Channels A, B, C and D to OFF. (N/A if NOT in BYPASS) ______

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
RPS Instrumentation

K/A 000012K401 [3.7/4.0]

Question a:
When a RPS cabinet is de-energized, what would be the resulting trip logic?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
RPS Instrumentation

K/A 000012K401 [3.7/4.0]

Question a:
When a RPS cabinet is de-energized, what would be the resulting trip logic?

Answer:

One out of three

Reference Use Allowed? NO

Reference 1 OI-6, Section 6.2 pg. 8 Rev.11

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ________________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
RPS Instrumentation

K/A 000012K604 [3.3/3.6]

Question b:
When de-energizing 2 RPS Cabinets, how is opening of the PORVs prevented?

☐ Satisfactory ☐ Unsatisfactory Candidate ________________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

RPS INSTRUMENTATION
K/A 012000K6.04 [3.3/3.6]

Question a:
When de-energizing 2 RPS Cabinets, how is opening of the PORVs prevented?

Answer:

Place each PORV handswitch to the OVERRIDE TO CLOSE position.

Reference Use Allowed? NO

Reference 1 OI-6, Section 6.2 Page 7 Rev. 11

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EOP-8, CE-2

TASK: 020010413 Containment Environment Control by Containment Isolation

PERFORMER'S NAME: ______________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for Containment.

EVALUATION LOCATION:

____PLANT __X__ SIMULATOR ____ CONTROL ROOM

EVALUATION METHOD:

______ ACTUAL PERFORMANCE ____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEL:

TRAIN

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

EOP-8, Appendix (5), Success Path CE-2

TASK STANDARDS:

This JPM is complete when EOP-8, Success Path CE-2, Containment Isolation, Block Step A has been completed.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EOP-8, CE-2

TASK: 020010413 Containment Environment Control by Containment Isolation

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

8. Simulator Setup

   a. Reset to IC13

   b. Insert malfunction RCS002 at 2200 GPM.

   c. Perform EOP-0

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

DIRECTIONS TO TRAINEE:

1. To complete the task successfully, you must:

   - perform each critical element correctly. You must inform the evaluator of the indications you are monitoring. Where necessary, consider the evaluator to be the CRS.

   - comply with industrial safety practices, radiation safety practices and use of event free tools. **<u>NOTE:</u> Violation of safety procedures will result in failure of the JPM.**

2. Initial Conditions:

   a. A reactor trip, SIAS and CIS actuations have occurred on Unit 1.

   b. Currently EOP-8 is being performed and Success Path CE-2: Containment Isolation has been identified as the appropriate Functional Restoration path.

   c. You are performing the duties of the CRO.

3. Initiating Cue: The CRS directs you to perform the actions of Success Path CE-2: Containment Isolation. Are there any questions? You may begin.

(7) This is very "simple" JPM.
Not sure it will distinguish safe operators.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EOP-8, CE-2

ELEMENT (* = CRITICAL STEP)			STANDARD
TIME START ____			
____		Identify and locate EOP-8, CE-2.	Same as element
	A.	**ESTABLISHES CONTAINMENT ENVIRONMENT BY CONTAINMENT ISOLATION**	
CUE: Containment pressure is 3.0 psig.			
____	1.	**IF** containment pressure rises to 2.8 PSIG, **THEN** verify ESFAS actuation of the following: • SIAS • CIS	For SIAS, verifies alarm, HPSI pumps running and the HPSI Hdr Valves are open. For CIS, verifies alarm and CC CNTMT Isol Valves are shut.
CUE: All RCPs tripped.			
*____	2.	**IF CIS** actuates, **THEN** trip **ALL** RCPs.	Trips all RCPs.
____	3.	Maximize containment cooling by performing the following actions:	
CUE: All CACs start.			
____	a.	Start **All** available CNTMT AIR CLRs.	Verifies all CNTMT AIR CLRs running.
CUE: All CAC EMER OUT valves indicate open.			
____	b.	Open CNTMT CLR EMER OUT valves: • 1-SRW-1582-CV • 1-SRW-1585-CV • 1-SRW-1590-CV • 1-SRW-1593-CV	Verifies CNTMT CLR EMER OUT valves open.

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ELEMENT (* = CRITICAL STEP)			STANDARD
CUE: SRW Pp RM ventilation is in service.			
____	4.	Verify SRW Pump Room Ventilation is in service **PER** the SRW PUMP ROOM VENTILATION section of OI-15.	Dispatches TBO.
CUE: CNTMT Pressure is 3.0 psig.			
____	5.	**IF** containment pressure rises to 4.25 PSIG, **THEN PROCEED** to CE-3, CONTAINMENT SPRAY.	N/A

NOTE: **HPSI and LPSI throttle/termination will affect the system lineup in the checklists used in the following step.**

CAUTION: **To prevent uncontrolled system restoration, handswitches should be matched to the checklist positions unless specified otherwise.**

CUE: CRS has assigned an extra RO to perform the SIAS and CIS checklists.			
____	6.	Verify ESFAS equipment is aligned correctly **AND** handswitches are matched **PER** the following checklists as appropriate: • ATTACHMENT (2) SIAS VERIFICATION CHECKLIST • ATTACHMENT (4), CIS VERIFICATION CHECKLIST	N/A
CUE: All Iodine Filt Fans running.			
____	7.	Verify **ALL** available IODINE FILT FANs are running.	Verifies all Iodine Filt fans running.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EOP-8, CE-2

ELEMENT (* = CRITICAL STEP)		STANDARD
____ 8.	Direct Chemistry to place the Hydrogen Monitors in service.	Contacts Chemistry.

CUE: H2 Concentration is zero.

____ 9.	**IF** hydrogen concentration rises to 0.5%, **OR** hydrogen concentration can **NOT** be determined, **THEN** start the Hydrogen Recombiners **PER** OI-41A <u>HYDROGEN RECOMBINERS</u>.	N/A
____ 10.	**IF** the Plant Technical Support Center recommends the use of the Hydrogen Purge System, **THEN** operate the Hydrogen Purge System **PER** OI-41B, <u>HYDROGEN PURGE SYSTEM OPERATION</u>, until the Plant Technical Support Center recommends its termination.	N/A

TERMINATING CUE:	This task is complete when Block Step A is complete. No further actions are required.

TIME STOP ____

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EOP-8, CE-2

TASK: 020010413 Containment Environment Control by Containment Ioslation

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTES: Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Containment Environment Control by Containment Isolation

K/A 00027A403 [3.3/3.2]

Question a:
Regarding the Containment Iodine Removal System, how many recirculation filter units are required to achieve 100% capacity?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Containment Environment Control by Containment Isolation

K/A 00027A403 [3.3/3.2]

Question a:
Regarding the Containment Iodine Removal System, how many recirculation filter units are required to achieve 100% capacity?

Answer:

2 Units (50% capacity each)

Reference Use Allowed? NO

Reference 1 EOP-8, CE-2 Basis Pg. 287 Rev. 17

Reference 2

Comments:

* ARE THERE TWO [illegible]
USED [illegible]

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Containment Environment Control by Containment Isolation

K/A 00022K402 [3.1/3.4]

Question b:
What is the reason for the Containment Air Coolers shifting to low or starting in low on a SIAS?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Containment Environment Control by Containment Isolation

K/A 00022K401 [3.1/3.4]

Question a:
What is the reason for the Containment Air Coolers shifting to low or starting in low on a SIAS?

Answer:

The steam water atmosphere from a LOCA or Steam Line break is more dense than air which results in an increased load on the fan motor. Slow speed operation prevents motor overloading the fan motor that would occur if the fan was in high speed.

Reference Use Allowed? NO

Reference 1 L/P CRO 7-1 L.O. 13 page 59

Reference 2 EOP-8, CE-2 Basis, Page 286 Rev. 17 (RPA to be submitted due to wrong inference as basis)

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

TAB 5

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

TASK: 020070303 Respond to a Complete Loss of SDC with Pressurization of the RCS Possible

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the Safety Injection System.

EVALUATION LOCATION:

_____ PLANT _X_ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
15 MINUTES	____ MINUTES	NO

TASK LEVEL:

LEVEL 1 PERFORM

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

AOP-3B

TASK STANDARDS:

This JPM is complete when shutdown cooling flow has been restored following automatic closure of the SDC return valves.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

TASK: 020070303 Respond to a Complete Loss of SDC with Pressurization of the RCS Possible

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **NOTE: Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task..

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

8. Simulator Setup

   a. U1 Mode 5, RCS temperature 180°, 150 psi, pressurizer level 160”, 11 LPSI in service, 1-SI-652 MOV override closed.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 020070303

DIRECTIONS TO TRAINEE:

1. To complete the task successfully, you must:

   - perform each critical element correctly. You must inform the evaluator of the indications you are monitoring. Where necessary, consider the evaluator to be the CRS.
   - comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

2. Initial Conditions:

   a. Unit 1 is in Mode 5 for maintenance.

   b. The RCS is filled and pressurizer level is 160".

   c. #11 LPSI pump was in service supplying shutdown cooling flow.

   d. RCS temperature is 180°F.

   e. RCS pressure is 150 PSIA.

   f. The reactor has been shut down for 72 hours.

   g. Electricians were working the limitorque on 1-SI-652-MOV, they just reclosed the breaker, 1-SI-652-MOV went shut.

   h. You are performing the duties of the Unit 1 CRO.

3. Initiating Cue: The CRS directs you to restore shutdown cooling in accordance with AOP-3B, beginning at Step IV.A.4. Are there any questions? You may begin.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

ELEMENT (* = CRITICAL STEP)			STANDARD

TIME START ____

____		Identify and locate AOP-3B, Step IV.A.4.	Same as element.
____	4.	Check that the SDC HDR RETURN ISOL valves are open: . 1-SI-651-MOV . 1-SI-652-MOV	1C09 Reports SI-652 indicates shut.

ALTERNATE ACTIONS

<u>CAUTION</u>: Isolation of the LPSI PP suction flow path can cause pump damage if the LPSI PPs are allowed to operate.

____	4.1	**IF ANY** of the SDC HDR RETURN ISOL valves are **NOT** fully open, **THEN** complete the following:	
*____	a.	Stop the operating LPSI PP(s).	HS-302X, 1C08 breaker light open.
____	b.	Place **BOTH** LPSI PP handswitches in PULL TO LOCK.	HS-302X and 302Y, 1C08 and 1C09

CUE:	RCS pressure is 150 PSIA.

____	c.	Initiate Aux Spray as necessary **PER** Step C.5.b to maintain RCS pressure less than 260 PSIA.	Monitors RCS pressure on PIC-103.

CUE:	Electricians reopened the 1-SI-652-MOV breaker, they put a wire in backwards, they have since restored 1-SI-652-MOV breaker.

____	d.	Attempt to open the affected SDC HDR RETURN ISOL valve(s) from the Control Room: . 1-SI-651-MOV . 1-SI-652-MOV	HS-2652, 1C09 open light.

ELEMENT (* = CRITICAL STEP)		STANDARD
____	e. **IF BOTH** SDC HDR RETURN ISOL valves are open, **THEN** attempt to restore SDC **PER** ATTACHMENT (3), RETURNING SHUTDOWN COOLING TO SERVICE.	Refers to Attachment 3.

ATTACHMENT 3

CUE:	RCS pressure is 160 PSIA.

____	1. Ensure RCS pressure is less than 260 PSIA.	Monitors RCS pressure on PIC-103 and/or PIC-103-1, 1C06.

CUE:	RCS temperature is 183°F.

____	2. Ensure RCS temperature is less than 300°F.	Monitors CET temperatures, 1C05.

CUE:	When checked, SI-651 and 652 indicate open.

____	3. Ensure the SDC HDR RETURN ISOL valves are open: . 1-SI-651-MOV . 1-SI-652-MOV	1-HS-3651 & 3652 @ 1C09 open position light

CUE:	When dispatched, PO reports valves are locked shut.

____	4. Ensure the LPSI PP NORM SUCT ISOL valves are Locked Shut: . (11 LPSI PP) 1-SI-444 . (12 LPSI PP) 1-SI-432	Dispatches PO to check valve positions.

ELEMENT (* = CRITICAL STEP)			STANDARD
CUE:		When dispatched, PO reports valves are locked open.	
____	5.	Ensure the LPSI PP SDC SUCT ISOL valves are Locked Open: . (11 LPSI PP) 1-SI-441 . (12 LPSI PP) 1-SI-440	Dispatches PO to check valve positions.
	6.	Verify the LPSI PP DISCH ISOL valves are Locked Open: . (11 LPSI PP) 1-SI-447 . (12 LPSI PP) 1-SI-435	

NOTE: **SDC Return Header Vent valves, 1-SI-563 and 1-SI-562 are located in the 5 foot East Piping Penetration Room along the East wall.**

WARNING: **Venting the SDC System may release high temperature, highly radioactive gasses.**

____	7	IF air is suspected of being trapped in the SDC Return Header,	Determines step is N/A.

WARNING: **Venting the SDC System may release high temperature, highly radioactive gasses.**

____	8	IF air is suspected in the LPSI PPs,	Determines step is N/A.
CUE:		When checked, SI-657 indicates shut.	
*____	9	Shut the S/D COOLING TEMP CONTR valve, 1-SI-657-CV.	Lowers HIC-657 to zero output. Checks position indication for SI-657.
*____	10.	Partially open the SHUTDOWN CLG FLOW CONTR valve, 1-SI-306-CV, as follows:	
____		a. Place the SHUTDOWN CLG FLOW CONTR, 1-FIC-306, to MANUAL.	Shifts FIC-306 to Manual.

ELEMENT (* = CRITICAL STEP)			STANDARD
CUE: When adjusted, FIC-306 output indicates 95%.			
*____	b.	Adjust the SHUTDOWN CLG FLOW CONTR, 1-FIC-306, to 95% output.	Adjusts output of FIC-306 to 95%.
____	11.	Verify LPSI HDR flowpath:	
____	a.	IF the LPSI HDR valves are in the Reduced Inventory position per OP-7, SHUTDOWN OPERATIONS,	Determines step is N/A.
CUE: When checked, SI-615, 625, 635, 645 indicate open.			
____	b.	IF the LPSI HDR valves are NOT in the Reduced Inventory position per OP-7, THEN verify open ALL LPSI HDR valves: . 1-SI-615-MOV . 1-SI-625-MOV . 1-SI-635-MOV . 1-SI-645-MOV	HS-3615 and 3625, 1C08 & HS-3635 and 3645, 1C09 Open position lights.

CAUTION: Do NOT operate the LPSI PPs at shutoff head.

CUE: The LPSI pump starts and trips after several seconds. The ABO reports hearing a loud squeal from the LPSI pump motor and the motor outboard bearing is extremely hot.			
*____	12.	Start a LPSI PP.	HS-302X, 1C08 or 302Y, 1C09 breaker open light. The cause of the LPSI pump trip is investigated before attempting to start the other pump.
CUE: When output lowered, FIC-306 indicates 3000 GPM.			
*____	13.	IF the RCS level is above the 37.6 foot elevation, THEN slowly adjust the SHUTDOWN CLG FLOW CONTR, 1-FIC-306, to raise SDC flow to 3000 GPM.	Slowly lowers output of FIC-306 until flow indicates 3000 GPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

ELEMENT (* = CRITICAL STEP)		STANDARD
____ 14.	**IF** the RCS level is at or below the 37.6 foot elevation,	Determines step is N/A.
____ 15.	Place the SHUTDOWN CLG FLOW CONTR, 1-FIC-306, in AUTO if desired.	Adjust Auto Setpoint until Auto output matches Manual output and shifts FIC-306 to Auto.

<u>**CAUTION:**</u> **Do NOT exceed the following cooldown limits in any one hour:**

- **greater than 270°F 100°F/hr**
- **184°F to 270°F 20°F/hr**
- **less than 184°F 10°F/hr**

<u>**CAUTION:**</u> **Do NOT exceed a heatup rate of 14°F/MIN for the Shutdown Cooling Heat Exchanger as indicated on TI-303X and TI-303Y.**

<u>**CAUTION:**</u> **Do NOT exceed 4800 GPM flow through one SDC HX.**

*____ 16.	Adjust the S/D COOLING TEMP CONTR, 1-HIC-3657, as necessary to maintain the desired temperature and current mode. . (Mode 4) less than 300°F . (Mode 5) less than 200°F . (Mode 6) less than 140°F	Raises output of HIC-3657 and monitors RCS temperature on TR-351.

<u>**NOTE:**</u> **The SDC Flow Control valve, 1-SI-306-CV, fails open on a Loss of Instrument Air, therefore SDC flow is controlled by throttling two LPSI HDR valves, to prevent vortexing, if a Loss of Instrument Air were to occur.**

____ 17.	**IF** the RCS level is at or below the 37.6 foot elevation **AND** the LPSI HDR valves are **NOT** in the Reduced Inventory position per OP-7	Determines step is N/A.

TIME STOP ____

TERMINATING CUE:	This JPM is complete when the standby LPSI pump has been started and SDC flow adjusted to maintain RCS temperature. No further actions are required.

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CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

TASK: 020070303 Respond to a Complete Loss of SDC with Pressurization of the RCS Possible

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

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K/A 00024AA206 [3.6/3.7]

Question a:

What are the primary sources of dilution of the RCS during plant startup in Mode 3?

☐ Satisfactory ☐ Unsatisfactory Candidate ________________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

SDC

K/A 00024AA206 [3.6/3.7]

Question a:

What are the primary sources of dilution of the RCS during plant startup in Mode 3?

Answer:

The two possible causes of dilution of the RCS in Mode 3 are inadvertant injection of water (makeup) or improper operation of an Ion Exchanger.

Reference Use Allowed? YES

Reference 1 AOP 1A Section VII, Step B, page 21

Reference 2 AOP 1A Technical Basis, pages 7 and 11

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
SDC

K/A 00025AK101 [3.9/4.3]

Question b:

During preparation for entering Reduced Inventory Conditions when must RCS boiling times be considered for Containment closure deviations?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
SDC

K/A 00025AK101 [3.9/4.3]

Question b:

During preparation for entering Reduced Inventory Conditions when must RCS boiling times be considered for Containment closure deviations?

Answer:

When SGs are NOT available

Reference Use Allowed? NO

Reference 1 OP 7 Section 6.3 page 37

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

TASK: 020050305 Respond to RCS leakage exceeding one charging pump, Modes 1 and 2

PERFORMER'S NAME: ____________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the Reactor Coolant System.

EVALUATION LOCATION:

_____ PLANT ✓ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEL:

LEVEL 1 PERFORM

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

AOP-2A

TASK STANDARDS:

This JPM is complete when the leak is isolated in accordance with AOP-2A and charging has been lined up to the Auxiliary HPSI header.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

TASK: 020050305 Respond to RCS leakage exceeding one charging pump, Modes 1 and 2

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

8. Simulator Setup/Booth Operator Instructions

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 020050305

DIRECTIONS TO TRAINEE:

1. To complete the task successfully, you must:

   - perform each critical element correctly. You must inform the evaluator of the indications you are monitoring. Where necessary, consider the evaluator to be the CRS.

   - comply with industrial safety practices, radiation safety practices and use of event free tools. **<u>NOTE:</u> Violation of safety procedures will result in failure of the JPM**.

2. Initial Conditions:

   a. Unit 1 is at 100% power and operating with steady state conditions.

   b. Pressurizer level starts to steadily decrease and the backup charging pumps automatically start.

   c. Pressurizer level is slowly decreasing.

   d. You are performing the duties of the Unit 1 RO and CRO.

3. Initiating Cue: The CRS directs you to perform Step VI.B.1 of AOP-2A. Are there any questions? You may begin.

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CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

TASK: 020050305 Respond to RCS leakage exceeding one charging pump, Modes 1 and 2

a. IC-13

b. Charging Line Break 5.0 value; CVCS 008 (Charging header break inside Containment)

NOTE: For this size leak, charging hdr pressure will be greater than RCS pressure with 3 Charging Pps running.

c. Run simulator until the backup charging pumps start.

d. Shut 1-CVC-183 when requested.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)		STANDARD
TIME START ____		
____	Locate AOP-2A, Section VI.	Same as element.
CUE:	When checked, pressurizer level is slowly lowering.	
____B.1.	**IF**, at **ANY** time, PZR pressure reaches the TM/LP pretrip setpoint, **THEN**, with the permission of the SM/CRS, perform the following actions:	Monitors alarm window D14, on 1C05.
	a. Trip the reactor.	Determines step is N/A at this time.
CUE:	When checked, pressurizer level is slowly lowering.	
____C.1.	Verify that Charging Pumps are maintaining PZR level within 15 inches of programmed level.	Monitors pressurizer level (LI-110X-1 and LI-110Y-1 and/or LR-110, on 1C06). Notes that pressurizer level is slowly lowering with all backup charging pumps running.
CUE:	When checked, CVC-515 and CVC-516 indicate shut.	
____1.1	**IF** PZR level is **NOT** being maintained by **ALL** available Charging Pumps, **THEN** shut the Letdown CNTMT Isolation valves: • 1-CVC-515-CV • 1-CVC-516-CV	1-HS-2515 & 2516 @ 1C07 closed position lights
____2.	Makeup to the VCT to maintain level as necessary.	If Auto Makeup desired at this time, sets FIC-210X and FIC-210Y to appropriate flow rates (for 675 ppm flow rates are 100 gpm DI and 5 gpm BA). Places FIC-210X and 210Y in AUTO. Places HS-2512 (CVC-512) in AUTO and places HS-210 (M/U Mode Sel SW) in AUTO.

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CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)		STANDARD
CUE:	Condenser Off Gas, BLDN, Main Steam Line Rad Monitors all indicate normal readings. Preliminary check of SG samples indicate no tube leakage. SG levels are normal.	
_____D.1.	Determine if a SG Tube Leak exists by observing a rise in ANY of the following:	Monitors RI-1752, RI-4014 and/or RI-4095 (N/A for simulator) on 1C22, and RIC-5421 and 5422, on 2C24B.
	. SG sample activities	
	. Condenser Off-Gas radiation levels at 1-RI-1752	Monitors LIA-1105 and LIA-1106 and/or LR-1111 and LR-1121, on 1C03.
	. SG Blowdown radiation levels at 1-RI-4095 or 1-RI-4014	
	. MAIN STEAM EFFL RAD MONITOR radiation levels at 1-RIC-5421 or 1-RIC-5422	Monitors Main Steam Rad Monitors.
	. MAIN STM N-16 RAD MONITOR levels at 1-RIC-5421A or 1-RIC-5422A	
	. SG water level (Unexplained)	
	. Feed flow mismatch	
_____ 2.	IF a SG Tube Leak is indicated,	Determines step is N/A.
_____E.1.	Verify that the Letdown CNTMT Isolation valves are shut: • 1-CVC-515-CV • 1-CVC-516-CV	1-HS-2515 & 2516 @ 1C07 closed position lights.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)		STANDARD
CUE:	When checked, Quench Tank parameters, discharge piping temperatures and acoustic monitor indications are normal.	
_____2.	**CHECK** there is **NO** PORV leakage by the following indications: . Quench Tank Parameters . PORV discharge piping temperatures, computer points T107 and T108 . Acoustic Monitor indication	Monitors Quench Tank parameters (LIA-116, PA-116 and PA-116A and TIA-116, on 1C06). Monitors computer point T107 and T108. Monitors acoustic monitor indication.
CUE:	When checked, PS-5464 indicates shut.	
_____ 3.	Verify that RCS SAMPLE ISOL valve, 1-PS-5464-CV, is shut.	1-HS-5464 @ 1C10 close position light.
CUE:	When checked, RC-103 and RC-104 indicate shut.	
_____ 4.	Verify that the Reactor Vessel Vent valves are shut: • 1-RC-103-SV • 1-RC-104-SV	1-HS-103 & 104 @ 1C06 closed position lights.
CUE:	When checked, RC-105 and RC-106 indicate shut.	
_____ 5.	Verify that the PZR Vent valves are shut: • 1-RC-105-SV • 1-RC-106-SV	1-HS-105 & 106 @ 1C06 closed position lights

NOTE: **A leak on the Charging header which exceeds the capacity of the charging pumps can be identified by Charging header pressure indicating less than RCS pressure. Identification of the leak may be missed if more than one charging pump is running.**

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)			STANDARD
CUE: When checked, charging header pressure is 450 psig with one charging pump.			
*____	6.	Determine if the leak is on the Charging header by performing the following actions:	
*____	a.	Stop all but ONE CHG PP.	1-HS-224x, 224y, 224z @ 1C07 control switch open lights.
*____	b.	IF Charging header pressure is less than RCS Pressure, THEN assume the leak is on the Charging header.	Determines charging header pressure is less than RCS pressure, assumes leak is on the charging header.
____	c.	IF the leak is NOT on the Charging header,	Determines step is N/A.
____	7.	IF the leak is on the Charging header, THEN align Charging to the Auxiliary HPSI Header:	Determined by Step 6.
CUE: When monitored, all charging pumps indicate stop.			
CUE: Operator reports the leak was found in the Aux building east penetration room between 1-CVC-183 and the containment penetration.			
*____	a.	Place ALL CHG PPs in PULL TO LOCK.	Places HS-224X and 224Y and 224Z in P-T-L. Monitors pump stopped indication.
*____	b.	Dispatch an operator to determine the location of the leak.	~~Obtains CRS/SM concurrence for dispatching PO into Containment,~~ dispatch PO to Aux Bldg.
CUE: When checked, CVC-517, 518 and 519 indicates shut.			
_____	c.	Verify that the following valves are shut:	
	•	Auxiliary Spray valve, 1-CVC-517-CV	1-HS-2517 @ 1C07 closed position lights.

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CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)			STANDARD
____	•	Loop Charging valves: . 1-CVC-518-CV . 1-CVC-519-CV	1- HS-2518, 1-HS-2519 @ 1C07 closed position lights

NOTE **The Auxiliary HPSI Header is out of service and T.S. 3.5.2 applies when 1-SI-656-MOV is shut.**

CUE:	When checked, SI-656 indicates shut.

*____	d.	Shut the HPSI AUX HDR ISOL valve, 1-SI-656-MOV.	1-HS-3656 @ 1C08 closed position light.

CUE:	Selected valve indicates open.

*____	e.	Open ONE of the following AUX HPSI HDR valves: • 1-SI-617-MOV • 1-SI-627-MOV • 1-SI-637-MOV • 1-SI-647-MOV	1-HS-3617 or 1-HS-3627 @ 1C08 open position lights. **OR** 1-HS-3637 or 1-HS-3647 @ 1C09 open position lights.

CUE:	When checked, CVC-269 indicates open.

*____	f.	Open the SI TO CHG HDR valve, 1-CVC-269-MOV.	1-HS-269 @ 1C07 open position light.

NOTE **REGEN HX CHG INLET, 1-CVC-183, is located in the 27 foot West Penetration Room.**

CUE:	When dispatched, PO reports CVC-183 is shut. Cue Booth Operator to shut CVC-183.

*____	g.	**IF** the leak is downstream of the REGEN HX CHG INLET valve, 1-CVC-183, **THEN** shut 1-CVC-183.	Determines leak is downstream of CVC-183. Dispatches PO to shut CVC-183.

NOTE **CHG PP HDR XCONN, 1-CVC-182, is located near 12 Charging Pump.**

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)			STANDARD
_____	h.	**IF** the leak is upstream of 1-CVC-183,	Determines step is N/A.

<u>**CAUTION:**</u> **When a Charging Pump is started, Reactor power will lower due to the concentration of Boric Acid in the Auxiliary HPSI header being 2300 PPM or greater.**

_____	i.	**IF** the leak is upstream of 1-CVC-183 **AND** shutting 1-CVC-182 isolates the leak,	Determines step is N/A.

CUE:	Selected Charging Pump indicates running.

*_____	j.	**IF shutting 1-CVC-183 isolates the leak, THEN start any available CHG PP.**	1-HS-224x, or 224Y, or 224z @ 1C07 Bkr closed light, Norm Amps, System response, Alarm response.

CUE:	When checked, pressurizer level is rising.

_____	k.	Verify charging flow by observing a rise in PZR level.	Monitors pressurizer level on LI-110X and LI-110Y and/or LR-110, on 1C06.

CUE:	CRS will review LCO actions.

_____	l.	Declare the Auxiliary HPSI Header out of service and enter T.S. 3.5.2 <u>ECCS SUBSYSTEMS</u>.	No action required.

?

TIME STOP _____

TERMINATING CUE:	This JPM is complete when charging is lined up to the Aux HPSI header and the header is declared OOS. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

TASK: 020050305 Respond to RCS leakage exceeding one charging pump, Modes 1 and 2

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE:** **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

CONFIDENTIAL

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
CVCS

K/A 000004K604 [2.8/3.1]

Question a:

Which Charging pump feature protects the pump from a loss of NPSH during normal conditions and during LOCA conditions?

☐ Satisfactory ☐ Unsatisfactory Candidate ________________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

CVCS

K/A 000004K604 [2.8/3.1]

Question a:

Which Charging pump feature protects the pump from a loss of NPSH during normal conditions and during LOCA conditions?

does not protect dur LOCA ?

Answer:

The (9.5 " vac or ~10 PSIA) low suction pressure trip will protect the pumps during normal operation, but is bypassed during the LOCA by the SIAS actuation

Reference Use Allowed? **Yes**

Reference 1 Setpoint manual and/or CVCS piping drawing OM 73 (OM 461)

Reference 2 System description # 41 page 20

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ________________

K/A 000002K201 [4.3/4.4]

Question b:

Given the data for STP O-27-2, calculate the RCS gross leakrate for Unit 2 in Mode 3.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

CALVERT CLIFFS NUCLEAR POWER PLANT
SURVEILLANCE TEST PROCEDURE
UNIT TWO

STP O-27-2

REACTOR COOLANT SYSTEM LEAKAGE EVALUATION

REVISION 15

SAFETY RELATED

CONTINUOUS USE

Approval Authority: Nile [illegible] 8/27/98
Signature/Date

Effective Date: 8/28/98

SURVEILLANCE TEST PROCEDURES ADDITIONAL COVER SHEET INFORMATION

A. **Test Performance**

Permission to perform test: ______________________ / ________
Shift Manager / Date

B. **Test completion, results review and approval** (Circle appropriate answer)

Accept. Criteria in spec?	YES NO N/A	Adjustments made?	YES NO N/A
As found results in spec?	YES NO N/A	IR submitted?	YES NO N/A
As left results in spec?	YES NO N/A	Malfunctions indicated?	YES NO N/A

REMARKS: ______________________________

Test completed by: ______________________ / ________
Date

Analysis of results: ______________________________

Shift Manager review: ______________________ / ________
Date

Analysis/Comments: ______________________________

Functional Surveillance
Test Coordinator: ______________________ Date: ________

EQSE (if required): ______________________ Date: ________

* POSRC Meeting No.: ______________________ Date: ________

* Plant General Manager: ______________________ Date: ________

* Required only if completed test on SR and designated NSR structures, systems and components (per Q List) identified a malfunction or were out of specification.

Attach a separate sheet, if necessary, to document additional comments.

TABLE OF CONTENTS

TABLE OF CONTENTS

6.3 RCS LEAK RATE; ALTERNATE MANUAL CALCULATION

A. IF the Unit is NOT on Shutdown Cooling,
THEN CALCULATE the Gross RCS Leakage normalized to 120° F by use of the following equation showing calculations on ATTACHMENT 3 IF:

1. RCS pressure is less than 2200 PSIA OR:

2. T_{AVG} is less than 530° F.

$$\text{GROSS RCS LEAKAGE } (FT^3) = 153\left[\frac{(V_1 - V_0)}{V_1 V_0}\right] + \left[\frac{(M/U - DIV)}{7.4805}\right] - \left[3.61\,(LV_1 - LV_0)\right] - .0673\left[\frac{LP_1}{VP_1} - \frac{LP_0}{VP_0}\right]$$

Where:

V_0 = RCS specific volume at initial pressure and temperature from ASME Steam Tables.

V_1 = RCS specific volume at final pressure and temperature from ASME Steam Tables.

M/U = Makeup, in gallons. (RCS M/U plus BA M/U)

DIV = Letdown diverted, in gallons; including RWT M/U.

LP_0 = Initial pressurizer level, in inches.

LP_1 = Final pressurizer level, in inches.

VP_0 = PZR specific volume of water at initial pressure from ASME Steam Tables.

VP_1 = PZR specific volume of water at final pressure from ASME Steam Tables.

LV_0 = Initial VCT level, in inches.

LV_1 = Final VCT level, in inches.

MONTH: YEAR:

INST No.	XAT 011	2-FQI 210X	2-FQI 210Y	2-FQI 2540	L 226	XAP 001	XVL 001											
DAY/ TIME	Tavg	RC M/U INT	BA INT RDG	DIVERT INT	VCT LVL	PZR PRESS	PZR LVL	GROSS LKG	RCDT LKG	SIT LKG	VLV LKG	QT LKG	RWT LKG	CHG PP LKG	NET LKG	PERF INIT	VERF INIT
INIT DATA																	
22 0100																	
23 0100																	
24 0100																	
25 0100	530	0	0	0	88	2000	144	—									
26 0100	520	1000	80	100	87	1800	144										
27 0100																	
28 0100																	

SRO Review: 22:______ 23:______ 24:______ 25:______ 26:______ 27:______ 28:______

RWT M/U
DAY/ AMT
__/______
__/______
__/______
__/______
__/______
__/______
__/______

COMMENTS: ______

______/______
PC Validation/Date

ATTACHMENT 3

RCS LEAK RATE CALCULATION WORKSHEET

INITIALS

A. PROCEDURE

1. This attachment is to be used in conjunction with the procedure when an RCS Manual Leak Rate Calculation is required to document the actual performance of the test.

2. Any additional calculations required shall be performed on facsimiles of this attachment and attached to the procedure for review and documentation PER Section 9.0.

3. RCS leak rate manual calculation(s) NOT required to be performed by the body of this procedure shall be marked N/A in the initials block(s).

4. **RECORD** the following parameters:

   a. Date: TODAY

   b. Time: Now

   c. PZR Pressure: 1800 PSIA

   d. T_{AVG} : 520 °F ______

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
CVCS

K/A 000002K201 [4.3/4.4]

Question b:

Given the data for STP O-27-2, calculate the RCS gross leakrate for Unit 2 in Mode 3.

Answer:

.266 GPM $\pm$ .01 (2 significant places)
See worksheet

Reference Use Allowed YES

Reference 1 STP O-27-2 with data supplied on attachments

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

ATTACHMENT 3

RCS LEAK RATE CALCULATION WORKSHEET

INITIALS

2. ALTERNATE MANUAL CALCULATION (6.3.A)
(No Shutdown Cooling)

$$\text{GROSS RCS LEAKAGE } (FT^3) = 153\left[\frac{(V_1 - V_2)}{V_1 V_2}\right] + \left[\frac{(M/U - D/V)}{7.4805}\right] - \left[3.61\,(LV_1 - LV_2)\right] - .0673\left[\frac{LP_1}{VP_1} - \frac{LP_2}{VP_2}\right]$$

$$\underline{\qquad\qquad}\ (FT^3) = 153\left[\frac{(.02065 - .02086)}{(.02065 \times .02086)}\right] + \left[\frac{(1050 - 100)}{7.4805}\right] - \left[3.61\ (87 - 88)\right] - .0673\left[\frac{144}{.02065} - \frac{144}{.02086}\right]$$

$$= 153\left[\frac{-.00021}{.000431}\right] + \left[\frac{950}{7.4805}\right] - \left[-3.61\right] - .0673\left[6973.4 - 6903.2\right]$$

$$= -74.547 + 126.997 + 3.61 - 4.724$$

$$= 51.336$$

Step D = 51.336 ft³ / (5.195 × 10⁻³)

leakrate (GPM) = .266 ± .01

CONFIDENTIAL

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

TASK: 020400203 Shifting CC Heat Exchangers

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for Component Cooling System.

EVALUATION LOCATION:

_____ PLANT __X__ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEL:

TRAIN

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

OI-16

TASK STANDARDS:

This JPM is complete when a CC Heat Exchanger is placed in service per OI 16 Section 6.4.

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CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

TASK: 020400203 Shifting CC Heat Exchangers

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

8. NOTE FOR SIMULATOR SETUP: the simulator should be set up with 12 CC HX BLOCKED Malfunction (xmmvsw003_05) and Panel overrides for 5208-CV Red lights off at 1C13 and 2C24A.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK 020400203

DIRECTIONS TO TRAINEE:

1. To complete the task successfully, you must

   - perform each critical element correctly. You must inform the evaluator of the indications you are monitoring. Where necessary, consider the evaluator to be the CRS.

   - comply with industrial safety practices, radiation safety practices and use of event free tools. **__NOTE:__ Violation of safety procedures will result in the failure of the JPM.**

2. Initial Conditions:

   a. Unit 1 is at 100% power.

   b. 11 CC Heat Exchanger is in service.

   c. You are performing the duties of the CRO.

3. Initiating Cue: The CRS has directed you to shift CC Heat Exchanger per the OI in preparation for tagging out 11 Salt Water header. Are there any questions? You may begin.

all should be like this (cue)

CONFIDENTIAL

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

ELEMENT (* = CRITICAL STEP)		STANDARD

TIME START ____

CUE:	Initial Conditions and General Precautions are satisfied. Begin at Step 6.4.B.

CAUTION: **RCS Boron will be affected when CVCS ion exchangers are returned to service if the letdown heat exchanger outlet temperature has changed since they were bypassed [B0270]**

- **lower letdown system temperature will add positive reactivity**
- **higher letdown system temperature will add negative reactivity**

CUE:	The CRS desires the CVCS Ion Exchangers to be bypassed.

		ELEMENT	STANDARD
____	1.	IF it is desired to bypass the CVCS ion exchangers, THEN PLACE IX BYPASS, 1-CVC-520-CV, to BYPASS AND RECORD stop time in the CVCS Ion Exchanger and Filter Log. [B0018] [B0270]	Determines step is applicable and BYPASSES the CVCS ion exchangers by opening 1-CVC-520-CV at 1C07. Records stop time in log
____	2.	THROTTLE the Component Cooling Heat Exchanger saltwater outlet controller for the heat exchanger being placed in service to a value equal to the heat exchanger being removed from service. 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	THROTTLES 12 CC HX SW FLOW CONTR 1-HIC-5208 to match the output on 11 CC HX SW FLOW CONTR 1-HIC-5206 NOTE: The SW Outlet CV will continue to indicate CLOSE due to the failed CV.
____	3.	OPEN the Component Cooling Heat Exchanger outlet on the heat exchanger being placed in service: 11 CC HX CC OUT, 1-CC-3824-CV 12 CC HX CC OUT, 1-CC-3826-CV	Operator OPENS 12 CC HX OUT, 1-CC-3826-CV.

ELEMENT (* = CRITICAL STEP)		STANDARD
* ____4.	CLOSE the Component Cooling Heat Exchanger outlet on the heat exchanger being removed from service: 11 CC HX CC OUT, 1-CC-3824-CV 12 CC HX CC OUT, 1-CC-3826-CV	Operator CLOSES 11 CC HX CC OUT, 1-CC-3824-CV
____5.	CHECK (1C13) "COMPT CLG PPS DISCH PRESS LO" annunciator clear.	Operator checks annunciator clear.

NOTE: **For optimum Reactor coolant Pump seal life and performance, controlled bleed off temperature must be maintained between 110 oF and 200 oF.**

____6.	SHUT the component Cooling Heat Exchanger saltwater outlet on the heat exchanger being removed from service: 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	Operator SHUTS 11 CC HX SW FLOW CONTR, 1-HIC-5206.
* ____7.	ADJUST the in service Component Cooling Heat Exchanger saltwater outlet to maintain the component cooling heat Exchanger outlet temperature approximately 95°F: 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	Operator adjusts 12 CC HX SW FLOW CONTR, 1-HIC-5208. NOTE: at this point, the failure of the SW outlet CV to respond should become evident and the Operator should stop and notify the CRS of the malfunction.

ELEMENT (* = CRITICAL STEP)		STANDARD
CUE:	The CRS will direct the Operator to place 11 CC Heat Exchanger back in service per steps B.2 through B.8 (the same section). The CRS will waive the initial condition A.1 (at least one CC HX inservice)	
____ 2.	THROTTLE the Component Cooling Heat Exchanger saltwater outlet controller for the heat exchanger being placed in service to a value equal to the heat exchanger being removed from service. 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	THROTTLES 11 CC HX SW FLOW CONTR 1-HIC-5206 to match the original output NOTE: output on 12 CC HX SW FLOW CONTR 1-HIC-5208 may still set at this position NOTE: The SW Outlet CV will continue to indicate CLOSE due to the failed CV.
*____ 3.	OPEN the Component Cooling Heat Exchanger outlet on the heat exchanger being placed in service: 11 CC HX CC OUT, 1-CC-3824-CV 12 CC HX CC OUT, 1-CC-3826-CV	Operator OPENS 11 CC HX OUT, 1-CC-3824-CV.
*____ 4.	CLOSE the Component Cooling Heat Exchanger outlet on the heat exchanger being removed from service: 11 CC HX CC OUT, 1-CC-3824-CV 12 CC HX CC OUT, 1-CC-3826-CV	Operator CLOSES 12 CC HX CC OUT, 1-CC-3826-CV
____ 5.	CHECK (1C13) "COMPT CLG PPS DISCH PRESS LO" annunciator clear.	Operator checks annunciator clear.

NOTE: **for optimum Reactor coolant Pump seal life and performance, controlled bleed off temperature must be maintained between 110 oF and 200 oF.**

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

ELEMENT (* = CRITICAL STEP)		STANDARD
____ 6.	SHUT the component Cooling Heat Exchanger saltwater outlet on the heat exchanger being removed from service: 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	Operator SHUTS 12 CC HX SW FLOW CONTR, 1-HIC-5208.
* ____ 7.	ADJUST the in service Component Cooling Heat Exchanger saltwater outlet to maintain the component cooling heat Exchanger outlet temperature approximately 95°F: 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	Operator adjusts 11 CC HX SW FLOW CONTR, 1-HIC-5206.
____ 8.	ADJUST the saltwater flow to the associated train's Service Water Heat Exchanger as required.	Operator determines no adjustment is required.

CAUTION: RCS Boron will be affected when CVCS ion exchangers are returned to service if the letdown heat exchanger outlet temperature has changed since they were bypassed [B0270]

- **lower letdown system temperature will add positive reactivity**
- **higher letdown system temperature will add negative reactivity**

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

ELEMENT (* = CRITICAL STEP)			STANDARD
* ____ 9.		IF the CVCS ion exchangers were bypassed in Step B.1, THEN PERFORM the following:	Operator determines that step is applicable.
____	a.	CHECK the Letdown heat exchanger outlet temperature has stabilized less than or equal to 120°F.	Operator checks temperature at 1C07.
____	b.	PLACE IX BYPASS, 1-CV-520-CV, in AUTO	Operator places 1-CVC-520-CV in AUTO
____	c.	RECORD the flowrate in the CVCS Ion Exchanger and Filter Log for the in service ion exchanger and filter. [B0018]	Operator logs flowrate in log.

TIME STOP ______

TERMINATING CUE:	This task is complete when 1-CVC-520-CV is placed in AUTO. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

TASK: 020400203 Shifting CC Heat Exchangers

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ____________________________ DATE: __________

CONFIDENTIAL

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Component Cooling

K/A 000003K404 [3.1/3.4]

Question a:

Unit 1 has completed a Refueling Outage and is in Mode 3 at NOT and NOP with all RCPs running. The Plant Computer RCP Trend Group shows consistent temperatures for 11A, 11B and 12B RCPs. 12A RCP components are trending consistently higher than the other RCPs. No RCP alarms are presently annunciated on 1C07 and the ABO reports that all RCP CC flowrates have been verified at 200 GPM locally in the containment.

Is any corrective action required?

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

CVC

K/A 000003K404 [3.1/3.4]

Question a:

Unit 1 has completed a Refueling Outage and is in Mode 3 at NOT and NOP with all RCPs running. The Plant Computer RCP Trend Group shows consistent temperatures for 11A, 11B and 12B RCPs. 12A RCP components are trending consistently higher than the other RCPs. No RCP alarms are presently annunciated on 1C07 and the ABO reports that all RCP CC flowrates have been verified at 200 GPM locally in the containment.

Is any corrective action required?

Answer:

12A RCP should be adjusted to approximately 250 GPM due to additional cooling needed for the RCDT Heat Exchanger.

Reference Use Allowed? YES

Reference 1 Alarm manual 1C07A&B window X-10

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Component Cooling

K/A 000008A102 [2.9/3.1]

Question b:

How is Temperature controlled at ~95 °F in the Component Cooling System?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

K/A 000008A102 [2.9/3.1]

Question b:

How is Temperature controlled at ~95 °F in the Component Cooling System?

Answer:

The temperature of the Component Cooling System is controlled by a Heat Exchanger Temperature Control Bypass Valve (AUTO) on each heat exchanger and by the Operator manually throttling the in service Component Cooling Heat Exchanger SW outlet valve(s).

During warm weather operations it may be necessary to place the standby Heat Exchanger in service, especially if the RCW Evaporator(s) are in operation. ? is this part of ans.

Reference Use Allowed? YES

Reference 1 OI 16

Reference 2 System Description # 15 page 13

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

TAB 8 4

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-3

TASK: 020190302 Lineup for ADV Control at 1(2)C43

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for Main Steam and MSIV.

EVALUATION LOCATION:

_X_ PLANT ______ SIMULATOR ______ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEl

NO TRAIN

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

AOP-9A

TASK STANDARDS:

This JPM is complete when both ADVs are aligned for control at 1C43.

CONFIDENTIAL

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-3

TASK: 020190302 Lineup for ADV Control at 1(2)C43

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **<u>NOTE:</u> Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 020190302

DIRECTIONS TO TRAINEE:

1. To complete the task successfully, you must:

   - perform each critical element correctly. You must inform the evaluator of the indications you are monitoring. Where necessary, consider the evaluator to be the CRS.

   - comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

2. Initial Conditions:

   a. A severe fire has resulted in the evacuation of the control room. AOP-9A has been implemented.

   b. You are performing the actions of the Unit-1 CRO and RO.

3. Initiating Cue: You have been directed by the Shift Supervisor to initialize the ADV controllers on 1C43, and to align 11 and 12 ADV's to 1C43, per AOP-9A steps V and W, respectively. Are there any questions? You may begin.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-3

ELEMENT (* = CRITICAL STEP)			STANDARD
TIME START ____			

CUE: Give the operator a copy of AOP-9A.

____		Locate AOP-9A step V.	Same as element.

CUE: Output indicates 0.

* ____	1.	**Place 11 ADV Control, 1-HC-4056A, to SHUT.**	Positions 1-HC-4056A to shut until output indicates 0.

CUE: Output indicates 0.

* ____	2.	**Place 12 ADV Control, 1-HC-4056B, to SHUT.**	Positions 1-HC-4056B to shut until output indicates 0.

CUE: Since you are also the RO, you may omit this step and continue.

____	3.	Notify the RO that the ADV Controllers are initialized and to align 11 and 12 ADVs to 1C43 **PER** Step W.	Determines step is N/A.
____		Locate Step W of AOP-9A.	

CUE: Since you are also the RO, you may continue.

____	1.	**WHEN** notified that the ADV Controllers on 1C43 have been initialized, **THEN** go to the ADV Hand Transfer Station **AND** place the following Handvalves to POSITION 2:	

NOTE TO EVALUATOR: ***Opening ADV Hand Transfer Station enclosures will cause AFAS Status alarm in the Control Room. Have operator describe the transfer process.***

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-3

ELEMENT (* = CRITICAL STEP)			STANDARD
*____	a.	11 ADV Aux Shutdown Control Transfer, 1-HV-3938A	Places 1-HV-3938A in position 2.
*____	b.	11 ADV Quick Open Override Handvalve, 1-HV-3938B	Places 1-HV-3938B in position 2.
*____	c.	12 ADV Aux Shutdown Control Transfer, 1-HV-3939A	Places 1-HV-3939A in position 2.
*____	d.	12 ADV Quick Open Override Handvalve, 1-HV-3939B	Places 1-HV-3939B in position 2.
____	2.	Notify the CRO that the ADVs are aligned to 1C43.	Notifies CRO.

TIME STOP: __________

TERMINATING CUE:	The task is complete when both ADV's are aligned for control at 1C43. No further actions are necessary.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-3

TASK: 020190302 Lineup for ADV Control at 1(2)C43

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
STM DUMP

K/A 000016K404 [3.1/3.4]

Question a:

What is the basis for the limitations of 1200 GPM in the common suction header or 600 GPM in the individual suction header ~~is~~ when using AFW?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

STM DUMP

K/A 000016K404 [3.1/3.4]

Question a:

What is the basis for the limitations of 1200 GPM in the common suction header or 600 GPM in the individual suction header when using AFW?

Answer:

to prevent AFW pump cavitation when it is in operation during single pump operation and when multiple pumps are in operation on each Unit.

Reference Use Allowed? NO

Reference 1 OI 32 section 6.3 page 26

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
STM DUMP

K/A 00068AK312 [4.1/4.5]

Question b:

What is the basis for securing the CEDM MG sets during the implementation of AOP-9A for a Control Room evacuation?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

K/A 00068AK312 [4.1/4.5]

Question b:

What is the basis for securing the CEDM MG sets during the implementation of AOP-9A for a Control Room evacuation?

Answer:

This provides an additional method of ensuring power is removed from the CEDMs and will reduce the noise levels in the 45 foot and 27 foot Switchgear Rooms.

Reference Use Allowed? NO

Reference 1 AOP 9A Technical Basis, Action 7, page 1

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-5

TASK: 010530301 Tie Vital MCCs (1Y09 and 1Y10 AOP-9A scenario)

PERFORMER'S NAME: ______________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the 480 VAC Electrical Power Distribution.

EVALUATION LOCATION:

_X_ PLANT ____ SIMULATOR ____ CONTROL ROOM

EVALUATION METHOD:

______ ACTUAL PERFORMANCE ____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEL:

TRAIN

TOOLS AND EQUIPMENT:

Field copy of AOP-9A

REFERENCE PROCEDURE(S):

AOP-9A

TASK STANDARDS:

This JPM is complete when 120 VAC instrument bus 1Y09 is electrically tied to instrument bus 1Y10.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-5

TASK: 010530301 Tie Vital MCCs (1Y09 and 1Y10 AOP-9A scenario)

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **NOTE: Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 010530301

DIRECTIONS TO TRAINEE:

1. To complete the task successfully, you must:

   - perform each critical element correctly. You must inform the evaluator of the indications you are monitoring. Where necessary, consider the evaluator to be the CRS.

   - comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

2. Initial Conditions:

   a. The control room has been evacuated due to a severe fire.

   b. The emergency diesel generators have been started.

   c. Power is systematically being restored to selected plant components.

   d. You are performing the duties of the Unit 1 TBO.

3. Initiating Cue: The CRO has directed you to locally energize bus 1Y09 and tie 1Y10 to 1Y09, per AOP-9A Step BS. Are there any questions? You may begin.

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ELEMENT (* = CRITICAL STEP)		STANDARD

TIME START ____

CUE: Give the operator a copy of AOP-9A.

____		Locate AOP-9A, Step BS.	Same as element.

CUE: 1X08 breaker is ON.

*____	1.	Check INSTR. TRANSF. 11 1X08 (1Y09 Feeder Breaker) ON.	Verifies instrument Transformer 11 1X08 ON.

CUE: 1X09 breaker is OFF.

*____	2.	Place INSTRUMENT TRANSF-12 1X09 (1Y10 Feeder Breaker) to OFF.	Verifies instrument Transformer 12, 1X09 OFF.

CUE: Bus Tie 208/120V is ON.

*____	3.	Place BUS TIE 208/120V BUS 11 (located on 1Y10), to ON.	Checks Bus Tie 208/120V Bus 11 in ON.
*____	4.	Place 1Y09-1Y10 Bus Tie Switch, 1SY09, to ON.	Places 1Y09-1Y10 Bus Tie Switch 1SY09 in ON.

CUE: 1C43 has been notified.

____	5.	Notify 1C43 that 1Y09 is energized and 1Y10 is tied to 1Y09.	Notifies 1C43.

TERMINATING CUE:	This task is complete when the 1Y09-1Y10 bus tie switch 1SY09 has been placed to ON and 1C43 has been notified. No other actions are required.

TIME STOP ____

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-5

TASK: 010530301 Tie Vital MCCs (1Y09 and 1Y10 AOP-9A scenario)

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and the use of event free tools. **NOTE:** **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

CONFIDENTIAL

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
AC Distribution

K/A 00055EK301 [2.7/3.4]

Question a:

During a Station Blackout, the Vital Auxiliaries Safety Function is checked and 11 125VDC Bus is 105 Volts.

What is action must be taken and the basis?

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

AC Distribution

K/A 00055EK301 [2.7/3.4]

Question a:

During a Station Blackout, the Vital Auxiliaries Safety Function is checked and 11 125VDC Bus is 105 Volts.

What is action must be taken and the basis?

Answer:

Implement EOP 8 due to 11 125 VDC Bus below 106 VDC. The basis for this action is that 106 Volts has been determined to be the minimum voltage for inverter operation to provide power to plant vital instrumentation and control systems.

Reference Use Allowed? NO

Reference 1 EOP 7 Technical Basis, Step V, page 57

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
AC Distribution

K/A 000062K103 [3.5/4.0]

Question b:

What constitues a 125 VDC train and briefly explain the reason for the designation in the Vital Auxiliaries Safety Function?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
AC Distribution

K/A 000062K103 [3.5/4.0]

Question b:

What constitues a 125 VDC train and briefly explain the reason for the designation in the Vital Auxiliaries Safety Function?

Answer:

A 125 VDC Train is composed of either 11 and 22 DC Busses or 12 and 21 DC Busses. The designation is based on the need to power at least one vital 120 VAC Bus for to supply power to monitor the RCS. The 2 DC trains will supply redundant and reliable power to each 120 VAC Bus on a Unit.

Reference Use Allowed? YES

Reference 1 EOP Vital Auxiliaries Safety Function Status Check

Reference 2 EOP 7 Technical Basis, Step V, page 57

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

TAB 10

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

PERFORMER'S NAME: ____________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the Chemical and Volume Control System.

EVALUATION LOCATION:

__X__ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
15 MINUTES	____ MINUTES	NO

TASK LEVEL:

LEVEL 1

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

AOP-1A

TASK STANDARDS:

This JPM is complete when the potential dilution paths are verified isolated and a report is made to the control room.

CONFIDENTIAL

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **NOTE:** **Violation of safety procedures will result in failure of the JPM.**

5. Questions should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

DIRECTIONS TO TRAINEE:

1. To complete the task successfully, you must:

   - perform each critical element correctly. You must inform the evaluator of the indications you are monitoring. Where necessary, consider the evaluator to be the CRS.

   - comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

2. Initial Conditions:

   a. Unit 1 is in Mode 1 at 100% power.

   b. Regulating CEAs are fully withdrawn.

   c. Reactor power unexpectedly begins to increase.

   d. RCS boron concentration indicated on the boronometer has dropped.

   e. Operator actions as directed in AOP-1A, INADVERTENT BORON DILUTION, Section V have been completed through Step C.1.a.

   f. You are performing the duties of an extra RO on shift.

3. Initiating Cue: The CRS directs you to locally verify the CVCS Lineup and Isolate any potential dilution paths per AOP-1A, Section V.C, Operations actions only. Notify the Control Room if any actions taken. Are there any questions? You may begin.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

ELEMENT (* = CRITICAL STEP)	STANDARD

TIME START ____

NOTE TO EVALUATOR: ***Supply the operator with a copy of AOP-1A.***

V.C. DETERMINE POSSIBLE SOURCES OF DILUTION

1. Verify correct lineup of the CVCS

		ELEMENT	STANDARD
____	a.	Ensure VCT M/U Control Valve Controllers are in MANUAL and 0% output: • __-FIC-210X • __-FIC-210Y	Determines action has been performed.

> CUE: The Unit 1 CRO has correctly aligned the VCT Makeup Control Valve Controllers.

NOTE TO EVALUATOR: ***Report of conditions may be made at any time during performance of actions. The last step in JPM provides for summary of these reports.***

		ELEMENT	STANDARD
____	b.	Ensure that any Purification IXs with deborating resin or unborated resin are removed from service **PER** OI-2D <u>PURIFICATION SYSTEM OPERATION</u>.	Determines action is NOT required.

> CUE: The inservice purification IX has been in its current alignment for the past 10 months. It does NOT contain deborating resin.

		ELEMENT	STANDARD
____	c.	Ensure IX FLUSH ISOL valve, 0-DW-190, is shut.	Locates valve behind the 11 Boric Acid Batching Tank @ the 27' Aux. Bldg. and determines valve is shut.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

ELEMENT (* = CRITICAL STEP)	STANDARD

> CUE: When checked or asked: 0-DW-190 is shut (Stem position, local indication).

2. Isolate any chemical additions.

		ELEMENT	STANDARD
____	a.	Verify that the Chemical Addition Metering Pump is secure.	Locates Chemical Addition Pump in NW BAST room [BAST room S Wall] @ the 5' Aux. Bldg. and determines pump is secured.

> CUE: When checked or asked: The Chemical Addition Metering Pump is NOT running (Control to STOP, Motor/shaft not rotating).

		ELEMENT	STANDARD
*____	b.	Verify shut RCMW TO CHG PP SUCTION 1-CVC-308.	Locates valve at NE BAST RM [BAST RM E WALL] @ the 5' Aux. Bldg., determines valve is NOT shut. ? *

> CUE: When checked or asked 1-CVC-308 is partially open (Stem position, local indication, handwheel rotates in BOTH directions).

		ELEMENT	STANDARD
____	c.	Verify shut CHEM ADD TK INLET 1-CVC-258.	Locates valve at NW BAST RM [BAST RM S WALL] @ the 5' Aux. Bldg. And determines valve is shut.

> CUE: When checked or asked: 1-CVC-258 is shut (Stem position, local indication).

		ELEMENT	STANDARD
____	d.	Verify shut CHEM ADD& MTRG TK COMB DISCH 1-CVC-338.	Locates valve at NE BAST RM [BAST RM S WALL] @ the 5' Aux. Bldg. And determines valve is shut.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

ELEMENT (* = CRITICAL STEP)		STANDARD

CUE: When checked or asked: 1-CVC-338 is shut (Stem position, local indication).

____3.	Notify the Control Room of action taken to close 1-CVC-308.	Contact control room and make report on valve operations.

CUE: When notification indicated: Acknowledge report.

TIME STOP ____

TERMINATING CUE: This JPM is complete when the chemical addition components are in there correct conditions. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE:** **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: _________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
CVC

K/A 004000A110 [3.7/3.9]

Question a:

Unit 1 is in Mode 5 and the current count rate is 800 cps.

The shutdown monitor ALARM SETPOINT RESET is depressed at this indicated count rate.

At what value (count rate) would the shutdown monitor alarm if a slow dilution event occurred?

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

CVC

K/A 004000A110 [3.7/3.9]

Question a:

Unit 1 is in Mode 5 and the current count rate is 800 cps.

The shutdown monitor ALARM SETPOINT RESET is depressed at this indicated count rate.

At what value (count rate) would the shutdown monitor alarm if a slow dilution event occurred?

Answer:

1200cps. (800 x 1.5)

Reference Use Allowed? YES

Reference 1 Lesson Plan CRO-57-1-11, LO #3.1 & 3.2, page 32

Reference 2 OP-2 Appendix 1

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
CVC

K/A 010000G132 [3.4/3.8]

Question b:

When performing a plant shutdown from Hot Standby to Cold Shutdown, a procedural precaution specifies lowering RCS pressure as a constant evolution instead of a series of step changes. What is the reason for this precaution?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

CONFIDENTIAL

K/A 010000G132 [3.4/3.8]

Question b:

When performing a plant shutdown from Hot Standby to Cold Shutdown, a procedural precaution specifies lowering RCS pressure as a constant evolution instead of a series of step changes. What is the reason for this precaution?

Answer:

Continuous cycling of the valves (whether normal spray or Aux. Spray) may result in excessive thermal transients on the PZR spray nozzles and piping.

Reference Use Allowed? NO

Reference 1 OP-5 Rev. 38 /Unit 1 Precaution 5.0.H, page 13

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Shift Staffing

Shift Turnover - RO Turnover Checklist

K/A 2.1.3 [3.0/3.4]

Question a:

The RO turnover checklist requires that the "reactor power distribution and boration/dilution patterns have been reviewed." What is the reason for reviewing these?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Shift Staffing

Shift Turnover - RO Turnover Checklist

K/A 2.1.3 [3.0/3.4]

Question a:

The RO turnover checklist requires that the "reactor power distribution and boration/dilution patterns have been reviewed." What is the reason for reviewing these?

Answer:
Knowing patterns of boration/dilution provides indication to the operator of changes occurring in the core, such as xenon buildin, xenon burnup. Power distribution provides indication to the operator of flux perturbations caused by power changes, CEA motion, changes in burnable poisons. Both of these enable RO to proactively manage core reactivity.

Reference Use Allowed ? NO

Reference 1 General Fundamentals

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Shift Staffing

Reactor Shutdown - CRO Responsibility

K/A 2.1.2 [3.0/4.0]

Question b:

Plant procedures describe two conditions for the CRO or RO to trip the reactor, what are they?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Shift Staffing

Reactor Shutdown - CRO Responsibility

K/A 2.1.2 [3.0/4.0]

Question b:

Plant procedures describe two conditions for the CRO or RO to trip the reactor, what are they?

Answer:

1. When any plant parameter reaches a RPS setpoint, trip the reactor if an automatic trip has not occurred.

2. When directed by the SM or CRS.

Reference Use Allowed? NO

Reference 1 NO-1-200 Section 5.4.B

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Plant Parameter Verification

Plant Heat Balance Performance

K/A 2.2.12 [3.0/3.4]

Question a:

Explain why OI-30 Manual Secondary Calorimetric Calculation requires the S/G heat rate be corrected for blowdown flow rate.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Plant Parameter Verification

Plant Heat Balance Performance

K/A 2.1.7 [3.7/4.4]

Question a:

Explain why OI-30 Manual Secondary Calorimetric Calculation requires the S/G heat rate be corrected for blowdown flow rate.

Answer:

Feed flow is used vice steam flow due to it being a more accurate measurement. The calculation then "assumes" that all feed flow is converted to steam. This assumption must be corrected for the blowdown which leaves the system as a saturated liquid.

open book

Reference Use Allowed? YES, OI-30 Section 6.4

Reference 1 OI-30 Section 6.4, Manual Secondary Calorimetric Calculation

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Plant Parameter Verification

SW Heat Exchangers

K/A 2.1.25 [2.8/3.1]

Question b:

Given Tables 1 and 5 from OI-29 (Saltwater System Unit 2) explain the difference in maximum allowable ΔP across the heat exchanger for the same saltwater inlet temperature and the same saltwater flow with all CACs in service and having one isolated.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

21 SRW HX MAX ALLOWABLE ΔP WITH 21 OR 23 SRW PUMP (PLANT COMPUTER, CW001) [B0083]

SW Temp (F)	SW Flow (1000 gpm)									
	15	16	17	18	19	20	21	22	23	24
55	5.23	5.94	6.67	7.45	8.27	9.12	10.02	10.96	11.95	12.98
56	5.10	5.79	6.51	7.27	8.06	8.90	9.78	10.70	11.65	12.67
57	4.97	5.64	6.34	7.08	7.86	8.68	9.53	10.43	11.36	12.35
58	4.85	5.50	6.18	6.90	7.66	8.46	9.29	10.16	11.08	12.04
59	4.72	5.36	6.02	6.72	7.46	8.24	9.05	9.90	10.79	11.73
60	4.60	5.22	5.87	6.55	7.27	8.03	8.82	9.65	10.51	11.43
61	4.47	5.08	5.71	6.38	7.08	7.82	8.59	9.39	10.24	11.13
62	4.35	4.94	5.55	6.20	6.89	7.60	8.35	9.14	9.96	-10.82
63	4.23	4.81	5.40	6.04	6.70	7.40	8.13	8.89	9.69	10.53
64	4.12	4.67	5.25	5.87	6.52	7.19	7.91	8.65	9.43	10.25
65	4.00	4.54	5.11	5.71	6.34	7.00	7.69	8.41	9.17	9.97
66	3.89	4.42	4.97	5.55	6.16	6.80	7.48	8.18	8.92	9.69
67	3.78	4.29	4.82	5.39	5.99	6.61	7.26	7.95	8.66	9.42
68	3.67	4.17	4.69	5.24	5.82	6.42	7.06	7.73	8.42	9.15
69	3.56	4.04	4.55	5.08	5.64	6.23	6.85	7.50	8.17	8.88
70	3.45	3.92	4.41	4.93	5.48	6.05	6.65	7.28	7.93	8.62
71	3.34	3.80	4.28	4.78	5.31	5.86	6.45	7.05	7.69	8.36
72	3.24	3.68	4.15	4.63	5.15	5.69	6.25	6.84	7.46	8.11
73	3.14	3.57	4.02	4.49	4.99	5.51	6.06	6.63	7.23	7.86
74	3.04	3.46	3.89	4.35	4.83	5.34	5.87	6.42	7.00	7.61
75	2.94	3.35	3.77	4.21	4.68	5.17	5.69	6.22	6.78	7.38
76	2.84	3.23	3.64	4.07	4.53	5.00	5.50	6.02	6.56	7.13
77	2.75	3.13	3.52	3.94	4.38	4.84	5.32	5.82	6.35	6.90
78	2.65	3.02	3.40	3.80	4.23	4.67	5.14	5.63	6.13	6.67
79	2.56	2.92	3.29	3.68	4.09	4.52	4.97	5.44	5.93	6.45
80	2.47	2.81	3.17	3.54	3.94	4.36	4.79	5.25	5.72	6.22
81	2.38	2.71	3.06	3.42	3.80	4.20	4.63	5.06	5.52	6.01
82	2.29	2.61	2.95	3.30	3.67	4.05	4.46	4.88	5.33	5.79
83	2.21	2.52	2.84	3.18	3.53	3.91	4.30	4.71	5.13	5.58
84	2.12	2.42	2.73	3.05	3.40	3.76	4.13	4.53	4.94	5.37
85	1.97	2.25	2.54	2.85	3.17	3.50	3.85	4.22	4.61	5.01

IF using 2-TR-17 for temperature indication,
THEN SUBTRACT .15 PSI from Delta P limit in the table to determine 2-TR-17 limit.

21 SRW HX MAX ALLOWABLE ΔP WITH A CAC ISOLATED (PLANT COMPUTER, CW001)[B0083]

SW Temp (F)	SW Flow (1000 gpm)									
	15	16	17	18	19	20	21	22	23	24
85 or less	5.10	5.79	6.51	7.28	8.09	8.93	9.82	10.75	11.73	12.75
86	4.74	5.38	6.05	6.77	7.52	8.31	9.13	10.00	10.90	11.86
87	4.39	4.98	5.61	6.27	6.97	7.70	8.46	9.27	10.10	10.99
88	4.05	4.60	5.18	5.79	6.44	7.11	7.82	8.56	9.33	10.15
89	3.69	4.19	4.72	5.28	5.86	6.48	7.12	7.80	8.50	9.25
90	3.27	3.71	4.18	4.68	5.20	5.74	6.31	6.91	7.54	8.20

IF using 2-TR-17 for temperature indication,
THEN SUBTRACT .3 PSI from Delta P limit in the table to determine 2-TR-17 limit.

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Plant Parameter Verification

SW Heat Exchangers

K/A 2.1.25 [2.8/3.1]

Question b:

Given Tables 1 and 5 from OI-29 (Saltwater System Unit 2) explain the difference in maximum allowable ΔP across the heat exchanger for the same saltwater inlet temperature and the same saltwater flow with all CACs in service and having one isolated.

Answer:

The allowed ΔP is higher for a given SW inlet temperature and flow with a CAC isolated. This is based on reduced heat input to the system from the containment atmosphere during accident conditions. This will leave a greater margin for the heat input from other components, primarily the diesels. With the CAC unisolated the heat input is greater and therefore the maximum allowable ΔP for a given SW flow and temperature must be lower.

Reference Use Allowed ? YES, Table 1 and 5 from OI-29, U2 — Is this (Tables) the only ref. allowed?

Reference 1 OI-29 Saltwater System (U2)

Reference 2 Engineering memo regarding bag temperature versus ΔP limits for system operability

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Surveillance Testing

Knowledge of Tagging Clearance Procedures

K/A 2.2.13 [3.6/3.8]

Question a:

Unit 1 is in Mode 5, LTOP controls are in place per OP-5. 12 HPSI Pump is aligned for boration/makeup, per NO-1-103. Post maintenance testing of 11 HPSI Pump is required. Can 11 HPSI Pump be tested in the present plant configuration. If not, what must be done to perform required testing?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Surveillance Testing

Knowledge of Tagging Clearance Procedures

K/A 2.2.13 [3.6/3.8]

Question a:

Unit 1 is in Mode 5, LTOP controls are in place per OP-5. 12 HPSI Pump is aligned for boration/makeup, per NO-1-103. Post maintenance testing of 11 HPSI Pump is required. Can 11 HPSI Pump be tested in the present plant configuration. If not, what must be done to perform required testing?.

Answer:

The LTOP tagout must be modified in accordance with NO-1-112 ensuring the requirements of T.S. LCO 3.4.12 are met.

Reference Use Allowed ? YES, NO-1-112

Reference 1 TS LCO 3.4.12

Reference 2 OP-5

Reference 3 NO-1-112

Reference 4 NO-1-103

Reference 5 Log Basis Document

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Surveillance Testing

Knowledge of Surveillance Required for CEA Deviation Circuit

K/A 2.2.12 [3.0/3.4]

Question b:

What actions are required for the Secondary CEA Position indication system being inoperable, with all CEAs fully withdrawn (full out indication and primary position indication operable).

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Surveillance Testing

Knowledge of Surveillance Required for CEA Deviation Circuit

K/A 2.2.12 [3.0/3.4]

Question b:

What actions are required for the Secondary CEA Position indication system being inoperable, with all CEAs fully withdrawn (full out indication and primary position indication operable).

Answer:

Verify the indicated position of each CEA to be within 7.5 inches of all other CEAs in its group (SR 3.1.4.1) within 1 hour and every 4 hours thereafter (T.S. 3.1.4 Actions D.1 and E.1). Restore CMI to operable or fully withdraw Groups 3 and 4 and withdraw Group 5 to less than 5% inserted (T.S. 3.1.4 Actions D.2.1, D.2.2).

Reference Use Allowed? YES

Reference 1 Tech Spec 3.1.4 Actions D.1, D.2.1, D.2.2

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Radiation Control

Use of SCBAs

K/A 2.3.10 [2.9/3.3]

Question a:

The Shift Manager has determined a need for Control Room staff to use respiratory protection. Where are SCBAs for control room staff use stored/located? Briefly describe the donning procedure.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Radiation Control

Use of SCBAs

K/A 2.3.10 [2.9/3.3]

Question a:

The Shift Manager has determined a need for Control Room staff to use respiratory protection. Where are SCBAs for control room staff use stored/located? Briefly describe the donning procedure.

Answer:

SCBAs are located in the Unit 1 and Unit 2 DAS Rooms and in the hallway outside the Tech Support Battery Rooms. (The Scott air packs are located in the Fire Brigade Locker).

is all required for correct answer?

Donning procedure is:

- Check cylinder pressure
- Inspect physical condition
- Put on using vest method
- Open cylinder valve, don mask, perform negative pressure check
- Connect hose to regulator and fully open regulator inlet
- Test regulator bypass valve
- Breathe normally

Reference Use Allowed ? NO

Reference 1 General Orientation Training Student Study Guide

Reference 2 Operations Admin Policy 98-01, Control Room Habitability Requirement

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Radiation Control

Conditions to Secure a Liquid Waste Release

K/A 2.3.11 [2.7/3.2]

Question b:

12 RCWMT discharge is in progress. An alarm is received on RI-2201. RI-2201 indicates low off scale and the liquid waste discharge control valves are open. What actions are required?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Radiation Control

Conditions to Secure a Liquid Waste Release

K/A 2.3.11[2.7/3.2]

Question b:

12 RCWMT discharge is in progress. An alarm is received on RI-2201. RI-2201 indicates low off scale and the liquid waste discharge control valves are open. What actions are required?

Answer:

Shut the liquid waste discharge control valves and secure the discharge lineup.

Reference Use Allowed? YES, OI-17C-4

Reference 1 OI-17C-4

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
ADMIN A4 Topics
Emergency Procedures

Loss of Annunciation

K/A 2.4.32 [3.3/3.5]

Question a:

Describe the effect on a loss of DC power to the Control Room annunciation

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A4 Topics
Emergency Procedures
Loss of Annunciation

K/A 2.4.32 [3.3/3.5]

Question a:

Describe the effect on a loss of DC power to the Control Room annunciation

Answer:

The loss of annunciation will require increase frequency of watchstation rounds, monitoring the Plant Computer and trends. The plant should be maintained in a steady state condition and the ERPIP may be implemented.

Reference Use Allowed ? NO

Reference 1 Alarm Manual for 1C01, window A-28

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A4 Topics
Emergency Procedures
Instrumentation

K/A 2.4.3 [3.5/3.8]

Question b:

Identify the proper instruments to monitor during implementation of EOPs that supports operator manual actions required for safety systems to accomplish their safety functions for Design Bases Accidents.

☐ Satisfactory ☐ Unsatisfactory Candidate ________________

Calvert Cliffs Nuclear Power Plant
ADMIN A4 Topics
Emergency Procedures
Instrumentation

K/A 2.4.3 [3.5/3.8]

Question b:

Identify the proper instruments to monitor during implementation of EOPs that supports operator manual actions required for safety systems to accomplish their safety functions for Design Bases Accidents.

Answer:

The instruments that are monitored by operators are the Post Accident Monitoring instruments in the control room; identified by the green tape around the face.

(Can also be identified by use of STP O-63)

Reference Use Allowed? Yes
Reference 1 STP O-63

Reference 2 Tech Spec B3.3.10, page B 3.3.10-1

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
Admin A1 Topics
Title
Fuel Handling Supervisor Turnover

K/A 2.1.3 [3.0/3.4]

Question a:
You are relieving the Fuel Handling Supervisor. You have dressed out and are entering Unit 1 Containment. You are informed that the PAL interlocks are defeated. Is this permissible?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
Admin A1 Topics
Title
Fuel Handling Supervisor Turnover

K/A 00027A403 [3.3/3.2]

Question a:
You are relieving the Fuel Handling Supervisor. You are dressed out and are entering Unit 1 Containment. You are informed that the PAL interlocks are defeated. Is this permissible?

Answer:

Yes, this is permissible as long as there is an individual immediately outside the PAL to close the door.

Reference Use Allowed? NO

Reference 1 N0-1-207 Attachment 9, Shift Turnover Checklist Fuel Handling Supervisor, item #7

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
Admin A1 Topics
Title
Fuel Handling Supervisor Turnover

K/A

Question b:
Fuel Handling is in progress. You are relieving the Fuel Handling Supervisor. One item on the FHS Turnover Checklist is to verify at least two WRNIs are operable.
How would you verify their operability?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
Admin A1 Topics
Title
Fuel Handling Supervisor Turnover

K/A 00022K401 [3.1/3.4]

Question a:
Fuel Handling is in progress. You are relieving the Fuel Handling Supervisor. One item on the FHS Turnover Checklist is to verify at least two WRNIs are operable.
How would you verify their operability?

Answer:

SR 3.9.2.1 requires a channel check be performed once per 12 hours. This surveillance is verified to be current, or have a channel check peformed per T.S. 1.1 definition of CHANNEL CHECK (A CHANNEL CHECK shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameter.)

Reference Use Allowed? Yes, NO-1-207 and Tech Specs

Reference 1 Tech Spec LCO 3.9.2 Surveillance SR 3.9.2.1; Tech Spec Applications and Use Section 1.1 Definition of CHANNEL CHECK.

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

TASK: 032040504 Perform the initial review of a completed STP

PERFORMER'S NAME: ____________________________

APPLICABILITY:

SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for Calvert Cliffs Instructions.

EVALUATION LOCATION:

_____ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ACTUAL PERFORMANCE _____DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
15 MINUTES	____ MINUTES	NO

TASK LEVEL:

T

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

STP O-63-1
EN-4-104

TASK STANDARDS:

This JPM is complete when STP O-63-1 has been reviewed and completed.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

TASK: 032040504 Perform the initial review of a completed STP

DIRECTIONS TO EVALUATOR:

where

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion
   - "U" for unsatisfactory completion
   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 032040504

DIRECTIONS TO TRAINEE:

1. To complete the task successfully, you must:

   - perform each critical element correctly. You must inform the evaluator of the indications you are monitoring. Where necessary, consider the evaluator to be the CRS.

   - comply with industrial safety practices, radiation safety practices and use of event free tools. **<u>NOTE:</u> Violation of safety procedures will result in failure of the JPM.**

2. Initial Conditions:

   a. You are an extra SRO on shift.

3. Initiating Cue: The Shift Manager request that you perform a review of STP O-63-1 fro completion. Are there any questions? You may begin.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

ELEMENT (* = CRITICAL STEP)			STANDARD
TIME START _____			
____		Identify and locate Step 6.4 (Acceptance Criteria) of STP O-63-1.	
CUE: CRO has initiated an IR for Hot Leg Temp deviation.			
	A.	Did all the instruments listed in ATTACHMENT 1 meet the Acceptance Criteria?	Reviews ATTACHMENT 1. Determines Step 4 (RCS Hot Leg Temp) is unacceptable.} Refers to footnote 2 and determines IR is required but STP failure is not required. Circles YES.
*____	B.	**Did all the instruments listed in ATTACHMENT 2 meet the Acceptance Criteria?**	Reviews ATTACHMENT 2. Determines Step 5 (12 S/G LvL) is unacceptable. Refers to footnote 1 and determines reading was taken at >90% power. Circles NO.
*____	C.	**This surveillance is considered satisfactory is YES was answered in all steps above**	Circles UNSAT.
*____		1. **IF UNSAT, THEN notify the SM, declare the affected equipment inoperable and take actions as required by Technical Specifications and administrative actions stated in EN-4-104.**	Notifies SM. Refer to T.S. 3.3.10 Condition C.
CUE: CRO has initiated an IR for 12 S/G LvL deviation.			
*____		2. INITIATE an Issue Report for any equipment deficiencies.	No action required. ?

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

ELEMENT (* = CRITICAL STEP)	STANDARD

NOTE TO EVALUATOR: ***It is not required to reference EN-4-104, however STP "Additional Cover Sheet Information" is required to be completed.***

	ELEMENT	STANDARD
	Identify and locate EN-4-104 Section 5.5 (Test Completion and Review) and/or STP Additional Cover Sheet Information page.	
	A. After the test has been completed the Test Coordinator shall:	
____	1. Verify all steps have been completed or deleted according to PR-1-101 or PR-1-103.	Verifies all steps completed. Note: May have been done during review.
____	2. Review test results and answer the test questions on the STP over sheet as follows:	
____	a. Check "No" in the acceptance criteria block if any acceptance criteria has not been met - verify condition documentation on cover sheet, IR initiated, and Shift Manager informed; otherwise check "Yes".	Circles NO. Documents Hot Leg Temp and S/G LvL deviations in Section B Remarks of STP "Additional Cover Sheet Information".
____	b. Check "No" in the AS FOUND reading block if any AS FOUND readings were not in specification - verify condition documented on cover sheet; otherwise check "Yes".	Circle NO.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

ELEMENT (* = CRITICAL STEP)			STANDARD
____	c.	Check "Yes" in the adjustment made block if adjustments were made - verify condition documented on cover sheet; otherwise check "No".	Circles NO.
____	d.	Check "No" in the AS LEFT block if AS LEFT conditions were not in specification - verify conditions documented on cover sheet, IR initiated, and Shift Manager informed; otherwise check "Yes"	Circles NO.
____	e.	Check "Yes" in the MALFUNCTION INDICATED block if malfunctions were encountered during performance of the Surveillance Test - verify condition documented on cover sheet; otherwise check "No".	Circles YES.
____	f.	Check "Yes" in the IR WRITTEN block if an IR was written as a result of the STP performance - verify condition documented on STP cover sheet and Shift Manager informed; otherwise check "No".	Circles Yes. Documents IRs in Section B Remarks of STP "Additional Cover Sheet Information".

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

ELEMENT (* = CRITICAL STEP)		STANDARD
____ 3.	Sign "Test Completed By" block on the STP cover sheet.	Signs STP.
____ 4.	Present completed STP to the Shift Manager for completion acknowledgment.	STP given to SM.

TIME STOP ____

TERMINATING CUE:	The JPM is complete when STP Additional Cover Sheet Information Step B is completed and STP given to SM for review. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

TASK: 032040504

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ________________________ DATE: _________

CALVERT CLIFFS NUCLEAR POWER PLANT
SURVEILLANCE TEST PROCEDURE
UNIT ONE

STP O-63-1

REMOTE SHUTDOWN AND POST ACCIDENT MONITORING INSTR CHANNEL CHECK

REVISION 27

SAFETY RELATED

CONTINUOUS USE

Approval Authority: 8/21/98
Signature/Date

Effective Date: 8/28/98

SURVEILLANCE TEST PROCEDURES ADDITIONAL COVER SHEET INFORMATION

A. Test Performance

Permission to perform test: ______________ / 1-25-99
Shift Manager Date

B. **Test completion, results review and approval** (Circle appropriate answer)

Accept. Criteria in spec?	YES NO N/A	Adjustments made?	YES NO N/A
As found results in spec?	YES NO N/A	IR submitted?	YES NO N/A
As left results in spec?	YES NO N/A	Malfunctions indicated?	YES NO N/A

REMARKS: ______________

Test completed by: ______________ / ______
Date

Analysis of results: ______________

Shift Manager review: ______________ / ______
Date

Analysis/Comments: ______________

Functional Surveillance Test Coordinator: ______________ Date: ______

EQSE (if required): ______________ Date: ______

* POSRC Meeting No.: ______________ Date: ______

* Plant General Manager: ______________ Date: ______

* Required only if completed test on SR and designated NSR structures, systems and components (per Q List) identified a malfunction or were out of specification.

Attach a separate sheet, if necessary, to document additional comments.

TABLE OF CONTENTS

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	REVISION
1-22	27

PROCEDURE ALTERATIONS

REVISION/CHANGE	PAGES
27/00	1-22

1.0 PURPOSE

A. This test verifies the operability of instrumentation, by channel check, that:

- Sufficient information available to permit facility shutdown and maintenance of Hot Standby conditions from outside the Control Room.
- Sufficient information available on selected plant parameters to monitor and assess these variables following an accident.

2.0 APPLICABILITY/SCOPE

A. Completion of this STP satisfies ITS SR 3.3.10.1 and 3.3.11.1 for equipment tested.

B. This STP does not test the Hydrogen Monitors for ITS SR 3.3.10.1.

C. Test Performance Requirements:

1. The sections of this STP may be performed in any order. Each step shall be initialed or circled immediately after it is completed and prior to performing the next step. Each step shall be initialed by either the licensed operator directing the STP or the operator performing the applicable step.

2. The 1/2 Decade is determined by taking the lowest meter reading times 3.16 and ensuring all other meter readings are within this value. Example: 7×10^{-3} % times 3.16 equals 2.2×10^{-2} %.

D. **INDICATE** the reason(s) for performing this STP:

☒ Scheduled Surveillance.

☐ Operability Verification.

☐ Post Maintenance Verification.
(Enter attachment/parameter to be performed in Pre-surveillance Remarks)

MO/IR numbers: ______________________

Pre-surveillance remarks: ______________________

____

____

____

____

Determination made by: ______________________
(SRO)

3.0 REFERENCES

A. Procedure

1. OI-1I, Reactor Vessel Level Monitoring System (RVLMS)
2. EN-4-104, Surveillance Test Program

B. Drawing

1. 61-101, sht 43D

C. Codes and Standards

1. Quality List (Q List)
2. Technical Manual 15-109-82, Heated Junction Thermocouple Electronics
3. Technical Specifications
4. UFSAR, Post-Accident Monitoring Instrumentation

4.0 PREREQUISITES

INITIALS

A. Plant is in EITHER Mode 1, 2, or 3 OR Mode 4, if preparations are being made to enter Mode 3.

B. Administrative Requirements:

1. **VERIFY** qualifications of test personnel. SRO
2. **PERFORM** a pretest page check of this STP.
3. **DETERMINE** pretest briefing requirements: (check one)

☒ Pretest briefing NOT required.

☐ Pretest briefing required, surveillance and watch personnel have been briefed on procedures, precautions, and actions to be taken in the event an unexpected condition occurs.

Shift Manager

5.0 PRECAUTIONS

A. When an instrumentation channel does not meet the acceptance criteria, declare the channel inoperable and refer to the applicable Technical Specification for the appropriate action.

6.0	PERFORMANCE	INITIALS

6.1 REMOTE SHUTDOWN INSTRUMENTATION

A. **CHECK** 1C43 power supplies, upper and lower, indicating lights (4) energized. (Located in 1C43 back panel) (N/A if performed in step 6.3.A) RN

B. **RECORD** the parameter readings listed in ATTACHMENT 1, REMOTE SHUTDOWN INSTRUMENTATION from the Remote Shutdown Monitoring Instrumentation panel 1C43 and the Reactor Trip Switchgear. RN

C. **PERFORM** a channel check by comparing each step's parameter recorded values to each other and verify that any channel deviation is within the Acceptance Criteria. RN

D. **DETERMINE** the operability of each step by circling SAT or UNSAT. RN

6.2 POST-ACCIDENT MONITORING INSTRUMENTATION

A. **RECORD** the parameter readings listed in ATTACHMENT 2, POST-ACCIDENT INSTRUMENTATION from the Control Room and Heated Junction Thermocouple (HJTC) Panels. RN

B. **PERFORM** a channel check by comparing each step's parameter recorded values to each other, unless stated otherwise, and verify that any channel deviation is within the Acceptance Criteria. RN

C. **DETERMINE** the operability of each step by circling SAT or UNSAT. RN

6.3 POST ACCIDENT MONITORING INSTRUMENTATION AT THE REMOTE SHUTDOWN PANEL — INITIALS

A. **CHECK** 1C43 power supplies, upper and lower, indicating lights (4) energized. (Located in 1C43 back panel) (N/A if performed in step 6.1.A.) — N/A

B. **RECORD** the parameter readings listed in ATTACHMENT 3, POST ACCIDENT MONITORING INSTRUMENTATION AT THE REMOTE SHUTDOWN PANEL at 1C43. — RN

C. **PERFORM** a channel check by comparing each step's parameter recorded values to each other and verify that any channel deviation is within the Acceptance Criteria. — RN

D. IF any instrument is outside of the Acceptance Criteria, THEN **WRITE** an Issue Report. (N/A if all instruments are within Acceptance Criteria values.) — N/A

6.4 ACCEPTANCE CRITERIA

INITIALS

> **NOTE**
> Performance of this section constitutes a supervisory review. Actual observation of equipment response by the SRO performing this review is not required. Answering YES to a step signifies that the noted step has been completed and signed off by a qualified operator and that the actual equipment response is acceptable and valid.

A. Did all the instruments listed in ATTACHMENT 1 meet the Acceptance Criteria?

YES / NO (circle one) ______ SRO

B. Did all the instruments listed in ATTACHMENT 2 meet the Acceptance Criteria?

YES / NO (circle one) ______ SRO

C. This surveillance is considered satisfactory if YES was answered in all steps above.

SAT / UNSAT (circle one) ______ SRO

1. IF unsat,
   THEN notify the SM, declare the affected equipment inoperable and take actions as required by Technical Specifications and administrative actions stated in EN-4-104.

2. INITIATE an Issue Report for any equipment deficiencies.

7.0 POST PERFORMANCE ACTIVITIES

PERFORM a post test page verification of this surveillance. RN

8.0 BASES

[B0283]: Uncertainty Calculation for the Reactor Coolant System Temperature Indication/Recording Instrumentation Loops.

[B0285]: Memo from S.P. Hillier dated July 28, 1992 regarding "Core Exit Thermocouple Status Unit-1."

[B0431]: TEMP ALT 1-98-069, CET 42 is not installed for Unit 1 Cycle 14.

[B0433]: ES199502311, Uncertainty Calculation for Low Range Pressurizer Pressure Instrumentation Loops. (DCALC-CA00753)

[B0434]: ES199701033, Total Loop Uncertainty (TLU) for 12 CST.

[B0435]: ES199701243, Acceptance criteria for Channel Check of Containment Area Radiation High Range Monitors (1 & 2 RI 5217 A & B)

[B0436]: IR3-001-059, Identifies deficencies in the implementation of CET Operability Requirements. This includes the requirements of TS Amendments 148 (U-1) and 129 (U-2).

[B0438]: NRM memo NRM98183, P. S. Furio to D. L. Montana, PDMAU, dated 7/31/98, "Post-Accident Monitoring Instrumentation Surveillance Requirements".

[B0439]: SE memo, J. E. Kunzmann to D. L. Montana, PDMAU, dated 8/6/98, "RVLMS Testing per STP-O-63".

9.0 RECORDS

A. Records generated by this procedure shall be captured and controlled. Prior to transferring records to Records Management for retention, legibility and completeness of the record shall be verified by the transmitting organization.

B. Maintain records as defined in EN-4-104, Surveillance Test Program.

ATTACHMENT 1

REMOTE SHUTDOWN INSTRUMENTATION

	PARAMETER	REMOTE SHUTDOWN INSTR (1C43)	ACCEPTANCE CRITERIA	CIRCLE ONE
1.	Reactor Power 100 (Control Room narrow range) Mode 1			
2.	11 S/G LVL (1)	1-LI-1114B -50 in. 1-LI-1114A -55 in.	MAX DEV 25 in.	SAT / UNSAT
3.	11 S/G PRESS	1-PI-1013BB 870 PSIA 1-PI-1013AA 880 PSIA	MAX DEV 40 PSIA	SAT / UNSAT
4.	RCS Hot Leg TEMP (2)	1-TI-112HB 595 °F 1-TI-112HA 598 °F 1-TI-122HB 588 °F 1-TI-122HA 580 °F	MAX DEV 15° F	N/A
5.	RCS Cold Leg TEMP	1-TI-112CB 545 °F 1-TI-112CA 553 °F 1-TI-122CB 545 °F 1-TI-122CA 543 °F	MAX DEV 15° F	SAT / UNSAT
6.	PRZR LVL	1-LI-110Y 212 in. 1-LI-110X 218 in.	MAX DEV 10 in.	SAT / UNSAT
7.	PRZR PRESS	1-PI-105B 2275 PSIA 1-PI-105AA 2250 PSIA	MAX DEV 60 PSIA	SAT / UNSAT

(1) S/G LVL READINGS SHOULD BE TAKEN AT < 1% OR > 90% REACTOR POWER.

(2) NOT REQUIRED BY TECH SPECS. WHEN OUTSIDE OF ACCEPTANCE CRITERIA, WRITE AN ISSUE REPORT. THIS DOES NOT CONSTITUTE A FAILURE OF THE STP.

ATTACHMENT 1

REMOTE SHUTDOWN INSTRUMENTATION

	PARAMETER	REMOTE SHUTDOWN INSTR (1C43)	ACCEPTANCE CRITERIA	CIRCLE ONE
8.	RX WR POWER {3} (Use WRNI CH SEL 1-HS-015B to shift between Channels B and D) (Record values from either 1-NI-015 or 1-NI-016 depending on PWR LVL)	CH B 150 CH D 160	MAX DEV ½ Decade >10^{-4} % OR 2 Decades <10^{-4} %	SAT / UNSAT
9.	12 S/G LVL {1}	1-LI-1124B -55 in. 1-LI-1124A -45 in.	MAX DEV 25 in.	SAT / UNSAT
10.	12 S/G PRESS	1-PI-1023BB 880 PSIA 1-PI-1023AA 875 PSIA	MAX DEV 40 PSIA	SAT / UNSAT
11.	11 S/G AFW FLOW {2}	1-FI-4524A 0 GPM 1-FI-4509B 0 GPM	MAX DEV 40 GPM	N/A
12.	12 S/G AFW FLOW {2}	1-FI-4534A 0 GPM 1-FI-4510B 0 GPM	MAX DEV 40 GPM	N/A
13.	Reactor TCB Position Indication (Cable Spreading RM 306)	U-1 TCB-1 CLOSED U-1 TCB-2 CLOSED U-1 TCB-3 CLOSED U-1 TCB-4 CLOSED U-1 TCB-5 CLOSED U-1 TCB-6 CLOSED U-1 TCB-7 CLOSED U-1 TCB-8 CLOSED U-1 TCB-9 CLOSED	Indicates OPEN or CLOSED	SAT / UNSAT

{1} S/G LVL READINGS SHOULD BE TAKEN AT < 1% OR > 90% REACTOR POWER.
{2} **NOT** REQUIRED BY TECH SPECS. WHEN OUTSIDE OF ACCEPTANCE CRITERIA, WRITE AN ISSUE REPORT. THIS DOES **NOT** CONSTITUTE A FAILURE OF THE STP.
{3} THE 1/2 DECADE IS DETERMINED BY TAKING THE LOWEST METER READING TIMES 3.16 **AND** ENSURING ALL OTHER METER READINGS ARE WITHIN THIS VALUE.

ATTACHMENT 2

POST-ACCIDENT INSTRUMENTATION

INITIALS

	PARAMETER	CONTROL ROOM INSTRUMENT	ACCEPTANCE CRITERIA	CIRCLE ONE
1.	Reactor Power 100 (Control Room narrow range) Mode 1			
2.	11 S/G PRESS (1C03)	1-PI-1013A 885 PSIA 1-PI-1013B 890 PSIA 1-PI-1013C 880 PSIA 1-PI-1013D 890 PSIA	MAX DEV 40 PSIA	SAT / UNSAT
3.	12 S/G PRESS (1C03)	1-PI-1023A 880 PSIA 1-PI-1023B 885 PSIA 1-PI-1023C 900 PSIA 1-PI-1023D 880 PSIA	MAX DEV 40 PSIA	SAT / UNSAT
4.	11 S/G LVL (1) (1C04)	1-LR-1114D -50 in. 1-LI-1114C -60 in.	MAX DEV 12 in.	SAT / UNSAT
5.	12 S/G LVL (1) (1C04)	1-LR-1124D -50 in. 1-LI-1124C -65 in.	MAX DEV 12 in.	SAT / UNSAT
6.	PZR LOW RANGE PRESS (5) (1C06)	1-PI-103 1600 PSI 1-PI-103-1 1601 PSI	MAX DEV ±13 PSI **[B0433]**	SAT / UNSAT
7.	CONTAINMENT RADIATION (2)(2C24B)	1-RI-5317A 1.5×10^{0} R/HR 1-RI-5317B 1.5×10^{0} R/HR	READINGS $\geq 1 \times 10^{0}$ TO $\leq 2 \times 10^{0}$ **AND** THE OPERATE LAMP IS LIT **[B0435]**	SAT / UNSAT

(1) S/G LVL READINGS SHOULD BE TAKEN AT < 1% OR > 90% REACTOR POWER.
(2) CONTAINMENT RADIATION MONITORS INDICATE SEPARATE **AND** DIFFERENT RADIATION FIELDS. A COMPARISON CHECK OF CHANNELS 1RI5217A & B SHOULD **NOT** BE PERFORMED. **[B0435]**
(5) PRESSURIZER LOW RANGE PRESSURE INDICATORS THAT ARE OUT OF RANGE HIGH, REQUIRE CHANNEL CHECKING THE INDICATORS IN ACCORDANCE WITH ITS SR BASES 3.3.10.1.

ATTACHMENT 2

POST-ACCIDENT INSTRUMENTATION

INITIALS

	PARAMETER	CONTROL ROOM INSTRUMENT	ACCEPTANCE CRITERIA	CIRCLE ONE
8.	WR Log PWR (1C05) (3)	1-JI-001 140 1-JI-002 100 1-JI-003 150 1-JI-004 150	MAX DEV ½ Decade >10^{-4} % OR 2 Decades <10^{-4} %	SAT / UNSAT
9.	Subcooled Margin Monitor (1C05)	1-AI-11 57.8 °F 1-AI-12 57.9 °F (Ensure 1-HS-6411 and 1-HS-6412 selected to TEMP prior to recording values)	MAX DEV 10°F	SAT / UNSAT
10.	RCS Hot Leg TEMP (1C06)	1-TI-112H 596.3 °F 1-TI-122H 596.0 °F	MAX DEV 4°F [B0283]	SAT / UNSAT
11.	RCS Hot Leg TEMP (1C06)	1-TR-112 590 °F 1-TR-122 590 °F	MAX DEV 7°F [B0283]	SAT / UNSAT
12.	RCS Cold Leg TEMP (1C06)	1-TI-112C 547.4 °F 1-TI-122C 547.6 °F	MAX DEV 4°F [B0283]	SAT / UNSAT
13.	RCS Cold Leg TEMP (1C06)	1-TR-112 538 °F 1-TR-122 538 °F	MAX DEV 7°F [B0283]	SAT / UNSAT
14.	PRZR PRESS (1C06)	1-PI-105A 2274 PSIA 1-PR-105B 2300 PSIA	MAX DEV 60 PSIA	SAT / UNSAT
15.	PRZR LVL (1C06)	1-LI-110X-1 215.0 in. 1-LI-110Y-1 216.8 in.	MAX DEV 10 in.	SAT / UNSAT
16.	CNTMT PRESS (1C09) (4)	1-PI-5310 1 PSIG 1-PI-5307 1 PSIG 1-PI-5308 .1 PSIG	MAX DEV 2 PSIG	SAT / UNSAT
17.	WR CNTMT LVL (1C10)	1-LI-4147 0 in. 1-LI-4146 0 in.	MAX DEV 4 in.	SAT / UNSAT
18.	12 CST LVL (1C04)	1-LIA-5610 34.5 FT. 1-LI-5611 35 FT.	MAX DEV 1.5 FT [B0434]	SAT / UNSAT

(3) THE 1/2 DECADE IS DETERMINED BY TAKING THE LOWEST METER READING TIMES 3.16 **AND** ENSURING ALL OTHER METER READINGS ARE WITHIN THIS VALUE.
(4) BOTH 1-PI-5307 AND 1-PI-5308 REQUIRED TO MEET 1 CHANNEL REQUIREMENT.

ATTACHMENT 2

POST-ACCIDENT INSTRUMENTATION

INITIALS

PARAMETER	CONTROL ROOM INSTRUMENT	ACCEPTANCE CRITERIA	CIRCLE ONE
19. Core Exit Thermocouples	(1C05)	[B0436]	

QUAD No. ONE	QUAD No. TWO
1-TI-112H 596.3 °F	1-TI-122H 596.0 °F
1-HS-132A (ZB)	1-HS-132B (ZB)
T06 579 (1)	T08 588 (1)
T23 585 (1)	T09 587 (1)
T24 581 (1)	T28 588 (1)
T39 586 (2)	T29 581 (1)
T40 583 (2)	T30 589 (2)
T41 585 (2)	T44 585 (2)
1-HS-132C (ZA)	1-HS-132D (ZA)
T07 582 (1)	T01 589 (1)
T25 578 (2)	T11 587 (1)
T26 583 (1)	T12 583 (1)
T27 587 (1)	T31 585 (2)
T42 N/A* (2)	T32 590 (2)
T43 588 (2)	T45 586 (2)

(1) INTERIOR CETs
MAX TEMP DEV from 1-TI-112H **AND** 1-TI-122H is plus 35°F or minus 40°F

(2) PERIPHERAL CETs
MAX TEMP DEV from 1-TI-112H **AND** 1-TI-122H is plus 20° or minus 45°F

*T42 IS NOT INSTALLED PER TEMP. ALT. TA 1-98-069 FOR UNIT 1 CYCLE 14 [B0431]

VERIFY at least ONE **INTERIOR(1) AND** ONE **PERIPHERAL(2)** CET **PER** handswitch (ZA/ZB) meet the Acceptance Criteria to satisfy this step. — SAT / UNSAT

For any CET deviating greater than acceptance criteria:
- **INITIATE** an IR
- **REMOVE** the CET from scan
- **NOTIFY** NFMU Reactor Engineer

ATTACHMENT 2

POST-ACCIDENT INSTRUMENTATION

INITIALS

PARAMETER	CONTROL ROOM INSTRUMENT	ACCEPTANCE CRITERIA	CIRCLE ONE

19. Core Exit Thermocouples (1C05) **(continued)** [B0436]

QUAD No. THREE

1-TI-112H 596.3 °F
1-HS-131B (ZA)
T03 587 (1)
T04 583 (1)
T18 579 (1)
T19 585 (1)
T20 585 (2)
T37 580 (2)

1-HS-131D (ZB)
T05 580 (1)
T21 587 (2)
T22 575 (2)
T38 584 (2)

QUAD No. FOUR

1-TI-122H 596.0 °F
1-HS-131A (ZA)
T10 583 (1)
T13 589 (1)
T33 579 (2)
T34 582 (2)
T35 585 (2)

1-HS-131C (ZB)
T02 N/A (1)[B0285]
T14 584 (1)
T15 584 (1)
T16 580 (1)
T17 588 (1)
T36 579 (2)

(1) INTERIOR CETs
MAX DEV from 1-TI-112H **AND** 1-TI-122H is plus 35° F or minus 40° F

(2) PERIPHERAL CETs
MAX DEV from 1-TI-112H **AND** 1-TI-122H is plus 20° F or minus 45° F

VERIFY at least ONE **INTERIOR(1)** **AND** ONE **PERIPHERAL(2)** CET **PER** handswitch (ZA/ZB) meet the Acceptance Criteria to satisfy this step.

SAT ✓ UNSAT

For any CET deviating greater than acceptance criteria:
- **INITIATE** an IR
- **REMOVE** the CET from scan
- **NOTIFY** NFMU Reactor Engineer

ATTACHMENT 2

POST-ACCIDENT INSTRUMENTATION

INITIALS

20. Rx Vessel LVL (CAB 1C144A and 1C144B) **[B0439]**

NOTE
Jumpered unheated sensors are still considered operable.

a. **REVIEW** the RVLMS Operability Log, OI-1I Appendix 3, for any HJTC heated sensors that are jumpered out and, **WRITE** INOP for that HJTC ΔT in step 20.c. Acceptance Criteria. RN

b. **RECORD** the Delta-temperature (ΔT) of each unjumpered Heated Junction Thermocouple (HJTC) sensors in each channel as follows:

NOTE
To select Test 1, step 3 must be done immediately after step 2.

(1) **SET** the LEVEL/THOT pushbutton to LEVEL and wait five seconds. RN

(2) **DEPRESS** the LEVEL/THOT pushbutton five times in less than two seconds. (The right most decimal point will be blinking) RN

(3) WHEN the desired test number (shown in 20.c.) is displayed, **DEPRESS** the LEVEL/THOT pushbutton and the temperature will be displayed. (Record these temperatures in step 20.c. Acceptance Criteria) RN

(4) To read additional temperatures, **DEPRESS** the LEVEL/THOT pushbutton and repeat Step 3. RN

(5) WHEN all temperatures have been read, **DEPRESS** SYSTEM RESET pushbutton to exit the test mode. RN

ATTACHMENT 2

POST-ACCIDENT INSTRUMENTATION

INITIALS

c. ACCEPTANCE CRITERIA:

NOTE
A HJTC is considered operable if its ΔT is in the range of 25° to 200° F and its heated sensor is not jumpered out.

(1) CH A upper sensors (1C144A 27' SWGR)

CIRCLE ONE

ΔT1 60 °F (Test 1)
ΔT2 93 °F (Test 4)
ΔT3 75 °F (Test 7)

(a) One or more of the upper three sensors operable. SAT UNSAT

(2) CH A lower sensors (1C144A 27' SWGR)

ΔT4 81 °F (Test 10)
ΔT5 73 °F (Test 13)
ΔT6 110 °F (Test 16)
ΔT7 65 °F (Test 19)
ΔT8 77 °F (Test 22)

(a) Three or more of the lower five sensors operable. SAT UNSAT

(3) CH B upper sensors (1C144B 45' SWGR)

ΔT1 60 °F (Test 1)
ΔT2 70 °F (Test 4)
ΔT3 97 °F (Test 7)

(a) One or more of the upper three sensors operable. SAT UNSAT

(4) CH B lower sensors (1C144B 45' SWGR)

ΔT4 125 °F (Test 10)
ΔT5 70 °F (Test 13)
ΔT6 68 °F (Test 16)
ΔT7 73 °F (Test 19)
ΔT8 65 °F (Test 22)

(a) Three or more of the lower five sensors operable. SAT UNSAT

POST-ACCIDENT INSTRUMENTATION

INITIALS

(5) CIRCLE ONE

(a) 1C06 "RVLMS TROUBLE CHANNEL A 1C144A" and "RVLMS TROUBLE CHANNEL B 1C144B" annunciator clear,

OR

(b) RVLMS PNL error codes E25 through E28 and E31 NOT displayed AND: Any other error codes displayed, evaluated NOT to INOP the RVLMS channel. SAT UNSAT

POST-ACCIDENT INSTRUMENTATION

INITIALS

21. Containment Isolation Valve Position

NOTE
For a containment isolation valve position indication to be operable, isolation valve status must be assured for each valve in a containment penetration flow path. ZL switches must function to provide accurate status to the Control Room of each isolation valve.

VERIFY each channel of control room containment isolation valve position indication is operable. {6} {7}.

	CIRCLE ONE
1-CVC-515-CV	SAT / UNSAT
1-CVC-516-CV	SAT / UNSAT
1-CVC-505-CV	SAT / UNSAT
1-CVC-506-CV	SAT / UNSAT
1-WGS-2180-CV	SAT / UNSAT
1-WGS-2181-CV	SAT / UNSAT
1-CRM-5291-CV	SAT / UNSAT
1-CRM-5292-CV	SAT / UNSAT
1-HP-6900-MOV	SAT / UNSAT
1-HP-6901-MOV	SAT / UNSAT
1-IA-2080-MOV	SAT / UNSAT
1-CC-3832-CV	SAT / UNSAT
1-CC-3833-CV	SAT / UNSAT
1-RCW-4260-CV	SAT / UNSAT

{6} VERIFICATION OF VALVE POSITION INDICATION IS **NOT** REQUIRED FOR ISOLATION VALVES WHOSE ASSOCIATED PENETRATION IS ISOLATED BY AT LEAST ONE CLOSED **AND** DEACTIVATED AUTOMATIC VALVE, CLOSED MANUAL VALVE, CHECK VALVE WITH FLOW THROUGH THE VALVE SECURED, BLIND FLANGE, **OR** EQUIVALENT.

{7} ONLY ONE POSITION INDICATION CHANNEL IS REQUIRED FOR PENETRATION FLOW PATHS WITH ONLY ONE INSTALLED CONTROL ROOM INDICATION CHANNEL.

ATTACHMENT 3

POST ACCIDENT MONITORING INSTRUMENTATION AT THE REMOTE SHUTDOWN PANEL

	PARAMETER	PAM INSTRUMENTS AT 1C43	ACCEPTANCE CRITERIA	CIRCLE ONE
1.	12 CST LVL (1) (1C43) [B0438]	1-LI-5610A 35 ft. 1-LI-5611A 34 ft.	MAX DEV 1.5 ft. [B0434]	N/A

(1) NOT REQUIRED BY TECH SPECS. WHEN OUTSIDE OF ACCEPTANCE CRITERIA, WRITE AN ISSUE REPORT. THIS DOES NOT CONSTITUTE A FAILURE OF THE STP.

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Troubleshooting and Configuration Control
Troubleshooting

K/A 2.2.20 [2.2/3.3]

Question a:

As the Shift Manager, a Responsible Maintenance Group Supervisor requests for you to review and approve a Troubleshooting Control Form (TCF). The TCF describes proposed troubleshooting on PT-102A and PT-102B indication on 1C07 by opening the slide links and installing a recorder on each sigma to monitor for loop current stability. The troubleshooting will be complete on the same shift.

What is the Risk Level for this proposed activity and what level of approvals are required?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Troubleshooting and Configuration Control
Troubleshooting

K/A 2.2.20 [2.2/3.3]

Question a:

As the Shift Manager, a Responsible Maintenance Group Supervisor requests for you to review and approve a Troubleshooting Control Form (TCF). The TCF describes proposed troubleshooting on PT-102A and PT-102B indication on 1C07 by opening the slide links and installing a recorder on each sigma to monitor for loop current stability. The troubleshooting will be complete on the same shift.

What is the Risk Level for this proposed activity and what level of approvals are required?

Answer:

The Risk Level is level 1 which requires the approval of GS-NPO in addition to the RMGS, System Manager, CRS and Shift Manager on attachment TS-1.

Reference Use Allowed ? YES

Reference 1 MN-1-110 Appendix TS, page 17

Reference 2

Comments:
Supply copy of attachment for examiners.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Troubleshooting and Configuration Control

Maintenance Orders

K/A 2.2.19 [2.1/3.1]

Question b:

Describe the duties and responsibilities of the OWC regarding unscheduled maintenance orders

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Troubleshooting and Configuration Control

Maintenance Orders

K/A 2.2.19 [2.1/3.1]

Question b:

Describe the duties and responsibilities of the OWC regarding unscheduled maintenance orders

Answer:

The OWC reviews the Maintenance order package to determine if the proposed work will conflict with the current work. The OWC ensures that the Operational Risk Assessment and PRA or the emergent work is completed, as well as any compensatory actions.

Reference Use Allowed? Yes

Reference 1 MN 1-120, section 4.8, page 13

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Control of Radiation Releases

Containment Purge Release

K/A 2.3.6 [2.1/3.1]

Question a:
Given a Containment Purge Release Permit and the following data, evaluate the release criteria for acceptablity for signing as Shift Manager/SCRO reviewer:

Main Vent (RI 5415) reading 140 CPM

WRNGM (RIC 5415) reading 5.56 E-0

Main Vent flow reading 42,565 SCFM

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

ATTACHMENT 9.1.1, GASEOUS RELEASE PERMIT

PERMIT # 98 0065

PRE-RELEASE DATA SECTION

N/A CONTAINMENT VENT: N/A Ctmt Vent via H2 Purge: N/A EAL
Unit # N/A, PRESSURE N/A psig.

✓ CONTAINMENT PURGE: Unit # 1

NA OTHER: N/A

N/A DECAY TANK: # N/A : PRESSURE N/A psig. DATE ISOLATED N/A

RMS BACKGROUND

MAIN VENT RMS (RI-5415) 55 CPM WASTE GAS RMS (RI-2191) N/A CPM
WIDE RANGE RMS (RIC-5415) 2.53 E-6 µCi/cc (Low Range)

RELEASE CRITERIA/SURVEILLANCE SECTION

SUSPEND RELEASE IF THE CRITICAL SETPOINT IS EXCEEDED

MAIN VENT (R5415)	WIDE RANGE (RIC5415)	WASTE GAS (RI2191)
COMPUTER: (U1) R5415A! or (U2) 5415B!	COMPUTER: (U1 or U2) R5415!	COMPUTER: R2191! Waste Gas Max Flow N/A CFM
WARNING SETPOINT: 86 CPM	WARNING SETPOINT: 135 µCi/sec	WARNING SETPOINT N/A CPM
ALERT SETPOINT: 102 CPM(1)	ALERT SETPOINT: 478 µCi/sec(1)	ALERT SETPOINT: N/A CPM
CRITICAL SETPOINT: 203 CPM	CRITICAL SETPOINT: 957 µCi/sec	CRITICAL SETPOINT: CPM

Permit # 980065 Release Criteria is within ODCM Requirements and is APPROVED FOR DISCHARGE to Unit 1 Main Vent at a MAXIMUM DISCHARGE RATE of 22.4 M3/sec or 47,387 SCFM

Supervisor Plant Chemistry: D. [signature] for SC [signature] Date/Time ____

General Supervisor Chemistry: C. Eads Date/Time ____

RELEASE CRITERIA REVIEWED: ____ Date/Time ____
Shift Manager/SCRO

RELEASE DATA SECTION

ENTER TERMINATION CRITERIA INTO PLANT COMPUTER AS ALARM SETPOINT: (2,3) INITIAL ____
ODCM 4.3.3.9 RI-2191 PRE-RELEASE SOURCE CHECK AND CHANNEL CHECK COMPLETED:
CRO INITIAL: ____ DATE/TIME: ____ [B-354]
WGDT RELEASE FLOW METER CHANNEL CHECK DURING RELEASE PER ODCM TABLE 4.3-11 COMPLETED:
CRO INITIAL: ____ DATE/TIME: ____ [B-354]

START PRESSURE ____ psig START DATE/TIME ____ (4)
STOP PRESSURE ____ psig END DATE/TIME ____

POST RELEASE SECTION

SHIFT MANAGER/SCRO ____ Date/Time ____
Comments: ____

(1) **IF** the Alert Setpoint has been exceeded on the containment purge permit, **THEN NOTIFY** Plant Chemistry.
(2) **IF** discharging a WGDT with O-RE-2191 OOS, **THEN RECORD** RI-5415 or RIC-5415 response on Attachment 9.1.5.
(3) **IF** plant computer OOS, **THEN RECORD** RI-5415 or RIC-5415 response on Attachment 9.1.5.
(4) **IF** a containment purge has or will be secured for >2 hours, **THEN CLOSE OUT** the purge permit. **LOG** additional start/stop times on rear of form **AND NOTE** in comments section.

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Control of Radiation Releases

Containment Purge Release

K/A 2.3.6 [2.1/3.1]

Question a:
Given a Containment Purge Release Permit and the following data, evaluate the release criteria for acceptablity for signing as Shift Manager/SCRO reviewer:

Main Vent (RI 5415) 140 CPM   WRNGM (RIC 5415) 5.56 E-0

Main Vent flow 42,565 SCFM

Answer:
The permit should be sent back to Chemistry for recalculation due to the change in Main Vent RMS backround reading

Reference Use Allowed ? Yes

Reference 1 Containment Purge Permit

Reference 2 OI 36 and CP-604

Comments:
Supply copy of permit for examiners.

☐ Satisfactory   ☐ Unsatisfactory   Candidate ______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Control of Radiation Releases

K/A 001000A212 [3.6/4.2]

Question b:

Describe the strategy in EOP 6 (SGTR Event) used control the radionuclides that may be released to the General Public.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Control of Radiation Releases

K/A 001000A212 [3.6/4.2]

Question b:

Describe the strategy in EOP 6 (SGTR Event) used to control the radionuclides that may be released to the General Public.

Answer:

In a SGTR Event the radionuclide control is accomplished in steps that:
Cool down the RCS to prevent lifting the Safety valves
isolating the damaged SG
control RCS inventory and pressure

Reference Use Allowed? Yes

Reference 1 EOP 6 Technical Basis page 3

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE ERPIP-3-3

TASK: 032170413 Evaluate Weather Conditions Against Emergency Action Levels

PERFORMER'S NAME: ____________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for Safety Injection and Containment Spray.

EVALUATION LOCATION:

_____ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEL:

LEVEL 1

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

ERPIP 3.0

TASK STANDARDS:

This JPM is complete when an EAL classification is determined based on given weather conditions.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE ERPIP-3-3

TASK: 032170413 Evaluate Weather Conditions Against Emergency Action Levels

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. <u>NOTE:</u> **Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 032170413

DIRECTIONS TO TRAINEE:

1. To complete the task successfully, you must:

   - perform each critical element correctly. You must inform the evaluator of the indications you are monitoring. Where necessary, consider the evaluator to be the CRS.
   - comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

2. Initial Conditions:

   a. A tornado warning has been in effect for several hours in Calvert County.

   b. Severe thunderstorms have been passing through the area.

   c. A reactor and turbine trip occur on Unit-1 & Unit-2.

   d. Several people report seeing a tornado briefly touch down in the 500 kV switchyard.

   e. Security reports heavy damage to parts of switchyard and vehicles in the parking lot.

   f. Meteorological instrumentation indicates wind gusts > 75 MPH.

   g. You are performing the duties of the Shift Supervisor.

3. Initiating Cue: You are called to the control room to implement the Emergency Response Plan. Are there any questions? You may begin.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE ERPIP-3-3

ELEMENT (* = CRITICAL STEP)		STANDARD

TIME START ____

____	Identify and locate ERPIP 3.0.	Same as element.
____1.	Identify the proper category from the listing located on page 1 of ERPIP 3.0 Immediate Actions.	Determines proper category to be "Severe Weather".

NOTE: **If EAL classification is recognized, it is permissable to refer to Attachment 1 (EAL Criteria) before Attachment 17.**

____2.	Refer to Attachment 17 for "Severe Weather" category.	Same as element.

CUE: Attachment 17 has been completed through step C.2.0.

ATTACHMENT 17

____C.	Monitor Weather Conditions.	
____	3.0 **IF** Nuclear Security reports a tornado onsite **THEN** evaluate the damage. **GO TO** ERPIP 3.0, Attachment 2, Emergency Classification. Do not return to this part.	Refers to Attachment 2.

ATTACHMENT 2

NOTE: The decision to classify an emergency may NOT be delegated.

*____1.	EVALUATE current conditions against Attachment 1, Emergency Action Levels (EAL) criteria.	Evaluates Attachment 1 and determines an UNUSUAL EVENT (NU1 2) exists, due to tornado striking switchyard or protected area.

TIME STOP ____

TERMINATING CUE: The task is complete when an EAL classification based on weather conditions is declared. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE ERPIP-3-3

TASK: 032170413 Evaluate Weather Conditions Against Emergency Action Levels

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: __________________________ DATE: _________

As Given

Operating Test

1 to Master
EXAM File
(In PPR)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

February 25, 1999

Mr. Charles H. Cruse
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657 - 4702

SUBJECT: CALVERT CLIFFS UNIT 1 AND UNIT 2 REACTOR AND SENIOR REACTOR OPERATOR INITIAL EXAMINATION REPORT NOS. 50-317/99-301(OL) AND 50-318/99-301(OL)

Dear Mr. Cruse:

This report transmits the results of the subject operator licensing examinations. These examinations addressed areas important to public health and safety and were developed and administered in accordance with the guidelines of the Examination Standards for Power Reactors (NUREG 1021, Interim Revision 8). All segments of the examination were developed by Baltimore Gas and Electric Company personnel, while the NRC provided oversight and final approval prior to the administration of the examinations. The operational portion licensing examinations were conducted by NRC examiners during the period of January 25-29, 1999, and the written examination was administered by your staff on January 22, 1999, at the Calvert Cliffs Nuclear Power Facility. The preliminary major findings and conclusions findings, as a result of the examinations, were discussed with your staff via a telephone conference call on February 12, 1999.

Based on the results of the examinations, all applicants passed all portions of the examinations. Overall quality of the initial submittal was acceptable. Exam development problems were noted particularly in the walk-through tests reflecting a weak attention to detail by the facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

IE42

No reply to this letter is required, but should you have any questions regarding this examination report, please contact me at 610-337-5183, or by E-mail at RJC@NRC.GOV.

Sincerely,

Richard J. Conte

Richard J. Conte, Chief
Human Performance & Emergency
Preparedness Branch
Division of Reactor Safety

Docket Nos. 50-317; 50-318

Enclosure: Initial Examination Report Nos. 50-317/99-301(OL) and 50-318/99-301(OL) w/Attachments 1 through 2

cc w/encl; w/Attachments 1-2:
N. Winters, Training Manager

cc w/encl; w/o Attachments 1-2:
B. Montgomery, Director, Nuclear Regulatory Matters (CCNPP)
R. McLean, Administrator, Nuclear Evaluations
J. Walter, Engineering Division, Public Service Commission of Maryland
K. Burger, Esquire, Maryland People's Counsel
R. Ochs, Maryland Safe Energy Coalition
State of Maryland (2)

Distribution w/encl and w/Attachments 1-2:
DRS Master Exam File
PUBLIC
Nuclear Safety Information Center (NSIC)

Distribution w/encl; w/o Attachments 1-2:
Region I Docket Room (with concurrences)
W. Lanning, DRS
W. Ruland, DRS
R. Conte, DRS
J. Williams, Chief Examiner, DRS
NRC Resident Inspector
DRS OL Facility File (V. Curley)
DRS File
H. Miller, RA/J. Wiggins, DRA (1)
D. Screnci, PAO,
S. Barber, DRP
W. Cook, DRP
R. Junod, DRP

Distribution w/encl; w/o Attachments 1-2 **(VIA E-MAIL)**:
G. Shear, RI EDO Coordinator
S. Stewart - Calvert Cliffs
S. Bajwa, NRR
A. Dromerick, NRR
M. Campion, RI
Inspection Program Branch, NRR (IPAS)
R. Correia, NRR
DOCDESK

DOCUMENT NAME: G:\HPEPB\WILLIAMS\CC99301.OL
To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	RI/DRS		RI/DRS			N				
NAME	JWilliams		RConte		C Bo-ba					
DATE	2/24/99		2/22/99		2/25/99				02/ /99	

OFFICIAL RECORD COPY

U. S. NUCLEAR REGULATORY COMMISSION
REGION 1

Docket Nos:	50-317, 50-318
Report Nos:	50-317/99-301(OL) and 50-318/99-301(OL)
License Nos:	DPR-53, DPR-69
Licensee:	Baltimore Gas and Electric Company (BG&E)
Facility:	Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Location:	Lusby, Maryland
Dates:	January 22, 1999 and January 25-29, 1999 (Administration) February 1-5, 1999 (Grading)
Chief Examiner:	J. Williams, Senior Operations Engineer/Examiner
Examiners:	J. D'Antonio, Operations Engineer/Examiner L. Briggs, Senior Operations Engineer/Examiner
Approved by:	Richard J. Conte, Chief Human Performance & Emergency Preparedness Branch Division of Reactor Safety

EXECUTIVE SUMMARY

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Inspection Report Nos. 50-317/99-301(OL) and 50-318/99-301(OL)

Operations

- Five reactor operator (RO), five senior reactor operator instant (SROI) and one senior reactor operator upgrade (SROU) applicants were administered initial licensing exams. All applicants successfully passed all portions of the examinations.

- The applicants, with few exceptions, performed well on the operating portions of the exam. A number of positive observations were made in the following areas during the dynamic simulator portion of the exam: communication skills; SRO applicant control of plant operations; timely crew briefings; self checking practices; and peer checking practices during activities involving significant plant changes.

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- Operator license training and eligibility is being conducted in accordance with NRC Regulatory Guide (RG) 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," Rev. 2, and ES 202 of NUREG 1021, "Operator Licensing Examination Standards for Power Reactors," Interim Rev. 8.

Report Details

I. Operations

05 Operator Training and Qualifications

05.1 Reactor Operator and Senior Reactor Operator Initial Exams

a. Scope

The NRC examiners reviewed the drafts of the written and operating initial examinations submitted by BG&E to ensure that they were prepared in accordance with the guidelines of the Examination Standards for Power Reactors (NUREG 1021, Interim Revision 8). The review was conducted both in the Region 1 office and at the Calvert Cliffs Nuclear Power Plant facility. Final resolution of comments and test revisions were performed during the on site preparation week. The NRC examiners administered the operating portion of the exams to all applicants. The written exams were administered by Calvert Cliffs training staff on January 22, 1999.

b. Observations and Findings

Grading and Results

The results of the exams are summarized below:

	SRO PASS	FAIL	RO PASS	FAIL
Written	6	0	5	0
Operating	6	0	5	0
Overall	6	0	5	0

Examination Preparation and Quality

The exam development and validation team was comprised of Calvert Cliffs training and operations representatives. Each individual signed onto a security agreement before they became involved in the development of the exam. The NRC subsequently reviewed and validated all portions of the proposed exams. Some changes and/or additions to the proposed exams were requested by the NRC prior to and during the onsite NRC review. Calvert Cliffs personnel incorporated the agreed-to comments and finalized the exams.

Two NRC examiners in Region I and one examiner in NRC Headquarters reviewed samples of the written exam questions and independently determined that the exam was acceptable for further NRC review. As a result of further NRC review of the written examinations, there was a replacement of three of 129 questions and there were revisions to several question stems (3) and distractors (16). Twenty two minor editorial changes were also made. Changes were made to increase question discriminatory validity, to enhance question clarification or to make distractors more plausible.

Changes were made to three JPM follow up questions to provide more discrimination between the RO and SRO exams. In addition, several JPM questions were revised to increase the number of open book questions (from 10 to 16 open book questions on the RO exam). One JPM was replaced as a result of NRC comments. Three JPMs included alternate path actions.

The proposed simulator scenarios were of high quality. They were well developed, ran smoothly and were good test instruments. Very few changes were made to the scenarios as a result of the NRC review. One change that was necessary was to include an instrument failure that required meaningful and/or significant operator actions.

Overall, the quality of the initial submittal was acceptable. The facility had no post-examination comments concerning quality or technical accuracy.

Written Test Administration and Performance

The Calvert Cliffs Nuclear Power Plant training staff performed an analysis of questions missed on the written exam for generic and individual weaknesses. There were nine questions that were missed by more that half of the SRO applicants and four such questions missed by the RO applicants. Three of these questions were missed on both exams. Topics identified as possibly needing corrective actions from the facility exam analysis included:

- Loss of containment integrity (SRO)
- Waste gas system design and operation (SRO & RO)
- Alarm response to Area Radiation Monitors (SRO)
- Refueling operations and design (SRO)
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- Core cooling during two phase natural circulation (SRO)
- Safety evaluation screening process (SRO & RO)

These questions were discussed with the applicants during the post exam review process. The licensee is using their corrective action program to evaluate appropriate corrective actions. The licensee's actions in this area were determined to be acceptable.

Operating Test Administration and Performance

The operating test consisted of ten JPMs for all RO and SROI applicants and five JPMs for the SROU applicant. Two followup questions were associated with each JPM. Each applicant was also tested on administrative subjects as part of the operating test. All applicants performed three simulator scenario exercises in crew positions appropriate to their examination level.

The walkthrough examination consisted of good JPMs for test instruments. Three JPMs involved alternate path actions. Notebooks were prepared for each applicant with each day's exam material separated out. These notebooks and the control of applicants during the examination provided good exam security.

However, there were attention to detail problems evident with the walkthrough. For example: the prepared answers to two of the JPM questions were incorrect; completed procedures and other data supplied to the applicants was not always correct; some questions relied on Unit 2 data which was not available in the simulator and the initiating cue for one JPM was incorrect.

The examiners noted that the calculations of reactor coolant system (RCS) leakrate and estimated critical condition were involved enough to be JPMs rather than just JPM questions. Also, many applicants had trouble using the ASME steam tables when calculating RCS leakrate.

The applicants demonstrated good communications and teamwork during the dynamic simulator exercises in both the routine and emergency portions of the scenario. Briefings were routinely conducted by the SRO applicants. The briefings were well controlled and ensured that all crew members knew the plant (simulator) status. The applicants demonstrated good self checking practices. All applicants demonstrated good peer checking practices during activities involving significant plant changes.

c. Conclusions

Five reactor operator (RO), five senior reactor operator instant (SROI) and one senior reactor operator upgrade (SROU) applicants were administered initial licensing exams. All applicants successfully passed all portions of the examinations.

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O5.2 NRC Regulatory Guide (RG) 1.8, Rev. 2, Application Inspection

a. Scope (41500)

NRC Regulatory Guide (RG) 1.8, Rev. 2, "Qualification and Training of Personnel for Nuclear Power Plants," specifies guidelines for training and eligibility which should be satisfied by a license applicant prior to taking the NRC examination for a hot Reactor Operator or Senior Reactor Operator license.

b. Observations and Findings

The inspectors reviewed the licensee's updated final safety analysis report, the administrative section of the licensee's technical specifications and selective portions of the licensee's training program procedures. The licensee's program commits to maintain licensed operator qualifications and training in accordance with the guidelines of NUREG-1021 and ANSI N18.1-1971. NUREG-1021 applies the guidelines of RG 1.8, Rev. 2. The licensee's training program is Institute of Nuclear Power Operations accredited. The applicants' qualifications met the guidance of NUREG-1021 and hence RG 1.8, Rev. 2.

c. Conclusions

Operator license training and eligibility is being conducted in accordance with NRC Regulatory Guide (RG) 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," Rev. 2, and ES 202 of NUREG 1021, "Operator Licensing Examination Standards for Power Reactors," Interim Rev. 8.

V. Management Meetings

X1 Exit Meeting Summary

On February 12, 1999, the preliminary observations were discussed with Calvert Cliffs operations and training management representatives.

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Charles Zapp, Assistant General Supervisor, Operator Training
John Hornick, Supervisor Initial Operator Training
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Mike Navin, Superintendent Nuclear Operations
Tim Grover, Nuclear Regulatory Matters

NRC

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Attachments:
1. Calvert Cliffs RO Written Exam w/Answer Key
2. Calvert Cliffs SRO Written Exam w/Answer Key

U. S. NUCLEAR REGULATORY COMMISSION
REGION 1

Docket Nos:	50-317, 50-318
Report Nos:	50-317/99-301(OL) and 50-318/99-301(OL)
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Attachments:
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2. Calvert Cliffs SRO Written Exam w/Answer Key

Attachment 1

CALVERT CLIFFS RO WRITTEN EXAM W/ANSWER KEY

U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination

Applicant Information	
Name:	Region: I / II / III / IV
Date: 1-22-99	Facility/Unit: CCNPP Units 1-2
License Level: RO / SRO	Reactor Type: W / CE / BW / GE
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected four hours after the examination starts.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

____
Applicant's Signature

Results		
Examination Value	______	Points
Applicant's Score	______	Points
Applicant's Grade	______	Percent

Name: ______________________________

1. During a Waste Gas discharge, the RMS goes in alarm. Why must the discharge lineup be promptly secured?
   A. Prevent damage to the Waste Gas Compressors.
   B. Prevent an unmonitored release.
   C. Prevent WG header relief from discharging to the Main Vent.
   D. Prevent WG header relief from discharging to the Surge Tank.

2. Given the following:
   * Unit 1 is in Mode 3
   * RCS pressure is 1950 PSIA
   * RCS temperature is 532°F
   * 11A SIT boron concentration is 2325 ppm
   * 11A SIT level is 195 inches
   * 11A SIT pressure is 195 PSIG
   * 11A SIT Outlet isolation 1-SI-614-MOV is OPEN with MCC breaker shut

   Which ONE of the following identifies the operability status of 11A SIT that requires correction per TS based on the stated conditions?

   A. 11A SIT Outlet MOV power must be removed, open mov breaker within 1 hour .
   B. 11A SIT is above the required level, restore to the required level within 1 hour.
   C. 11A SIT is below the required pressure, restore to the required pressure within 1 hour.
   D. 11A SIT boron is below the required concentration, restore concentration within 72 hours.

3. Using the provided references
   Given the following:
   * Unit 1 is at 98% power
   * 1-PT-102B transmitter is OOS due to reliability concerns by System Engineering
   * CRO bypasses Channnel B RPS trip units 5 and 6 to comply with TS 3.3.1

   The CRS directs you to perform a peer check per OI 6, determine the compliance with TS 3.3.1

   Which ONE of the following is the proper action based on TS 3.3.1:
   A. Notify the CRS that the OI 6 peer check is complete and the correct channel RPS is bypassed.
   B. Notify the CRS that the OI 6 peer check is unsat because the wrong channel RPS is bypassed.
   C. Notify the CRS that the OI 6 peer check is complete and the correct trip units are bypassed.
   D. Notify the CRS that the OI 6 peer check is unsat because the wrong trip units are bypassed.

4. Unit 2 is at 50%. The designated CRO requests a break and requires a temporary relief. The Shift Manager directs the SM Assistant to relieve the CRO.

   Which of the following describes the minimum action for the temporary watch relief per NO-1-200?

   A. Verbally brief the SMA.
   B. Walkdown the panels with the SMA.
   C. No turnover required, SMA is already signed in.
   D. Complete the turnover requirements of NO-1-207 (Shift Turnover)

5. Which ONE of the following is the responsibility of the Safety Evaluation Screening Preparer?

   A. Ensure the reason for the change includes a specific detailed explanation, attaching additional pages if necessary.
   B. Ensure that the proposed change will not alter what is to be accomplished by the procedure in a safety significant manner.
   C. Ensure that the proposed change will not cause equipment operation in a manner that violates the Technical Specifications and UFSAR.
   D. Ensure that the proposed change is not a Change of Intent, is consistent with the Tech Specs and does not require a Safety Evaluation.

6. Fuel handling is in progress with a contractor on the refueling machine. The CRO via the RCRO has requested that the FHS immediately investigate a continuous containment sump alarm.

   Which ONE of the following represents the correct action?

   A. Secure fuel handling, move the refueling machine out of the core area,and proceed to the containment basement.
   B. Proceed to the containment basement after directing the refueling machine operator and the RCRO which step to perform.
   C. Leave the refueling machine but remain on the 69 foot area of the containment and direct the RFP upender operator to investigate.
   D. Relieve the refueling machine operator and direct him/her to proceed to the containment basement to investigate.

7. Given the following:

   * Unit 1 turbine startup in progress
   * Unit 1 MT at 1800 RPM
   * "420 HZ MALFUNCTION" light is on
   * Unit 2 turbine startup in progress
   * Unit 2 MT at 560 RPM
   * "EMERGENCY POWER SUPPLY" light is on

   Determine the action required, if any, for each Unit's Main Turbine condition.

   A. Reset the light on Unit 1, No action required for Unit 2.
   B. No action required for Unit 1, reset the light for Unit 2.
   C. Trip Unit 1 Main Turbine, trip Unit 2 Main Turbine.
   D. Shut down Unit 1 Main Turbine, shut down Unit 2 Main Turbine.

8. During the performance of a routine valve line up while the unit is in Mode 5, a valve listed as OPEN is discovered to be CLOSED.

   Which ONE of the following describes the correct action to be taken for this valve line up condition?

   A. Since the unit is not in Mode 1 or 2, an entry in the CRO log is required.
   B. Note the valve position in the "discrepancy section" of the coversheet and notify SRO to evaluate.
   C. With concurrence of the CRO, the valve is immediately returned to the recommended position.
   D. An abnormal valve position tag is attached to the valve and the step is signed off as completed.

9. Unit 1 is at 100% power when scheduled maintenance on #11 SG Channel C, 1-PT-1013C, will require this transmitter to be taken out of service. Which safety signals, RPS and ESFAS, are affected by the transmitter inoperability?

   A. Low SG Pressue trip, ASGT(TM/LP) trip and AFW flow to break.
   B. Low SG Pressure trip, SGIS and AFAS Start.
   C. Low SG Pressure trip, ASGT (TM/LP) trip, SGIS and SGIS Block.
   D. Low SG Pressure trip, SGIS and SGIS Block.

10. Given the following:

   * Unit 1 is in Mode 3, RCS Cooldown to Mode 5 in progress
   * RCS pressure is ~2050 PSIA
   * "CHG HDR *FLOW LO *PRESS LO" alarms repeatedly at 1C07

   Which ONE of the following is the proper action, if any, for this condition?

   A. None, start a backup charging pump to increase charging flow to 88 GPM.
   B. Notify CRS, remove alarm card and place a magenta dot on alarm window per NO1-206.
   C. None, shift charging pump and check for proper desurger pressure on the pump discharge.
   D. Notify CRS, remove alarm card and place a blue dot alarm window per NO-1-206.

11. Given the following:
   * CRS directs you to assist with the performance of valve line ups in the Auxiliary Building
   * After SWP review, RCSS discussion and sign in for the EPD, you go to the 27 foot Valve Alley
   * While in the Valve Alley, your EPD alarms continuously

   Which ONE of the following is the required actions and basis for the described condition?
   A. Exit the RCA, report to the Rad Con for evaluation of exceeding dose limit.
   B. Exit the Valve Alley, report to the level RST for evaluation of exceeding dose limit.
   C. Exit the RCA, report to Dosimetry for evaluation of EPD malfunction.
   D. Exit the Valve Alley, report to the level RST for evaluation of EPD malfunction.

12. Given the following:
   * Unit 1 is in Mode 5 with SDC in operation
   * You have been assigned to tag out and drain 11 Charging pump for maintenance
   * Your dose limit is 100 mrem/shift per the SWP
   * Your present accumulated dose is 70 mrem this shift
   * The RST states the expected dose rate in the area is 10 mrem/hr

   Which ONE of the following is the calculated time in the area based on CCNPP Admin limits?
   A. 60 minutes
   B. 90 minutes
   C. 120 minutes
   D. 180 minutes

13. A call is received on the control room emergency phone extension (911) and the caller identifies himself and reports that a worker in the SFP ventilation room was hurt from a load that pinched his hand and it is cut with heavy bleeding.

   The CRS assigns you with making the notification of the appropriate response personnel.

   Which ONE of the following is proper notification, per the ERPIP?
   A. Activate the Emergency recall pager system for recalling the FST.
   B. Sound the emergency alarm for 5 seconds, announce"a personnel emergency exists in the 69 foot Auxiliary Building with a hand injury, Medical department and Decon Team respond". Repeat once.
   C. Activate the Emergency Recall pager system for recalling a BGE Physican.
   D. Sound the emergency alarm for 5 seconds, announce"a personnel emergency exists in the 69 foot SFP ventilation room with a hand injury, First Aid team and Radiation Safety Technician respond". Repeat once.

14. Given the following:
   * Unit 2 has implemented EOP 1 for an uncomplicated trip
   * RO observes that VCT pressure is 4 PSIG and VCT level is at 50 inches
   * RO commences auto makeup to the VCT per OI 2B

   What additional actions are required based on the stated conditions?

   A. Verify Pressurizer heaters are ON to equalize boron .
   B. Notify Chemistry to sample the BASTs.
   C. Start or vent any idle charging pumps.
   D. Add H^2 to the VCT to maintain 10 to 15 PSIG.

15. What is the basis for reducing RCS Tavg to < 500°F if RCS activity limits are exceeded?

   A. Prevent the iodine spiking phenomenon which occurs at NOT.
   B. Lower the saturation pressure of the RCS below the lift setpoint of the ADVs and MSSVs.
   C. Minimize fuel damage.
   D. Ensure unit is in mode 3 to allow chemistry to accurately determine extent of fuel damage.

16. Given the following:
   * Unit 2 is in Mode 3 with Total Loss of Feedwater
   * EOP 3 is implemented, natural circulation has been verified
   * Both SG water levels are -250 inches

   Evaluate the effect on RCS temperatures as SG water level continues to lower during natural circulation but before cooldown commences:

   A. Tave is constant as Th minusTc increases.
   B. Tave will increase as Th and Tc increase.
   C. Tave is constant as Th minus Tc decreases.
   D. Tave will decrease as Th and Tc decrease.

17. A fire has occurred in the control room requiring evacuation. Where will the U-1 RO, U-2 CRS, and OWC (designated STA) proceed to upon "IMMEDIATE" evacuation of the control room per AOP 9A?
Assume U-1 is in Mode 1, U-2 is in a defueled mode, and shift manning requirements are being met per NO-1-200

A. U-1 45 Ft. switchgear room, U-2 45 Ft. switchgear room, and Plant Computer Room on 72 Ft.

B. U-2 45 Ft. switchgear room, U-1 45 Ft. switchgear room, and U-1 45 Ft. switchgear room.

C. U-1 Main Turbine front standard, U-2 45 Ft. switchgear room, and U-1 45 Ft. switchgear room.

D. U-1 45 Ft. switchgear room, U-2 45 Ft. switchgear room, and Fire Brigade Locker.

18. Given the following:
* Unit 2 is in Mode 3 with a SG Tube Rupture event in progress
* EOP 6 is implemented
* RCS is at NOT and NOP

Which ONE of the following is the basis to commence RCS boration prior to lowering RCS temperature below 515°F?

A. Ensures SIAS has initiated properly before the affected SG is isolated.

B. Ensures SDM requirements and to compensate for backfill.

C. Ensures the assumed uncontrolled cooldown at 515°F keeps the core subcritical.

D. Ensures RCP trip strategy does not result in diluted areas of RCS.

19. Given the following:
* Unit 1 has tripped and EOP 0 has been completed
* EOP 3 has been diagnosed and implemented
* The CRS directs that the RCPs to be tripped

Which one of the following is the reason for tripping all reactor coolant pumps?

A. Prevents RCP cavitation when the RCS reaches saturation conditions from rapid cooldown to Condensate Booster pump injection.

B. Reduces RCP heat input to the RCS, increasing the SG water inventory effectiveness.

C. Minimizes RCP seal damage from SIAS isolating bleed off flow to VCT.

D. Reduces RCP motor damage from steam when once-through core cooling is initiated

20. Given the following:
    * Unit 2 is at EOC and at 85% power and steady
    * Regulating Group 5 CEAs are at ~125 inches
    * System Engineer discovers and reports Regulating Group 5 CEA #1 is untrippable
    * AOP 1B is implemented and a rapid power reduction per OP 3 is commenced

    Determine the effect of plant transient on the axial power distribution:
    A. As Reactor power is decreased, axial power will shift towards the upper region of the core.
    B. As Reactor power is decreased, axial power will shift towards the lower region of the core.
    C. As Reactor power is decreased, axial power will not change towards either upper or lower region of the core.
    D. As Reactor power is decreased, axial power will initially shift to the lower region then shift to the upper region.

21. Given the following:
    * Unit 1 is at 100% power
    * "RCP AUXILIARIES STATUS PANEL" alarms
    * "CCW FLOW LO" alarms
    * RO reports increasing temperatures on all RCPs from the plant computer trends
    * CRO reports that a CC Containment Cooling isolation CV is SHUT

    Which ONE of the following may result in component damage?
    A. RCP Controlled Bleedoff temperature of 225°F.
    B. RCP Upper Guide bearing temperature of 190°F.
    C. RCP Downward Thrust bearing temperature of 190°F.
    D. RCP Seal cavity temperature of 195°F.

22. A loss of condenser vacuum occurred on Unit 1 with reactor power at 60%. The operators are reducing power and are able to maintain condenser vacuum at 24 inches Hg.

    Which ONE of the following indicates the power level at which the turbine will have to be tripped if vacuum can NOT be increased to greater than 25 inches Hg?
    A. 88 MWE
    B. 176 MWE
    C. 270 MWE
    D. 440 MWE

23. Given the following:

* Unit 1 is in Mode 4 with heatup to 532°F in progress
* The ABO performing a Containment tour reports the Personnel Airlock interlock mechanism is broken.

Determine the immediate action required based on plant conditions:

A. Direct the ABO to lock the inner Personnel Airlock door and remain in the area until a guard is posted.
B. Direct the ABO to verify a Personnel Airlock door is SHUT and maintain one door shut during ingress/egress.
C. Notify the CRS for an operability determination per the Technical Requirements Manual.
D. Notify the CRS for an operability determination per NO-1-114 (Containment Closure)

24. Given the following:

* Unit 1 and 2 are in Mode 5
* Unit 1 and 2 Salt Water Systems are lined up on the Emergency Overboard

Which ONE of the following describes how the minimum/maximum flow requirements for the applicable Salt Water pumps are met?

A. Unit 1 automatic operation of 12A/B SRW HX bypass valve, Unit 2 by manual throttling of 22 or 23 SW pump discharge valve.
B. Unit 1 automatic operation of 11A/B SRW HX bypass valve, Unit 2 by manual throttling of 21 or 23 SW pump discharge valve.
C. Unit 1 automatic operation of 12A/B SRW HX bypass valve, Unit 2 by manual throttling of Emergency Overboard Control Valve.
D. Unit 1 automatic operation of 11A/B SRW HX bypass valve, Unit 2 by preset throttling by the Emergency Overboard header orifice.

25. Unit 1 is in Mode 1. AFAS Sensor Channel "ZE" has been de-energized for maintenance per the OI. While the maintenance is ongoing, a loss of 120V Vital AC Bus 13 occurs. What best describes the response of AFAS?

A. No effect on system operation other than alarms.
B. AFAS "A" and AFAS "B" actuation occurs.
C. Only AFAS "A" actuation occurs.
D. Sensor logic is reduced to 1 out of 2 to generate an AFAS.

26. Select the statement that describes the operation of the pressurizer heaters from 1(2)C43:

A. Heaters trip 10 minutes after pressurizer level drops below 101" as associated time delay dropout relay actuates.

B. Pressurizer level must be raised above 101" initially to reset low level cutout relay and energize heaters when placing keyswitch in LOCAL at 1(2)C43.

C. Operator secures the heaters when pressurizer level drops below 101".

D. Heaters trip on pressurizer low level cutout below 101" as indicated on 1(2)C43.

27. Given the following:

* Unit 1 is at MOC and 100% power
* Unit 1 trips due loss of Offsite power
* Unit 2 is at MOC and 100% power
* Unit 2 trips due to a seized rotor on 21A RCP

Evaluate the effect, if any, on each Unit from the described transients:

A. Unit 1 DNB limits are approached more closely compared to the Unit 2 transient effects.

B. Unit 2 DNB limits are approached more closely compared to the Unit 1 transient effects.

C. Unit 1 and Unit 2 DNB limits are approached equally for each transient.

D. Unit 1 and Unit 2 DNB limits are not approached due the automatic RPS trip action for each Unit.

28. Which one of the following is the basis for maintaining a maximum of 140°F subcooled margin during EOP-5 implementation?

A. prevent a pressurized thermal shock event occurrence

B. minimize pressure across the break thereby reducing the leak rate

C. prevent RCS pressure from increasing to the PORV setpoint

D. maintain an adequate amount of subcooled fluid to remove decay heat

29. Given the following:

* A loss of Offsite power has occurred
* Unit 1 has implemented EOP 7

Which one of the following conditions must be met to allow transition to the next appropriate procedure for Unit 1?

A. Energizing any 4 KV bus and associated load centers.

B. Completing the SFSC final acceptance criteria in EOP 7.

C. TSC determination that sufficient battery capacity exists.

D. Emergency boration has been completed for Mode 5 entry.

30. The plant is at 100% power when a large excess steam demand event occurs. Which of the following RPS and/or ESFAS signals actuates first to prevent violations of DNB or the exceeding of SAFDLs?

A. Low pressurizer pressure

B. High containment pressure

C. Low steam generator pressure

D. Low S/G Level Trip

31. Given the following:

* Unit 1 had a loss of MFW which resulted in a automatic reactor trip
* Both SG levels are ~ -100" when MFW capability is restored in EOP 0

Select the reason for AFW to be used to restore SG levels to ~0":

A. Prevent a severe water hammer which may occur in the main feed ring.

B. AFW will fill the SGs slower which limits the cooldown of the RCS.

C. MFW can result in an overfeed condition which is a reactivity concern.

D. Prevent a thermal shock to the SG tube sheet to ensure tube integrity.

32. Five (5) minutes following a reactor trip from 100% power, all RCPs were tripped. The following conditions exist during EOP 0 implementation:

- Thot is 547 F and lowering
- Tcold is 534 F and lowering
- RCS pressure is 2050 PSIA and slowly rising

What response would the operator observe on the panel for the ADVs and TBVs with these plant conditions ?

	ADVs	TBVs
A.	Full Shut	Modulated Open
B.	Full Open	Full Open
C.	Modulated Open	Modulated Open
D.	Modulated Open	Full Shut

33. The pressure band of 1850 to 2300 PSIA per EOP-0 is based on the following:

A. Ensuring adequate NPSH for operating RCPs is maintained for all non-LOCA conditions to prevent lifting of SG safety valves.

B. Ensuring RCS fluid is maintained in a subcooled condition following a LOCA for adequate heat removal and time for HPSI injection after a trip from > 85% power.

C. Ensuring single phase flow continues and SGs are available for heat removal (under flow and no-flow conditions) for an uncomplicated "standard" reactor trip.

D. Ensuring adequate RCS subcooling and preventing lifting a primary relief or safety valve and representing the values for an uncomplicated "standard" reactor trip.

34. A SG tube rupture event has occurred with both RVLMS inoperable. Which condition indicates the presence of a void in the RCS?

A. Unexplained rapid increase in PZR level.

B. PZR level steady and subcooled margin of 50°F using CETs.

C. Charging flow greater than letdown flow.

D. Unexplained rapid decrease in PZR level

35. Given the following:

* Unit 2 has tripped and EOP 6 (SG Tube Rupture) has been implemented
* 21A and 22B RCPS are running
* RCS Pressure is ~1050 PSIA and slowly lowering
* RCS Subcooling is 36°F and steady
* Pressurizer level is 105" and rising
* 22 SG is removing heat from the RCS
* RVLMS lights are out

Select the required action based on plant conditions:

A. Depressurize the RCS to minimize the d/p with the affected SG.

B. Commence RCS Boration to ensure SDM is met during current backfill from the affected SG.

C. Commence RCS cooldown to isolate the unaffected SG.

D. Commence HPSI termination to prevent a solid pressurizer and RCS repressurization.

36. Given the following:

* Unit 1 has tripped and EOP 5 has been subsequently implemented
* RCS pressure is 1720 PSIA and slowly lowering
* RCS Tc is 527°F and slowly lowering
* Containment pressure is 1.0 PSIG and slowly rising

Select the required actions for the plant conditions:

A. Verify SIAS actuation based on containment environment safety function.

B. Verify SIAS actuation with a minimum of 345 GPM HPSI flow.

C. Implement RCP trip strategy with 11A and 12A RCPs running.

D. Implement RCP trip strategy with 11B and 12A RCPs running.

37. Given the following:
* Unit 1 is at 100% power
* Liquid Waste discharge is in progress to Unit 1 Circulating Water
* RO is preparing to make up the RWT due to "11 RWT-LEVEL-TEMP" alarm
    * CRO reports 11 RWT level is decreasing
* ABO reports that "11 REFUEL WTR STORAGE AREA SUMP LEVEL HI" alarm at 1C63

Which ONE of the following is the proper action for the described conditions?

A. Implement AOP 6B (Accidental Release of Radioactive Liquid Waste) due to the Liquid Waste Discharge in progress.
B. Implement AOP 6B (Accidental Release of Radioactive Liquid Release) due to the RWT level change.
C. Direct the ABO to investigate the Liquid Waste Discharge line up.
D. Direct the ABO to investigate the RWT makeup line up.

38. Given the following:
* CRS observes 2 out of 4 RPS trip logic for RCS flow tripped with no protective channel trip alarm on Unit 1
* RO observes Reactor power is at 100% at 1C05
* EOP 0 is implemented by the crew
* RO observes prompt drop in NI power and negative SUR while performing his IMMEDIATE ACTIONS for Reactivity Safety Function

Which ONE of the following was the method used to respond to the ATWS event?

A. Deenergizing 11A and 14A 480 Volt busses.
B. Deenergizing 12B and 13B 480 volt busses.
C. Depressing Reactor Trip buttons at 1C05.
D. Emergency Boration with all available Charging pumps.

39. Given the following:
* Unit 1 Reactor startup in progress after Refueling Outage per applicable PSTP and OP-2
* All Shutdown groups are fully withdrawn
* RO has completed his first 30 inch CEA pull on Regulating group 1
* RO observes that Regulating Group 1 primary and secondary CEA position indication are increasing

What actions are required for the existing plant conditions?

A. Insert group 1 CEAs to stop the outward motion per OP 2.
B. Place the CEDS Control Panel in OFF and implement AOP 1B.
C. Emergency borate with all available Charging pumps per PSTP.
D. Commence a reactor shutdown by inserting all CEAs per OI 42.

40. Given the following:
- 2 CEAs have dropped into the core
- Pressurizer level decreases to ~195 inches
- Reactor power decreases from 100% to ~85%
- RCS Pressure decreases to ~2225 PSIA

Which ONE of the following is the action required per AOP?

A. Trip the Reactor and perform Standard Post Trip Actions.
B. Reduce Turbine load to match Reactor power.
C. Commence a Reactor shutdown to subcritical.
D. Reduce Reactor power to less than 70%.

41. Which one of the following describes the design basis core heat removal process during a large break LOCA?

A. HPSI injection provides makeup and heat is removed via natural circulation flow to the S/Gs
B. HPSI pumps, LPSI pumps and the SITs provide makeup and heat is removed via flow out the break
C. LPSI pumps and the SITs provide makeup and heat is removed via forced flow to the S/Gs
D. HPSI pumps and CS pumps provide makeup and heat is removed via flow out the break

42. The Unit is operating at 80% power when steam demand is increased by 5% due to a turbine bypass valve failing open. How will the Pressurizer spray valves and heaters initially respond?

A. Spray valves shut, heaters energized in auto control.
B. Spray valves shut, heater off.
C. Spray valves open, heaters energized in auto control.
D. Spray valves open, heaters off.

43. Given the following:
* Unit 1 and 2 at 100% power
* "RMS PANEL" alarms at 1C17
* CRO reports that area rad monitor "UNIT 1 SAMPLE RM" is in alarm
* RO reports the VCT level trend indicates an increased leak rate

Which ONE of the following is the correct sequence of the alarm response actions for these plant conditions?

A. Notify Rad Safety to perform an area survey, evacuate the immediate area, have Chemistry check sample sink isolation valves shut.
B. Contact Chemistry to check sample sink isolation valves shut, evacuate the immediate area and have Rad Safety perform an area survey.
C. Notify Rad Safety to update the area survey map, evacuate the immediate area, have Chemistry check sample sink isolation valves shut.
D. Contact Chemistry to check sample sink isolation valves shut, evacuate the immediate area, and have Rad Safety update the area survey map.

44. Given the following:
* Unit 2 has tripped and EOP 0 implemented
* EOP 0 Safety functions completed were:
  * Reactivity
  * Vital Auxiliaries
  * Rad Level External to Containment
  * All other Safety Functions were not met
* CRS directs implementation of the Functional Recovery Procedure EOP 8

Which ONE of the following is the appropriate implementation method for EOP 8?

A. Evaluate PIC, HR and CE Safety functions success paths in order as a minimum.
B. Evaluate All Safety functions success paths in any order as directed by the CRS.
C. Evaluate HR, PIC and CE Safety functions success paths in order as a minimum.
D. Evaluate recommended safety function success paths based on STA input.

45. While operating U-2 at 100% power, a loss of 125 vdc bus #11occurs. Which one of the following actions, if any, must be taken to ensure a reactor/turbine trip?

A. No actions are required as the loss of this bus does not affect automatic tripping of the turbine/reactor.
B. The turbine must be manually tripped at 2C02 at the same time the reactor is manually tripped from 2C05.
C. The turbine must be tripped from the front standard at the same time the reactor is tripped from 2C05.
D. The turbine must be tripped from the cable spreading room at the same time the reactor is tripped from 2C05.

46. Given the following:
* Unit-1 is in Mode 5
* #11 LPSI pump is in service providing shutdown cooling.
* The shutdown cooling return valves are open.
* The RCS is being drained below the midplane of the hot legs for maintenance.
* 11 LPSI pump amps, discharge pressure and flow are fluctuating.

Which one of the following actions should be taken in this situation?
A. Secure draining of the RCS and raise vessel level until LPSI pump flow comes back up.
B. Place the LPSI pumps in pull-to-lock, drain the vessel to the desired level, then restart a LPSI pump.
C. Stop the running LPSI pump and place in pull-to-lock.Secure draining and raise reactor vessel level.Vent and restart a LPSI pump.
D. Stop the running LPSI pump, secure draining the RCS and start the standby LPSI pump.

47. Given the following:
* Unit 2 is in Mode 6 with refueling in progress, core on load is complete
* CEA swaps are being performed per the applicable fuel handling procedure
* RCRO observes that Channel A and B WRNI indicate steady at 10 CPS and Channel C WRNI indicates ~1 CPS and decreasing after a Shutdown CEA insertion

What response is required, if any, to the plant conditions?

A. Channel A and B WRNI are inoperable, notify the CRS.
B. Channel A and B WRNI are operable, no action is needed.
C. Channel C WRNI is seeing the effect of the Shutdown CEA insertion.
D. Channel C WRNI has failed, notify the FHS and NFM.

48. An RCS leak has resulted in implementing AOP-2A (Excess RCS Leakage). What direction from the CRS is provided when RCS leakage exceeds TS 3.4.13 but is within the capacity of one charging pump?

Assume the initial actions to locate the source of leakage has commenced.
A. Evaluate operation of the plant with letdown isolated and operate charging pumps not to exceed a pressurizer level of 225".
B. Commence a plant shutdown to COLD SHUTDOWN per OP-3, OP-4, and OP-5.
C. If PZR level cannot be maintained within 15 inches of program level, then trip the reactor and implement EOP-0.
D. Trip the reactor when RCS pressure drops below 2200 PSIA.

49. During a pre job brief for a planned Transfer Cask operation (to be moved from the SFP to the cask washdown pit), a review of AOP 6D is performed. It was noted that dropping the Transfer Cask may spill fuel bundles in the Auxiliary Building causing high radiation levels (according to AOP 6D).

Which ONE of the following describes the purpose for the warning in AOP 6D?

A. The Transfer Cask as it is being removed from the SFP is very close to the load limit for the crane until the cask is dewatered in the Cask washdown pit.
B. The Transfer Cask operation can take it over the New Fuel Storage area where a dropped Cask will damage new fuel.
C. The Transfer Cask lid may not retain the spent fuel in the Transfer Cask until placed in the Cask washdown pit.
D. The Transfer Cask operation can take it over areas where damage is possible to ESFAS piping and components.

50. Which one of the following describes the reason for an assessment of secondary water sources to be performed in EOP 2 when offsite power will not be promptly restored?

A. Tech Spec Action statement for 12 CST may need to be entered.
B. Condensate inventory dictates how long a plant cooldown can be delayed.
C. Tech Spec Action statement for AFW system may need to be entered.
D. Condensate inventory is used to determine whether TBVs or ADVs will be used for cooldown.

51. Given the following:

* Reactor startup in progress per OP-2
* Core is at MOC

Select the event that is expected to cause the actual CEA position at criticality to be lower than the calculated position from the Estimated Critical Condition (ECC):

A. The TBV controller setpoint is manually adjusted to 950 PSIA
B. Both steam generator levels are raised by 25 inches with AFW flow
C. The pressurizer pressure controller malfunctions to lower RCS pressure to 2000 PSIA
D. A loss of gland sealing steam results in condenser vacuum dropping to 17"Hg

52. Given the following:

* Unit 1 is at 100% power
* 12 Charging pump is running with 11 and 13 Charging pumps in standby
* a loss of 208/120 Volt Instrument bus 12 (1Y10) occurs

Which ONE of the following describes the effect the loss of the instrument bus will have on charging pump operation?

A. 12 Charging pump trips on low suction, 11 and 13 start as backup pumps.
B. 11 and 13 Charging pumps start with 12 Charging pump running.
C. Charging pump suction shifts to the BAST's via gravity feeds.
D. Loss of suction to charging pumps due to 1-CVC-501-CV (VCT Outlet) shutting.

53. The "Containment Pressure Transmitters Isolated" alarm has annunciated on 1C08 due to 1-HS-5313A in the shut position. Which 3 ESFAS signals are potentially affected?

A. SGIS, CSAS, SIAS

B. CVCIS, CSAS, CIS

C. SIAS, SGIS, CIS

D. CIS, CSAS, SIAS

54. Following a U-1 turbine trip, what is the response of the Main Feed Valves (MFVs)? **Assume reactor power is at 12% when turbine trips**

A. MFVs ramp shut at specified rate for 20 seconds and then contact is opened and MFVs shut fully.

B. The Controller output signal is initially grounded to shut MFVs and after 20 seconds contact opens and MFVs shut fully.

C. Controller output signal goes to maximum to open BFVs fully as steam flow is reduced when main stop valves shut.

D. MFVs remain shut with a -5.0 % demand signal and BFVs continue to operate to control SG levels.

55. Given the following:

* Unit 2 is at 95% power
* #22 125 Volt Vital AC Bus is lost due to a ground fault
* EM has determined that the ground was in the Linear Range NI cabinet
* The affected Linear Range NI is electrically isolated
* #22 125 Volt Vital AC Bus is restored

Which ONE of the following is the expected effect from the deenergized Linear Range NI cabinet?

A. Channel B RPS Trip Units tripped for Hi power, TM/LP and APD.

B. Channel B RPS Trip Units tripped for Hi power, SUR, TM/LP and APD.

C. Channel B RPS Trip Units tripped for Hi power, TM/LP, APD and loss of 1C05 indication.

D. Channel B RPS Trip Units tripped for Hi power, SUR, TM/LP and loss of 1C05 indication

56. Given the following:
- #12 waste gas decay tank release through the U-1 plant vent in progress
- Waste Gas discharge radiation monitor (RI-2191) alarms

Which valve must be manually shut to prevent a possible waste gas decay tank discharge to the waste gas surge tank?
A. Waste gas discharge isolation (WGS-2191-CV)
B. Waste gas discharge to Unit 1 plant vent (WGS-683)
C. Waste gas discharge pressure control (WGS-2191-PCV)
D. Waste gas discharge final filter bypass (WGS-630)

57. The RCSS reports to the control room and describes a high rad material move from 45 foot truck loading area to the Unit 1 45 foot east penetration room.

Which of the following Area RMS alarm would be expected at 1C22 based on the movement path?
A. "UNIT 1 CC".
B. "DRUM STORAGE RM"
C. "UNIT 1 S/G B/D TK AREA"
D. "MISC WASTE EVAP RM"

58. The CRS directs you to perform the check source of RMS per OI 35.

Which of the following RMS should NOT have the "check source" test performed per OI 35 due to automatic functions?
A. SFP Platform RI-7025
B. CAR Discharge RI-1752
C. Containment ICI RI-7008
D. Liquid Waste RI-2201

59. Which condition below would cause the AFAS NO FLOW alarm to initiate?
A. AFW flow 60 gpm, 60 seconds after an AFAS START signal.
B. AFW flow 90 gpm, 60 seconds after an AFAS START signal.
C. AFW flow 60 gpm, 30 seconds after an AFAS START signal.
D. AFW flow 90 gpm, 30 seconds after an AFAS START signal.

60. Given the following:
    * Loss of Offsite power has occurred
    * Unit 1 tripped and no DGs are available
    * Unit 2 tripped and 2A and 2B DGs are supplying power

Which one of the following describes the operation of AFW flow control valves on Unit 1?

A. Override Open the steam driven train block valves for both SGs at 1C43 .

B. Align N^2 to the AFW amplifier air system to maintain operation from the control room.

C. Direct the ABO to adjust local handwheel and observe local flow indicator for response.

D. Place the output signal on controllers at 1C43 to 100% value to maintain operation from the control room.

61. Given the following:
    * Unit 2 is at 65%
    * 21 and 22 Condensate pumps are running
    * 23 Condensate pump is in standby
    * 21 Condensate pump mechanically seizes, 23 Condensate pump starts

Which ONE of the following is the design feature that resulted in the auto start:

A. 21 Condensate Pump low discharge pressure at 150 PSIG.

B. Main Feedwater Suction header pressure at or below 220 psig.

C. Condensate Header discharge pressure at 175 psig.

D. Condensate Booster Pump Suction pressure at or below 20 psig.

62. Using provided reference:

Unit 1 is in Mode 1 and #11 SRW HDR is OOS for maintenance. What effect, if any, does this have on the operability of the Containment Spray and Air Cooling System if #12 Containment Spray Pump is declared OOS?

A. No effect, both Containment Cooling trains of the Containment Air Cooling system remain operable.

B. The inoperable Containment Cooling train must be restored to operable status within 10 days.

C. The inoperable Containment Spray train must be restored to operable status within 72 hours.

D. The inoperable Containment Spray train must be restored to operable status within seven (7) days.

63. What ESFAS actuation(s) based on plant parameters and circuit logic are required to automatically initiate Containment Spray flow?

A. Containment pressure of 2.8 PSIG for SIAS OR containment pressure of 4.25 PSIG for CSAS.

B. RCS pressure of 1725 PSIA for SIAS AND containment pressure of 2.8 PSIG for CSAS.

C. RCS pressure of 1725 PSIA for SIAS OR containment pressure of 4.25 PSIG for CSAS.

D. Containment pressure of 2.8 PSIG for SIAS AND containment pressure of 4.25 PSIG for CSAS.

64. When subcritical in Mode 2, adequate SHUTDOWN MARGIN is determined by:

A. Verifying that CEA Shutdown Group withdrawal is in the correct sequence.

B. Verifying that the predicted critical CEA position is within the INSERTION limits of TS 3.1.6

C. Verifying that RCS boron concentration is sufficient to maintain the SHUTDOWN MARGIN requirements of TS 3.1.1

D. Verifying that CEA Regulating Group withdrawal is in the correct sequence.

65. Given the following:

- Unit 2 at EOC and power reduced to 95% power for waterbox cleaning one hour ago
- Regulating Group 5 CEAs were moved out one step to 129 inches for ASI control
- Condenser Water Box cleaning has started and the first waterbox has been returned to service
- 21 CVCS Ion exchanger has been filled with new resin and placed in service
- RO observes RCS temperatures trending upwards for several minutes

Which ONE of the following would explain the change in RCS temperatures?:

A. Xenon decay from the power reduction for water box cleaning.

B. Starting the Circulating Water pump with clean waterbox.

C. Placing an 21 CVCS Ion Exchanger in service.

D. Group 5 CEA movement to control the ASI.

66. During recovery from a LOCA on Unit 2, you are directed by the U-2 CRS to reset SIAS from the control room using the EOP procedure. Containment pressure is 2.0 PSIG and Pressurizer pressure is 800 PSIA.

Which ONE of the following is the sequence to properly complete this action?

A. Match required handswitches, block PZR Pressure SIAS, and depress both SIAS channel reset pushbuttons.

B. Block PZR Pressure SIAS and depress either SIAS channel reset pushbuttons.

C. Match required handswitches and depress both SIAS channel reset pushbuttons.

D. Block the PZR Pressure SIAS and depress both SIAS channel reset pushbuttons.

67. While operating in mode 3 on natural circulation, how many CETs should be read as a minimum to ensure consistency with Th?

A. One per quadrant

B. Two per quadrant

C. Two

D. One

68. Given the following:

* Unit 1 is at 100%
* Unit 2 is in Mode 3 heating up to 532°F
* 21 Degasifier vacuum pump accumulator level control is erratic
* ABO is filling the Degasifier vacuum pump accumulator per OI 17C -1

Which ONE of the following is the result, if any, of opening the level transmitter vent to atmosphere during the accumulator fill?

A. No effect since the accumulator discharges directly to Main Vent via Aux building ventilation.

B. Release of radioactive gases from the Waste Gas Surge Tank through the accumulator vent.

C. Release of water from the accumulator during vacuum pump startup during Unit 1 diversion.

D. Release of water from the accumulator during vacuum pump startup during Unit 2 diversion.

69. Given the following:

* Unit 2 is defueled
* Instrument Air is tagged out for LLRT testing
* 2-SI-4150-CV and 2-SI-4151-CV indicate OPEN
* Both CS pumps are in PTL
* Safety Tagger calls the control room to notify that he will be tagging out and draining Component Cooling to the RCPs
* Shortly thereafter, "CNTMT NORMAL SUMP LVL HI" alarms at 2C10

Which ONE of the following is the correct operator actions per OI 17D for the conditions?

A. Ensure an Operator is stationed in 21 ECCS Pump Room, drain the containment sump using EAD 5462 until drained, shut EAD 5462.

B. Verify 21 ECCS Pp Rm sump pumps in AUTO, drain the containment sump using EAD 5462 and 5463 for at least 5 seconds, shut EAD 5462 and 5463.

C. Ensure an Operator is stationed in 22 ECCS Pump Room, drain the containment sump using EAD 5463 until drained, shut EAD 5463.

D. Verify 22 ECCS Pp Rm sump pumps in AUTO, drain the containment sump using EAD 5462 and 5463 for at least 5 seconds, shut EAD 5462 and 5463.

70. Given the following:
   * Unit 1 has tripped and EOP 0 is implemented
   * "ACTUATION SYS SGIS TRIP" and "ACTUATION SYS CSAS TRIP" alarms annunciate at 1C08

   Select the plant components that receive both a SGIS and CSAS signals from ESFAS.
   A. Condensate pumps, Condensate Booster pumps, Heater Drain pumps and MSIVs.
   B. Heater Drain pumps, SGFPs, MFIVs, and MSIVs.
   C. SGFPs, CS pumps, SG Blowdown CVs, and MSIVs.
   D. Condensate Booster pumps, SG Blowdown CVs, MFIVs, and SGFPs.

71. Which of the following occurs on a loss of high voltage power supply to the LRNIs?
   A. HV bistable trip
   B. Power On light goes off
   C. Channel fails to 200%
   D. Actuation of the 15 VDC interlock

72. Given the following:
   * Unit 1 is in Mode 5 with RCS temperature at 125°F
   * Shutdown Cooling has been secured for plant heatup
   * RCS pressure has been raised to 300 PSIA for RCP start
   * Pressurizer level at 170 inches
   * Preparing to start 11A and 11B RCPs for plant heatup
   * ABO reports that 11 and 12 SG temperatures are 165°F
   * RCP portion of the LTOP Tagout is cleared

   Which ONE of the following describes the plant response to starting the first RCP based on stated conditions?
   A. RCS pressure will increase, the Pzr Safeties will open from the RCS pressure surge.
   B. RCS pressure will decrease, the Pzr Backup heaters will automatically energize.
   C. RCS pressure will increase, PORVs will open from the RCS pressure surge.
   D. RCS pressure will decrease, PZR Proportional heaters will automatically increase their output.

73. What are the oxygen and curie content limits for the waste gas decay tanks?
   A. Oxygen 4% by volume, 58,500 Curies of noble gas
   B. Oxygen 4% by weight, 53,500 Curies of noble gas
   C. Oxygen 6% by volume, 58,500 Curies of noble gas
   D. Oxygen 6% by weight, 53,500 Curies of noble gas

74. Using provided reference:

U-1 is at full power when the reactor automatically trips and SIAS actuates. Upon completion of EOP-0 it is determined that a LOCA has occurred. Approximately 10 minutes have elapsed since the event began. RCS pressure has stabilized at 950 PSIA. Actuation of RAS is not imminent.

What is expected HPSI flow in each HPSI injection path assuming SI operates properly and HPSI flow is balanced?

A. 110 gpm
B. 220 gpm
C. 435 gpm
D. 880 gpm

75. Given the following:

* Unit 1 and 2 are at 100% power
* "0C DG" alarms at 1C19
* The CRO directs the OSO respond to the alarm
* OSO reports that "STARTING AIR PRESS LO" alarmed at 0C188 and the indication lights for the compressor handswitch at 0C188 are deenergized.
* The OSO reports the compressor motor appears normal by touch and smell

Which ONE of the following is the correct action?

A. Direct the OSO to investigate the breaker trip status at MCC 023.
B. Direct the OSO to investigate the breaker trip status at 07 480 Volt Load Center.
C. Direct the OSO to investigate the breaker trip status at 17 480 Volt Load Center.
D. Direct the OSO to investigate the breaker trip status at MCC 123.

76. Which statement describes the basis for the Axial Power Distribution Trip?

A. DNB and peak linear heat rate will not be exceeded.
B. DNB SAFDL of 1.25 is not exceeded.
C. Tech Spec license power limit will not be exceeded.
D. Asymterical Steam Generator limits are not exceeded .

77. Given the following:
   * Unit 2 has tripped and EOP 5 (LOCA) has been implemented
   * RCS Pressure is ~800 PSIA
   * SIAS, CSAS and CIS have been verified
   * Containment Pressure is at 3.8 PSIG and lowering

   What conditions per the EOP are required to secure Containment Spray?
   A. Containment Pressure is maintained <2.8 PSIG by CS flow and SIAS has been RESET .
   B. Containment Temperature is maintained <120^{0}F by CACs and SIAS has been RESET.
   C. Containment Pressure is maintained <2.8 PSIG by CS flow and SIAS and CSAS have been RESET.
   D. Containment Temperature is maintained <120^{0}F by CACs and SIAS and CSAS have been RESET.

78. Using the provided reference:

   Given the following:
   * Unit is at 97% with Regulating Group 5 CEAs at 110 inches for NFM testing
   * RO observes a difference of 10 inches between the primary and secondary CEA position indications for all Group 5 CEAs
   * Initial diagnosis is the primary CEA position indication may be inoperable and the TRM is reviewed by the operators

   Which ONE of the following is the expected effect of this condition?
   A. Implement Nonconformance A by contingency measure A.2.1 of the TRM.
   B. Implement Nonconformance B by contingency measure B.1 of the TRM.
   C. Implement Nonconformance A by contingency measure A.1 of the TRM.
   D. Implement Nonconformance C by contingency measure C.1 of the TRM.

79. 1A DG is running under load during periodic testing and is paralleled to 4KV bus 11-17.

   What is the DG response to a loss of offsite power?
   A. DG output breaker, 152-1703, will remain closed, repower all required loads, and continue to supply power to loads on 4KV bus 17.
   B. DG output breaker, 152-1703, will remain closed, attempt to pick up the required loads and trip on overcurrent.
   C. DG output breaker, 152-1703, will trip open and remain open until the synch stick is inserted and manually closed by the operator.
   D. DG output breaker, 152-1703, will trip open and automatically reclose on 4KV bus 17 with normal and alternate feeders open to 4 KV Bus 11.

80. Given the following:
- Unit 2 is in Mode 5
- Preparations for drawing a Main Condenser vacuum were completed by the previous shift
- CRO starts all 4 CARs
- Shortly thereafter the CRO observes indication of all 4 CARs tripped on 1C13
- TBO reports that all 4 CAR shell stops isolation valves are OPEN and all 4 CAR breakers have tripped on overcurrent and have been reset

Which ONE of the following is the correct action for the condition?

A. Restart one CAR, wait for Condenser vacuum to reach ~20 inches Hg, start the last 3 CARs.
B. Direct the TBO to throttle all CAR Shell Stop valves to ~25% OPEN, restart CARs
C. Direct the TBO to throttle 2 CAR Shell Stop valves to ~25% OPEN, restart the applicable CARs.
D. Restart 2 CARs, wait for condenser vacuum to reach~ 20 inches Hg, start the last 2 CARs.

81. Which instrumentation must be operable to ensure the Containment Purge System will be automatically secured should a fuel handling incident occur inside containment?

A. Containment High Range Monitors (RE-5317 A/B)
B. Containment Area Radiation Monitors (RE-5316 A/B/C/D)
C. Main Vent Gaseous Monitor (RE-5415)
D. Wide Range Noble Gas Monitor (RIC-5415)

82. An electrical transient has occurred and the following indications are observed at 1C24A:

- 1Y02 is deenergized
- 2Y02 is deenergized

Which one of the following buses has been lost?

A. 120 VAC vital bus #12
B. 120 VAC vital bus #22
C. 125 VDC vital bus #21
D. 125 VDC vital bus #11

83. A recent change to the operation of the 1A DG requires the operator to verify load is greater than the unloaded value to minimize carbon buildup in the cylinders. When the DG is operating in the unloaded range what action is required when this condition is present?

A. An alarm appears on the plant computer CRT near CRO's desk and a cleanout run of at least 2000 KW for 2 hours should be performed.

B. A control room alarm is received informing the operator that DG is below minimum load and loads should be started within 8 hours to achieve $\geq$ 1620 KW.

C. Close monitoring by the CRO ensures unloaded operation of the DG does not exceed 8 hours; if time limit is exceeded, the engine is shutdown and inspected.

D. A control room alarm is received and as long as the time does not exceed 12 hours no further action is required.

84. Given the following:

* Unit 1 is at 100% power
* IAS 3.7.3 for 13 AFW pump OOS
* Unit 2 is in Mode 5 for planned outage
* Attachment 6 (MEEL) completed for Conduct of Lower Mode Operations with Pressurizer Manway removed

The OWC notifies the Unit 2 control room that 23 AFW pump is to be tagged out for 2 weeks for scheduled maintenance

Which ONE of the following describes the effect this tagout?

A. Unit 1 is effected due to Tech Spec requirements for AFW.

B. Unit 2 is effected due to Tech Spec requirements for AFW.

C. Unit 1 will be losing an Appendix R redundant component

D. Unit 2 will be losing an Appendix R redundant component.

85. Which ONE of the following describes what normally starts to shift the Full Range Digital Feedwater Control System to the High Power Mode of operation during plant startup?

A. When the High Power Mode button is depressed.

B. When the average of Reactor Reg Channels X and Y indicate greater than or equal to 17% power.

C. When reactor power has been greater than or equal to 19% power for 5 minutes.

D. When the average of the Wide Range NI channels A thru D indicate greater than 15% power.

86. Given the following:

* Unit 1 heatup in progress per OP 1
* RCS Tc is 450°F
* RCS Pressure is 1750 PSIA
* Panel 1T22 MS Line Drain handswitches are in the NORMAL operating position per the valve lineup

Describe the actions and effect, if any, with the drain valves in the NORMAL position:

A. None, this is the expected position of the drain valves at 1T22 for plant heatup
B. Place drain valves in the STARTUP position to minimize corrosion from air/non-condensible gases
C. OPEN MS Line drain valves (1-HS-6622) at 1C02 to continue heatup
D. Place drain valves in the STARTUP position to prevent steam/water hammers

87. Given the following:

* Unit 1 is at 65% and increasing to 100%
* "RADIATION MONITOR LEVEL HI" alarms at 1C07
* Letdown flow is adjusted per the appropriate AOP
* Reactor power is stabilized at 67% power
* Chemistry reports that the RCS specific activity has stabilized below the chemistry action level 1 for Tech Spec 3.4.15

Which ONE of the following is the action taken and the response of the Process Radiation Monitor to the letdown flow adjustment over the next few days?

A. Letdown flow is increased in conjunction with the purification IX lineup to obtain maximum purification flow resulting in decreasing activity level on the monitor.
B. Letdown flow is reduced to minimum to allow Rad Con surveys in the 27' East Penetration Room resulting in increasing activity level on the monitor.
C. Letdown flow is increased to allow the diversion to be processed by the Reactor Coolant Waste system IXs resulting in decreasing activity level on the monitor.
D. Letdown flow is secured until the leak in the letdown line that was detected by the radiation monitor alarm can be located and isolated for repairs.

88. Which of the following describes the plant response if the selected Pressurizer Level control channel fails low at 100% power? **Assume no operator action is taken**

A. All heaters deenergize, letdown goes to minimum, standby charging pumps start, actual pressurizer level and pressure increase and reactor trips on High Pressurizer Pressure.
B. All heaters deenergize, actual pressurizer level and pressure decrease and reactor trips on TM/LP.
C. All heaters energize, letdown goes to maximum, only the selected charging pump runs, actual pressurizer level and pressure decrease and reactor trips on TM/LP.
D. All heaters energize, letdown goes to minimum, actual pressurizer level and pressure increase and the reactor trips on High Pressurizer Pressure.

89. Given the following:

* Unit1 is at 25% power
* "U-1 480V ESF TRIP UNDERVOLTAGE" alarms at 1C19
* CRO reports that 11 4KV Bus is energized
* TBO reports that 15 Battery Charger and MCC 117T are deenergized
* AOP 7I (Loss of 4KV, 480 VOLT or 208/120 VOLT INSTRUMENT BUS POWER) is implemented

Which ONE of the following is also effected by this event?

A. 11 Pressurizer Proportional heater bank is deenergized.
B. 12 Charging pump is deenergized.
C. 13 Component Cooling pump is deenergized.
D. 14 Pressurizer Backup bank is deenergized.

90. Given the following:

* Unit 2 is at 100% power
* IAS 3.4.11 D due to both PORVs are not operable
* Main Turbine trips due to loss of bearing oil

Which ONE of the following will initially limit the effects of the RCS transient?

A. A single 2500 PSIA setpoint Primary Code Safety valve.
B. 2 out of 4 RPS Loss of Load logic trip.
C. Both Primary Code Safety valves.
D. 2 out of 4 RPS High Pressurizer Pressure logic trip.

91. Given the following:

* Unit 2 is at 100% power
* RO reports the Reactor tripped due an overpower transient
* CRO observes the RPS response

Which ONE of the following is the expected effect on RPS from the Reactor Trip?

A. 2/4 Channels Hi Power trip relays energized, 4 Matrices deenergize, trip path paths deenergize, 4 TCBs open.
B. 4/4 Channels APD trip relays energize, 6 Matrices deenergize, trip paths energize, 8 TCBs open.
C. 4/4 Channels Hi Power trip relays energize, 6 Matrices deenergize, trip paths deenergize, 8 TCBs open.
D. 2/4 Channels APD trip relays energize, 4 Matrices deenergize, trip paths deenergize, 4 TCBs open.

92. Given the following:

* Unit 1 core has been off loaded to the SFP for 10 year ISI Reactor vessel inspection, RFP level is at 63 foot elevation
* Unit 1 RFP boron concentration is at the COLR concentration (2310 PPM) and the SFP boron concentration is at 2450 PPM

Which ONE of the following actions, if any, is required to maintain the design SDM for the stored fuel?

A. No action is required, the SFP boron is above the Tech Spec required concentration of 2300 ppm

B. Borate the RFP to the SFP concentration to prevent the dilution of the required SFP boron concentration.

C. No action is required, the SFP Racks are designed to maintain the design SDM.

D. Shut Transfer tube gate valve to isolate RFP from SFP and maintain SFP boron concentration.

93. Given the following:

* Unit 1 is at 10%, preparing to parallel to the Grid
* AOP 3G (Malfunction of MFW system) is implemented
* 11 BFRV control is in manual due to erratic controller operation
* 11 SG level is -25 inches and 12 SG level is -10 inches
* The CRO raises the bias on the speed controller for 12 SGFP due to low FRV d/p on both 11 and 12 FRVs.
* approximately 15 seconds later, the CRO observes a large feed flow/steam flow mismatch (feed greater than steam)
* Both SG levels are lowering

Which ONE of the following is the correct action for the conditions?

A. Start 13 AFW pump and monitor auto AFW initiation to raise both SG water levels.

B. Decrease the SGFP speed bias or lower BFRV controller output, maintain a slight positive feed flow/steam flow.

C. Place 11 MFV controller in manual and open MFV to increase the positive feed flow/ steam flow mismatch to 11 SG.

D. Shut the TBVs to reduce steam flow and raise SG pressure to increase SG water level for the available FW flow.

94. Using the provided reference:

Unit 1 is in Mode 5 with the RCS partially drained and shutdown cooling in service. Outstanding entries exist in the Containment Closure Deviation Log to document unisolated containment penetrations. Additionally, given the following:

* 12A SI loop check valve is removed for maintenance
* 7 days have elapsed since shutdown
* RCS level is at the middle of the hot leg
* Initial RCS temperature is 160°F
* Pressurizer manway is removed

Determine the time available to establish containment closure in the event shutdown cooling is lost:

A. 10 minutes
B. 50 minutes
C. 60 minutes
D. 120 minutes

95. During LOCA (EOP 5), hydrogen generation is a concern in maintaining the containment as a barrier to fission product releases during the event.

Select the time frame and the sources where hydrogen generation occurs:

A. Within minutes of LOCA initiation from aluminum and zinc sources.
B. Within a few hours of LOCA initiation from aluminum and zinc sources.
C. Within minutes of LOCA initiation from aluminum and steel sources.
D. Within a few hours of LOCA initiation from aluminum and steel sources.

96. Given the following:

* EOP 5 (Loss of Coolant Accident) is implemented on Unit 2
* RCS pressure is ~ 1000 PSIA
* RCS Subcooling is 25°F
* Containment pressure is 3.2 PSIG and rising
* "22 CNTMT FILT " alarms at 2C09

Which ONE of the following is the proper alarm response action for the CRO due to the condition?

A. Verify handswitch in NORMAL and 22 Iodine Filter Fan starts on CIS at 4.25 PSIG
B. Ensure 21 and 23 Iodine Filter Fans have started and attempt to start 22 Iodine Filter Fan.
C. Ensure there is no common mode failure and attempt to start 22 Iodine Filter Fan.
D. Verify handswitch in NORMAL and 22 Iodine Filter Fan starts on CSAS at 4.25 PSIG.

97. To perform movement of fuel assemblies seated within the reactor pressure vessel, the **MINIMUM** refueling pool level per Tech Specs must be at least 23 feet above the top of the fuel seated in the core. This corresponds to an indicated level of_______. Fuel handling and operating procedures require that an alarm band of______ feet from RFP level to warn the control room and FHS of an increase or decrease in RFP level.

A. 57.7 feet, 0 $\pm$ 0.2 feet

B. 56.7 feet, 0 $\pm$ 0.5 feet

C. 57.7 feet, 0 $\pm$ 0.5 feet

D. 56.7 feet, 0 $\pm$ 0.2 feet

98. The normal power supply and header lineup of #13 and 23 Component Cooling pumps is:

A. Powered from bus 14A(21B) and aligned to 11(22) CCW headers.
B. Powered from bus 14B(24B) and aligned to both CCW headers.
C. Powered from bus 11A(24A) and aligned to 12(21) CCW headers.
D. Powered from bus 11B(21B) and aligned to both CCW headers.

99. Given the following:

* RCS heatup in progress
* RCS Pressure was 2250 PSIA
* An acoustic monitor for a safety valve indicates valve leakage
* A management decision is made to cooldown the plant for repairs

Which ONE of the following describes the tailpipe temperature response and fluid state as RCS pressure is decreased to 500 PSIA in the subsequent plant cooldown? (assume pressure downstream of the RV is constant)

A. Tailpipe temperature will be higher than at NOP with superheated vapor downstream of the safety valve.
B. Tailpipe temperature will be lower than at NOP with wet vapor downstream of the safety valve.
C. Tailpipe temperature will be higher than NOP with saturated vapor downstream of the safety valve.
D. Tailpipe temperature will be lower than it was at NOP with saturated liquid downstream of the safety valve.

100. Given the following:

* Unit 1 is at 100% power
* Condenser delta T hourly average is 11.5°F and slowly rising
* Unit 2 is at 95% power
* 26 Circulating Water pump is OFF
* Condenser Water Boxes being cleaned
* Travelling Screen d/ps are rising on both Units
* Service Water Heat Exchanger d/ps are rising on both Units

Bay conditions have changed due to a storm coming from the North East which has resulted in large quantities of "grass" migrating into the intake structure. The OSO reports that "grass" is carrying over the travelling screens on both units.

Which ONE of the following is the effect of the described conditions

A. Unit 2 SRW HX strainers will auto back flush, Unit 1 SRW HX will require frequent monitoring per OI 29.

B. Unit 2 Travelling Screens are placed in off for Water Box cleaning, Unit 1 Travelling Screens are left in AUTO.

C. Unit 1 SRW HX strainers will auto back flush, Unit 2 SRW HX will require frequent monitoring per OI 29.

D. Unit 1 Travelling Screens are left in AUTO, Unit 2 Travelling Screens are placed in HAND to prevent "grass" carryover

Answer Key

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

		Question ID		Type	Pts	Answer(s) 0	1	2	3	4	5	6	7	8	9
1:	1	ACCD GAS RELEASE	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	2	CONDUCT OF OPS	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	3	CONDUCT OF OPS	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	4	CONDUCT OF OPS	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	5	CONDUCT OF OPS	004	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	6	EQUIPMENT CONTROL	004	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	7	EQUIPMENT CONTROL	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	8	EQUIPMENT CONTROL	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	9	EQUIPMENT CONTROL	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	10	EQUIPMENT CONTROL	005	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	11	RADIATION CONTROL	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	12	RADIATION CONTROL	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	13	EMER PROC ERPIP	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	14	EMER PROC ERPIP	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	15	HI RCS ACTIVITY	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	16	NATURAL CIRC	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	17	PLANT FIRE	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	18	EMERGENCY BORATION	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	19	INADEQUATE CORE CLG	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	20	INOP/STUCK ROD	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	21	LOSS OF CCW	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	22	LOSS OF COND VAC	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	23	LOSS OF CONT INTEG	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	24	LOSS OF SALT WATER	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	25	LOSS OF VITAL AC	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	26	PZR PRESS CONTROL	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	27	RCP MALFUNCTION	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	28	RCS OVERCOOLING	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	29	STATION BLACKOUT	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	30	STM LINE RUPTURE	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	31	LOSS OF MFW	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	32	REACTOR TRIP STABIL	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	33	REACTOR TRIP STABIL	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	34	SG TUBE LEAK	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	35	SG TUBE RUPTURE	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	36	SMALL BREAK LOCA	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	37	ACCD LIQ RELEASE	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	38	ATWS	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	39	CONT ROD WITHDRAWL	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	40	DROPPED ROD	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	41	LARGE BREAK LOCA	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	42	STM DUMP/TURB BYP	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	43	AREA RAD MONITORS	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	44	FUNCTIONAL RECOVERY	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	45	LOSS OF DC	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

	Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1: 46	LOSS OF SDC	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 47	LOSS OF SR NIS	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 48	EXCESS RCS LEAKAGE	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 49	FUEL HANDLING ACCD	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 50	LOSS OF OFFSITE	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 51	CONTROL ROD DRIVE	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 52	CVCS	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 53	ESFAS	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 54	MAIN FEEDWATER	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 55	NUC INSTRUMENTATION	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 56	WASTE GAS	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 57	AREA RAD MONITORING	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 58	AREA RAD MONITORING	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 59	AUX FEEDWATER	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 60	AUX FEEDWATER	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 61	CONDENSATE	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 62	CONTAINMENT CLG	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 63	CONTAINMENT CLG	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 64	CONTROL ROD DRIVE	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 65	CVCS	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 66	ESFAS	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 67	INCORE TEMP	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 68	LIQUID RADWASTE	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 69	LIQUID RADWASTE	003	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 70	MAIN FEEDWATER	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 71	NUC INSTRUMENTATION	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 72	REACTOR COOLANT PP	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 73	WASTE GAS	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 74	ECCS	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 75	EMERGENCY DG	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 76	REACTOR PROTECTION	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 77	CONTAINMENT SPRAY	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 78	ROD POSITION IND	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 79	AC DISTRIBUTION	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 80	CONDENSER AIR REMVL	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 81	CONTAINMENT PURGE	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 82	DC DISTRIBUTION	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 83	EMERGENCY DG	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 84	FIRE PROTECTION	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 85	INSTRUMENTATION	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 86	MAIN/RHT STEAM	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 87	PROCESS RAD MON	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 88	PZR LEVEL CONTROL	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 89	PZR PRESSURE CONTROL	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 90	REACTOR COOLANT	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C

Test Name: RONRC.TST
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		Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1:	91	REACTOR PROTECTION	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	92	SFP COOLING	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	93	STEAM GENERATOR	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	94	CONTAINMENT	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	95	HYDROGEN RECOMBINER	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	96	CONT IODINE REMOVAL	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	97	FUEL HANDLING EQUIP	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	98	COMPONENT COOLING	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	99	PZR RELIEF/QT	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	100	SERVICE WATER	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D

Attachment 2

CALVERT CLIFFS SRO WRITTEN EXAM W/ANSWER KEY

U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination

Applicant Information	
Name:	Region: I / II / III / IV
Date: 1-22-99	Facility/Unit: CCNPP Units 1+2
License Level: RO / SRO	Reactor Type: W / CE / BW / GE
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected four hours after the examination starts.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

Applicant's Signature

Results	
Examination Value	______ Points
Applicant's Score	______ Points
Applicant's Grade	______ Percent

Name: ______________________________

1. Using the provided references
   Given the following:
   * Unit 1 is at 98% power
   * 1-PT-102B transmitter is OOS due to reliability concerns by System Engineering
   * CRO bypasses Channnel B RPS trip units 5 and 6 to comply with TS 3.3.1

   The CRS directs you to perform a peer check per OI 6, determine the compliance with TS 3.3.1

   Which ONE of the following is the proper action based on TS 3.3.1:
   A. Notify the CRS that the OI 6 peer check is complete and the correct channel RPS is bypassed.
   B. Notify the CRS that the OI 6 peer check is unsat because the wrong channel RPS is bypassed.
   C. Notify the CRS that the OI 6 peer check is complete and the correct trip units are bypassed.
   D. Notify the CRS that the OI 6 peer check is unsat because the wrong trip units are bypassed.

2. Unit 2 is at 50%. The designated CRO requests a break and requires a temporary relief. The Shift Manager directs the SM Assistant to relieve the CRO.

   Which of the following describes the minimum action for the temporary watch relief per NO-1-200?
   A. Verbally brief the SMA.
   B. Walkdown the panels with the SMA.
   C. No turnover required, SMA is already signed in.
   D. Complete the turnover requirements of NO-1-207 (Shift Turnover)

3. Given the following:
   * Unit 1 turbine startup in progress
   * Unit 1 MT at 1800 RPM
   * "420 HZ MALFUNCTION" light is on
   * Unit 2 turbine startup in progress
   * Unit 2 MT at 560 RPM
   * "EMERGENCY POWER SUPPLY" light is on

   Determine the action required, if any, for each Unit's Main Turbine condition.
   A. Reset the light on Unit 1, No action required for Unit 2.
   B. No action required for Unit 1, reset the light for Unit 2.
   C. Trip Unit 1 Main Turbine, trip Unit 2 Main Turbine.
   D. Shut down Unit 1 Main Turbine, shut down Unit 2 Main Turbine.

4. During the performance of a routine valve line up while the unit is in Mode 5, a valve listed as OPEN is discovered to be CLOSED.

   Which ONE of the following describes the correct action to be taken for this valve line up condition?

   A. Since the unit is not in Mode 1 or 2, an entry in the CRO log is required.
   B. Note the valve position in the "discrepancy section" of the coversheet and notify SRO to evaluate.
   C. With concurrence of the CRO, the valve is immediately returned to the recommended position.
   D. An abnormal valve position tag is attached to the valve and the step is signed off as completed.

5. Unit 1 is at 100% power when scheduled maintenance on #11 SG Channel C, 1-PT-1013C, will require this transmitter to be taken out of service. Which safety signals, RPS and ESFAS, are affected by the transmitter inoperability?

   A. Low SG Pressue trip, ASGT(TM/LP) trip and AFW flow to break.
   B. Low SG Pressure trip, SGIS and AFAS Start.
   C. Low SG Pressure trip, ASGT (TM/LP) trip, SGIS and SGIS Block.
   D. Low SG Pressure trip, SGIS and SGIS Block.

6. Given the following:
   * CRS directs you to assist with the performance of valve line ups in the Auxiliary Building
   * After SWP review, RCSS discussion and sign in for the EPD, you go to the 27 foot Valve Alley
   * While in the Valve Alley, your EPD alarms continuously

   Which ONE of the following is the required actions and basis for the described condition?

   A. Exit the RCA, report to the Rad Con for evaluation of exceeding dose limit.
   B. Exit the Valve Alley, report to the level RST for evaluation of exceeding dose limit.
   C. Exit the RCA, report to Dosimetry for evaluation of EPD malfunction.
   D. Exit the Valve Alley, report to the level RST for evaluation of EPD malfunction.

7. Given the following:
   * Unit 1 is in Mode 5 with SDC in operation
   * You have been assigned to tag out and drain 11 Charging pump for maintenance
   * Your dose limit is 100 mrem/shift per the SWP
   * Your present accumulated dose is 70 mrem this shift
   * The RST states the expected dose rate in the area is 10 mrem/hr

   Which ONE of the following is the calculated time in the area based on CCNPP Admin limits?
   A. 60 minutes
   B. 90 minutes
   C. 120 minutes
   D. 180 minutes

8. A call is received on the control room emergency phone extension (911) and the caller identifies himself and reports that a worker in the SFP ventilation room was hurt from a load that pinched his hand and it is cut with heavy bleeding.

   The CRS assigns you with making the notification of the appropriate response personnel.

   Which ONE of the following is proper notification, per the ERPIP?
   A. Activate the Emergency recall pager system for recalling the FST.
   B. Sound the emergency alarm for 5 seconds, announce"a personnel emergency exists in the 69 foot Auxiliary Building with a hand injury, Medical department and Decon Team respond". Repeat once.
   C. Activate the Emergency Recall pager system for recalling a BGE Physican.
   D. Sound the emergency alarm for 5 seconds, announce"a personnel emergency exists in the 69 foot SFP ventilation room with a hand injury, First Aid team and Radiation Safety Technician respond". Repeat once.

9. Given the following:
   * Unit 2 has implemented EOP 1 for an uncomplicated trip
   * RO observes that VCT pressure is 4 PSIG and VCT level is at 50 inches
   * RO commences auto makeup to the VCT per OI 2B

   What additional actions are required based on the stated conditions?
   A. Verify Pressurizer heaters are ON to equalize boron .
   B. Notify Chemistry to sample the BASTs.
   C. Start or vent any idle charging pumps.
   D. Add H^2 to the VCT to maintain 10 to 15 PSIG.

10. Given the following:
    * Unit 2 is in Mode 3 with a SG Tube Rupture event in progress
    * EOP 6 is implemented
    * RCS is at NOT and NOP

Which ONE of the following is the basis to commence RCS boration prior to lowering RCS temperature below 515°F?

A. Ensures SIAS has initiated properly before the affected SG is isolated.
B. Ensures SDM requirements and to compensate for backfill.
C. Ensures the assumed uncontrolled cooldown at 515°F keeps the core subcritical.
D. Ensures RCP trip strategy does not result in diluted areas of RCS.

11. Given the following:
    * Unit 1 has tripped and EOP 0 has been completed
    * EOP 3 has been diagnosed and implemented
    * The CRS directs that the RCPs to be tripped

Which one of the following is the reason for tripping all reactor coolant pumps?

A. Prevents RCP cavitation when the RCS reaches saturation conditions from rapid cooldown to Condensate Booster pump injection.
B. Reduces RCP heat input to the RCS, increasing the SG water inventory effectiveness.
C. Minimizes RCP seal damage from SIAS isolating bleed off flow to VCT.
D. Reduces RCP motor damage from steam when once-through core cooling is initiated

12. Given the following:
    * Unit 2 is at EOC and at 85% power and steady
    * Regulating Group 5 CEAs are at ~125 inches
    * System Engineer discovers and reports Regulating Group 5 CEA #1 is untrippable
    * AOP 1B is implemented and a rapid power reduction per OP 3 is commenced

Determine the effect of plant transient on the axial power distribution:

A. As Reactor power is decreased, axial power will shift towards the upper region of the core.
B. As Reactor power is decreased, axial power will shift towards the lower region of the core.
C. As Reactor power is decreased, axial power will not change towards either upper or lower region of the core.
D. As Reactor power is decreased, axial power will initially shift to the lower region then shift to the upper region.

13. Given the following:
   * Unit 1 is at 100% power
   * "RCP AUXILIARIES STATUS PANEL" alarms
   * "CCW FLOW LO" alarms
   * RO reports increasing temperatures on all RCPs from the plant computer trends
   * CRO reports that a CC Containment Cooling isolation CV is SHUT

   Which ONE of the following may result in component damage?

   A. RCP Controlled Bleedoff temperature of 225°F.

   B. RCP Upper Guide bearing temperature of 190°F.

   C. RCP Downward Thrust bearing temperature of 190°F.

   D. RCP Seal cavity temperature of 195°F.

14. A loss of condenser vacuum occurred on Unit 1 with reactor power at 60%. The operators are reducing power and are able to maintain condenser vacuum at 24 inches Hg.

   Which ONE of the following indicates the power level at which the turbine will have to be tripped if vacuum can NOT be increased to greater than 25 inches Hg?

   A. 88 MWE
   B. 176 MWE
   C. 270 MWE
   D. 440 MWE

15. Given the following:
   * Unit 1 is in Mode 4 with heatup to 532°F in progress
   * The ABO performing a Containment tour reports the Personnel Airlock interlock mechanism is broken.

   Determine the immediate action required based on plant conditions:

   A. Direct the ABO to lock the inner Personnel Airlock door and remain in the area until a guard is posted.
   B. Direct the ABO to verify a Personnel Airlock door is SHUT and maintain one door shut during ingress/egress.
   C. Notify the CRS for an operability determination per the Technical Requirements Manual.
   D. Notify the CRS for an operability determination per NO-1-114 (Containment Closure)

16. Given the following:
    * Unit 1 and 2 are in Mode 5
    * Unit 1 and 2 Salt Water Systems are lined up on the Emergency Overboard

    Which ONE of the following describes how the minimum/maximum flow requirements for the applicable Salt Water pumps are met?
    A. Unit 1 automatic operation of 12A/B SRW HX bypass valve, Unit 2 by manual throttling of 22 or 23 SW pump discharge valve.
    B. Unit 1 automatic operation of 11A/B SRW HX bypass valve, Unit 2 by manual throttling of 21 or 23 SW pump discharge valve.
    C. Unit 1 automatic operation of 12A/B SRW HX bypass valve, Unit 2 by manual throttling of Emergency Overboard Control Valve.
    D. Unit 1 automatic operation of 11A/B SRW HX bypass valve, Unit 2 by preset throttling by the Emergency Overboard header orifice.

17. Unit 1 is in Mode 1. AFAS Sensor Channel "ZE" has been de-energized for maintenance per the OI. While the maintenance is ongoing, a loss of 120V Vital AC Bus 13 occurs. What best describes the response of AFAS?
    A. No effect on system operation other than alarms.
    B. AFAS "A" and AFAS "B" actuation occurs.
    C. Only AFAS "A" actuation occurs.
    D. Sensor logic is reduced to 1 out of 2 to generate an AFAS.

18. Select the statement that describes the operation of the pressurizer heaters from 1(2)C43:
    A. Heaters trip 10 minutes after pressurizer level drops below 101" as associated time delay dropout relay actuates.
    B. Pressurizer level must be raised above 101" initially to reset low level cutout relay and energize heaters when placing keyswitch in LOCAL at 1(2)C43.
    C. Operator secures the heaters when pressurizer level drops below 101".
    D. Heaters trip on pressurizer low level cutout below 101" as indicated on 1(2)C43.

19. Given the following:

* Unit 1 is at MOC and 100% power
* Unit 1 trips due loss of Offsite power
* Unit 2 is at MOC and 100% power
* Unit 2 trips due to a seized rotor on 21A RCP

Evaluate the effect, if any, on each Unit from the described transients:

A. Unit 1 DNB limits are approached more closely compared to the Unit 2 transient effects.
B. Unit 2 DNB limits are approached more closely compared to the Unit 1 transient effects.
C. Unit 1 and Unit 2 DNB limits are approached equally for each transient.
D. Unit 1 and Unit 2 DNB limits are not approached due the automatic RPS trip action for each Unit.

20. Which one of the following is the basis for maintaining a maximum of 140°F subcooled margin during EOP-5 implementation?

A. prevent a pressurized thermal shock event occurrence
B. minimize pressure across the break thereby reducing the leak rate
C. prevent RCS pressure from increasing to the PORV setpoint
D. maintain an adequate amount of subcooled fluid to remove decay heat

21. Given the following:

* A loss of Offsite power has occurred
* Unit 1 has implemented EOP 7

Which one of the following conditions must be met to allow transition to the next appropriate procedure for Unit 1?

A. Energizing any 4 KV bus and associated load centers.
B. Completing the SFSC final acceptance criteria in EOP 7.
C. TSC determination that sufficient battery capacity exists.
D. Emergency boration has been completed for Mode 5 entry.

22. The plant is at 100% power when a large excess steam demand event occurs. Which of the following RPS and/or ESFAS signals actuates first to prevent violations of DNB or the exceeding of SAFDLs?

A. Low pressurizer pressure
B. High containment pressure
C. Low steam generator pressure
D. Low S/G Level Trip

23. Given the following:
- Unit 1 is at 100% power
- Liquid Waste discharge is in progress to Unit 1 Circulating Water
- RO is preparing to make up the RWT due to "11 RWT-LEVEL-TEMP" alarm
  - CRO reports 11 RWT level is decreasing
- ABO reports that "11 REFUEL WTR STORAGE AREA SUMP LEVEL HI" alarm at 1C63

Which ONE of the following is the proper action for the described conditions?

A. Implement AOP 6B (Accidental Release of Radioactive Liquid Waste) due to the Liquid Waste Discharge in progress.
B. Implement AOP 6B (Accidental Release of Radioactive Liquid Release) due to the RWT level change.
C. Direct the ABO to investigate the Liquid Waste Discharge line up.
D. Direct the ABO to investigate the RWT makeup line up.

24. Given the following:
- CRS observes 2 out of 4 RPS trip logic for RCS flow tripped with no protective channel trip alarm on Unit 1
- RO observes Reactor power is at 100% at 1C05
- EOP 0 is implemented by the crew
- RO observes prompt drop in NI power and negative SUR while performing his IMMEDIATE ACTIONS for Reactivity Safety Function

Which ONE of the following was the method used to respond to the ATWS event?

A. Deenergizing 11A and 14A 480 Volt busses.
B. Deenergizing 12B and 13B 480 volt busses.
C. Depressing Reactor Trip buttons at 1C05.
D. Emergency Boration with all available Charging pumps.

25. Given the following:
- Unit 1 Reactor startup in progress after Refueling Outage per applicable PSTP and OP-2
- All Shutdown groups are fully withdrawn
- RO has completed his first 30 inch CEA pull on Regulating group 1
- RO observes that Regulating Group 1 primary and secondary CEA position indication are increasing

What actions are required for the existing plant conditions?

A. Insert group 1 CEAs to stop the outward motion per OP 2.
B. Place the CEDS Control Panel in OFF and implement AOP 1B.
C. Emergency borate with all available Charging pumps per PSTP.
D. Commence a reactor shutdown by inserting all CEAs per OI 42.

26. Given the following:

* 2 CEAs have dropped into the core
* Pressurizer level decreases to ~195 inches
* Reactor power decreases from 100% to ~85%
* RCS Pressure decreases to ~2225 PSIA

Which ONE of the following is the action required per AOP?

A. Trip the Reactor and perform Standard Post Trip Actions.
B. Reduce Turbine load to match Reactor power.
C. Commence a Reactor shutdown to subcritical.
D. Reduce Reactor power to less than 70%.

27. Which one of the following describes the design basis core heat removal process during a large break LOCA?

A. HPSI injection provides makeup and heat is removed via natural circulation flow to the S/Gs
B. HPSI pumps, LPSI pumps and the SITs provide makeup and heat is removed via flow out the break
C. LPSI pumps and the SITs provide makeup and heat is removed via forced flow to the S/Gs
D. HPSI pumps and CS pumps provide makeup and heat is removed via flow out the break

28. Given the following:

* Unit 1 and 2 are at 100%
* Unit 1 is at EOC and had returned to service from a maintenance outage with subsequent indications of 1% failed fuel
* 13 WGDT is in service and full, ABO requests placing 12 WGDT in service

Which ONE of the following describes the expected conditions while shifting the WGDT?

A. 13 WGDT will contain primarily radioactive Xenon and Krypton and dose rates will be slightly elevated above normal.
B. 13 WGDT will contain primarily radioactive Iodine and Argon and dose rates will be slightly elevated above normal.
C. 13 WGDT will contain primarily radioactive Xenon and Krypton and dose rates will be substantially elevated above normal.
D. 13 WGDT will contain primarily radioactive Iodine and Argon and dose rates will be substantially elevated above normal.

29. Given the following:
    * Unit 1 and 2 at 100% power
    * "RMS PANEL" alarms at 1C17
    * CRO reports that area rad monitor "UNIT 1 SAMPLE RM" is in alarm
    * RO reports the VCT level trend indicates an increased leak rate

Which ONE of the following is the correct sequence of the alarm response actions for these plant conditions?

A. Notify Rad Safety to perform an area survey, evacuate the immediate area, have Chemistry check sample sink isolation valves shut.
B. Contact Chemistry to check sample sink isolation valves shut, evacuate the immediate area and have Rad Safety perform an area survey.
C. Notify Rad Safety to update the area survey map, evacuate the immediate area, have Chemistry check sample sink isolation valves shut.
D. Contact Chemistry to check sample sink isolation valves shut, evacuate the immediate area, and have Rad Safety update the area survey map.

30. Given the following:
    * Unit 2 has tripped and EOP 0 implemented
    * EOP 0 Safety functions completed were:
        * Reactivity
        * Vital Auxiliaries
        * Rad Level External to Containment
        * All other Safety Functions were not met
    * CRS directs implementation of the Functional Recovery Procedure EOP 8

Which ONE of the following is the appropriate implementation method for EOP 8?

A. Evaluate PIC, HR and CE Safety functions success paths in order as a minimum.
B. Evaluate All Safety functions success paths in any order as directed by the CRS.
C. Evaluate HR, PIC and CE Safety functions success paths in order as a minimum.
D. Evaluate recommended safety function success paths based on STA input.

31. While operating U-2 at 100% power, a loss of 125 vdc bus #11occurs. Which one of the following actions, if any, must be taken to ensure a reactor/turbine trip?

A. No actions are required as the loss of this bus does not affect automatic tripping of the turbine/reactor.
B. The turbine must be manually tripped at 2C02 at the same time the reactor is manually tripped from 2C05.
C. The turbine must be tripped from the front standard at the same time the reactor is tripped from 2C05.
D. The turbine must be tripped from the cable spreading room at the same time the reactor is tripped from 2C05.

32. Given the following:
   * Unit-1 is in Mode 5
   * #11 LPSI pump is in service providing shutdown cooling.
   * The shutdown cooling return valves are open.
   * The RCS is being drained below the midplane of the hot legs for maintenance.
   * 11 LPSI pump amps, discharge pressure and flow are fluctuating.

Which one of the following actions should be taken in this situation?

A. Secure draining of the RCS and raise vessel level until LPSI pump flow comes back up.
B. Place the LPSI pumps in pull-to-lock, drain the vessel to the desired level, then restart a LPSI pump.
C. Stop the running LPSI pump and place in pull-to-lock.Secure draining and raise reactor vessel level.Vent and restart a LPSI pump.
D. Stop the running LPSI pump, secure draining the RCS and start the standby LPSI pump.

33. Given the following:
   * Unit 2 is in Mode 6 with refueling in progress, core on load is complete
   * CEA swaps are being performed per the applicable fuel handling procedure
   * RCRO observes that Channel A and B WRNI indicate steady at 10 CPS and Channel C WRNI indicates ~1 CPS and decreasing after a Shutdown CEA insertion

What response is required, if any, to the plant conditions?

A. Channel A and B WRNI are inoperable, notify the CRS.
B. Channel A and B WRNI are operable, no action is needed.
C. Channel C WRNI is seeing the effect of the Shutdown CEA insertion.
D. Channel C WRNI has failed, notify the FHS and NFM.

34. The RCSS reports to the control room and describes a high rad material move from 45 foot truck loading area to the Unit 1 45 foot east penetration room.

Which of the following Area RMS alarm would be expected at 1C22 based on the movement path?

A. "UNIT 1 CC".
B. "DRUM STORAGE RM"
C. "UNIT 1 S/G B/D TK AREA"
D. "MISC WASTE EVAP RM"

35. The CRS directs you to perform the check source of RMS per OI 35.

Which of the following RMS should NOT have the "check source" test performed per OI 35 due to automatic functions?

A. SFP Platform RI-7025

B. CAR Discharge RI-1752

C. Containment ICI RI-7008

D. Liquid Waste RI-2201

36. Which condition below would cause the AFAS NO FLOW alarm to initiate?

A. AFW flow 60 gpm, 60 seconds after an AFAS START signal.

B. AFW flow 90 gpm, 60 seconds after an AFAS START signal.

C. AFW flow 60 gpm, 30 seconds after an AFAS START signal.

D. AFW flow 90 gpm, 30 seconds after an AFAS START signal.

37. Given the following:

* Loss of Offsite power has occurred
* Unit 1 tripped and no DGs are available
* Unit 2 tripped and 2A and 2B DGs are supplying power

Which one of the following describes the operation of AFW flow control valves on Unit 1?

A. Override Open the steam driven train block valves for both SGs at 1C43 .

B. Align N^2 to the AFW amplifier air system to maintain operation from the control room.

C. Direct the ABO to adjust local handwheel and observe local flow indicator for response.

D. Place the output signal on controllers at 1C43 to 100% value to maintain operation from the control room.

38. Given the following:

* Unit 2 is at 65%
* 21 and 22 Condensate pumps are running
* 23 Condensate pump is in standby
* 21 Condensate pump mechanically seizes, 23 Condensate pump starts

Which ONE of the following is the design feature that resulted in the auto start:

A. 21 Condensate Pump low discharge pressure at 150 PSIG.

B. Main Feedwater Suction header pressure at or below 220 psig.

C. Condensate Header discharge pressure at 175 psig.

D. Condensate Booster Pump Suction pressure at or below 20 psig.

39. Using provided reference:

Unit 1 is in Mode 1 and #11 SRW HDR is OOS for maintenance. What effect, if any, does this have on the operability of the Containment Spray and Air Cooling System if #12 Containment Spray Pump is declared OOS?

A. No effect, both Containment Cooling trains of the Containment Air Cooling system remain operable.

B. The inoperable Containment Cooling train must be restored to operable status within 10 days.

C. The inoperable Containment Spray train must be restored to operable status within 72 hours.

D. The inoperable Containment Spray train must be restored to operable status within seven (7) days.

40. What ESFAS actuation(s) based on plant parameters and circuit logic are required to automatically initiate Containment Spray flow?

A. Containment pressure of 2.8 PSIG for SIAS OR containment pressure of 4.25 PSIG for CSAS.

B. RCS pressure of 1725 PSIA for SIAS AND containment pressure of 2.8 PSIG for CSAS.

C. RCS pressure of 1725 PSIA for SIAS OR containment pressure of 4.25 PSIG for CSAS.

D. Containment pressure of 2.8 PSIG for SIAS AND containment pressure of 4.25 PSIG for CSAS.

41. When subcritical in Mode 2, adequate SHUTDOWN MARGIN is determined by:

A. Verifying that CEA Shutdown Group withdrawal is in the correct sequence.

B. Verifying that the predicted critical CEA position is within the INSERTION limits of TS 3.1.6

C. Verifying that RCS boron concentration is sufficient to maintain the SHUTDOWN MARGIN requirements of TS 3.1.1

D. Verifying that CEA Regulating Group withdrawal is in the correct sequence.

42. Given the following:

* Unit 2 at EOC and power reduced to 95% power for waterbox cleaning one hour ago
* Regulating Group 5 CEAs were moved out one step to 129 inches for ASI control
* Condenser Water Box cleaning has started and the first waterbox has been returned to service
* 21 CVCS Ion exchanger has been filled with new resin and placed in service
* RO observes RCS temperatures trending upwards for several minutes

Which ONE of the following would explain the change in RCS temperatures?:

A. Xenon decay from the power reduction for water box cleaning.
B. Starting the Circulating Water pump with clean waterbox.
C. Placing an 21 CVCS Ion Exchanger in service.
D. Group 5 CEA movement to control the ASI.

43. During recovery from a LOCA on Unit 2, you are directed by the U-2 CRS to reset SIAS from the control room using the EOP procedure. Containment pressure is 2.0 PSIG and Pressurizer pressure is 800 PSIA.

Which ONE of the following is the sequence to properly complete this action?

A. Match required handswitches, block PZR Pressure SIAS, and depress both SIAS channel reset pushbuttons.
B. Block PZR Pressure SIAS and depress either SIAS channel reset pushbuttons.
C. Match required handswitches and depress both SIAS channel reset pushbuttons.
D. Block the PZR Pressure SIAS and depress both SIAS channel reset pushbuttons.

44. While operating in mode 3 on natural circulation, how many CETs should be read as a minimum to ensure consistency with Th?

A. One per quadrant
B. Two per quadrant
C. Two
D. One

45. Given the following:

* Unit 1 is at 100%
* Unit 2 is in Mode 3 heating up to 532°F
* 21 Degasifier vacuum pump accumulator level control is erratic
* ABO is filling the Degasifier vacuum pump accumulator per OI 17C -1

Which ONE of the following is the result, if any, of opening the level transmitter vent to atmosphere during the accumulator fill?

A. No effect since the accumulator discharges directly to Main Vent via Aux building ventilation.

B. Release of radioactive gases from the Waste Gas Surge Tank through the accumulator vent.

C. Release of water from the accumulator during vacuum pump startup during Unit 1 diversion.

D. Release of water from the accumulator during vacuum pump startup during Unit 2 diversion.

46. Given the following:

* Unit 2 is defueled
* Instrument Air is tagged out for LLRT testing
* 2-SI-4150-CV and 2-SI-4151-CV indicate OPEN
* Both CS pumps are in PTL
* Safety Tagger calls the control room to notify that he will be tagging out and draining Component Cooling to the RCPs
* Shortly thereafter, "CNTMT NORMAL SUMP LVL HI" alarms at 2C10

Which ONE of the following is the correct operator actions per OI 17D for the conditions?

A. Ensure an Operator is stationed in 21 ECCS Pump Room, drain the containment sump using EAD 5462 until drained, shut EAD 5462.

B. Verify 21 ECCS Pp Rm sump pumps in AUTO, drain the containment sump using EAD 5462 and 5463 for at least 5 seconds, shut EAD 5462 and 5463.

C. Ensure an Operator is stationed in 22 ECCS Pump Room, drain the containment sump using EAD 5463 until drained, shut EAD 5463.

D. Verify 22 ECCS Pp Rm sump pumps in AUTO, drain the containment sump using EAD 5462 and 5463 for at least 5 seconds, shut EAD 5462 and 5463.

47. Given the following:
* Unit 1 has tripped and EOP 0 is implemented
* "ACTUATION SYS SGIS TRIP" and "ACTUATION SYS CSAS TRIP" alarms annunciate at 1C08

Select the plant components that receive both a SGIS and CSAS signals from ESFAS.

A. Condensate pumps, Condensate Booster pumps, Heater Drain pumps and MSIVs.
B. Heater Drain pumps, SGFPs, MFIVs, and MSIVs.
C. SGFPs, CS pumps, SG Blowdown CVs, and MSIVs.
D. Condensate Booster pumps, SG Blowdown CVs, MFIVs, and SGFPs.

48. Which of the following occurs on a loss of high voltage power supply to the LRNIs?

A. HV bistable trip
B. Power On light goes off
C. Channel fails to 200%
D. Actuation of the 15 VDC interlock

49. Given the following:
* Unit 1 is in Mode 5 with RCS temperature at 125°F
* Shutdown Cooling has been secured for plant heatup
* RCS pressure has been raised to 300 PSIA for RCP start
* Pressurizer level at 170 inches
* Preparing to start 11A and 11B RCPs for plant heatup
* ABO reports that 11 and 12 SG temperatures are 165°F
* RCP portion of the LTOP Tagout is cleared

Which ONE of the following describes the plant response to starting the first RCP based on stated conditions?

A. RCS pressure will increase, the Pzr Safeties will open from the RCS pressure surge.
B. RCS pressure will decrease, the Pzr Backup heaters will automatically energize.
C. RCS pressure will increase, PORVs will open from the RCS pressure surge.
D. RCS pressure will decrease, PZR Proportional heaters will automatically increase their output.

50. What are the oxygen and curie content limits for the waste gas decay tanks?

A. Oxygen 4% by volume, 58,500 Curies of noble gas
B. Oxygen 4% by weight, 53,500 Curies of noble gas
C. Oxygen 6% by volume, 58,500 Curies of noble gas
D. Oxygen 6% by weight, 53,500 Curies of noble gas

51. Given the following:
- * Unit 2 has tripped and EOP 5 (LOCA) has been implemented
- * RCS Pressure is ~800 PSIA
- * SIAS, CSAS and CIS have been verified
- * Containment Pressure is at 3.8 PSIG and lowering

What conditions per the EOP are required to secure Containment Spray?

A. Containment Pressure is maintained <2.8 PSIG by CS flow and SIAS has been RESET .

B. Containment Temperature is maintained <120^{0}F by CACs and SIAS has been RESET.

C. Containment Pressure is maintained <2.8 PSIG by CS flow and SIAS and CSAS have been RESET.

D. Containment Temperature is maintained <120^{0}F by CACs and SIAS and CSAS have been RESET.

52. Using the provided reference:

Given the following:
- * Unit is at 97% with Regulating Group 5 CEAs at 110 inches for NFM testing
- * RO observes a difference of 10 inches between the primary and secondary CEA position indications for all Group 5 CEAs
- * Initial diagnosis is the primary CEA position indication may be inoperable and the TRM is reviewed by the operators

Which ONE of the following is the expected effect of this condition?

A. Implement Nonconformance A by contingency measure A.2.1 of the TRM.

B. Implement Nonconformance B by contingency measure B.1 of the TRM.

C. Implement Nonconformance A by contingency measure A.1 of the TRM.

D. Implement Nonconformance C by contingency measure C.1 of the TRM.

53. 1A DG is running under load during periodic testing and is paralleled to 4KV bus 11-17.

What is the DG response to a loss of offsite power?

A. DG output breaker, 152-1703, will remain closed, repower all required loads, and continue to supply power to loads on 4KV bus 17.

B. DG output breaker, 152-1703, will remain closed, attempt to pick up the required loads and trip on overcurrent.

C. DG output breaker, 152-1703, will trip open and remain open until the synch stick is inserted and manually closed by the operator.

D. DG output breaker, 152-1703, will trip open and automatically reclose on 4KV bus 17 with normal and alternate feeders open to 4 KV Bus 11.

54. Given the following:

* Unit 2 is in Mode 5
* Preparations for drawing a Main Condenser vacuum were completed by the previous shift
* CRO starts all 4 CARs
* Shortly thereafter the CRO observes indication of all 4 CARs tripped on 1C13
* TBO reports that all 4 CAR shell stops isolation valves are OPEN and all 4 CAR breakers have tripped on overcurrent and have been reset

Which ONE of the following is the correct action for the condition?

A. Restart one CAR, wait for Condenser vacuum to reach ~20 inches Hg, start the last 3 CARs.
B. Direct the TBO to throttle all CAR Shell Stop valves to ~25% OPEN, restart CARs
C. Direct the TBO to throttle 2 CAR Shell Stop valves to ~25% OPEN, restart the applicable CARs.
D. Restart 2 CARs, wait for condenser vacuum to reach~ 20 inches Hg, start the last 2 CARs.

55. Which instrumentation must be operable to ensure the Containment Purge System will be automatically secured should a fuel handling incident occur inside containment?

A. Containment High Range Monitors (RE-5317 A/B)
B. Containment Area Radiation Monitors (RE-5316 A/B/C/D)
C. Main Vent Gaseous Monitor (RE-5415)
D. Wide Range Noble Gas Monitor (RIC-5415)

56. An electrical transient has occurred and the following indications are observed at 1C24A:

- 1Y02 is deenergized
- 2Y02 is deenergized

Which one of the following buses has been lost?

A. 120 VAC vital bus #12
B. 120 VAC vital bus #22
C. 125 VDC vital bus #21
D. 125 VDC vital bus #11

57. A recent change to the operation of the 1A DG requires the operator to verify load is greater than the unloaded value to minimize carbon buildup in the cylinders. When the DG is operating in the unloaded range what action is required when this condition is present?

A. An alarm appears on the plant computer CRT near CRO's desk and a cleanout run of at least 2000 KW for 2 hours should be performed.

B. A control room alarm is received informing the operator that DG is below minimum load and loads should be started within 8 hours to achieve ≥ 1620 KW.

C. Close monitoring by the CRO ensures unloaded operation of the DG does not exceed 8 hours; if time limit is exceeded, the engine is shutdown and inspected.

D. A control room alarm is received and as long as the time does not exceed 12 hours no further action is required.

58. Given the following:

* Unit 1 is at 100% power
* IAS 3.7.3 for 13 AFW pump OOS
* Unit 2 is in Mode 5 for planned outage
* Attachment 6 (MEEL) completed for Conduct of Lower Mode Operations with Pressurizer Manway removed

The OWC notifies the Unit 2 control room that 23 AFW pump is to be tagged out for 2 weeks for scheduled maintenance

Which ONE of the following describes the effect this tagout?

A. Unit 1 is effected due to Tech Spec requirements for AFW.

B. Unit 2 is effected due to Tech Spec requirements for AFW.

C. Unit 1 will be losing an Appendix R redundant component

D. Unit 2 will be losing an Appendix R redundant component.

59. Which ONE of the following describes what normally starts to shift the Full Range Digital Feedwater Control System to the High Power Mode of operation during plant startup?

A. When the High Power Mode button is depressed.

B. When the average of Reactor Reg Channels X and Y indicate greater than or equal to 17% power.

C. When reactor power has been greater than or equal to 19% power for 5 minutes.

D. When the average of the Wide Range NI channels A thru D indicate greater than 15% power.

60. Given the following:
* Unit 1 heatup in progress per OP 1
* RCS Tc is 450°F
* RCS Pressure is 1750 PSIA
* Panel 1T22 MS Line Drain handswitches are in the NORMAL operating position per the valve lineup

Describe the actions and effect, if any, with the drain valves in the NORMAL position:

A. None, this is the expected position of the drain valves at 1T22 for plant heatup
B. Place drain valves in the STARTUP position to minimize corrosion from air/non-condensible gases
C. OPEN MS Line drain valves (1-HS-6622) at 1C02 to continue heatup
D. Place drain valves in the STARTUP position to prevent steam/water hammers

61. Given the following:
* Unit 1 is at 65% and increasing to 100%
* "RADIATION MONITOR LEVEL HI" alarms at 1C07
* Letdown flow is adjusted per the appropriate AOP
* Reactor power is stabilized at 67% power
* Chemistry reports that the RCS specific activity has stabilized below the chemistry action level 1 for Tech Spec 3.4.15

Which ONE of the following is the action taken and the response of the Process Radiation Monitor to the letdown flow adjustment over the next few days?

A. Letdown flow is increased in conjunction with the purification IX lineup to obtain maximum purification flow resulting in decreasing activity level on the monitor.
B. Letdown flow is reduced to minimum to allow Rad Con surveys in the 27' East Penetration Room resulting in increasing activity level on the monitor.
C. Letdown flow is increased to allow the diversion to be processed by the Reactor Coolant Waste system IXs resulting in decreasing activity level on the monitor.
D. Letdown flow is secured until the leak in the letdown line that was detected by the radiation monitor alarm can be located and isolated for repairs.

62. Which of the following describes the plant response if the selected Pressurizer Level control channel fails low at 100% power? **Assume no operator action is taken**

A. All heaters deenergize, letdown goes to minimum, standby charging pumps start, actual pressurizer level and pressure increase and reactor trips on High Pressurizer Pressure.
B. All heaters deenergize, actual pressurizer level and pressure decrease and reactor trips on TM/LP.
C. All heaters energize, letdown goes to maximum, only the selected charging pump runs, actual pressurizer level and pressure decrease and reactor trips on TM/LP.
D. All heaters energize, letdown goes to minimum, actual pressurizer level and pressure increase and the reactor trips on High Pressurizer Pressure.

63. Given the following:
- * Unit1 is at 25% power
- * "U-1 480V ESF TRIP UNDERVOLTAGE" alarms at 1C19
- * CRO reports that 11 4KV Bus is energized
- * TBO reports that 15 Battery Charger and MCC 117T are deenergized
- * AOP 7I (Loss of 4KV, 480 VOLT or 208/120 VOLT INSTRUMENT BUS POWER) is implemented

Which ONE of the following is also effected by this event?

A. 11 Pressurizer Proportional heater bank is deenergized.

B. 12 Charging pump is deenergized.

C. 13 Component Cooling pump is deenergized.

D. 14 Pressurizer Backup bank is deenergized.

64. Given the following:
- * Unit 2 is at 100% power
- * IAS 3.4.11 D due to both PORVs are not operable
- * Main Turbine trips due to loss of bearing oil

Which ONE of the following will initially limit the effects of the RCS transient?

A. A single 2500 PSIA setpoint Primary Code Safety valve.

B. 2 out of 4 RPS Loss of Load logic trip.

C. Both Primary Code Safety valves.

D. 2 out of 4 RPS High Pressurizer Pressure logic trip.

65. Given the following:
- * Unit 2 is at 100% power
- * RO reports the Reactor tripped due an overpower transient
- * CRO observes the RPS response

Which ONE of the following is the expected effect on RPS from the Reactor Trip?

A. 2/4 Channels Hi Power trip relays energized, 4 Matrices deenergize, trip path paths deenergize, 4 TCBs open.

B. 4/4 Channels APD trip relays energize, 6 Matrices deenergize, trip paths energize, 8 TCBs open.

C. 4/4 Channels Hi Power trip relays energize, 6 Matrices deenergize, trip paths deenergize, 8 TCBs open.

D. 2/4 Channels APD trip relays energize, 4 Matrices deenergize, trip paths deenergize, 4 TCBs open.

66. Given the following:

* Unit 1 core has been off loaded to the SFP for 10 year ISI Reactor vessel inspection, RFP level is at 63 foot elevation
* Unit 1 RFP boron concentration is at the COLR concentration (2310 PPM) and the SFP boron concentration is at 2450 PPM

Which ONE of the following actions, if any, is required to maintain the design SDM for the stored fuel?

A. No action is required, the SFP boron is above the Tech Spec required concentration of 2300 ppm

B. Borate the RFP to the SFP concentration to prevent the dilution of the required SFP boron concentration.

C. No action is required, the SFP Racks are designed to maintain the design SDM.

D. Shut Transfer tube gate valve to isolate RFP from SFP and maintain SFP boron concentration.

67. Given the following:

* Unit 1 is at 10%, preparing to parallel to the Grid
* AOP 3G (Malfunction of MFW system) is implemented
* 11 BFRV control is in manual due to erratic controller operation
* 11 SG level is -25 inches and 12 SG level is -10 inches
* The CRO raises the bias on the speed controller for 12 SGFP due to low FRV d/p on both 11 and 12 FRVs.
* approximately 15 seconds later, the CRO observes a large feed flow/steam flow mismatch (feed greater than steam)
* Both SG levels are lowering

Which ONE of the following is the correct action for the conditions?

A. Start 13 AFW pump and monitor auto AFW initiation to raise both SG water levels.

B. Decrease the SGFP speed bias or lower BFRV controller output, maintain a slight positive feed flow/steam flow.

C. Place 11 MFV controller in manual and open MFV to increase the positive feed flow/ steam flow mismatch to 11 SG.

D. Shut the TBVs to reduce steam flow and raise SG pressure to increase SG water level for the available FW flow.

68. Given the following:
- EOP 5 (Loss of Coolant Accident) is implemented on Unit 2
- RCS pressure is ~ 1000 PSIA
- RCS Subcooling is 25°F
- Containment pressure is 3.2 PSIG and rising
- "22 CNTMT FILT " alarms at 2C09

Which ONE of the following is the proper alarm response action for the CRO due to the condition?

A. Verify handswitch in NORMAL and 22 Iodine Filter Fan starts on CIS at 4.25 PSIG

B. Ensure 21 and 23 Iodine Filter Fans have started and attempt to start 22 Iodine Filter Fan.

C. Ensure there is no common mode failure and attempt to start 22 Iodine Filter Fan.

D. Verify handswitch in NORMAL and 22 Iodine Filter Fan starts on CSAS at 4.25 PSIG.

69. To perform movement of fuel assemblies seated within the reactor pressure vessel, the **MINIMUM** refueling pool level per Tech Specs must be at least 23 feet above the top of the fuel seated in the core. This corresponds to an indicated level of_______. Fuel handling and operating procedures require that an alarm band of______ feet from RFP level to warn the control room and FHS of an increase or decrease in RFP level.

A. 57.7 feet, 0 ± 0.2 feet

B. 56.7 feet, 0 ± 0.5 feet

C. 57.7 feet, 0 ± 0.5 feet

D. 56.7 feet, 0 ± 0.2 feet

70. The normal power supply and header lineup of #13 and 23 Component Cooling pumps is:

A. Powered from bus 14A(21B) and aligned to 11(22) CCW headers.

B. Powered from bus 14B(24B) and aligned to both CCW headers.

C. Powered from bus 11A(24A) and aligned to 12(21) CCW headers.

D. Powered from bus 11B(21B) and aligned to both CCW headers.

71. Given the following:
* RCS heatup in progress
* RCS Pressure was 2250 PSIA
* An acoustic monitor for a safety valve indicates valve leakage
* A management decision is made to cooldown the plant for repairs

Which ONE of the following describes the tailpipe temperature response and fluid state as RCS pressure is decreased to 500 PSIA in the subsequent plant cooldown? (assume pressure downstream of the RV is constant)

A. Tailpipe temperature will be higher than at NOP with superheated vapor downstream of the safety valve.
B. Tailpipe temperature will be lower than at NOP with wet vapor downstream of the safety valve.
C. Tailpipe temperature will be higher than NOP with saturated vapor downstream of the safety valve.
D. Tailpipe temperature will be lower than it was at NOP with saturated liquid downstream of the safety valve.

72. Given the following:
* Unit 1 is at 100% power
* Condenser delta T hourly average is 11.5°F and slowly rising
* Unit 2 is at 95% power
* 26 Circulating Water pump is OFF
* Condenser Water Boxes being cleaned
* Travelling Screen d/ps are rising on both Units
* Service Water Heat Exchanger d/ps are rising on both Units

Bay conditions have changed due to a storm coming from the North East which has resulted in large quantities of "grass" migrating into the intake structure. The OSO reports that "grass" is carrying over the travelling screens on both units.

Which ONE of the following is the effect of the described conditions

A. Unit 2 SRW HX strainers will auto back flush, Unit 1 SRW HX will require frequent monitoring per OI 29.
B. Unit 2 Travelling Screens are placed in off for Water Box cleaning, Unit 1 Travelling Screens are left in AUTO.
C. Unit 1 SRW HX strainers will auto back flush, Unit 2 SRW HX will require frequent monitoring per OI 29.
D. Unit 1 Travelling Screens are left in AUTO, Unit 2 Travelling Screens are placed in HAND to prevent "grass" carryover

73. The Unit is operating at 80% power when steam demand is increased by 5% due to a turbine bypass valve failing open. How will the Pressurizer spray valves and heaters initially respond?

A. Spray valves shut, heaters energized in auto control.

B. Spray valves shut, heater off.

C. Spray valves open, heaters energized in auto control.

D. Spray valves open, heaters off.

74. Given the following:

* The fire starts in the control room and AOP 9A is implemented
* Unit 1 RO depresses the Reactor trip pushbuttons at 1C05 before leaving the control room
* Unit 1 CRO was not in the control room prior to the evacuation

Which ONE of the following watchstanders ensures the Unit is shutdown, with regards to the Main Turbine?

A. CRO trips the Main Turbine at the front standard.

B. RO trips the Main Turbine at the front standard.

C. TBO trips the Main Turbine at the front standard.

D. PWS trips the Main Turbine at the front standard.

75. Given the following:

* Unit 2 is at 100% power
* 21 and 22 Salt Water headers in normal lineup
* "22 SW HDR PRESS LO" alarms at 2C13
* CRO reports that 22 SW header pressure indicates 8 PSIG
* CRS directs the implementation of AOP 7A
* CRO verifies the CC and SRW HX saltwater outlet valves in their normal positions
* OSO verifies the sluice gates on 22 SW pump are open and Emergency Overboard valve is shut.

Which one of the following is the proper action for a suspected leak on 22 SW header?

A. SHUT the CC and SRW HX saltwater outlet valves and observe 22 SW header pressure greater than 10 PSIG.

B. Start 23 Salt Water pump, stop 22 Salt Water pump and dispatch an operator to identify the location of the leak.

C. Shift Salt Water lineup to the Emergency Overboard and observe 22 SW header pressure greater than 10 PSIG.

D. Stop 22 Salt Water pump and dispatch an operator to identify the location of the leak.

76. Given the following:

* ~ 10 minutes ago a Loss of Offsite power occurred
* EOP 2 is implemented on Unit 1
* MSIVs and SG Blowdown valves have been shut
* Shutdown sequencer loads have been verified
* Establishment of RCS heat sink is in progress
* AFW flow is at the auto initiation setpoint for both SGs
* CRO reports the following parameters:

11 SG pressure is 850 PSIA	12 SG pressure is 925 PSIA
Tc is 532 °F and steady	Tc is 536°F and slowly increasing
11 SG is steady at -30 inches	12 SG is at -100 inches and slowly rising
11 ADV indicates intermediate	12 ADV indicates shut

As CRS, which ONE of the following is the proper direction to the CRO for plant conditions?

A. Direct the CRO to OPEN the TBVs further to balance natural circulation flow in 12 RCS loop with 11 RCS loop.
B. Direct the CRO to increase AFW flow to 12 SG to restore level to balance natural circulation flow in both loops .
C. Direct the CRO to shift the ADV controller to AUTO to maintain SG pressure 850 to 920 PSIA and Tc 525 to 535°F.
D. Direct the CRO to shift to local manual operation on 12 ADV and maintain 12 SG balanced with 11 SG pressure and loop Tc.

77. Given the following:

* A SBO has occurred
* EOP 7 is implemented on Unit 1 and EOP 8 on Unit 2
* The following parameters exist on both Units:

Unit 1 subcooled margin is 40°F	Unit 2 subcooled margin is 0°F
Loop Tc's are 530°F and lowering	Loop Tc's are 516°F and erratic
PZR level is 110 inches	RVLMS last indicating light is ON
	SIAS actuation has been verified

Which ONE of the following is used to verify sufficient natural circulation flow to maintain Core/RCS Heat Removal safety function for Unit 2?

A. HPSI and LPSI at required flow rate.
B. Steaming the SG with the TBVs.
C. CETs indicate less than superheat.
D. Both Th's consistent with CETs.

78. At 1605 a fire is reported in 45 foot solid waste area and the ERPIP actions are implemented. At 1612 the fire brigade leader informs the Control Room that the fire brigade is on the scene and fire fighting efforts will start momentarily. The fire brigade leader reports at 1621 that the water was applied to the fire in the solid waste area and is extinguished.

Which ONE of the following is correct EAL, if any, based on the described conditions?

A. No EAL is appropriate, since fire was not in a safe shutdown area.

B. UNUSUAL EVENT for fire not extinguished within 15 minutes of notification.

C. ALERT for fire not extinguished within 15 minutes of notification in the RCA.

D. NO EAL is appropriate since fire was extinguished within 30 minutes.

79. Given the following:

* A ESDE occurred on Unit 2, implemented EOP 4
* 21 SG pressure is 450 PSIA and decreasing
* 22 SG pressure is 780 PSIA and steady
* CETs indicate 484°F
* SIAS actuated and verified at required flow
* Containment pressure is 3 PSIG

Which one of the following is the required action and basis for the described conditions?

A. Direct the RO perform alternate actions for the Containment Environment safety function to meet containment criteria.

B. Direct the CRO to cooldown 22 SG to 680 PSIA to prevent RCS expansion after blowdown is complete.

C. Direct the RO to perform alternate actions and borate to 2300 ppm to met the Reactivity safety function criteria.

D. Direct the CRO to initiate SGIS to isolate 21 SG blowdown and meet the Heat Removal safety function.

80. Given the following:

* Unit 2 is at 100% power
* CRO reports Instrument Air pressure is 80 PSIG and lowering
* When Instrument Air pressure reaches 40 PSIG, The reactor is tripped and EOP 0 is implemented

Which ONE of the following is the basis for the reactor trip?

A. Both Main Feedwater Regulating Valves cannot control SG water levels.

B. Both CCW isolation valves to the containment isolated cooling to the RCPs.

C. All SRW Turbine Building isolation valves isolated cooling to the Main Generator

D. Condensate Precoat Bypass valve failed closed isolating condensate flow to CBPs.

81. Assume that a loss of main feedwater flow has resulted in low SG levels. Why must auxiliary feedwater be used to restore SG levels to 0 inches before re-establishing main feedwater flow to the SGs?

A. Severe water hammer may occur when steam voids collapse in the main feed ring.

B. Feedwater isolation valves are prevented from opening unless SG level is greater than -26 inches.

C. The SG downcomer must be refilled slowly to avoid thermal shock to the tube sheet.

D. Thermal shock may occur to the metal of the main feed ring resulting in mechanical damage.

82. Given the following:

* AOP 2A on unit 2 is implemented with the following:
  - STA estimated the RCS leak rate to be ~40 gpm
  - Containment environment parameters are steady
  - Preliminary checks have determined no observable SG tube leakage
  - Letdown is isolated with 21 Charging pump running
  - RCS pressure is 2250 PSIA
  - Charging header pressure is 2150 PSIA

Which ONE of the following is the assumed leakage location based on these conditions?

A. Either SG until chemistry reports on the SG sample results.

B. Charging header downstream of 2-CVC-269 MOV (Chg hdr to aux HPSI).

C. RCP pump seal to Component Cooling system.

D. Charging header downstream of 21 Charging pump.

83. Given the following:

* Unit 2 has just completed a power reduction to 95%
* Pressurizer Backup heaters were ON for boron equalization
* Pzr Pressure Channel100X was selected as the control channel
* "PZR CH 100 PRESS" alarms at 2C06 and the RO reports the following:

Pzr pressure alarm is unexpected
PIC-100X is reading 2250 PSIA and steady
PIC-100Y is reading 2050 PSIA and steady
Pressure Recorder 105B shows pressure trended down to 2065 PSIA
Pressurizer level trended down during the transient and is returned to programmed level

Which ONE of the following is the proper response?

A. Shift PIC-100X to manual, restore RCS pressure, go in TS action for DNB parameters.
B. Shift pressure control to Channel 100Y, restore RCS pressure, go in TS for DNB parameters.
C. Declare Pzr pressure Channel 100X OOS due to failed channel check with 100Y per Post Accident Monitoring Tech Spec.
D. Declare Pzr pressure Channel 100Y OOS due to failed channel check with 100X per Post Accident Monitoring Tech Spec.

84. During a LOCA on the top of the Pressurizer, the RCS inventory is being restored.

Which ONE of the following is the HPSI Throttling criteria?

A. Loop Subcooled Margin >30°F, PZR level <225 inches, 1 SG available for heat removal, RVLMS indicates level above top of hot leg.
B. Loop Subcooled Margin > 30°F, PZR level > 101 inches, 2 SGs available for heat removal, RVLMS indicates level above middle of hot leg.
C. CET Subcooled Margin >30°F, PZR level >101 inches, 1 SG available as a heat sink, RVLMS indicates level above the top of hot leg.
D. CET Subcooled Margin > 30°F, PZR level <225 inches, 2 SGs available for heat removal, RVLMS indicates level above middle of hot leg.

85. Given the following:

* An overcooling event occurs resulting in SIAS actuation and HPSI injection, the appropriate procedure is implemented
* RVLMS indicates RCS level above the top of the hot leg
* Affected SG Blowdown is complete
* Pressurizer level is ~160 inches and rising rapidly
* RCS pressure is rising rapidly

Which ONE of the following is the proper response for plant conditions?

A. Restore and maintain subcooling by energizing pressurizer heaters and operation of the charging system.
B. Perform SIAS verification per EOP attachment, block Pressurizer Pressure SIAS, secure the LPSI pumps.
C. Cooldown the unaffected SG and maintain subcooling by use of Auxiliary Spray to lower RCS pressure.
D. Perform SIAS verification per EOP attachment, block Containment Pressure SIAS, terminate HPSI flow.

86. Given the following:

* Unit 1 is at 100% power
* Reactor trips due to loss of 500KV BLACK ~~Red~~ bus Rw)
* EOP 0 is implemented
* CRO reports that "Core and RCS heat removal can not be met due to low Tc and SG pressures"

The CRS directs the CRO to perform his alternate actions.

Which ONE of the following is the proper action and basis to be taken by the CRO?

A. Reduce AFW flow due to excess flow from automatic initiation of steam driven pump.
B. SHUT both MSIVs due to MTCV failure to close on loss of power
C. Reduce AFW flow due to excess flow from automatic start of 13 AFW pump.
D. SHUT both MSIVs due to MSR second stage MOVs failed to close on loss of power.

87. Given the following:

* Unit 2 is at 100% power
* 21 Charging pump is running, 23 is OOS for maintenance
* CRO reports that Main Steam/ N-16 Rad Monitor indicates leakage in 21 SG at 4 GPD and 22 SG at 8 GPD
* Approximately 30 minutes later the STA reports that calculated RCS leak rate is .064 GPM from the combined SG tube leakage and the MainSteam/ N-16 Rad Monitor indicates leakage in 21 SG at 4 GPD and 22 SG at 88 GPD
* RO reports Pressurizer level is steady with no noticeable trend on VCT level trace

Which ONE of the following is the proper response and basis for plant conditions?

A. Implement AOP 10 (Abnormal Secondary Chemistry Conditions) to respond to a small SG tube leak less than 5 GPD.
B. Implement AOP 2A (Excessive Reactor Coolant Leakage) to respond to a small SG tube leak greater than 100 GPD.
C. Implement AOP 10 (Abnormal Secondary Chemistry Conditions) to respond to a small SG tube leak rate change of greater than 60 GPD.
D. Implement AOP 2A (Excessive Reactor Coolant Leakage) to respond to a small SG tube leak rate change of greater than 60 GPD.

88. Given the following:

* a SGTR has been diagnosed in 21 SG with EOP 6 implemented
* The applicable block steps for initial response to the event have been completed
* Plant stabilization steps are in progress to depressurize the RCS, maintain 21 SG level and restore 22 SG level to 0 inches
* Block step for HPSI or LPSI throttling/termination criteria has been implemented with 21 HPSI pump the running pump and RCS pressure steady at ~ 650 PSIA and both LPSI pumps are secured
* CETs indicate ~460°F

Why doesn't the RCS inventory control require the LPSI pumps?

A. RCS Subcooling is maintained greater than 20°F.
B. RCS pressure is controlled above 200 PSIA.
C. Unaffected 22 SG is maintaining RCS temperature control.
D. 21 SG level backfills the RCS.

89. Using the provided reference:

Given the following:

* EOP 5 has been implemented on Unit 2
* RCS pressure rapidly decreased to 1200 PSIA
* RO has started the RCP trip strategy
* RCS Tc is 515°F
* 21 and 22 Penetration Room Exhaust fans have automatically started
* All automatic safety systems have actuated as designed
* Pressurizer spray Valve RC-100E-CV indicates OPEN

Which ONE of the following is the required action?

A. Trip all RCPs.

B. Trip 21B and 22A RCPs.

C. Trip 21A and 22A RCPs.

D. Trip 21A and 21B RCPs.

90. Given the following:

* Unit 2 is at 100% power
* STP O-27-2 RCS leak rate has been performed with total of 8 GPM
* the source of leakage has been identified

Based on the leakage identification, a power reduction is started to be in Mode 3 in 6 hours per TS 3.4.13 condition B.

Which ONE of the following requires the action of TS 3.4.13 condition B?

A. 2-CVC-515 Letdown isolation body to bonnet gasket leak .

B. PORV-402 leakage to Quench Tank

C. 22 SG primary to secondary leakage at 11 GPD.

D. 21 SG tube leakage of .07 GPM

91. Given the following:
   * Unit 2 is in Mode 6 with fuel handling in progress
   * The FHS observes the refueling pool level rapidly lowering directs the implementation of AOP 6E (loss of Unit 2 Refueling Pool Level)

Which ONE of the following provides the basis to minimize the containment activity levels and Offsite release to the public?

A. Actuation of CRS to isolate Containment Purge, manually starting 4 CAC in slow speed and opening 4 CAC normal outlet SRW CVs, CIS actuation starting Iodine Filter Fans and Pentration Room Exhaust Fan and operators verify SFP charcoal filters in service.
B. Containment Closure, isolation of Containment Purge, manually starting all Iodine Filter Fans, manually starting 4 CAC in fast speed and opening 4 CAC emergency outlet SRW CVs, manually starting both Pentration Room Exhaust Fans.
C. Actuation of CRS to isolate Containment Purge, manually starting 4 CAC in fast speed and opening 4 CAC normal outlet SRW CVs, manually starting Iodine Filter Fans, manually starting a Pentration Room Exhaust Fan and verify SFP charcoal filters in service.
D. Containment Closure, isolation of H^2 Purge, manually starting an Iodine Filter Fan, manually starting 4 CAC in slow speed and opening 4 CAC emergency outlet SRW CVs, manually starting a Pentration Room Exhaust Fan.

92. Given the following:
   * Unit 1 is stabilized at 100% power after completion of Refueling Outage PSTP
   * Unit 2 is at 100% power for the past 100 days
   * A loss of Offsite power has occurred
   * EOP 0 is implemented with a transition to EOP 2 on both Units.
   * Block step Maintaining Natural Circualtion Flow Verification is implemented on both Units
   * Tc is being controlled manually at 532°F on both Units
   * Condenser vacuum is 20 inches Hg on both Units

Which ONE of the following describes the expected plant responses?

A. U1 ADV controller output signal is greater than U2 ADV controller output signal.
B. U1 TBV controller output signal is greater than U2 TBV controller output signal.
C. U1 ADV controller output signal is less than U2 ADV controller output signal.
D. U1 TBV controller output signal is less than U2 TBV controller output signal

93. Given the following:
  * Unit 1 is in Mode 5
  * 11, 12 and 13 Charging pumps are in "PTL"
  * Nonborated water source tagout in progress
  * RCS is being drained to 110 inches after the collapse of the Pressurizer bubble
  * At termination of RCS drain, RO reports that LI-103 indicates 80 inches.

Which ONE of the following is the required direction from the CRS?

A. Direct the CRO to compare LI-103 with the Refueling level indicator and write an Issue Report on LI-103.
B. Direct IM to fill the reference leg on 1-LT-103 and compare the Pressurizer level indications.
C. Direct the RO to start all charging pumps to raise Pressurizer level to 110 inches.
D. Direct the CRO and RO to verify SDM, RCS level above the bottom of the hot leg and sources of nonborated water less than 88 GPM .

94. Unit 2 is in Mode 3 preparing for Unit startup per OP 2.

What are the additional dedicated Operators specified by OP 2?

A. SM to observe startup, a SRO at 2C02 and a licensed operator at 2C05.
B. SRO to supervise startup , a licensed operator at 2C02, and a licensed operator at 2C03.
C. SM to supervise startup, a licensed operator at 2C02, and a license operator at 2C03.
D. SRO to observe startup, a SRO at 2C02, and a licensed operator at 2C05.

95. Which ONE of the following describes the intent of the Safety Evaluation Screenings required by PR-1-101 for proposed procedure changes?

A. Evaluate the proposed change for safety significance (industrial and nuclear).
B. Evaluate the proposed change for Tech Spec or UFSAR compliance.
C. Evaluate the proposed change for technical accuracy.
D. Evaluate the proposed change for an Unreviewed Safety Question.

96. During refueling operations, the Refueling machine operator observes that during the withdrawal of fuel assemblies, the Refueling Machine cable makes noise. Upon closer examination by the FHS, the RFM hoist cable has a few broken strands.

Which ONE of the following must be notified of the adverse condition?

A. FHS notifies the Shift Manager and NFM Shift Engineer.
B. FHS notifies the CRS and NFM Shift Engineer.
C. FHS notifies the NFM Shift Engineer and System Engineer.
D. FHS notifies the NFM Shift Engineer and OWC.

97. Unit 2 is in Mode 6 with Refueling in progress. The refueling machine is at the upender to grapple a spent fuel assembly for insertion into the core. When the refueling machine is clear of the upender, the operator starts to lower the upender for transfer to the SFP side. Seconds later, the FHS observes a rapid drop in refueling pool level and AOP 6E is implemented.

Which ONE of the following is the proper location for the spent fuel assembly on the refueling machine?

A. Continue to the core area and lower the assembly in its designated location.
B. Continue to the core area and lower the assembly in any open location.
C. Stop the refueling machine movement and lower the assembly to the bottom of the RFP cavity.
D. Stop the refueling machine over the 44 foot ledge and lower the assembly on the ledge.

98. As CRS, you are conducting the prejob brief for a valve operation in the 27 foot Valve Alley. The ABO informs you that he has a yearly dose of 805 mrem. The RST states the job is expected to result in a dose of 100mrem.

Which ONE of the following are the approvals required, if any, for a dose extension?

A. No approval is required since the Operations SWP allows for 100 mrem/shift.
B. Rad Safety reviews the dosimetry record, Shift Manager and S-NO approvals required.
C. Rad Safety reviews the dosimetry record, GS-NPO and GS-RS approvals required.
D. High Rad area brief, RCSS and Shift Manager approvals required.

99. Given the following:

* Unit 1 tripped and EOP 0 is implemented
* The following is the status of the Safety functions as reported by the RO and CRO and reassessed:

Reactivity -not met,	Vital Auxiliaries- met
RCS Pressure and Inventory-met	Core/RCS Heat Removal-met
Containment Environment-met	Rad Levels External to Containment-met

Which ONE of the following is the proper action for the described conditions?

A. Direct the RO to determine the success path for Reactivity Safety function using the Resource Assessment Table per EOP 8.
B. Direct the CRO to determine the success paths for all Safety Functions using the Resource Assessment Table per EOP 8.
C. Direct the RO to determine the success paths for Reactivity and direct the CRO to determine the success path for Containment Environment using the Resource Assessment Table per EOP 8.
D. Direct the STA to determine the success paths for Reactivity, Vital Auxiliaries and Core/RCS Heat Removal using the Resource Assessment Table per EOP 8.

100. Given the following:

* Unit 1 at 100% power
* "UNIT 1 SPDS" alarms at 1C06

Which ONE of the following is the sequence to determine the alarm status?

A. Depress the "ALARM CUTOUT" key, select the alarmed critical safety function box,select the alarm or indication page of the affected critical safety function and the alarmed parameter will be yellow or magenta.

B. Depress the "ALARM ACKNOWLEDGE" pushbutton, select the alarmed critical safety function box,select the alarm or indication page of the affected critical safety function and the alarmed parameter will be blue or green.

C. Depress the "ALARM CUTOUT" key, select the alarmed critical safety function box,select the alarm or indication page of the affected critical safety function and the alarmed parameter will be yellow or red.

D. Depress the "ALARM ACKNOWLEDGE" pushbutton, select the alarmed critical safety function box,select the alarm or indication page of the affected critical safety function and the alarmed parameter will be blue or magenta.

Answer Key

Test Name: SRONRC.TST
Test Date: Friday, December 11, 1998

		Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1:	1	CONDUCT OF OPS	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	2	CONDUCT OF OPS	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	3	EQUIPMENT CONTROL	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	4	EQUIPMENT CONTROL	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	5	EQUIPMENT CONTROL	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	6	RADIATION CONTROL	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	7	RADIATION CONTROL	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	8	EMER PROC ERPIP	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	9	EMER PROC ERPIP	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	10	EMERGENCY BORATION	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	11	INADEQUATE CORE CLG	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	12	INOP/STUCK ROD	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	13	LOSS OF CCW	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	14	LOSS OF COND VAC	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	15	LOSS OF CONT INTEG	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	16	LOSS OF SALT WATER	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	17	LOSS OF VITAL AC	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	18	PZR PRESS CONTROL	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	19	RCP MALFUNCTION	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	20	RCS OVERCOOLING	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	21	STATION BLACKOUT	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	22	STM LINE RUPTURE	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	23	ACCD LIQ RELEASE	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	24	ATWS	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	25	CONT ROD WITHDRAWL	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	26	DROPPED ROD	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	27	LARGE BREAK LOCA	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	28	ACCD GAS RELEASE	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	29	AREA RAD MONITORS	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	30	FUNCTIONAL RECOVERY	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	31	LOSS OF DC	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	32	LOSS OF SDC	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	33	LOSS OF SR NIS	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	34	AREA RAD MONITORING	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	35	AREA RAD MONITORING	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	36	AUX FEEDWATER	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	37	AUX FEEDWATER	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	38	CONDENSATE	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	39	CONTAINMENT CLG	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	40	CONTAINMENT CLG	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	41	CONTROL ROD DRIVE	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	42	CVCS	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	43	ESFAS	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	44	INCORE TEMP	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	45	LIQUID RADWASTE	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C

Test Name: SRONRC.TST
Test Date: Friday, December 11, 1998

	Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1: 46	LIQUID RADWASTE	003	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 47	MAIN FEEDWATER	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 48	NUC INSTRUMENTATION	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 49	REACTOR COOLANT PP	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 50	WASTE GAS	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 51	CONTAINMENT SPRAY	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 52	ROD POSITION IND	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 53	AC DISTRIBUTION	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 54	CONDENSER AIR REMVL	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 55	CONTAINMENT PURGE	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 56	DC DISTRIBUTION	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 57	EMERGENCY DG	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 58	FIRE PROTECTION	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 59	INSTRUMENTATION	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 60	MAIN/RHT STEAM	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 61	PROCESS RAD MON	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 62	PZR LEVEL CONTROL	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 63	PZR PRESSURE CONTROL	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 64	REACTOR COOLANT	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 65	REACTOR PROTECTION	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 66	SFP COOLING	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 67	STEAM GENERATOR	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 68	CONT IODINE REMOVAL	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 69	FUEL HANDLING EQUIP	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 70	COMPONENT COOLING	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 71	PZR RELIEF/QT	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 72	SERVICE WATER	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 73	STM DUMP/TURB BYP	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 74	CR EVACUATION	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 75	LOSS OF SALT WATER	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 76	NATURAL CIRCULATION	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 77	NATURAL CIRCULATION	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 78	PLANT FIRE	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 79	STM LINE RUPTURE	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 80	LOSS OF INST AIR	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 81	LOSS OF MFW	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 82	LOSS OF RC MAKEUP	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 83	PZR PRESS CONT MALF	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 84	PZR VAPOR SPACE ACCD	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 85	REACTOR TRIP STABIL	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 86	REACTOR TRIP STABIL	004	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 87	SG TUBE LEAK	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 88	SG TUBE RUPTURE	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 89	SMALL BREAK LOCA	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 90	EXCESS RCS LEAKAGE	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A

Test Name: SRONRC.TST
Test Date: Friday, December 11, 1998

		Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1:	91	FUEL HANDLING ACCD	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	92	LOSS OF OFFSITE	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	93	CONDUCT OF OPS	006	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	94	CONDUCT OF OPS	005	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	95	CONDUCT OF OPS	007	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	96	EQUIPMENT CONTROL	006	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	97	EQUIPMENT CONTROL	007	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	98	RADIATION CONTROL	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	99	EMER PROC ERPIP	004	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	100	EMER PROC ERPIP	005	MC-SR	1	C	D	A	B	C	D	A	B	C	D

AS Given Oper

BGE

1/99 SRO AND RO WRITTEN EXAM

Operations Training Unit

TO: J. H. Williams, NRC Region 1 Chief Examiner
FROM: R. E. Niedzielski, Facility Author
SUBJ: Exam Results
DATE: January 29, 1999

Attached per Nureg 1021 ES 403 and ES 501 are the following Exam materials from the SRO and RO Written Exam administered on 1/22/98 at Calvert Cliffs Nuclear Power Plant :

* Exam Cover Sheets with candidate's Answer Sheet attached (Scantron and Exam software report)
* Master SRO (one annoted change) and RO exam with answer keys
* Questions asked by candidates during test administration and proctor responses (Attachments 3 and 7)
* Examination seating chart
* ES-403-1, Written Exam Grading Quality Assurance Checklist
* SRO and RO Examination analysis

The original form for ES 201-3 "Examination Security Agreement" will be submitted later upon completion of the Operating Test.

The post exam analysis has concluded that both exams are valid with no corrections required to either the answer keys or questions. The post exam review with the candidates had a large consensus that the exam was fair and challenging. There were no wording problems or exam format structure concerns that could have resulted in unnecessary confusion and exam stress levels. The use of Unit 1 and Unit 2 conditions in the stem of a few higher cognitive level questions was a new format to the candidates, but all agreed that this format should be included as part of the class exam design since it resulted in more thought provoking question.

There were a few questions that some candidates either had difficulty recalling being taught or learning such as Appendix R redundant components and alarm response actions for RMS and radioactive Waste system operations, but all agreed that the questions were face (operationally) valid.

There were nine questions missed by greater than 50% of the SRO candidates and 4 questions by the RO candidates. The analysis results of these questions are attached in the following pages.

A048

10028

The post exam analysis results that require further evaluation are as follows:

* knowledge of Appendix R redundant components (program upgrade)
* Liquid and Gaseous waste system operation and design features and operational implications during emergency and abnormal evolutions (remedial training)
* Refueling operation and design features (remedial training)

During the administration of the exam, the candidates requested clarification on 6 questions on the SRO Exam and 4 questions on the RO Exam. The Proctors redirected the candidates to answer the questions as written.

If you need any additional information, please contact me at 410 495 6542

Sincerely,

R. E. Niedzielski
Facility Author

J. F. Hornick
Facility Representative
410 495 4789

cc: N. A. Winter
C. C. Zapp
D. A. Holm
T. M. Grover

Attachments:

1. SRO and RO Written Exam Analysis Summary
2. SRO Written Exam Analysis (>50% questions missed)
3. SRO Written Exam administration candidate comments/questions
4. SRO Written Exam Test Statistics (\LXRTEST\sronrc.scr)
5. SRO Written Exam Question Statistics (\LXRTEST\sronrc.scr)
6. RO Written Exam Analysis (>50% questions missed)
7. RO Written Exam administration candidate comments/questions
8. RO Written Exam Test Statistics (\LXRTEST\ronrc.scr)
9. RO Written Exam Question Statistics (\LXRTEST\ronrc.scr)

Attachment 1

1/22/99 NRC SRO and RO Written Exam Analysis Summary

Background:

The NRC SRO and RO Written Exam was developed per Nureg 1021 by BGE. The exam was developed, validated and reviewed by 11 BGE personnel and 3 NRC Region 1 Examiners. The Exam was approved by NRC Region 1 for administration by BGE on 1/22/99. The test was administered per ES-402 and initially graded by BGE per ES-403. The completed Exam was submitted to Region 1 Chief Examiner on 1/29/99 with no changes recommended to the answer key or test questions.

Test Configuration:	SRO	RO
Total points:	100	100
Group average test time	3 hrs 42 min	3 hrs 40 min
Cognitive level		
memory	33	40
comprehensive	49	49
application	18	11
SRO only	28	N/A
Question source		
Bank	30	45
Modified	12	13
New	58	42
Candidate scores		
High	94	93
Mean (test difficulty)	88.833	89.000
Low	84	85
Question discrimination		
Total questions missed	41	29
Questions missed by ≥ 50%	9	4
Questions missed by ≥ 20 %	5	12
Question Validity		
Questions face valid	100	100
Questions operationally valid	100	100

Attachment 2

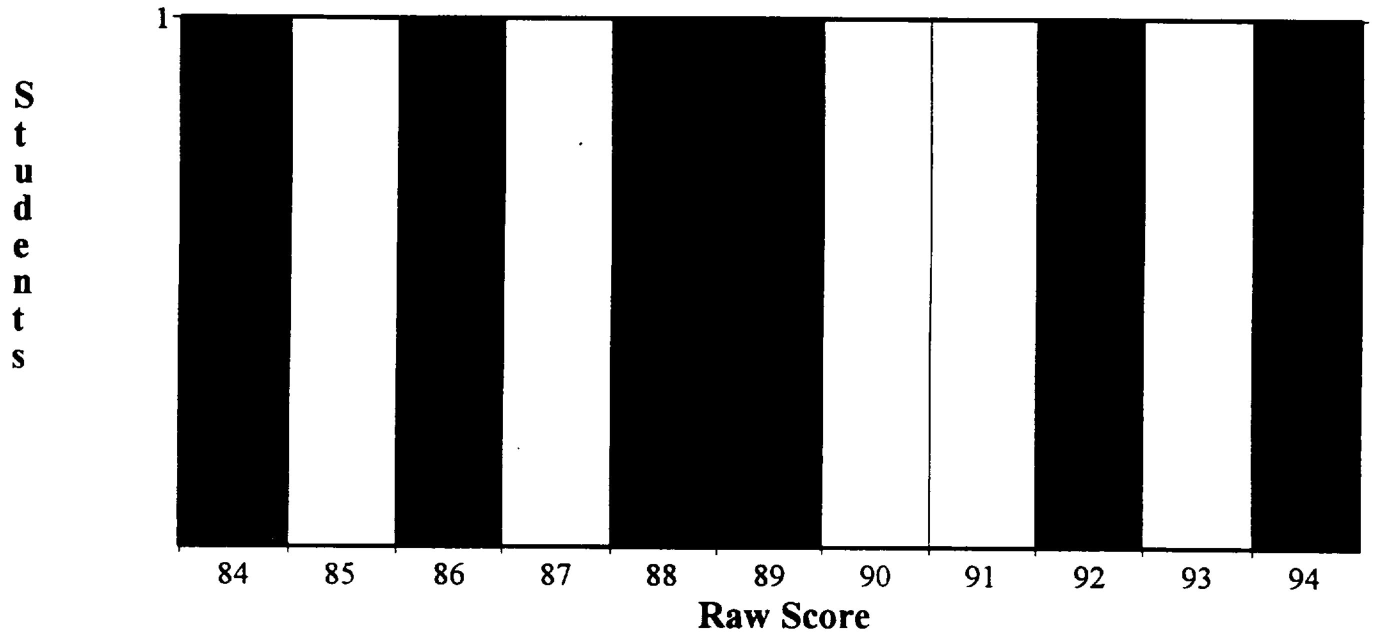
1/22/99 SRO Written Exam Analysis (>50% missed)

#	Topic	NRC Type	Remarks
9	Gas binding of Charging pumps	Generic- operational implications of EOP cautions	Covered in LOIT program
15	Loss of Containment Integrity	Emer/abnormal evolutions	Fundamental knowledge
28	Waste Gas system design basis with failed fuel	Emer/abnormal evolutions	covered in LOIT program
29	Alarm response to Area Radiation Monitors (sample room)	Emer/abnormal evolutions	covered in LOIT program
33	Loss of NI during Refueling operation (CEA swaps)	Emer/abnormal evolutions	covered in LOIT program
45	Radioactive gas release during degasifer operational checks	Emer/abnormal evolutions	Fundamental knowledge
58	Knowledge of Appendix R redundant components	Plant sys- Fire Protection	Site issue not covered in LOIT program
77	Knowledge of core cooling during two phase natural circulation	Emer/abnormal evolutions	covered in LOIT program
97	Safety Evaluation Screening process	Conduct of Operations	covered in LOIT program

Site corrective action system will be used to assess and evaluate required corrective actions for the SRO initial training program based on the exam responses.

1/22/99 SRO Written Exam Administration Comments

#	Candidate comment/question	Proctor response
15	Asked if he could assume if no one is in the Containment	directed to read the question
23	Stated he thought a typo in answer B (Accidental Release of Radioactive Liquid *Waste*).	none
41	Questioned whether the Tech Spec numbers were new (current) or old	directed to answer the question as written
61	Questioned whether the letdown adjustment or plant effect is being asked	directed to answer question as written
64	Asked if he should assume everything works properly	direct to answer the question as written
86	Questioned whether the RED or BLACK Bus was correct	proctor discussed with exam author and stem was changed to BLACK
89	3 candidates questioned whether Unit 1 RCP curves should be used.	directed to answer question as written



Test Name:	SRONRC.TST	
Test Date:	Friday, January 22, 1999	
Number of Students:	6	
Number of Items:	100	
Maximum Point Value:	100	
Highest Score:	94	(94.0 %)
Lowest Score:	84	(84.0 %)
Median:	89	
Mean:	88.833	
Standard Deviation:	3.710	
Test Reliability:	0.391	
Standard Error of Measurement:	2.895	

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item		Type	Point Value	p(diff)	Point Biserial	Choice (Choices Statistics)	Response Index	Point Biserial
1:	1	MC-SR	1	1.000	-	A	0.000	-
						B	0.000	-
						C	0.000	-
						✓ D	1.000	-
						Omitted	0.000	-
1:	2	MC-SR	1	0.833	-0.682	✓ A	0.833	-0.682
						B	0.000	-
						C	0.000	-
						D	0.167	0.682
						Omitted	0.000	-
1:	3	MC-SR	1	1.000	-	✓ A	1.000	-
						B	0.000	-
						C	0.000	-
						D	0.000	-
						Omitted	0.000	-
1:	4	MC-SR	1	1.000	-	A	0.000	-
						✓ B	1.000	-
						C	0.000	-
						D	0.000	-
						Omitted	0.000	-
1:	5	MC-SR	1	1.000	-	A	0.000	-
						B	0.000	-
						✓ C	1.000	-
						D	0.000	-
						Omitted	0.000	-
1:	6	MC-SR	1	1.000	-	✓ A	1.000	-
						B	0.000	-
						C	0.000	-
						D	0.000	-
						Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 7	MC-SR	1	0.667	-0.244	A	0.000	-
					✓ B	0.667	-0.244
					C	0.000	-
					D	0.333	0.244
					Omitted	0.000	-
1: 8	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 9	MC-SR	1	0.500	0.541	A	0.167	-0.638
					B	0.000	-
					✓ C	0.500	0.541
					D	0.333	-0.070
					Omitted	0.000	-
1: 10	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 11	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 12	MC-SR	1	0.833	-0.418	✓ A	0.833	-0.418
					B	0.000	-
					C	0.000	-
					D	0.167	0.418
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index (Choices Statistics)	Point Biserial (Choices Statistics)
1: 13	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 14	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 15	MC-SR	1	0.500	0.443	A	0.167	0.418
					✓ B	0.500	0.443
					C	0.000	-
					D	0.333	-0.800
					Omitted	0.000	-
1: 16	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 17	MC-SR	1	0.833	0.374	A	0.000	-
					✓ B	0.833	0.374
					C	0.000	-
					D	0.167	-0.374
					Omitted	0.000	-
1: 18	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 19	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 20	MC-SR	1	0.833	-0.418	✓ A	0.833	-0.418
					B	0.167	0.418
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 21	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 22	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 23	MC-SR	1	0.833	-0.418	A	0.000	-
					✓ B	0.833	-0.418
					C	0.000	-
					D	0.167	0.418
					Omitted	0.000	-
1: 24	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 25	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 26	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 27	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 28	MC-SR	1	0.500	-0.443	A	0.000	-
					B	0.167	-0.110
					✓ C	0.500	-0.443
					D	0.333	0.557
					Omitted	0.000	-
1: 29	MC-SR	1	0.333	-0.383	✓ A	0.333	-0.383
					B	0.667	0.383
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 30	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Choices Statistics: Response Index	Choices Statistics: Point Biserial
1: 31	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 32	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 33	MC-SR	1	0.500	0.049	A	0.000	-
					B	0.167	-0.638
					C	0.333	0.452
					✓ D	0.500	0.049
					Omitted	0.000	-
1: 34	MC-SR	1	0.833	-0.418	A	0.000	-
					B	0.167	0.418
					✓ C	0.833	-0.418
					D	0.000	-
					Omitted	0.000	-
1: 35	MC-SR	1	0.833	0.638	A	0.000	-
					B	0.167	-0.638
					C	0.000	-
					✓ D	0.833	0.638
					Omitted	0.000	-
1: 36	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 37	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 38	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 39	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 40	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 41	MC-SR	1	0.833	0.110	A	0.000	-
					✓ B	0.833	0.110
					C	0.000	-
					D	0.167	-0.110
					Omitted	0.000	-
1: 42	MC-SR	1	0.833	0.374	A	0.000	-
					B	0.167	-0.374
					✓ C	0.833	0.374
					D	0.000	-
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
					Choices Statistics		
1: 43	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 44	MC-SR	1	0.667	0.383	A	0.000	-
					B	0.333	-0.383
					✓ C	0.667	0.383
					D	0.000	-
					Omitted	0.000	-
1: 45	MC-SR	1	0.333	0.244	A	0.167	-0.110
					✓ B	0.333	0.244
					C	0.000	-
					D	0.500	-0.148
					Omitted	0.000	-
1: 46	MC-SR	1	0.667	0.070	A	0.000	-
					B	0.333	-0.070
					C	0.000	-
					✓ D	0.667	0.070
					Omitted	0.000	-
1: 47	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 48	MC-SR	1	0.833	-0.418	A	0.000	-
					✓ B	0.833	-0.418
					C	0.167	0.418
					D	0.000	-
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
					— Choices Statistics —		
1: 49	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 50	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 51	MC-SR	1	0.833	-0.022	A	0.000	-
					B	0.167	0.022
					C	0.000	-
					✓ D	0.833	-0.022
					Omitted	0.000	-
1: 52	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 53	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 54	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index (Choices Statistics)	Point Biserial (Choices Statistics)
1: 55	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 56	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 57	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 58	MC-SR	1	0.333	0.870	A	0.500	-0.541
					B	0.000	-
					✓ C	0.333	0.870
					D	0.167	-0.374
					Omitted	0.000	-
1: 59	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 60	MC-SR	1	0.833	0.110	A	0.167	-0.110
					B	0.000	-
					C	0.000	-
					✓ D	0.833	0.110
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 61	MC-SR	1	0.833	-0.022	✓ A	0.833	-0.022
					B	0.167	0.022
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 62	MC-SR	1	0.833	0.374	✓ A	0.833	0.374
					B	0.000	-
					C	0.167	-0.374
					D	0.000	-
					Omitted	0.000	-
1: 63	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 64	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 65	MC-SR	1	0.833	0.374	A	0.167	-0.374
					B	0.000	-
					✓ C	0.833	0.374
					D	0.000	-
					Omitted	0.000	-
1: 66	MC-SR	1	0.833	-0.022	A	0.167	0.022
					B	0.000	-
					✓ C	0.833	-0.022
					D	0.000	-
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 67	MC-SR	1	0.833	0.638	A	0.167	-0.638
					✓ B	0.833	0.638
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 68	MC-SR	1	0.667	0.800	A	0.000	-
					✓ B	0.667	0.800
					C	0.167	-0.638
					D	0.167	-0.374
					Omitted	0.000	-
1: 69	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 70	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 71	MC-SR	1	0.833	0.110	✓ A	0.833	0.110
					B	0.167	-0.110
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 72	MC-SR	1	0.833	0.638	A	0.000	-
					B	0.000	-
					✓ C	0.833	0.638
					D	0.167	-0.638
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 73	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 74	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 75	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 76	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 77	MC-SR	1	0.500	0.738	A	0.167	-0.374
					B	0.000	-
					✓ C	0.500	0.738
					D	0.333	-0.487
					Omitted	0.000	-
1: 78	MC-SR	1	0.833	-0.022	A	0.167	0.022
					✓ B	0.833	-0.022
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 79	MC-SR	1	0.833	0.374	A	0.000	-
					✓ B	0.833	0.374
					C	0.000	-
					D	0.167	-0.374
					Omitted	0.000	-
1: 80	MC-SR	1	0.667	0.800	✓ A	0.667	0.800
					B	0.333	-0.800
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 81	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 82	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 83	MC-SR	1	0.833	0.638	A	0.000	-
					✓ B	0.833	0.638
					C	0.000	-
					D	0.167	-0.638
					Omitted	0.000	-
1: 84	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
					Choices Statistics		
1: 85	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 86	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 87	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 88	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 89	MC-SR	1	0.833	0.374	✓ A	0.833	0.374
					B	0.167	-0.374
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 90	MC-SR	1	0.833	0.638	A	0.167	-0.638
					B	0.000	-
					C	0.000	-
					✓ D	0.833	0.638
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
					Choices Statistics		
1: 91	MC-SR	1	0.833	0.638	A	0.000	-
					✓ B	0.833	0.638
					C	0.167	-0.638
					D	0.000	-
					Omitted	0.000	-
1: 92	MC-SR	1	0.833	0.638	A	0.167	-0.638
					B	0.000	-
					✓ C	0.833	0.638
					D	0.000	-
					Omitted	0.000	-
1: 93	MC-SR	1	0.833	0.110	A	0.167	-0.110
					B	0.000	-
					C	0.000	-
					✓ D	0.833	0.110
					Omitted	0.000	-
1: 94	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 95	MC-SR	1	0.500	-0.148	A	0.167	0.682
					✓ B	0.500	-0.148
					C	0.000	-
					D	0.333	-0.383
					Omitted	0.000	-
1: 96	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: SRONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index (Choices Statistics)	Point Biserial (Choices Statistics)
1: 97	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 98	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 99	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 100	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-

Attachment 6

1/22/99 RO Written Exam Analysis (> 50% missed)

#	Topic	NRC Type	Remarks
5	Safety Evaluation Screening process	Conduct of Operations	covered in LOIT program
68	Radioactive gas release during degasifer operational checks	Emer/abnormal evolutions	Fundamental knowledge
71	Loss of high voltage to Linear Range NI	Plant Sys- Nuclear Inst	covered in LOIT program
84	Knowledge of Appendix R redundant components	Plant sys- Fire Protection	Site issue not covered in LOIT program

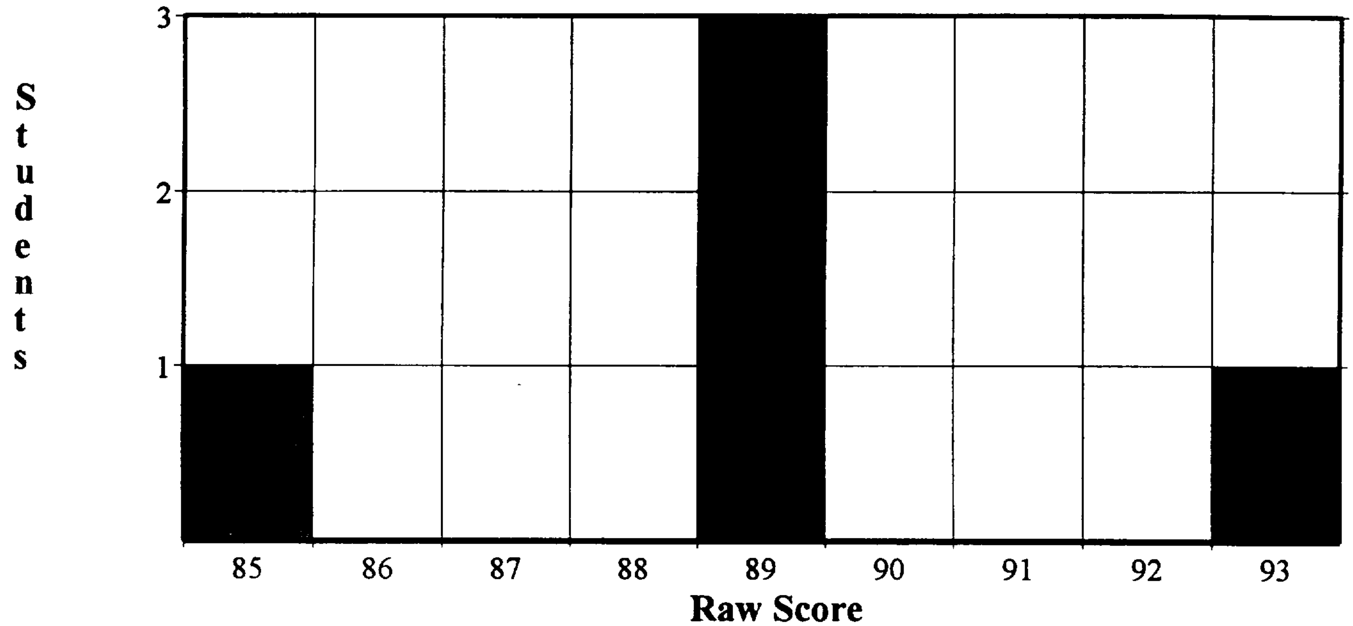
Site corrective action system will be used to assess and evaluate required corrective actions for the RO initial training program based on the exam responses.

Attachment 7

1/22/99 RO Written Exam Administration Comments

#	Candidate comment/question	Proctor response
32	Asked if any actions were performed by operators	directed to not assume anything
35	Asked if word "termination" in choice D meant "throttling"	directed to select best answer for the given information
88	Asked if the process variable had failed or the setpoint	directed to answer the question as written
99	Asked if use of steam tables is permitted if the question does not specifiy to use reference material	responded that use of steam table is permitted

Attachment 8



Test Name:	RONRC.TST	
Test Date:	Friday, January 22, 1999	
Number of Students:	5	
Number of Items:	100	
Maximum Point Value:	100	
Highest Score:	93	(93.0 %)
Lowest Score:	85	(85.0 %)
Median:	89	
Mean:	89.000	
Standard Deviation:	2.828	
Test Reliability:	0.101	
Standard Error of Measurement:	2.682	

Attachment 9

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item		Type	Point Value	p(diff)	Point Biserial	Choices Statistics: Choice	Response Index	Point Biserial
1:	1	MC-SR	1	0.800	0.791	A	0.000	-
						B	0.000	-
						C	0.200	-0.791
						✓ D	0.800	0.791
						Omitted	0.000	-
1:	2	MC-SR	1	0.600	0.000	A	0.400	0.000
						B	0.000	-
						✓ C	0.600	0.000
						D	0.000	-
						Omitted	0.000	-
1:	3	MC-SR	1	1.000	-	A	0.000	-
						B	0.000	-
						C	0.000	-
						✓ D	1.000	-
						Omitted	0.000	-
1:	4	MC-SR	1	1.000	-	✓ A	1.000	-
						B	0.000	-
						C	0.000	-
						D	0.000	-
						Omitted	0.000	-
1:	5	MC-SR	1	0.000	-	A	0.600	0.000
						B	0.000	-
						✓ C	0.000	-
						D	0.400	0.000
						Omitted	0.000	-
1:	6	MC-SR	1	1.000	-	✓ A	1.000	-
						B	0.000	-
						C	0.000	-
						D	0.000	-
						Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item		Type	Point Value	p(diff)	Point Biserial	Choices Statistics: Choice	Response Index	Point Biserial
1:	7	MC-SR	1	1.000	-	✓ A	1.000	-
						B	0.000	-
						C	0.000	-
						D	0.000	-
						Omitted	0.000	-
1:	8	MC-SR	1	1.000	-	A	0.000	-
						✓ B	1.000	-
						C	0.000	-
						D	0.000	-
						Omitted	0.000	-
1:	9	MC-SR	1	1.000	-	A	0.000	-
						B	0.000	-
						✓ C	1.000	-
						D	0.000	-
						Omitted	0.000	-
1:	10	MC-SR	1	1.000	-	A	0.000	-
						B	0.000	-
						C	0.000	-
						✓ D	1.000	-
						Omitted	0.000	-
1:	11	MC-SR	1	1.000	-	✓ A	1.000	-
						B	0.000	-
						C	0.000	-
						D	0.000	-
						Omitted	0.000	-
1:	12	MC-SR	1	0.600	0.645	A	0.000	-
						✓ B	0.600	0.645
						C	0.000	-
						D	0.400	-0.645
						Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 13	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 14	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 15	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 16	MC-SR	1	0.600	0.000	A	0.200	0.000
					✓ B	0.600	0.000
					C	0.000	-
					D	0.200	0.000
					Omitted	0.000	-
1: 17	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 18	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
					Choices Statistics		
1: 19	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 20	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 21	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 22	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 23	MC-SR	1	0.600	0.645	A	0.000	-
					✓ B	0.600	0.645
					C	0.200	-0.791
					D	0.200	0.000
					Omitted	0.000	-
1: 24	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 25	MC-SR	1	0.800	0.791	A	0.000	-
					✓ B	0.800	0.791
					C	0.000	-
					D	0.200	-0.791
					Omitted	0.000	-
1: 26	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 27	MC-SR	1	0.800	0.000	A	0.200	0.000
					✓ B	0.800	0.000
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 28	MC-SR	1	0.800	0.000	✓ A	0.800	0.000
					B	0.200	0.000
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 29	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 30	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 31	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 32	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 33	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 34	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 35	MC-SR	1	0.800	0.000	A	0.200	0.000
					B	0.000	-
					C	0.000	-
					✓ D	0.800	0.000
					Omitted	0.000	-
1: 36	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index (Choices Statistics)	Point Biserial (Choices Statistics)
1: 37	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 38	MC-SR	1	0.800	0.791	A	0.000	-
					B	0.200	-0.791
					✓ C	0.800	0.791
					D	0.000	-
					Omitted	0.000	-
1: 39	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 40	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 41	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 42	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
					Choices Statistics		
1: 43	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 44	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 45	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 46	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 47	MC-SR	1	0.600	-0.645	A	0.000	-
					B	0.200	0.000
					C	0.200	0.791
					✓ D	0.600	-0.645
					Omitted	0.000	-
1: 48	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 49	MC-SR	1	0.600	0.645	A	0.200	0.000
					B	0.000	-
					✓ C	0.600	0.645
					D	0.200	-0.791
					Omitted	0.000	-
1: 50	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 51	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 52	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 53	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 54	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choices Statistics — Choice	Response Index	Point Biserial
1: 55	MC-SR	1	0.600	0.000	✓ A	0.600	0.000
					B	0.200	0.000
					C	0.200	0.000
					D	0.000	-
					Omitted	0.000	-
1: 56	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 57	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 58	MC-SR	1	0.800	0.000	A	0.000	-
					B	0.000	-
					C	0.200	0.000
					✓ D	0.800	0.000
					Omitted	0.000	-
1: 59	MC-SR	1	0.600	0.000	✓ A	0.600	0.000
					B	0.200	0.791
					C	0.200	-0.791
					D	0.000	-
					Omitted	0.000	-
1: 60	MC-SR	1	0.800	0.000	A	0.000	-
					✓ B	0.800	0.000
					C	0.200	0.000
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
					Choices Statistics		
1: 61	MC-SR	1	0.800	0.791	A	0.000	-
					B	0.200	-0.791
					✓ C	0.800	0.791
					D	0.000	-
					Omitted	0.000	-
1: 62	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 63	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 64	MC-SR	1	0.800	0.791	A	0.000	-
					✓ B	0.800	0.791
					C	0.200	-0.791
					D	0.000	-
					Omitted	0.000	-
1: 65	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 66	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 67	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 68	MC-SR	1	0.400	0.000	A	0.200	0.000
					✓ B	0.400	0.000
					C	0.000	-
					D	0.400	0.000
					Omitted	0.000	-
1: 69	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 70	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 71	MC-SR	1	0.400	-0.645	A	0.000	-
					✓ B	0.400	-0.645
					C	0.200	0.000
					D	0.400	0.645
					Omitted	0.000	-
1: 72	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
					Choices Statistics		
1: 73	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 74	MC-SR	1	0.800	0.000	A	0.000	-
					✓ B	0.800	0.000
					C	0.200	0.000
					D	0.000	-
					Omitted	0.000	-
1: 75	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 76	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 77	MC-SR	1	0.600	0.645	A	0.000	-
					B	0.000	-
					C	0.400	-0.645
					✓ D	0.600	0.645
					Omitted	0.000	-
1: 78	MC-SR	1	0.800	0.791	A	0.000	-
					✓ B	0.800	0.791
					C	0.200	-0.791
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
					Choices Statistics		
1: 79	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 80	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 81	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 82	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-
1: 83	MC-SR	1	0.800	0.000	A	0.200	0.000
					✓ B	0.800	0.000
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 84	MC-SR	1	0.000	-	A	0.800	0.791
					B	0.200	-0.791
					✓ C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 85	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 86	MC-SR	1	0.600	0.645	A	0.400	-0.645
					B	0.000	-
					C	0.000	-
					✓ D	0.600	0.645
					Omitted	0.000	-
1: 87	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 88	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 89	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 90	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index	Point Biserial
1: 91	MC-SR	1	0.800	0.000	A	0.200	0.000
					B	0.000	-
					✓ C	0.800	0.000
					D	0.000	-
					Omitted	0.000	-
1: 92	MC-SR	1	0.600	-0.645	A	0.200	0.791
					B	0.200	0.000
					✓ C	0.600	-0.645
					D	0.000	-
					Omitted	0.000	-
1: 93	MC-SR	1	0.600	0.645	A	0.200	0.000
					✓ B	0.600	0.645
					C	0.000	-
					D	0.200	-0.791
					Omitted	0.000	-
1: 94	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 95	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 96	MC-SR	1	0.800	-0.791	A	0.000	-
					✓ B	0.800	-0.791
					C	0.200	0.791
					D	0.000	-
					Omitted	0.000	-

Test Name: RONRC.TST
Test Date: Friday, January 22, 1999

Item	Type	Point Value	p(diff)	Point Biserial	Choice	Response Index (Choices Statistics)	Point Biserial (Choices Statistics)
1: 97	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					C	0.000	-
					✓ D	1.000	-
					Omitted	0.000	-
1: 98	MC-SR	1	1.000	-	A	0.000	-
					✓ B	1.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 99	MC-SR	1	1.000	-	✓ A	1.000	-
					B	0.000	-
					C	0.000	-
					D	0.000	-
					Omitted	0.000	-
1: 100	MC-SR	1	1.000	-	A	0.000	-
					B	0.000	-
					✓ C	1.000	-
					D	0.000	-
					Omitted	0.000	-

Layout for Classrooms 5 & 6
Friday 1/22/99

All tables must be a minimum of 3 feet apart - front to back and side to side. (Individual table at front of class does not apply - Exam Proctor table)

	Proctor Bob Scott/Mike Weben		
Ro Jim Berton	SRO Eric Meerbach	Ro ERV Lyson	SRO Sonny Dean
SRO Phil Suter	Ro KERRY Hummer	SRO DAN Geneva	Ro Scott Miller
SRO Tim Riti	Ro CHRIS Furfaro	SRO Brian Hayden	

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JAN 1999 CCNPP INITIAL LICENSE OPERATOR

OPERATING TEST EXAMINATION MATERIAL

FINAL COPY
(1/14/99)

FOR OFFICIAL USE ONLY

Simulation Facility	Calvert Cliffs	Scenario No.: 1	Op Test No.:	1
Examiners:	____________	Operators:	____________	SRO
	____________		____________	RO
	____________		____________	BOP

Objectives: To evaluate the applicants' ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including failure of a PZR Press instrument high causing PZR Spray valves to open, the ADV controller, a leak in CNMNT from CCW, loss of MCC-104R, a S/G tube leak, and to execute the EOPs for a SGTR with B train of SIAS failing to actuate and the 11 HPSI Pp OOS. Following transition to EOP-6, the leaking CCW line ruptures in CNMNT requiring isolating CCW to CNMNT and tripping all RCPs.

Initial Conditions: The plant is at 100% Power, MOC (IC-13)

Danger tag 13 SRW Pp in Pull-To-Lock

Danger tag 11 HPSI Pp in Pull-To-Lock

1 transformer at Waugh Chapel is OOS

11 SGFP Oil Cooler SRW flow is being controlled manually using 1-SRW-446, CV-1622 bypass valve.

Turnover: Present plant conditions: 100% power, MOC; Unit 2 is in MODE 5.

Power history: 100% power for previous 34 days.

Equipment out of service:

1) 13 SRW Pp has grounded motor. Tripped off 6 hours ago and is expected to be returned to service in 2 days.

2) 11 HPSI Pp bearing wiped during STP 2 hours ago. Expected to be returned to service in about 36 hours. IAS T.S. 3.5.2.

3) 1 of the 3 main transformers at Waugh chapel is OOS.

4) 11 SGFP Oil Cooler SRW flow is being controlled manually using 1-SRW-446, CV-1622 bypass valve.

Surveillances due: STP 0-29 is to be performed by the end of shift.

Instructions for shift:

1) Maintain 100% power.

2) Shift Manager will inform crew when he is ready for them to do the brief and perform STP 0-29.

WRITTEN BY: FACILITY

APPROVED BY: [signature]

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Event No.	Malf. No.	Event Type*		Event Description
Preload	SRW003_03 SI002_01 ESFA001_02			13 SRW Pp OOS. 11 HPSI Pp OOS. Failure of SIAS 'B' to actuate.
1	RCS023_01 (HI)	I	RO	PZR Pressure Transmitter 1-PT-100X fails high resulting in both PZR Spray Valves going full open. The RO should determine 100X has failed high and that RCS pressure is dropping due to both spray valves being full open. The RO should take manual control of the spray valves and shut them and shift control to channel Y. RCS pressure should be restored to normal and the Alarm Manual referenced.
2	MS015 (OPEN)	I	BOP	Next the Atmospheric Dumps Valves fail open due to the S/G pressure input signal failing high. The CRO shall take manual control of the ADVs and shut them. The crew shall coordinate control of reactor power and turbine load as necessary to maintain/restore reactor power to less than 100% and Tc on program. The crew may refer to AOP-7K due to the excess steam demand.
3	CCW003 (0 to 1% over 2 min)	C	All	Approximately 2 minutes after the plant is stabilized a CCW leak develops in CNMNT. The first indication is a CNMNT sump alarm. The sump may drain the first time enough to clear the alarm but as the leak grows the alarm will not clear. The leak size will remain within the capacity of CCW makeup. The crew should evaluate RCS conditions and determine an RCS leak does not exist. T. S. 3.4.14 should be implemented. The crew may determine a CCW leak exists based on head tank level and makeup valve position, and if so they should implement AOP-7C. Preparations for a CNMNT entry to locate the source of the leak should be initiated.
4	480V002_01	C	All	Approximately 10 minutes after initiating the CCW leak in CNMNT, a loss of MCC-104R occurs. The crew will determine MCC-104 has been lost and implement AOP-7I, placing 2 Charging Pps in P-T-L, shifting Ch. Pp suction back to the VCT and adjusting turbine load as necessary to maintain Tc on program. Next they will tie 1Y10 to 1Y09. After 1Y10 is reenergized, Ch. Pp suction should be returned to auto from the VCT.
5	MS001_01 (90 gpm)	R N	RO BOP	About 5 minutes after the crew has reenergized 1Y10, a 90 gpm tube leak will begin in 11 S/G. The crew will implement AOP-2A due to the loss of RCS inventory and determine a S/G tube leak is occurring. The crew should commence a power reduction to take the unit off-line per AOP-2A. The boration lineup will be complicated by the loss MCC-104 requiring use of the gravity feed valves. When PZR level reaches 101 inches or Tave is <537°F the unit will be tripped and EOP-0 entered.
6	MS002_01 (.8 tube)	M	ALL	When the reactor is tripped the tube leak will degrade into a SGTR. The crew will progress through EOP-0. When the SIAS setpoint is reached train 'B' will not actuate and with 11 HPSI Pp already OOS, no HPSI Pps will be running. The crew should manually actuate train 'B' SIAS. The crew should recognize 13 HPSI has no path to inject into the RCS (header MOVs deenergized) and start 12 HPSI. The crew should complete EOP-0, determine EOP-6 is the correct EOP and implement it.
7	CCW003 (20%)	C	ALL	After the transition is made to EOP-6 and the brief complete, the leaking CCW line in CNMNT ruptures. The crew should note the CCW Low pressure alarm and the CCW Head Tank empty, isolate CCW to CNMNT and stop the CCW pumps if cavitating. The RO should stop all RCPs due to no CCW. The cooldown and isolation of 11 S/G will need to be done on natural circulation. Scenario should end when 11 S/G is isolated and S/G level and RCS inventory and subcooling have been stabilized.

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

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SCENARIO 1 OVERVIEW

The candidates will take the shift at 100% power with instructions to maintain power at 100%. STP-029 (CEA Free Movement Test) is to be performed later in the shift.

After taking the watch, PZR Pressure Transmitter 1-PT-100X fails high resulting in both PZR Spray Valves going full open. The RO should determine 100X has failed high and that RCS pressure is dropping due to both spray valves being full open. The RO should take manual control of the spray valves and shut them and shift control to channel Y. RCS pressure should be restored to normal and the Alarm Manual referenced.

Next the Atmospheric Dumps Valves fail open due to the S/G pressure input signal failing high. The CRO shall take manual control of the ADVs and shut them. The candidates shall coordinate control of reactor power and turbine load as necessary to maintain/restore reactor power to less than 100% and Tc on program. The crew should implement AOP-7K.

After the plant is stabilized a CCW leak develops in CNMNT. The first indication is a CNMNT sump alarm. The sump may drain enough the first time to clear the alarm but as the leak grows the alarm will not clear. The leak size will remain within the capacity of CCW makeup. The crew should evaluate RCS conditions and determine an RCS leak does not exist. T. S. 3.4.14 should be implemented. The crew may determine a CCW leak exists based on head tank level and makeup valve position, and if so they should implement AOP-7C. Preparations for a CNMNT entry to locate the source of the leak should be initiated.

After initiating the CCW leak in CNMNT, a loss of MCC-104R occurs. The crew will determine MCC-104 has been lost and implement AOP-7I, placing 2 Charging Pps in P-T-L, shifting Ch. Pp suction back to the VCT and adjusting turbine load as necessary to maintain Tc on program. Next they will tie 1Y10 to 1Y09. After 1Y10 is reenergized, Ch. Pp suction should be returned to auto from the VCT.

About 5 minutes after the crew has reenergized 1Y10, a 90 gpm tube leak begins in 11 S/G. The crew will implement AOP-2A due to the loss of RCS inventory and determine a S/G tube leak is occurring. The crew will commence a power reduction to take the unit off-line per AOP-2A. The boration lineup will be complicated by the loss MCC-104 requiring use of the gravity feed valves. When PZR level reaches 101 inches or Tave is <537°F the unit will be tripped and EOP-0 entered.

When the reactor is tripped the tube leak will degrade into a SGTR. The crew will progress through EOP-0. When the SIAS setpoint is reached train 'B' will not actuate and with 11 HPSI Pp already OOS, no HPSI Pps will be running. The crew should manually actuate train 'B' SIAS. The crew should complete EOP-0, determine EOP-6 is the correct EOP and implement it.

After the transition is made to EOP-6 and the brief is complete, the leaking CCW line in CNMNT ruptures. The crew should note the CCW Low Pressure alarm and the CCW Head Tank or empty, isolate CCW to CNMNT and stop the CCW Pps if cavitating. The RO should stop all RCPs due to no CCW. The cooldown and isolation of 11 S/G will need to be done on natural circulation. The scenario should end when 11 S/G is isolated and S/G level and RCS inventory and subcooling have been stabilized.

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Scenario No: 1		Event No. 1
Event Description:		PZR Pressure Transmitter 1-PT-100X fails high
Time	**Position**	**Applicant's Actions or Behavior**
	CUE:	Annunciator alarm 1C06 - E-29 PZR CH 100 PRESS Both PZR Spray valves come full open
	RO	• Acknowledges alarm, identifies and reports PT-100X has failed high • Refers to the ARM • Notes both PZR spray valves are open

	SRO	• Acknowledges report and directs RO to:
		  • Shift PZR pressure control to channel Y
		  • Verify the PZR spray valves go closed or take 1-HIC-100 to manual and close them
		  • Restore RCS pressure to normal

	RO	• Perform actions as directed by SRO
	SRO	• Determines no T.S. are applicable
	SRO	• Contacts OMC/I&C to investigate failure of 1-PT-100X.

Scenario No: 1		Event No. 2
Event Description:		Atmospheric Dump Valves Fail Open.
Time	**Position**	**Applicant's Actions or Behavior**
	CUE:	Audible steam dump to atmosphere occurring. Open indication of both ADVs.
	BOP	• Identify and report both ADVs have gone full open, recommends taking to manual and closing.

	SRO	• Identifies/acknowledges report of open ADVs.
		• Directs BOP to take ADV controller to manual and shut ADVs.
		• Implements AOP-7K, OVER COOLING EVENT IN MODE ONE OR TWO.
		  • Determines a reactor trip is not required.
		  • Monitors reactor power:
		    • Directs RO to insert CEAs or borate to maintain reactor power to less than 100%.
		    • Directs BOP to reduce/adjust turbine load as necessary to restore/maintain Tc on program.

	RO	• Monitors reactor power and borates or inserts CEAs if necessary to maintain power less than 100%.
	BOP	• Takes ADV controller to manual and verifies both ADVs go closed. • Adjusts turbine load as necessary to maintain Tc on program.
	SRO	• Contacts OMC/I&C to investigate failure of ADV Controller.

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Scenario No: 1		Event No. 3 Page 6 of 15
Event Description:		CCW Leak in CNMNT.
Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator Alarm - CNMNT NORMAL SUMP LVL HI
	BOP	• Identify and report CNMNT sump alarm, refers to ARM and drains sump.
	SRO	• Identify/acknowledge report of CNMNT sump alarm.
	BOP	• Secures draining and reports sump alarm did not clear.
	SRO	• Determines a leak is occurring inside CNMNT: • Directs BOP to evaluate CNMNT environment parameters (temp, press, humidity). • Directs RO to evaluate RCS inventory for leakage.
	RO	• Reports no leakage from RCS.
	BOP	• Reports no change in CNMNT environment parameters and concludes leakage is not from RCS, Feed or Steam.
	SRO	• Determines leakage from not from a hot system. • Directs BOP to monitor SRW and CCW for leakage.
	BOP	• Checks head tank levels, pump amps, pressures for SRW and CCW systems. • Directs ABO to check make-up CVs for SRW and CCW head tanks. • Reports SRW and CCW show no signs of leakage but CCW is making up (may report, suspect leakage from CCW system, head tank level will be low but not in alarm).
	SRO	• If CCW leakage is suspected may implement AOP-7C, LOSS OF COMPONENT COOLING WATER (not required). • Directs rad safety to prepare for a CNMNT entry to identify the source of the leakage. • Refers to T.S. 3.4.14 for CNMNT Sump Alarm being out of service.

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Scenario No: 1	Event No. 4	Page 7 of 15
Event Description:	Loss of MCC-104R.	

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm - Numerous. Loss of CEA position indication. Loss of various control board indications. 1-CVC-504-MOV RWT CHG PP SUCT valve open light lit. 1-CVC-501-MOV VCT OUT valve closed light lit.
	CREW	• Determines a loss of power has occurred and a reactor trip is not required. • Diagnoses the power loss to be loss of MCC-104R.

	SRO	• Directs the RO to place 2 Charging Pps in Pull-To-Lock and shift Charging Pp suction back to the VCT.
		• Directs the BOP to reduce turbine load as necessary to maintain Tc on program.
		• Implements AOP-7I, LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER:
		• Reviews preliminary section and transitions to Section XXV, REACTOR MCC-104R.
		  • Directs RO to maintain PZR level within 15 inches of program not to exceed 225 inches.
		  • Directs BOP to have plant operator tie 1Y10 to 1Y09.

	RO/BOP	• Perform actions directed by SRO.

	SRO	• After 1Y10 is reenergized:
		  • Directs RO to restore charging and letdown per OI-2A, Chemical and Volume Control System.
		  • Directs RO to return VCT Outlet and RWT Outlet valves to auto.
		  • Directs BOP to verify 11 SWGR A/C is in service.

	RO/BOP	• Perform actions directed by SRO.
	SRO	• Reviews T.S. for loss of MCC (3.8.9 and 3.6.3). Note - this is not required prior to proceeding to the next event.
	SRO	• Contact electricians to investigate Loss of MCC-104R.

Scenario No: 1	Event No. 5	
Event Description:	SG Tube Leak/Power Reduction.	

Time	Position	Applicant's Actions or Behavior
	CUE	Lowering PZR level and pressure. Various RMS alarms - Condenser Offgas, N-16.
	RO/BOP	• Identify and report lowering PZR level. • Acknowledge/Identify and report RMS alarms, reports alarm on 11 S/G.

	SRO	• Directs implementation of AOP-2A, EXCESSIVE REACTOR COOLANT LEAKAGE:
		  • Contacts Chemistry and Radcon.
		  • Determines leakage exceeds the capacity of one charging pump.
		  • Verifies a reactor trip is not required.
		  • Since Charging Pumps are not maintaining level, directs the RO to isolate letdown.
		  • Checks for and determines a SG tube leak exists.
		  • Directs BOP to verify SG Blowdown is isolated.

	RO/BOP	• Perform actions directed by SRO.

	SRO	Directs RO and BOP to begin power reduction to take the unit offline.
		• Briefs RO/BOP on plant status and plan of action (downpower).
		• Reviews trip criteria:
		  • Tave less than 537°F
		  • PZR level can NOT be maintained > 101 inches
		  • PZR pressure reaches TM/LP pretrip setpoint
		• Directs RO to borate as follows:
		  • Start all available Charging Pumps
		  • Perform one minute boration from Gravity Feed (due to loss of MCC-104R)
		  • Shift suction to the RWT
		  • Adjust CEAs or boration rate if necessary
		• Directs BOP to reduce turbine load as necessary to maintain SG pressure between 800 and 825 PSIA.

	RO	Commences boration as follows: • Starts all Charging Pumps • Opens BAST Gravity Feed Valves • Shuts VCT outlet Valve • Borates for one minute from BAST • Opens RWT Outlet Valve • Closes BAST Gravity Feed Valves • Coordinates power reduction with BOP • Monitors reactor power, PZR level, Tave, RCS pressure

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Scenario No: 1	Event No. 5	Page 9 of 15
Event Description: SG Tube Leak/Power Reduction.		

Time	Position	Applicant's Actions or Behavior
	BOP	• Coordinates power reduction with RO. • When SG pressure reaches 800-825 PSIA, reduces turbine load to maintain SG pressure in this band.
	RO	• Reports when Reactor trip criteria are met (PZR level <101 inches, or Tave <537°F)
	SRO	• Directs RO to trip the reactor and for RO and BOP to implement EOP-0, POST-TRIP IMMEDIATE ACTIONS.
	RO	• Trips reactor and implements EOP-0.

Scenario No:	1	Event No.	6	Page 10 of 15

Event Description:	Reactor Trip with SG Tube Rupture.

Time	Position	Applicant's Actions or Behavior
	CUE:	Manual Reactor Trip initiated.

	RO	Perform Post-Trip Immediate Actions:
		
		• Depresses ONE set of Manual RX TRIP buttons
		
		• Checks reactor tripped-
		  • Prompt drop in NI power
		  • Negative SUR
		
		• Checks ALL CEAs fully inserted
		
		• Verifies demin water makeup to RCS is secured
		  • 11 & 12 RCMU pumps secured
		  • VCT M/U valve 1-CVC-512-CV is shut
		  • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut (1-CVC-501-MOV must be opened first)
		
		Informs SRO Reactivity Safety Function is complete.

	BOP	• Checks reactor has tripped
		
		• Ensures Turbine has tripped:
		  • Depresses Turbine TRIP button.
		  • Checks the Turbine MAIN STOP VALVES shut.
		  • Checks Turbine SPEED drops
		  • Verifies turbine generator output breakers open:
		
		    • 11 GEN BUS BKR, 0-CS-552-22
		    • 11 GEN TIE BKR, 0-CS-552-23
		
		  • Verifies 11 GEN and EXCITER FIELD BKRs 1-CS-41 and 1-CS-41E are open.
		
		Informs SRO the Turbine is Tripped.

	BOP	• Checks 11 OR 14 4KV Vital Bus energized • Checks 125 VDC and 120 VAC busses energized • Verifies CCW flow to RCPs • Verifies Switchgear Ventilation in service Informs SRO Vital Auxiliaries Safety Function is complete.

Scenario No:	1	Event No.	6
Event Description:	Reactor Trip with SG Tube Rupture.		

Time	Position	Applicant's Actions or Behavior

	RO	• Ensures PZR pressure stabilizes between 1850 psia and 2300 psia and is trending to 2250 psia
		
		• Determines PZR pressure is continuing to drop
		• Manually operates heaters and sprays to attempt to restore pressure
		• When PZR pressure falls to 1725 psia, verifies SIAS actuates
		
		    • Notes SIAS 'B' fails to actuate, informs SRO and manually actuates SIAS 'B'.
		    • Informs SRO that with 11 HPSI OOS and loss of MCC-104, no HPSI path exists to RCS and starts 12 HPSI. (May also dispatch an operator for manual HPSI HDR valve operations)
		
		• Performs RCP Trip Strategy:
		
		  • When pressure drops to 1725 psia, trips either
		
		    • 11A and 12B RCPs OR
		    • 11B and 12A RCPs
		
		• Determines PZR level is not stabilizing between 80 and 180 inches or trending to 160 inches
		
		• Ensures RCS subcooling GREATER THAN 30°F
		
		Informs SRO that RCS Pressure and Inventory Safety Function can NOT be met due to low PZR pressure and PZR level.

	BOP	• Verifies Turbine Bypass Valves or ADVs operating to maintain:
		
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		
		• Checks at least one SG available for controlled heat removal
		
		  • SG level between -170 and +30 inches
		  • Main or Aux Feedwater operating to maintain level
		
		• Checks at least one RCP operating in loop with available SG
		
		• If any RCP operating, check Thot minus Tcold LESS THAN 10°F in loop with available SG
		
		Informs SRO Core and RCS Heat Removal Safety Function is complete.

Scenario No:	1	Event No.	6
Event Description:	Reactor Trip with SG Tube Rupture.		

Time	Position	Applicant's Actions or Behavior

	CREW	• Checks Containment pressure less than 0.7 psig
		• Checks Containment temperature less than 120°F
		• Checks containment radiation monitor alarms CLEAR with NO unexplained trends
		• Checks RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		• Determines a valid CNDSR OFF-GAS alarm exists and verifies S/G Blowdown secured
		Informs SRO that CNMNT environment is complete and Rad Levels External to CNMNT can NOT be met due to CNDSR OFF-GAS alarm.

	SRO	• Conducts EOP-0 mid-brief and directs operators to reverify Safety Function

	SRO	• Determines Recovery Procedure per Diagnostic Flowchart:
		  • NO for RCS press/inv safety function
		  • NO SG pressure <800 psia
		  • YES SG B/D or Offgas RMS alarm
		  • Consider EOP-6 (SGTR)
		  • NO for Rad levels external to CNMNT
		  • YES valid S/G B/D or Offgas RMS alarm
		  • Consider EOP-6 (SGTR)
		• All Safety Functions met - NO
		• Single Event Diagnosis - EOP-6
		• Directs transition to EOP-6.

Scenario No:	1	Event No.	7
Event Description:	EOP-6, SGTR.		

Time	Position	Applicant's Actions or Behavior
	SRO	• Briefs crew prior to EOP-6 implementation • Directs actions per EOP-6

	CREW	• If PZR pressure LESS THAN OR EQUAL TO 1725 psia verify SIAS actuation
		• Determines maximum safety injection flow does not exist - 11 HPSI is tagged out and 13 can NOT provide injection due to loss of MCC (header MOVs deenergized shut).
		  • Safety Injection is not maximized:
		    • Starts 12 HPSI (If not done in EOP-0)
		    • Verifies SIAS lineup per Attachment 2

	RO	• Performs RCP Trip Strategy: (If not done in EOP-0)
		  • When pressure drops to 1725 psia, trips either
		    • 11A and 12B RCPs OR
		    • 11B and 12A RCPs
		• Monitors RCS temp and pressure limits per ATTACHMENT 1 for minimum pump operating pressure for running RCPs

	CREW	• Notes CC PP(S) DISCH PRESS LO annunciator • Checks CCW head tank level and notes level is empty • Checks running CCW pump(s) for cavitation, amps

	SRO	• Directs BOP to:
		  • Isolate CCW to CNMNT
		  • Stop the running CCW pump(s) if cavitating and if not monitor pump amps and system pressure until head tank level is restored and place 13 CCW Pp in P-T-L
		• Directs RO to stop all RCPs

	RO/BOP	• Perform actions directed by the SRO
	BOP	• Determines isolating CCW to CNMNT has isolated the leak
	RO	• Commences RCS Boration (verifies occurring by SIAS actuation)

	BOP	• Commences RCS Cooldown
		  • When SGIS Block permitted alarms are received, blocks SGIS
		  • Commences a rapid ccoldown to <515°F Th on natural circulation
		    • Uses TBVs until loss of vacuum
		    • Uses ADVs and records time ADVs open
		  • Establishes AFW flow using 13 AFW pump to both S/Gs

Scenario No:	1	Event No.	7
Event Description:	EOP-6, SGTR.		

Time	Position	Applicant's Actions or Behavior
	BOP	• Identify, Isolate and Confirm the Affected S/G • Identifies affected S/G (11) by: • Mismatch in feed flow prior to trip • Unexplained S/G level rise pre or post trip • Main Steam Line RMS • S/G chemistry samples • When Th is less than 515°F, isolates the affected S/G by: • Shutting 11 MSIV • Verifying the MSIV bypass is shut • Shifting 11 ADV to 1C43 and verifying shut • Shutting 11 S/G FW Isolation valve • Shutting 11 AFW Block valves • Verifying 11 S/G B/D valves shut • Shutting the Main Steam Upstream Drain valves • Dispatches a plant operator to observe locally from the Aux. Bldg. Roof the S/G Safeties are shut • Verifies the correct S/G is isolated
	BOP	• When Th is <515°F continue the RCS cooldown to less than 300°F as follows: • Reduces cooldown rate to approximately 35°F/hr (due to natural circulation) • Verifies flow in the affected loop by: • Affected loop Tc trend consistent with the affected loop Tc • Tc greater than Th • Directs a plant operator to disable 11A and 11B RCPs by removing the close fuses
	RO	• Evaluates the need to throttle HPSI flow • When the following conditions are met: • At least 25°F subcooling based on CETs • PZR level > 101 inches • At least one S/G available for heat removal • RVLMS indicates level is above the top of the hot leg • Throttles HPSI flow by throttling HPSI HDR valves and/or stopping 12 HPSI PP to: • Maintain subcooling between 25 and 140°F based on CETs • PZR level between 101 and 180 inches • With PZR pressure >200 PSIA and constant stops both LPSI pumps • If the HPSI throttle criteria can not be maintained, reinitiates full flow

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Scenario No: 1	Event No. 7	Page 15 of 15
Event Description: EOP-6, SGTR.		

Time	Position	Applicant's Actions or Behavior

	RO	• Depressurizes the RCS to reduce subcooling and maintain PZR level
		
		• Uses Aux. Spray to depressurize the RCS as follows to maintain the following:
		  • Reduce RCS pressure to approximately affected S/G pressure
		  • at least 25°F
		  • RCS pressure as close to NPSH limit of Attachment 1 as possible
		
		• Records PZR water temp and Charging outlet temp
		• Opens Aux Spray valve
		• Operates charging loop stop valves as necessary to adjust Aux. Spray flow
		• Shifts PZR Spray control to manual
		• Shuts normal PZR Spray valves
		• Maintains PZR cooldown <200°F per hour
		
		• Controls Aux Spray flow to maintain the following
		  • Reduce RCS pressure to approximately affected S/G pressure
		  • at least 25°F
		  • RCS pressure as close to NPSH limit of Attachment 1 as possible
		
		• Controls RCS subcooling by the following methods:
		  • Controlling (securing) Aux Spray flow
		  • Operating (securing) PZR heaters
		  • Raising or lowering RCS cooldown rate
		  • Throttling or raising HPSI flow
		  • Use of PZR vent valves
		
		• When backflow is anticipated and HPSI throttle criteria are met and a bubble exists in the PZR maintains PZR level between 101 and 120 inches until backflow is initiated
		
		NOTE: Due to subcooling SG level may have to be maintained by use of the Miscellaneous Waste Sys.

	BOP	Maintains affected S/G level between -24 and +50 inches. When 11 S/G is isolated and S/G level, RCS inventory and subcooling have been stabilized terminate the scenario.

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SCENARIO #1 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicants' ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including failure of a PZR Press instrument high causing PZR Spray valves to open, the ADV controller, a leak in CNMNT from CCW, loss of MCC-104R, a S/G tube leak, and to execute the EOPs for a SGTR with B train of SIAS failing to actuate and the 11 HPSI Pp OOS. Following transition to EOP-6, the leaking CCW line ruptures in CNMNT requiring isolating CCW to CNMNT and tripping all RCPs.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-13. Draft Spin #805

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

5. Enter Malfunctions

____ a. SRW Pp Trip
SRW003_03 at time zero

____ b. 11 HPSI Pp Trip
SI002_01 at time zero

____ c. Failure of SIAS Actuation Channel 'B'
ESFA001_02 at time zero

____ d. 1-PT-100X Pressurizer Pressure Fails High
RCS023_01 HI on F1

____ e. Atmospheric Dump Valves Fail Open
MS015 on F2

____ f. CCW Leak in CNMNT
CCW003 0 to 1% ramp over 2 minutes on F3

____ g. Loss of MCC-104R
480V002_01 on F4

____ h. 11 S/G Tube Leak
MS001_01 set to 90 gpm on F5

____ i. 11 S/G Tube Rupture
MS002_01 set to .8 tube on F6

____ j. CCW leak in CNMNT
CCW003 after the transition to EOP-6 brief is complete, modify this malfunction to 20 %.

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SCENARIO #1 SETUP

6. Enter Panel Overrides

____ a. 11 HPSI Pump Green Light Out on 1C08 at time zero

____ b. 11 HPSI AUTO START BLOCKED Annunciator H17 OFF

____ c. 13 SRW Pump Green Light Out on 1C13 at time zero

____ d. 13 SRW AUTO START BLOCKED Annunciator K15 OFF

7. Enter Remote Functions / Administrative

____ a. Place 13 SRW Pump in PTL and danger tag.

____ b. Place 11 HPSI Pump in PTL and danger tag.

____ 8. Set simulator time to real time, then place simulator in CONTINUE.

____ 9. Give crew briefing.

a.	Present plant conditions:	100% power - MOC/8,400 MWD/MTU. Unit 2 is in Mode 5. RCS Boron - 679 PPM.
b.	Power history:	100% for previous 34 days.
c.	Equipment out of service:	13 SRW Pump out of service due to grounded motor. Tripped off 6 hours ago expected to be returned to service in 2 days. 11 HPSI Pump bearing wiped during the STP 2 hours ago. Expected to be returned to service in about 36 hours. IAS T.S. 3.5.2.
d.	Abnormal conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. 11 SGFP Oil Cooler SRW flow is being controlled manually using 1-SRW-446, CV-1622 Bypass Valve.
e.	Surveillances due:	STP-O-29 is to be performed by the end of shift.
f.	Instructions for shift:	Maintain 100% power. Shift Manager will inform the crew when he is ready for them to do the brief and perform STP-O-29.

____ 10. Allow crew 3-5 minutes to acclimate themselves with their positions.

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SCENARIO #1 SETUP

__ 11. Instructions for the Booth Operator.

a. Activate Malfunctions F1-F6 when each is cued by the lead evaluator.

b. After the transition to EOP-6 brief is complete, modify malfunction CCW003 to 20 %.

SCENARIO #1 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	OMC/I&C investigate failure of 1-PT-100X.	Acknowledge request.
2.	OMC/I&C investigate failure of the ADV Controller.	Acknowledge request.
3.	ABO check make-up CVs for CCW and SRW.	After 2-3 minutes report the CCW Head Tank CV is fully open and the SRW CV is shut.
4.	Rad Safety make preparations for a CNMNT entry.	Acknowledge request.
5.	PWS tie 1Y10 to 1Y09.	After approximately 3 minutes tie 1Y10 to 1Y09 and report action to the Control Room.
6.	Electricians investigate the loss of MCC-104R.	Acknowledge request.
7.	Contacts chemistry to sample both SGs and Rad con to inform them of potentially changing rad levels in the Aux. Bldg.	Acknowledge request. After about 15 minutes chemistry reports qualitative SG samples indicate RCS leakage into 11 SG.
8.	Directs ABO to verify Switchgear ventilation is in service.	After 3 minutes report 11 switchgear ventilation is in service.
9.	TBO shift #11 ADV to 1C43.	After 3 minutes report #11 ADV has been shifted to 1C43 with zero % output.
10.	ABO verify from the Aux. Bldg. roof all SG safeties are shut.	After 3 minutes report that from the Aux. Bldg. roof, all SG safeties are shut.

SCENARIO #1 SETUP

SHIFT TURNOVER

	Present Plant Conditions	100%
II.	Burnup:	8400 MWD/MTU (MOC)
III.	Power History	100% for previous 34 days.
IV.	Equipment out of Service:	13 SRW Pump out of service due to grounded motor. Tripped off 6 hours ago expected to be returned to service in 2 days. 11 HPSI Pump bearing wiped during the STP 2 hours ago. Expected to be returned to service in about 36 hours. IAS T.S. 3.5.2.
V.	Abnormal Conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. 11 SGFP Oil Cooler SRW flow is being controlled manually using 1-SRW-446, CV-1622 Bypass Valve.
VI.	Surveillances Due:	STP-O-29 is to be performed by the end of shift.
VII.	Instructions for Shift	Maintain 100% power. Shift Manager will inform the crew when he is ready for them to do the brief and perform STP-O-29.
VIII.	U2 Status and Major Equipment OOS:	Mode 5.

Simulation Facility	Calvert Cliffs	Scenario No.: 2	Op Test No.:	1
Examiners:	____________	Operators:	____________	SRO
	____________		____________	RO
	____________		____________	BOP

Objectives: To evaluate the applicant's ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including reducing power to remove a SGFP from service, failure of a VCT Level transmitter, malfunction of the Main Generator H2 Cooler SRW Controller, loss of 11 4KV Bus, and loss of the other SGFP. Upon ordering a reactor trip, an ATWS will occur. In EOP-0, a loss of the available AFW Pp results in a loss of all feedwater. In EOP-3, during the rapid cooldown to 465°F, SGIS 'A' fails to block and SGIS actuates. The loss of Condensate Booster Pump Injection capability requires initiation of Once Through Core Cooling.

Initial Conditions: The plant is at approximately 85% power (IC-67). Power increase is in progress.

12 SG has tube leakage of 3 gpd.

23 AFW Pump is OOS.

1 transformer at Waugh Chapel is OOS.

1B DG is OOS.

Turnover: Present plant conditions: 85% power, MOC; Unit 2 is in MODE 5.

Power history: 100% power for previous 60 days then reduced power to 70% 36 hours ago to repair a control oil leak on 12 SGFP.

Equipment out of service:

1) 12 SG has tube leakage of 3 gpd. Leakage has been constant at 3 gpd for the last 2 weeks.
2) 23 AFW Pp is OOS. Unit 2 has just entered Mode 5 from refueling.
3) 1 of the 3 main transformers at Waugh Chapel is OOS.
4) 1B DG is OOS. It was removed from service due to a fuel rack problem 10 hours ago and is expected to be returned to service within the next 2 hours. IAS T.S. 3.8.1.

Surveillances due: Perform STP-O-8 on 1B DG following return to service.

Instructions for shift:

1) Continue raising power to 100% per OP-3, currently at Step 6.1.i.2.
2) Perform STP-O-8 on 1B DG when it is returned to service.

WRITTEN BY: FACILITY

APPROVED BY: J H Williams

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Event No.	Malf. No.	Event Type*		Event Description
Preload	DG001_02 RPS005 RPS006 Pnl Override	N/A	N/A	1B DG OOS. ATWS. SGIS 'A' Block Keyswitch in Reset
1	N/A	R N	RO BOP	The candidates receive a report that 12 SGFP is leaking oil badly and reduce power to remove it from service. The crew should reduce power IAW OP-3.
2	CVCS009	I	RO	After power has been reduced, and 12 SGFP removed from service, VCT Level Instrument LT-227 fails low. The candidate should refer to the Alarm Manual, recognize Charging Pump suction has realigned to the RWT and take action to shift suction back to the VCT.
3	TG030_01	I	BOP	Several minutes after suction is realigned to the VCT, TCV-1608 fails shut (SRW to the Main Generator H2 Cooler) due to a failed input signal. Upon receipt of the Generator Status Panel Alarm the candidate should refer to the Alarm Manual, determine TCV-1608 has failed closed, take manual control and restore SRW to the H2 cooler.
4	4KV001_01	C	All	Approximately 2 minutes after the H2 temperature alarm is clear a loss of 11 4KV Bus occurs. The candidates should determine 11 4KV Bus has been lost and that RPS is not calling for a trip. They should take actions to stabilize power and restore Tc to program. They will implement AOP-7I and will tie 1Y09 to 1Y10, start a CCW Pp, place 13 SW and SRW Pps on 11 header, 14 4KV Bus. The candidates should consider Tech. Spec. action statements for deenergized equipment.
5	FW004_01	M	All	About 5 minutes after the crew has reenergized 1Y09 and had an opportunity to review the Technical Specifications, a loss of #11 SGFP occurs (if the reactor trips during loss of 11 4KV Bus, 11 SGFP will trip when the reactor trips). The CRO should attempt to reset the SGFP but when it does not reset and the SG LO LVL pre-trips are received the CRS should order the reactor tripped and implementation of EOP-0. When the unit receives an auto trip signal or is attempted to be tripped manually it will not trip (ATWS). The RO should then deenergize the CEDM MG Sets and then verify the reactor is tripped.
6	AFW001_01	C	BOP	After the first pass through the EOP-0 Safety Functions, 11 AFW Pump trips. The crew should attempt to start 12 AFW Pump and attempt to reset 11 AFW Pump, both of which will be unsuccessful. The candidates should determine a loss of all feedwater is taking place and implement EOP-3.
7	N/A	M	ALL	After the transition is made to EOP-3, the RCPs should be tripped. Following the brief, the candidates should commence a rapid cooldown to 465°F with the expectation of using Condensate Booster Pump Injection, however, when the SGIS Block permitted is received SGIS 'A' will not block. When SGIS 'A' actuates, Booster Pump Injection will no longer be available so the candidates will have to go to OTCC. The scenario can be terminated once OTCC has been initiated.

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

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SCENARIO 2 OVERVIEW

The candidates will take the shift at approximately 80% power with instructions to raise power to 100% using OP-3. 12 SGFP has just been returned to service following repair of an oil leak The crew is to perform STP-O-8 on the 1B DG when it is returned to service.

After taking the watch, the candidates receive a report that 12 SGFP is leaking oil badly and reduce power to remove it from service. The crew should reduce power IAW OP-3.

After power has been reduced and 12 SGFP removed from service, VCT Level Instrument LT-227 fails low. The candidate should recognize Charging Pump suction has realigned to the RWT, take action to shift suction back to the VCT and refer to the Alarm Manual. I & C should be notified to investigate/repair.

Several minutes after suction is realigned to the VCT, TCV-1608 fails shut (SRW to the Main Generator H2 Cooler) due to a failed input signal. Upon receipt of the Generator Status Panel Alarm the candidate should refer to the Alarm Manual, determine TCV-1608 has failed closed, take manual control and restore SRW to the H2 cooler. I & C should be notified to investigate/repair.

After the H2 temperature alarm is clear a loss of 11 4KV Bus occurs. The candidates should determine 11 4KV Bus has been lost and that RPS is not calling for a trip. They should take actions to stabilize power and restore Tc to program. They will implement AOP-7I, tie instrument buses 1Y09 to 1Y10, start a CCW Pp place 13 SW and SRW Pps on 11 header, 14 4KV Bus (if the reactor trips during loss of 11 4KV Bus, 11 SGFP will trip when the reactor trips). The candidates should consider Tech. Spec. action statements for deenergized equipment.

About 5 minutes after the crew has reenergized 1Y09 and had an opportunity to review the Technical Specifications, a loss of #11 SGFP occurs. The CRO should attempt to reset the SGFP but when it does not reset and the SG LO LVL pre-trips are received the CRS should order the reactor tripped and implementation of EOP-0. When the unit receives an auto trip signal or is attempted to be tripped manually it will not trip (ATWS). The RO should then deenergize the CEDM MG Sets and then verify the reactor is tripped on 1C15.

After the first pass through the EOP-0 Safety Functions, 11 AFW Pump trips. The crew should attempt to start 12 AFW Pump and attempt to reset 11 AFW Pump, both of which will be unsuccessful. The candidates should determine a loss of all feedwater is taking place and implement EOP-3.

After the transition is made to EOP-3, the RCPs should be tripped. Following the brief, the candidates should commence a rapid cooldown to 465°F with the expectation of using Condensate Booster Pump Injection, however, when the SGIS Block permitted is received SGIS 'A' will not block. When SGIS 'A' actuates, Booster Pump Injection will no longer be available so the candidates will have to go to OTCC. The scenario can be terminated once OTCC has been initiated.

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Scenario No:	2	Event No.	1	
Event Description:	Power Reduction to Remove 12 SGFP from Service.			

Time	Position	Applicant's Actions or Behavior
	CUE	The Control Room receives a report from the PWS that 12 SGFP is leaking oil badly and needs to be removed from service promptly.

	SRO	• Briefs crew on plan of action to remove 12 SGFP.
		
		• Directs crew to begin a rapid power reduction per OP-3 Appendix B.
		• Instructs crew on reactor trip criteria:
		  • Any valid low S/G pressure pre-trip
		  • Any valid high PZR pressure pre-trip
		  • Any valid TM/LP pre-trip
		  • S/G level approaching +50 or -45 inches
		
		• Informs system operator of power reduction
		• Informs chemistry if power reduction is greater than 15% in one hour

	RO	• Initiates PZR spray flow to equalize RCS Boron: (may already be in progress)
		  • Energize all PZR backup heater banks
		  • Adjust PZR Pressure Controller setpoint to maintain 2250 psia
		
		• Commences boration from the BASTs followed by shifting suction to the RWT:
		  • Opens BA direct makeup valve
		  • Verifies two charging pumps running
		  • Runs a BA pump for 30 seconds
		  • After BA Pump is secured, shuts BA direct makeup valve
		  • Opens RWT outlet valve
		  • Shuts VCT outlet
		
		• Inserts CEAs if necessary and maintains ASI within the limits of the COLR
		
		• Requests Peer checks for reactivity manipulations

	BOP	• Lowers TBV controller setpoint to 885 PSIA and requests peer check
		• If power is reduced below 70%, opens the LP FW heater HI LVL Dumps
		• Reduces turbine load to maintain Tc within 5°F of program (Maintains Main Steam header pressure 850-880 psia)
		
		• Monitors turbine parameters not to exceed
		  • 150°F/hr rate of change of 1st stage shell inner metal temperature (Point 6 on TR-4404)
		  • 75°F 1st stage shell metal temperature differential (Diff between Points 6 & 7 on TR-4404)
		  • Unloading rate of 10% step change or 5%/min
		
		• Biases down 12 SGFP and biases up 11 to shift the load to 11 SGFP and maintains:
		  • 11 SGFP suction flow rate <18,000 gpm
		  • 11 SGFP suction pressure> 250 psig
		  • 11 SGFP speed is < 5350 rpm
		
		• When 11 SGFP is carrying all the load, informs SRO and recommends tripping 12 SGFP

Scenario No:	2	Event No.	1	Page 5 of 13

Event Description:	Power Reduction to Remove 12 SGFP from Service.

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs BOP to trip 12 SGFP and secure oil pumps except emergency oil pump • Directs RO to shift Charging suction back to the VCT • Directs RO/BOP to stabilize the unit at current power level
	RO/BOP	• Performs actions directed by SRO
	SRO	• Contacts OMC/Maintenance to investigate oil leak on 12 SGFP

Scenario No: 2	Event No. 2	Page 6 of 13

Event Description: VCT level transmitter 1-LT-227 fails LOW.

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm 1C07 F-46 CHG PP SUCT FROM RWT • 1-CVC-504-MOV RWT CHG PP SUCT valve open light lit • 1-CVC-501-MOV VCT OUT valve closed light lit
	RO	• Identifies and reports charging pump suction swap to RWT • Diagnoses boration of RCS and affect on power (rapid shutdown)
	SRO	• Acknowledges charging pump suction swap to RWT
	RO	• Verifies VCT level normal on 1-LT-226 • Determines and reports failure of 1-LT-227
	SRO	• Directs realignment to VCT by taking HS to open for 1-CVC-501-MOV and HS to shut for 1-CVC-504-MOV. • Directs BOP to reduce turbine load if necessary to maintain Tc on program
	RO/BOP	• Performs actions directed by SRO and refer to Alarm Response Manual
	SRO	• Contacts OMC/I&C to investigate failure of 1-LT-227

Scenario No: 2		Event No. 3	Page 7 of 13
Event Description:		SRW Flow Controller for Main Generator H2 Cooler fails closed	
Time	Position	Applicant's Actions or Behavior	
	CUE	Annunciator alarm - GEN MON STATUS PANEL TCV-1608 fully shut	

	BOP	• Acknowledges/reports alarm
		  • Determines alarm is H2 PRESS PURITY TEMP alarm on status panel
		  • Refers to Alarm Response Manual (ARM)
		  • Reviews possible causes and determines a high temperature conidtion exists due to a malfunction of the temperature control valve.
		  • Reports findings to SRO	

	SRO	• Acknowledges report
		  • Directs BOP to take manual control of TCV and restore SRW flow to H2 cooler or to have the TBO operate the 1-SRW-1608 Bypass Valve per OI-15 to restore temperature
		  • Requests I&C investigate problem with TCV-1608 controller
		  • Directs BOP to monitor Main Generator H2 temperature	

	BOP	• Takes manual control of TCV and manually opens TCV to reduce Main Generator H2 temperature or directs the TBO to operate the SRW-1608 Bypass Valve • Monitors temperature and throttles TCV to maintain temperature	

Scenario No: 2		Event No. 4	Page 8 of 13

Event Description: Loss of 11 4KV

Time	Position	Applicant's Actions or Behavior
	CUE	Annunciator alarms - various Zero volts on 11 4KV Bus White Bus power on light out
	Crew	• Determines a loss of power has occurred and a reactor trip is not required. • Diagnoses the power loss to be loss of 11 4KV Bus
	SRO	• Implements AOP-7I, <u>LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER</u>: • Directs RO to reduce power to a level consistent with feedflow (Cond and Cond Booster Pump mini flows fail open) • Directs BOP to reduce turbine load to restore Tc to program (FW heater high level dumps fail open) • Informs crew if S/G level approaches -50 inches, the reactor will be tripped
	RO/BOP	Perform actions directed by SRO

	SRO	• Directs BOP to:
		  • Start 12 or 13 CCW Pp
		  • Verify 13 and 14 CACs are maintaining CNMNT temp <120°
		  • Place all FW heater hi level dump HSs in Open

	BOP	Performs actions directed by SRO
	SRO	• Contacts Electricians investigate loss of 11 4KV Bus • Directs plant operator to tie instrument bus 1Y09 to 1Y10 • Directs plant operators align 13 Charging pump to 14 Bus • Directs plant operators to align 13 SW and 13 SRW Pumps to 11 headers
	SRO	• Directs BOP to instruct the Outside Operator to take the 1A DG to LOCAL and shut it down • Directs the BOP to verify 12 cavity cooling fan is running • Directs BOP to start 12 Main Exhaust Fan and verify 12 CR HVAC and 12 SWGR A/C are in service
	BOP	• Performs actions directed by SRO
	SRO	• When 13 SW and SRW Pumps are align to 14 4KV Bus and 11 header, directs the BOP to start 13 SW and 13 SRW Pumps • Refers to T.S. 3.8.1, 3.8.9
	BOP	• When directed by the SRO, starts 13 SW and 13 SRW Pumps

Scenario No:	2	Event No.	5	Page 9 of 13
Event Description:	Trip of 11 SGFP/Reactor Trip/ATWS			

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm - 11 SGFPT TRIP Lowering SG levels Reduced Feedwater flow Trip light for 11 SGFP
	BOP	• Identify and report trip of 11 SGFP
	SRO	• Identify/acknowledge trip of 11 SGFP
	SRO	• Direct action of AOP-3G MALFUNCTION OF MAIN FEEDWATER SYSTEM • Informs crew if SG level approaches -50 inches OR SG level is < -26 AND Main Feedwater is NOT established, Trip the reactor • Directs BOP to attempt to reset 11 SGFP

	BOP	• Attempt to start tripped SGFP
		  • Verify shut the HP and LP stop valves
		  • Check the DEMAND MIN indicator is illuminated at OCS
		  • Reset the SGFP Vacuum trip and Turbine trip
		  • Depress DIRECT GOV VLV pushbutton at OCS
		  • Depress and hold the "up" SPEED arrow to obtain governor valve position approx. 3% to 5% above pre-trip governor valve position
		  • Shift OCS to HIC control as desired:
		
		• When the SGFP does not reset or as level approaches -26 inches or S/G level lo , informs the SRO

	SRO	• Directs RO to trip the reactor • Directs the RO and BOP to implement EOP-0, POST-TRIP IMMEDIATE ACTIONS

	RO	• Depresses one set of manual reactor trip pushbuttons
		  • Notes reactor failed to trip (should also note reactor failed to trip automatically if an auto trip signal was generated)
		  • Informs SRO of ATWS condition
		
		• Deenergizes CEDM Motor Generator sets:
		  • Opens 12A 480V Bus FDR (52-1201)
		  • Opens 13A 480V Bus FDR (52-1301)
		  • Opens 12A/12B 480V Bus TIE (52-1212)
		  • Opens 13A/13B 480V Bus Tie (52-1312)
		  • Reenergizes 12A and 13A 480V Buses by closing ANY breakers opened above
		• Checks ALL CEAs fully inserted
		  • Reports unable to verify due to loss of bus
		• Verifies demin water makeup to RCS is secured
		  • 11 & 12 RCMU pumps secured
		  • VCT M/U valve 1-CVC-512-CV is shut
		  • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut
		
		Reports Reactivity Control Safety Function is complete

Event Description:	EOP-0, POST-TRIP IMMEDIATE ACTIONS

Time	Position	Applicant's Actions or Behavior
		NOTE: Actions of EOP-0 continued from Event 5 **Safety Function reports may include consideration for loss of 11 4KV Bus**

	BOP	• Checks reactor has tripped
		
		• Ensures turbine has tripped:
		  • Depresses U-1 MAIN TURB TRIP button
		  • Checks Turbine Throttle valves shut
		  • Checks turbine speed drops
		  • Verifies turbine generator output breakers open:
		    • 11 GEN BUS BKR, 0-CS-552-22
		    • 11 GEN TIE BKR, 0-CS-552-23
		  • Verifies 11 GEN FIELD BKR 1-CS-41 is open
		  • Verifies 11 GEN EXCITER FIELD BKR 1-CS-41E is open
		
		Reports the turbine is tripped

	BOP	• Checks 11 OR 14 4KV Vital Bus energized • Depresses 0C DG Emergency Start Pushbutton • Checks 125 VDC and 120 VAC busses energized • Verifies CCW flow to RCPs • Verifies Switchgear Ventilation in service Reports Vital Auxiliaries Safety Function is complete.
	RO	• Ensures PZR pressure stabilizes between 1850 psia and 2300 psia AND is trending to 2250 psia • Ensures PZR level stabilizes between 80 and 180 inches and is trending to 160 inches • Ensures RCS subcooling GREATER THAN 30°F Reports RCS Pressure and Inventory Safety Function is Complete

	BOP	• Verifies turbine bypass valves or ADVs operating to maintain:
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		
		• Check at least one SG available for controlled heat removal
		  • SG level between -170 and +30 inches
		  • Main or Aux Feedwater are operating to maintain level
		
		• Check at least one RCP operating in loop with available SG
		
		• If any RCP operating, check Thot minus Tcold LESS THAN 10°F in loop with available SG
		
		Reports Core and RCS heat removal is complete

Scenario No:	2	Event No.	6	Page 11 of 13

Event Description: EOP-0, POST-TRIP IMMEDIATE ACTIONS

Time	Position	Applicant's Actions or Behavior

	CREW	• Checks Containment pressure less than 0.7 psig
		• Check Containment temperature less than 120°F
		• Check containment radiation monitor alarms CLEAR with NO unexplained trends:
		• Check RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		
		Reports CNMNT Environment and Rad Levels External to CNMNT complete (may report can not assess due to loss of power)

	SRO	• Conducts EOP-0 mid-brief and directs RO/BOP to reverify safety functions
	CREW	• On reverification, all safety functions reported as met with the exception of Core and RCS Heat Removal

	BOP	Reverification of Core and RCS Heat Removal
		
		• Verifies Turbine Bypass Valves or ADVs operating to maintain:
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		
		• Check at least one SG available for controlled heat removal
		  • SG level between -170 and +30 inches
		  • Notes no Main or Aux Feedwater operating
		  • Reports to SRO, 11 AFW Pump has tripped and taking alternate actions for loss of feed
		  • Trips both SGFPs
		  • Shuts the SG FW isolation valves
		  • Notes no AFW pumps available to start and dispatches plant operator to reset 11/12 AFW Pumps
		
		• Check at least one RCP operating in loop with available SG
		• Directs TBO/PWS to reset 12 or 11 AFW Pump
		• If any RCP operating, check Thot minus Tcold LESS THAN 10°F in loop with available SG
		
		Reports Core and RCS heat removal not met due to no main or auxiliary feedwater

	SRO	• Determines Recovery Procedure per Diagnostic Flowchart:
		  • NO for CORE and RCS Heat Removal
		  • NO for at least one S/G has feed flow
		• Consider EOP-3 (LOAF)
		
		• All Safety Functions met - NO
		• Single Event Diagnosis - EOP-3
		
		• Directs transition to EOP-3.

Scenario No:	2	Event No.	7	Page 12 of 13

Event Description:	EOP-3, LOSS OF ALL FEEDWATER

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs RO to stop all RCPs
	RO	• Stops all RCPs
	SRO	• Conducts EOP-3 entrance brief and directs implementation of EOP-3 • Directs plant operators/maintenance support to restore AFW pumps
	BOP	• Shuts S/G B/D isolation valves (may already be shut)

	RO	**Note - Not all components in this step will have power**
		
		• Commences RCS boration
		  • Shuts 1-CVC-512-CV VCT M/U valve
		  • Opens 1-CVC-514-MOV BA DIRECT M/U valve
		  • Opens BAST GRAVITY FD valves
		    • 1-CVC-508-MOV
		    • 1-CVC-509-MOV
		
		  • Verifies the M/U Mode Sel Sw in manual
		  • Starts 12 BA Pump
		  • Shuts 1-CVC-501-MOV VCT OUT valve
		  • Ensures 12 and 13 Charging Pumps running
		
		• Records time boration started
		
		• Records BAST levels:
		  • 11 BAST
		  • 12 BAST
		
		• Continue boration until ONE condition met:
		  • Shutdown Margin requirements met per NEOPs
		  • BAST level lowered a total of 71 inches
		  • Boration has been in progress for:
		    • 35 minutes with THREE charging pumps running
		    • 53 minutes with TWO charging pumps running
		    • 105 minutes with ONE charging pump running

	SRO	• Directs crew to commence natural circ cooldown to less than 465°F
		  • Informs crew if both S/G levels fall below -350 inches or Tc rises uncontrollably 5°F then OTCC must be initiated
		  • Informs crew that when SGIS block permitted alarms come in SGIS will be blocked

	BOP	• Commences natural circ cooldown to < 465°F
		
		  • Uses TBVs to commence C/D
		  • When SGIS Block Permitted alarms are received, informs SRO and takes block keyswitches to BLOCK
		  • Notes SGIS A fails to block and informs SRO

Event Description: EOP-3, LOSS OF ALL FEEDWATER

Time	Position	Applicant's Actions or Behavior
	SRO	• May direct BOP to stop or slow the cooldown while a attempt is made to block SGIS locally • Directs PWS to try to block SGIS A locally at ESFAS cabinets • When reported SGIS can not be blocked locally, directs BOP to continue rapid cooldown to <465°F • Determines SGIS actuation will prevent the use of Condensate Booster Pump Injection
	BOP	• Performs actions directed by SRO • When SGIS occurs, verifies SGIS and continues rapid cooldown using the ADVs • Can Not establish AFW or Cond. Bstr Pp Inj. to SGs

	CREW	• Continues efforts to establish a feed source
		
		• Monitors S/G level and Tc and when OTCC initiation criteria are met perform the following actions:
		  • Shifts L/D throttle valve controller to manual and shuts L/D control valves
		  • Starts all available charging pumps (12 and 13)
		  • Opens the main and aux HPSI header valves (only main header has power)
		  • Starts available HPSI pumps (12 and 13)
		    • Dispatches plant operator to locally open HPSI Hdr crossconnect valve
		    • Aligns 13 HPSI to 14 4KV Bus and starts it
		    • Places all PZR heaters in off
		    • Opens the CAC emergency outlet valves
		    • Starts all available CACs in high
		
		  • Opens both PORVs as follows:
		    • When PZR Press Block Permitted Alarm is received, then blocks SIAS
		    • Verifies both PORV block valves are open (1-RC-403-MOV will be deenergized open)
		    • Pulls two High PZR Pressure trip units on RPS
		    • Verifies PORV 404 is open (may consider stripping and tying MCC-104 and 114 to open other PORV)
		    • Verifies reduced OTCC lineup is maintaining CET temperatures constant or lowering
		
		  • When RCS pressure is <1270, verifies OTCC
		
		  • If CNMNT pressure reaches 2.8 psig then verifies SIAS and CIS
		
		After OTCC has been initiated the scenario may be terminated.

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SCENARIO #2 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicant's ability to conduct a unit power reduction, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including reducing power to remove a SGFP from service, failure of a VCT Level transmitter, malfunction of the Main Generator H2 Cooler SRW Controller, loss of 11 4KV Bus, and loss of the other SGFP. Upon ordering a reactor trip, an ATWS will occur. In EOP-0, a loss of the available AFW Pp results in a loss of all feedwater. In EOP-3, during the rapid cooldown to 465°F, SGIS 'A' fails to block and SGIS actuates. The loss of Condensate Booster Pump Injection capability requires initiation of Once Through Core Cooling.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-67. Draft Spin #805

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

5. Enter Malfunctions

____ a. 1B DG Start Failure
DG001_02 at time zero

____ b. Automatic Trip Failure
RPS005 at time zero

____ c. Manual Trip Failure
RPS006 at time zero

____ d. VCT Level Transmitter Fails Lo
CVCS009 fails low on F1

____ e. 1-TIC-1608 Fails Shut SRW to H2 Cooler
TG030_01 on F2

____ f. Loss of 11 4KV Bus
4KV001_01 on F3

____ g. 11 SGFP Trips
FW004_01 on F4

____ h. Trip of 11 AFW Pump
AFW001_01 on F5

____

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SCENARIO #2 SETUP

6. Enter Panel Overrides

   a. SGIS 'A' Block Keyswitch (11 S/G SGIS) in RESET at time zero.

7. Enter Remote Functions/Administrative

   a. Place 1B DG Output Breaker, 152-1403 in PTL and Danger Tag.

   b. Place a Caution Tag on 1B DG Start pushbutton.

8. Set simulator time to real time, then place simulator in CONTINUE.

9. Give crew briefing.

a.	Present plant conditions:	Approximately 83% power, MOC - 8,400 MWD/MTU. Unit 2 is in Mode 5. RCS Boron - 734 PPM.
b.	Power history:	100% for previous 60 days then reduced power to 70% 36 hours ago to repair a control oil leak on 12 SGFP.
c.	Equipment out of service:	1B DG was removed from service due to a fuel rack problem 10 hours ago and is expected to be returned to service within the next 2 hours. IAS T.S. 3.8.1. 23 AFW Pump is OOS for motor replacement. Expected to be returned to service in 2 days.
d.	Abnormal conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. 12 SG has tube leakage of approximately 3 gpd. Leakage has been constant at 3 gpd for the last two weeks.
e.	Surveillances due:	STP-O-8 on 1B DG when it is returned to service.
f.	Instructions for shift:	Continue raising power to 100% per OP-3, Step 6.1.I.2. Perform STP-O-8 on 1B DG when maintenance is complete.

10. Allow crew 3-5 minutes to acclimate themselves with their positions.

11. Instructions for the Booth Operator.

   a. When cued by the lead evaluator, as PWS, report 12 SGFP Control Oil leak has restarted and is worse than before. The pump needs to be removed from service as quickly as possible but does not have to be tripped.

   b. Activate malfunctions F1-F5 as each is cued by the lead evaluator.

SCENARIO #2 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1	OMC/Maintenance to investigate oil leak on 12 SGFP.	Acknowledge request.
2.	OMC/I&C investigate failure of VCT level transmitter LT-227.	Acknowledge request.
3.	OMC/I&C investigate failure of TCV-1608.	Acknowledge request.
4.	TBO operate main generator H2 cooler SRW CV (1608) bypass valve to maintain approximately 40 °C.	Acknowledge request. After 2 minutes, panel override the controller indiciation as is (fully shut), remove the malfunction and report as TBO you are contolling temperature on the bypass valve.
5.	Electricians investigate loss of 11 4KV Bus.	Acknowledge request. After 8 minutes report there appears to be a ground fault on the bus.
6.	PWS tie 1Y10 to 1Y09.	After approximately 3 minutes tie 1Y10 to 1Y09 and report action to the Control Room.
7.	Directs plant operators to align 13 Charging Pump to 14 Bus.	After about 4 minutes align 13 Charging Pump to 14 Bus and inform the Control Room.
8	Directs plant operators to align 13 SW and 13 SRW Pumps to 11 headers.	After about 3 minutes align the pumps to the 11 headers and report action to the Control Room.
9	OSO take 1A DG to Local and shut it down.	After 5 minutes take 1A DG to LOCAL and stop it and report actions to the Control Room.
10.	Directs ABO to verify Switchgear ventilation is in service.	After 3 minutes report 12 switchgear ventilation is in service.
11.	TBO/PWS attempt to reset 12 and/or 11 AFW Pumps.	After 3 minutes report cannot get 12 AFW pump reset. Two minutes later report unable to reset 11 AFW Pump either.
12	Requests maintenance support to restore an AFW pump to service.	Acknowledge request.
13	PWS go to ESFAS cabinets and attempt to block SGIS A.	After about 4 minutes report SGIS will not block at the cabinet.
14	ABO strip selected MCC-104 and 114 loads and tie MCCs to power both PORVS.	Acknowledge request.

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SCENARIO #2 SETUP

SHIFT TURNOVER

. Present Plant Conditions	Approximately 83%
II. Burnup:	8400 MWD/MTU (MOC) - Boron 734 PPM
III. Power History	100% for previous 60 days then reduced power to 70% 36 hours ago to repair a control oil leak on 12 SGFP.
IV. Equipment out of Service:	1B DG was removed from service due to a fuel rack problem 10 hours ago and is expected to be returned to service within the next 2 hours. IAS T.S 3.8.1.
V. Abnormal Conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. 12 SG has tube leakage of approximately 3 gpd. Leakage has been constant at 3 gpd for the last two weeks.
VI. Surveillances Due:	STP-O-8 on 1B DG when it is returned to service.
VII. Instructions for Shift	Continue raising power to 100% per OP-3, Step 6.1.I.2. Perform STP-O-8 on 1B DG when maintenance is complete.
VIII. U2 Status and Major Equipment OOS:	Mode 5. 23 AFW Pump is OOS for motor replacement. Expected to be returned to service in 2 days.

Simulation Facility	Calvert Cliffs	Scenario No.: **3**	Op Test No.:	**1**
Examiners:	______________	Operators:	______________	SRO
	______________		______________	RO
	______________		______________	BOP

Objectives: To evaluate the applicant's ability to initiate a normal plant power decrease; to implement the ARMs, OIs, AOPs, as appropriate, for a malfunctioning control system on a Steam Generator Feed Pump (SGFP), trip of running Boric Acid Pump, failure of a PZR Press instrument high causing PZR Spray valves to open, turbine CV failing partially closed, and Main Generator trip due to EHC power fault. To execute the EOPs for an ATWS condition following the turbine trip and subsequent pressurizer steam space LOCA due to failed open PORV and the block valve breaker tripping, and take actions for a feedline break in CNMNT requiring use of the Functional Recovery Procedure, EOP-8, and take actions for CIS failing to actuate.

Initial Conditions: The plant is at 80% Power, MOC (IC-67)

Danger tag 11 AFW Pp 1-MS-3988 "TRIPPED DO NOT RESET"

Bypass Channel "C" TM/LP with key 7

12 BAST aligned for DIRECT RECIRCULATION IAW OI-2C, 6.3 with Boric Acid Pp 12 running.

1) HS-210 in MANUAL (M/U Mode Selector Switch)
2) HS-2512 in CLOSE (CVC-512)
3) FIC-210Y in MANUAL set to 0%
4) 12 BAST recirculation valve CVC-511-CV open

Turnover: Present plant conditions: 80% power, MOC; Unit 2 is in MODE 6.

Power history: Decreasing power at 10%/hour to comply with ACTION statement of Technical Specification 3.7.3.

Equipment out of service:

1) 11 AFW Pp has failed turbine blades and is under repair. The pump has been unavailable for 9 1/2 days and may possibly be returned to service within 24 hours. 12 AFW Pp is aligned for auto start. Operations Management decided to initiate a plant shutdown about 2 hours ago to ensure compliance with the Technical Specification ACTION statement.

2) Channel "C" TM/LP trip bypassed at 0235 for troubleshooting.

Surveillances due: 12 BAST is currently on recirculation IAW OI-2C, section 6.3 for 30 minutes for planned sampling.

Instructions for shift:

1) Continue with downpower to HOT STANDBY conditions at 10% per hour.

2) 12 BAST may be restored from recirculation after 30 minutes.

WRITTEN BY: FACILITY

APPROVED BY: JH Williams

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Event No.	Malf. No.	Event Type*		Event Description
Preload	AFW001_01 RPS005 RPS006 ESFA010_01 .02 Panel Override			Trip of 11 AFW Pump. Failure of automatic reactor trip (ATWS). Failure of MANUAL reactor trip (ATWS). Failure of CIS to automatically actuate. Override PORV Block Valve HS-403 to open.
1	N/A	R N	RO BOP	Continue normal plant shutdown to Hot Standby.
2	Panel Override (Set bias at 2.0)	I	BOP	Approximately 5 minutes after commencing the power decrease and with at least 5% load shed, a malfunction of 12 Steam Generator Feed Pump Bias Controller occurs causing pump speed decrease resulting in 11 SGFP speed increase and SG level decrease. The candidate is expected to recognize that a problem exists with the 12 SGFP. The candidate should take manual control of 12 SGFP. The candidate is expected to implement AOP-3G.
3	CVCS014_02	C	RO	Approximately 2 minutes after completing the required actions of AOP-3G, 12 Boric Acid Pump trips. The candidate is expected to recognize the Boric Acid Pump has failed (may pick up off computer alarm display), and should stop any operations involving use of boric acid. Upon diagnosing the cause, the candidate may select the alternate Boric Acid Pump for operation. The candidate is expected to comply with Technical Specification 3.5.2 (Charging System not required < 80% power), and TRM 15.1.2.
4	RCS023_01 (HI)	I	RO	Approximately 5 minutes after placing the alternate Boric Acid Pump in operation, PZR Pressure Transmitter 1-PT-100X fails high resulting in both PZR Spray Valves going full open. The RO should determine 100X has failed high and that RCS pressure is dropping due to both spray valves being full open. The RO should take manual control of the spray valves and shut them and shift control to channel Y. RCS pressure should be restored to normal and the Alarm Manual referenced.
5	TG024_01 (10%)	C	BOP	Approximately 3 minutes after the actions of the Alarm Manual have been taken Turbine Control Valve #1 fails partially closed. The candidates should notice the loss of load and take action to stabilize the unit by verifying the proper operation of the TBVs and inserting CEAs as necessary or boration to restore Tc to program. The candidate is expected to implement AOP-7F.
6	TG013_01	M	ALL	Approximately 5 minutes after completing the required actions of AOP-7F, a Generator trip occurs due to an EHC Power Fault. The Reactor does not trip automatically or manually. The candidate is expected to recognize a Main Generator trip has occurred and that the Reactor and Turbine failed to trip. The candidate should attempt to manually trip the Reactor and upon failure to trip, complete contingency actions required to compensate for the ATWS. The BOP should close the MSIVs.
7	RCS027_01 Pnl Override (RC-403 red lite off when HS taken to close)	C	ALL	The PORVs open due to the ATWS condition, and ERV-402 fails open. The PORV Block valve (MOV-403) breaker trips when isolation is attempted. The candidate should implement EOP-5 based on Pressurizer steam space LOCA. When the crew attempts to maintain RCS Subcooling IAW EOP-5, Step M, a feedline break in CNMNT occurs.
8	FW0010-02 (30%)	M	ALL	The crew recognizes a second event is taking place and implements the Functional Recovery Procedure, EOP-8. The candidates should select Success Paths for the Safety Functions out in EOP-0 and EOP-5. When CNMNT pressure reaches 2.8 psig CIS will fail to actuate automatically and should be manually actuated. The scenario should end after the candidates start performing PIC-3 and HR-3.

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

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SCENARIO 3 OVERVIEW

From 80% power, a normal power decrease at 10%/hr will be conducted IAW OP-3, section 6.4.

Approximately 5 minutes after commencing the power decrease (at least 5%), a malfunction of 12 Steam Generator Feed Pump Bias Controller occurs causing pump speed to decrease resulting in 11 SGFP speed increase and SG level decrease. The candidate is expected to recognize that a problem exists with 12 SGFP. The candidate should take manual control of 12 SGFP. The candidate is expected to implement AOP-3G.

After completing the required actions of AOP-3G, 12 Boric Acid Pump trips. The candidate is expected to recognize the Boric Acid Pump has failed, and should stop any operations involving use of boric acid. Upon diagnosing the cause, the candidate may select the alternate Boric Acid Pump for operation. The candidate is expected to comply with Technical Specification 3.5.2 (Charging System not required < 80% power), and TRM 15.1.2.

After placing the alternate Boric Acid Pump in operation, PZR Pressure Transmitter 1-PT-100X fails high resulting in both PZR Spray Valves going full open. The RO should determine 100X has failed high and that RCS pressure is dropping due to both spray valves being full open. The RO should take manual control of the spray valves and shut them and shift control to channel Y. RCS pressure should be restored to normal and the Alarm Manual referenced.

After the actions of the Alarm Manual have been taken, Turbine Control Valve #1 fails partially closed. The candidates should notice the loss of load and take action to stabilize the unit by verifying the proper operation of the TBVs and inserting CEAs as necessary or boration to restore Tc to program. The candidate is expected to implement AOP-7F.

After completing the required actions of AOP-7F, a Generator trip occurs due to an EHC Power Fault. The Reactor does not trip automatically or manually. The candidate is expected to recognize a Main Generator trip has occurred and that the Reactor and Turbine failed to trip. The candidate should attempt to manually trip the Reactor and upon failure to trip, complete contingency actions required to compensate for the ATWS. The BOP should close the MSIVs. The PORVs open due to the ATWS, and ERV-402 fails open. The PORV Block valve (MOV-403) breaker trips when isolation is attempted. The candidate should implement EOP-5 based on Pressurizer steam space LOCA. When the crew attempts to maintain RCS Subcooling IAW EOP-5, Step M, a feedline break in CNMNT occurs.

The crew recognizes a second event is taking place and implements the Functional Recovery Procedure, EOP-8. The candidates should select Success Paths for the Safety Functions out in EOP-0 and EOP-5. When CNMNT pressure reaches 2.8 psig CIS will fail to actuate automatically and should be manually actuated. The scenario should end after the candidates start performing the actions of PIC-3 HR-3.

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Scenario No:	3	Event No.	1	
Event Description:	Normal plant shutdown to Hot Standby from 80% power.			

Time	Position	Applicant's Actions or Behavior
	CREW	Review Prerequisites and Precautions associated with OP-3 <u>NORMAL POWER OPERATION</u>

	SRO	• Directs load decrease per OP-3 Section 6.4:
		
		• Reviews guidelines for LRNIs:
		  • RPS Delta-T power is primary power indication
		  • Comparisons should be made periodically between the FOUR RPS channels and plant computer for secondary calorimetric
		  • NI power should be used for trending purposes only
		
		• Method of reducing reactor power
		  • Insertion of control rods.
		(NOTE: Boration is NOT available per OI-2C, when the BAST is set up for direct recirculation)

	RO	• Ensures Pressurizer spray flow: • Verifies PZR backup heater banks energized • Verifies PZR Pressure Controller setpoint to maintain 2250 psia • Reduces reactor power to maintain Tc within 2 °F of program • Inserts control rods (NOTE: Boration is NOT available per OI-2C, when the BAST is set up for direct recirculation)
	BOP	• Decreases turbine generator load to maintain Tc within 2 °F of program • (In LOAD LIMIT) Decreases the load by decreasing the load limit setpoint in small increments and maintain LOAD SET no higher than 100 MWe above actual load **OR** • (In LOAD SET) Decreases load by momentarily depressing the LOAD SELECTOR DECREASE button AND maintain LOAD LIMIT no higher than 100 MWe above actual load

	CREW	• Ensures requirements of APPENDIX D are met
		
		• If Tc deviates > 2°F from program Tc, notify CRS and initiate corrective actions to restore
		• Reduces MSR 2nd stage pressure in no more than 50 psig increments per Figure 2 (local)
		• Notifies Chemistry to sample RCS if power is changed by > 15% in one hour
		• Do NOT exceed turbine limits
		  • 150°F/hr rate of change of 1st stage shell inner metal temperature (Point 6 on TR-4404)
		  • 75°F 1st stage shell metal temperature differential (Diff between Points 6 & 7 on TR-4404)
		  • Unloading rate of 10% step change or 5%/min
		
		• Periodically compare all indications of power
		  • If unexplained difference exist between NI, Delta-T, or calorimetric power and plant conditions do NOT require expeditious shutdown, stabilize reactor power until discrepancy is resolved
		
		• Periodically ZERO the Voltage Regulator Transfer meter
		• Maintain ASI within limits of COLR
		• Periodically verify PZR Program Level is within acceptable PZR level band per Figure (3)
		• Periodically monitor ASI to ensure oscillations will NOT reach the ASI pre-trip value

Scenario No: 3		Event No. 2	Page 5 of 17
Event Description:		12 SG Feed Pump (SGFP) bias controller fails.	

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarms - 11/ 12 SG FW CONTR CH LVL Lowering S/G levels Decreasing 12 SGFP speed Increasing 11 SGFP speed Decreasing FW flow
	BOP	• Identify and report lowering 12 SGFP speed
	SRO	Directs actions of AOP-3G MALFUNCTION OF MAIN FEEDWATER SYSTEM Section VII: • If SG level approaches -50 inches OR SG level is < -26 and Main Feedwater is NOT established, Trip the reactor If ALL conditions maintained, operation with ONE SGFP above 440 MWE is permitted: • SGFP suction flow rate <18,000 gpm • SGFP suction pressure> 250 psig • SGFP speed is < 5350 rpm

	BOP	• Attempts to manually control 12 SGFP speed.
		
		Performs actions of AOP-3G
		• If SGFP controller fails:
		  • Verifies SGFP control mode has shifted to MAN or DIRECT GOVNR VLV at OCS
		  • Adjusts SGFP speed to maintain:
		    • Minimum of 50 psid across FRVs
		    • SG levels between -24 inches and +30 inches
		  • Balances load between 11 & 12 SGFPs by adjusting SGFPT SPD CONTR output in MANUAL on 12 SGFP

	RO/BOP	• Adjust power as necessary to maintain
		  • Tcold on program
		  • SGFP suction pressure > 250 psig

	SRO	• Contact OMC/I&C to investigate problem with 12 SGFP speed control

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Event Description: The 12 Boric Acid pump trips.

Time	Position	Applicant's Actions or Behavior
	CUE:	Boric Acid pump status lights de-energize (1C07) Plant computer alarm display
	RO	• Identifies and reports trip of the 12 Boric Acid Pump
	SRO	• Identifies/acknowledges trip of 12 Boric Acid Pump.
	RO	• Directs operator to locally check pump breaker 52-10406 • Aligns system for makeup from 11 Boric Acid Pump per OI-2C

	SRO	• Recognizes potential applicability of T.S. and TRM:
		  • T.S. 3.5.2 - ECCS Operating - Charging System only required if > 80% power
		  • TRM 15.1.2 - Boration Flowpaths - Operating

	SRO	• Contacts OMC to check breaker 52-10406 and/or 12 Boric Acid pump.

Scenario No: 3	Event No. 4	Page 7 of 17
Event Description:	PZR Pressure Transmitter 1-PT-100X fails high	

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm 1C06 - E-29 PZR CH 100 PRESS Both PZR Spray valves come full open
	RO	• Acknowledges alarm, identifies and reports PT-100X has failed high • Refers to the ARM • Notes both PZR spray valves are open

	SRO	• Acknowledges report and directs RO to:
		  • Shift PZR pressure control to channel Y
		  • Verify the PZR spray valves go closed or take 1-HIC-100 to manual and close them
		  • Restore RCS pressure to normal

	RO	• Perform actions as directed by SRO
	SRO	• Determines no T.S. are applicable
	SRO	• Contacts OMC/I&C to investigate failure of 1-PT-100X.

Scenario No: 3		Event No. 5 Page 8 of 17
Event Description:		Turbine Control Valve #1 fails partially closed
Time	Position	Applicant's Actions or Behavior
	CUE	Rising RCS temperature Rising PZR level and pressure Lowering MWe
	CREW	• Identifies rising RCS temperature, PZR level and pressure and lowering MWe
	BOP	• Diagnoses TCV#1 being partially closed as cause of the loss of load • Informs SRO

	SRO	• Directs actions of AOP-7F <u>LOSS OF LOAD</u> and concurrently implements AOP-7E, <u>MAIN TURBINE MALFUNCTIONS</u>, Section XIV, <u>Turbine Valve Failures</u>
		
		• Determines a reactor trip is not imminent
		
		• Directs the BOP/RO to stabilize the plant as follows:
		  • BOP to verify proper operation of the TBVs
		  • RO to lower reactor power to restore Tc to program by inserting CEAs or borating
		  • BOP not to adjust the turbine
		  • RO to verify PZR level and pressure are returning to their normal range
		  • BOP to verify S/G levels are restoring to normal
		
		• Refers to T.S. 3.2.5, 3.4.1, 3. 1.6, 3.4.9, as applicable.

	RO/BOP	• Perform actions directed by SRO
	SRO	• Contacts the system engineer for assistance

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Scenario No:	3	Event No.	6	

Event Description:	Turbine trip due to EHC power fault. The reactor fails to trip automatically or manually(ATWS).

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm 1C01 A-49 MAIN GEN EXCTR FIELD BKR TRIP 1C01 A-51 MAIN GEN EXCTR AUTO TO MANUAL TRANSFER 1C05 D-5 PROT CH TRIP EHC Panel deenergized MWe are zero
	BOP	• Reports the Main Generator has tripped but no Turbine Tripped alarm
	SRO	• Acknowledges report, directs the RO to trip the reactor
	RO	• Trips reactor by depressing manual reactor trip pushbuttons. • Identifies and reports failure of reactor to trip on manual actuation of trip pushbuttons • Reports failure of reactor to trip manually or automatically (high PZR pressure)
	BOP	• Identifies and reports the turbine has not tripped
	SRO	• Directs the implementation of EOP-0, POST-TRIP IMMEDIATE ACTIONS

	RO	• Depresses one set of manual reactor trip pushbuttons
		  • Notes reactor failed to trip (should also note reactor failed to trip automatically)
		  • Informs SRO of ATWS condition
		
		• Deenergizes CEDM Motor Generator sets:
		  • Opens 12A 480V Bus FDR (52-1201)
		  • Opens 13A 480V Bus FDR (52-1301)
		  • Opens 12A/12B 480V Bus TIE (52-1212)
		  • Opens 13A/13B 480V Bus Tie (52-1312)
		  • Checks the reactor has tripped by:
		    • Prompt drop in NI power
		    • Negative SUR
		  • Reenergizes 12A and 13A 480V Buses by closing ANY breakers opened above
		• Checks ALL CEAs fully inserted
		• Verifies demin water makeup to RCS is secured
		  • 11 & 12 RCMU pumps secured
		  • VCT M/U valve 1-CVC-512-CV is shut
		  • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut
		
		Reports Reactivity Control Safety Function is complete

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Scenario No:	3	Event No.	6	Page 10 of 17
Event Description:	Turbine trip due to EHC power fault. The reactor fails to trip automatically or manually (ATWS).			

Time	Position	Applicant's Actions or Behavior

	BOP	• Checks reactor has tripped
		
		• Ensures turbine has tripped:
		  • Depresses U-1 MAIN TURB TRIP button
		  • Checks Turbine Throttle valves shut (unable to verify due to EHC panel deenergized)
		  • Checks turbine speed drops (unable to verify due to EHC panel deenergized)
		  • With no turbine trip alarm and with first stage pressure and no EHC panel indications, closes the MSIVs
		  • Verifies turbine generator output breakers open:
		    • 11 GEN BUS BKR, 0-CS-552-22
		    • 11 GEN TIE BKR, 0-CS-552-23
		  • Verifies 11 GEN FIELD BKR 1-CS-41 is open
		  • Verifies 11 GEN EXCITER FIELD BKR 1-CS-41E is open
		
		Reports the turbine is not tripped and have closed the MSIVs

	BOP	• Checks 11 OR 14 4KV Vital Bus energized • Checks 125 VDC and 120 VAC busses energized • Verifies CCW flow to RCPs • Verifies Switchgear Ventilation in service Reports Vital Auxiliaries Safety Function is complete
		NOTE: Actions of EOP-0 continue in Event 7

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Scenario No: 3	Event No. 7	
Event Description:	PORV 402 fails open and Block Valve 403 breaker trips	

Time	Position	Applicant's Actions or Behavior
	CUE	Annunciator alarm - 1C06 E-22 PORV/SAFETY VLV ACOUSTIC MON RCS pressure decrease Quench Tank level, pressure and temperature increase (until rupture)

	RO	• Reports RCS pressure is lowering and PORV 402 is open (due to proximity of acoustic sensors, may be unable to determine if it is the PORV or Safety Valve lifting)
		• Determines PZR pressure is continuing to drop and not stabilizing
		• Manually operates heaters and sprays to attempt to restore pressure
		
		• When PZR pressure falls to 1725 psia, verifies SIAS actuates
		
		• Performs RCP Trip Strategy:
		  • When pressure drops to 1725 psia, trips either
		    • 11A and 12B RCPs OR
		    • 11B and 12A RCPs
		
		• If CIS actuates, trips ALL RCPs
		• Monitors Attachment 1 for RCP NPSH requirements
		
		• Determines PZR level is not stabilizing between 80 and 180 inches or trending to 160 inches and operates Charging and letdown to attempt to restore
		
		• Ensures RCS subcooling GREATER THAN 30°F
		
		Informs SRO RCS Pressure and Inventory Safety Function can NOT be met due to low PZR pressure, high PZR level and low subcooling.

	SRO	• Directs RO to close PORV Block Valve, 1-RC-403-MOV
	RO	• Attempts to close 403 - reports to SRO block valve 403 breaker appears to have tripped
	SRO	• May direct RO to take PORV 402 to override close • Directs electricians to investigate problem with block valve 403
	RO	• If directed, takes PORV 402 to Override Close and reports to SRO PORV did not close

Scenario No: 3		Event No. 7
Event Description:	PORV 402 fails open and Block Valve 403 breaker trips	

Time	Position	Applicant's Actions or Behavior

	BOP	• Verifies ADVs operating to maintain:
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		
		• Checks at least one SG available for controlled heat removal
		  • SG level between -170 and +30 inches
		  • Main or Aux Feedwater are operating to maintain level
		    • Trips both SGFPs
		    • Shuts the SG FW isolation valves
		    • Starts an AFW Pump
		    • Operates AFW to restore SG levels to -170 to +30 inches
		
		• Checks at least one RCP operating in loop with available SG
		• If any RCP operating, checks Thot minus Tcold LESS THAN 10°F in loop with available SG
		
		Reports Core and RCS heat removal is complete (if all RCPs are off then not met due to no RCPs)

	CREW	• Checks Containment pressure less than 0.7 psig
		  • If pressure exceeds 0.7 psig:
		    • Verifies ALL available CACs operating
		    • Opens CAC EMERGENCY OUT valves for operating CACs
		  If pressure exceeds 2.8 psig, verifies actuation
		    • SIAS (already actuated due to low PZR Pressure)
		    • CIS
		    • Note CIS failed to actuate automatically, informs the SRO and manually actuates CIS
		  • If CIS actuated, trips ALL RCPs
		  • If pressure exceeds 4.25. psig, verifies CSAS actuation
		
		• Checks Containment temperature less than 120°F
		  • If temperature exceeds 120°F:
		    • Verifies ALL available CACs operating
		    • Opens CAC EMERGENCY OUT valves for operating CACs
		
		• Checks containment radiation monitor alarms CLEAR with NO unexplained trends:
		  • If alarm received, starts the IODINE FILT FANS
		
		• Checks RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		
		Reports CNMNT Environment Safety Function can NOT be met due to high CNMNT temperature and pressure
		
		Reports Radiation levels external to CNMNT Safety Function is complete

Scenario No: 3	Event No. 7	Page 13 of 17
Event Description:	PORV 402 fails open and Block Valve 403 breaker trips	
Time	**Position**	**Applicant's Actions or Behavior**

	SRO	• Determines Recovery Procedure per Diagnostic Flowchart:
		  • NO for RCS press/inv safety function
		  • NO SG pressure <800 psia
		  • NO SG B/D or Offgas RMS alarm
		  • NO to SG level response mismatch
		• Consider EOP-5 (LOCA)
		  • NO for Cont Envir safety function
		  • NO SG pressure <800 psia
		  • YES PZR pressure or level low
		• Consider EOP-5 (LOCA)
		• Single Event Diagnosis - EOP-5

	SRO	• Directs transition to EOP-5, LOSS OF COOLANT ACCIDENT • Conducts EOP-5 pre-implementation brief

	CREW	• If PZR pressure <1725 psia or CNTMT pressure > 2.8 psig:
		  • Verifies SIAS actuation (done previously)
		
		• Determines maximum safety injection flow exists:
		  • 11 and 13 HPSI pumps running
		  • HPSI flow per ATTACHMENT (10) when pressure below 1270 psia
		  • 11 and 12 LPSI pumps running
		  • All charging pumps running

	RO	• Performs RCP Trip Strategy:
		  • Monitors RCS pressure for minimum head requirements per Attachment 1 if any RCPs running
		
		• If CIS actuates or Component Cooling flow to RCPs can NOT be verified, trips ALL RCPs
		
		• Attempts leak isolation:
		  • Verifies L/D CNTMT Isol. shut
		    • 1-CVC-515-CV
		    • 1-CVC-516-CV
		  • Checks PORV leakage (may still be unable to determine if PORV or Safety)
		    • Quench Tank parameters
		    • PORV disch temp, computer points:
		      • T107
		      • T108
		    • Acoustic Monitor indication
		
		• Reports to SRO still unable to isolate PORV 402 via its block valve
		
		  • Shuts 1-PS-5464-CV RCS SAMPLE ISOL
		  • Shuts RXV Vent valves:
		    • 1-RC-103-SV
		    • 1-RC-104-SV
		  • Shuts PZR VENT valves:
		    • 1-RC-105-SV
		    • 1-RC-106-SV

Event Description:	PORV 402 fails open and Block Valve 403 breaker trips

Time	Position	Applicant's Actions or Behavior

	RO (cont)	• Determines NO leakage into CC System by:
		  • Alarm clear on rad monitor 1-RI-3819 with NO rising trend
		  • CCW HEAD TK LVL alarm (1C13 K-17) clear
		
		• Determines leak is inside CNTMT

	CREW	• Observe CNTMT Sump level rises as RWT level drops

	RO	• With SIAS actuated, verifies boration in progress:
		  • 1-CVC-512-CV VCT M/U valve shut
		  • 1-CVC-514-MOV BA DIRECT M/U valve open
		  • BAST GRAVITY FD valves open:
		    • 1-CVC-508-MOV
		    • 1-CVC-509-MOV
		  • ALL available (11 BA Pump only) BA pumps running
		  • 1-CVC-501-MOV VCT OUT valve shut
		  • ALL available charging pumps running
		• Records time boration started
		• Records BAST levels:
		  • 11 BAST
		  • 12 BAST
		• Continues boration until ONE condition met:
		  • Shutdown Margin requirements met per NEOPs
		  • BAST level lowered a total of 71 inches
		  • Boration has been in progress for:
		    • 35 minutes with THREE charging pumps running
		    • 53 minutes with TWO charging pumps running
		    • 105 minutes with ONE charging pump running

	BOP	• If pressure exceeds 2.8 psig, verifies actuation
		  • SIAS (already verified)
		  • CIS
		
		• If CIS actuated, trips ALL RCPs (may already be tripped)
		
		• Verifies SRW Pump Room Ventilation per OI-15
		
		• If pressure exceeds 4.25. psig, verifies CSAS actuation and spray flow is ≈ 1350 gpm per pump:
		  • 1-FI-4148 (11 CS hdr flow)
		  • 1-FI-4149 (12 CS hdr flow)
		
		• Directs Chemistry to place Hydrogen Monitors in service
		
		• If hydrogen conc rises to 0.5%, OR hydrogen conc can NOT be determined, directs Hydrogen Recombiners be placed in service per OI-41A

Scenario No:	3	Event No.	7	Page 15 of 17
Event Description:	PORV 402 fails open and Block Valve 403 breaker trips			

Time	Position	Applicant's Actions or Behavior
	BOP	• Determines Main Feedwater is not available • Verifies AFW flow is established and SG FW isolation valves shut • Verifies AFW Pp Room ventilation is in service • Establishes SG levels between +10 and +50 inches • Ensures cooldown does not exceed 100°F/hr • Secures the Main Feed System • Trips SGFPs (previously done) • Places Cond, Cond Bstr, and Heater Drain Pps in P-T-L • Shuts the hotwell to CST dump CV
	CREW	• With Tcold > 300°F: • When SGIS A and B BLOCK PERMITTED alarms are received, blocks SGIS • Conducts a rapid cooldown to 300°F using ADVs NOT to exceed 100°F in any one hour
	CREW	• Evaluate need for HPSI/LPSI Throttling/Termination: • When following conditions can be maintained: • At least 30°F subcooling (CETs) • PZR level > 101 inches [141 inches if CNTMT pressure > 4.25 psig] • At least ONE SG available for heat removal • RVLMS indicates level > top of hot leg • HPSI flow can be reduced by throttling HPSI HDR valves OR stopping one HPSI pump at a time: • Maintain RCS subcooling between 30°F and 140°F (CETs) • Maintain PZR level between 101 inches and 180 inches [141 and 190 inches] • If PZR pressure > 200 psia and either constant or rising, stop operating LPSI pumps • If criteria can NOT be maintained after pumps are throttled or secured, restart appropriate pumps and restore full flow
	CREW	• Maintain RCS subcooling and PZR level • If bubble exists in PZR or reactor vessel head, restore and maintain subcooling between 30°F and 140°F (CETs): • Raise subcooling by ANY of following: • Operate PZR heaters • Raise RCS cooldown rate NOT to exceed 100°F in any ONE hour • If HPSI flow has been reduced, raise HPSI flow • Lower subcooling by ANY of following: • Deenergize PZR heaters • Lower RCS cooldown rate • Throttle or secure HPSI/Charging flow • Initiate Aux Spray • If bubble exist in PZR AND HPSI flow secured, restore and maintain PZR level between 101 and 180 inches [141 and 190 inches] by operating charging and letdown

Scenario No:	3	Event No.	7	Page 16 of 17

Event Description:	PORV 402 fails open and Block Valve 403 breaker trips

Time	Position	Applicant's Actions or Behavior
	CUE	• Rapidly rising CNMNT pressure, temperature, RCS cooldown rate and lowering level in 12 S/G • Increasing delta T in 12 loop
	CREW	• Notes rapidly rising CNMNT pressure, temperature, RCS cooldown rate and lowering level in 12 S/G • Determine a second events is occurring • Notes CIS has failed to actuate and informs the SRO • If CSAS had not previously actuated, then verifies CSAS
	SRO	• Directs transition to and implementation of EOP-8 • Directs RO/BOP to manually initiate CIS

Scenario No:	3	Event No.	8	Page 17 of 17
Event Description:	Feedline Break in CNMNT/EOP-8			

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs Chemistry to sample both S/Gs for activity and place the H2 monitors in service • Directs RO to determine Success Path for RCS Pressure and Inventory • Directs BOP to determine Success Paths for Core and RCS Heat Removal and for CNMNT Environment
	RO	• Evaluates RAT, selects PIC-3 as appropriate Success Path and informs SRO
	BOP	• Evaluates RAT, selects HR-3 and CE-3 as appropriate Success Paths and informs SRO
	SRO	• Directs RO/BOP to implement selected Success Paths PIC-3 and HR-3
	RO/BOP	• Commence PIC-3 and HR-3 This scenario may be terminated once the RO and BOP implement PIC-3 and HR-3

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SCENARIO #3 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicant's ability to initiate a normal plant power decrease; to implement the ARMs, OIs, AOPs, as appropriate, for a malfunctioning control system on a Steam Generator Feed Pump (SGFP), trip of running Boric Acid Pump, failure of a PZR Press instrument high causing PZR Spray valves to open, turbine CV failing partially closed, and Main Generator trip due to EHC power fault. To execute the EOPs for an ATWS condition following the turbine trip and subsequent pressurizer steam space LOCA due to failed open PORV and the block valve breaker tripping, and take actions for a feedline break in CNMNT requiring use of the Functional Recovery Procedure, EOP-8, and take actions for CIS failing to actuate.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-67. Draft Spin #805

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

5. Enter Malfunctions

____ a. 11 AFW Pump Trip
AFW001_01 at time zero

____ b. Automatic Trip Failure
RPS005 at time zero

____ c. Manual Trip Failure
RPS006 at time zero

____ d. Failure of CIS to Automatically Actuate
ESFA010_01, 02 at time zero

____ e. 12 Boric Acid Pump Trip
CVCS014_02 on F1

____ f. 1-PT-100X Pressurizer Pressure Fails High
RCS023_01 HI on F2

____ g. Turbine CV-1 Failure
TG024_01 set to 10% on F3

____ h. Unit 1 Turbine Trip EHC Power Fault
TG013_01 on F4

____ i. PORV 402 Fails Open
RCS027_01 on F5

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SCENARIO #3 SETUP

____ j. 11 Feedline Rupture in CNMNT
FW010_02 set to 30% on F6

6. Enter Panel Overrides

____ a. PORV-402 Block Valve, 1-RC-403-MOV Handswitch, to OPEN

7. Enter Remote Functions/Administrative

____ a. Align 12 AFW Pump for auto start (reset Stop Valve 1-MS-3988).

____ b. Danger Tag 11 AFW Pump "Tripped Do Not Reset".

____ c. Bypass Channel "C" TM/LP Trip Unit.

____ d. Align 12 BAST for Direct Recirculation IAW OI-2C, 6.3 using 12 BA Pump.
1) HS-210 in MANUAL (M/U Mode Selector Switch)
2) HS-2512 in CLOSE (CVC-512)
3) FIC-210Y in MANUAL set to 0%
4) 12 BAST recirculation valve CVC-511-CV open

____ 8. Set simulator time to real time, then place simulator in CONTINUE.

____ 9. Give crew briefing.

a.	Present plant conditions:	Approximately 83% power, MOC - 8,400 MWD/MTU. Unit 2 is in Mode 6. RCS Boron - 734 PPM.
b.	Power history:	Decreasing power at 10%/hour from 100% to comply with ACTION statement of Technical Specification 3.7.3.
c.	Equipment out of service:	11 AFW Pp has failed turbine blades and is under repair. The pump has been unavailable for 9 1/2 days and may possibly be returned to service within 24 hours. Operations Management decided to initiate a plant shutdown about 2 hours ago to ensure compliance with the Technical Specification ACTION statement. Channel "C" TM/LP trip bypassed at 0235 for troubleshooting.
d.	Abnormal conditions:	12 AFW Pp is aligned for auto start.
e.	Surveillances due:	12 BAST is currently on recirculation IAW OI-2C, section 6.3 for 30 minutes for planned sampling.

SCENARIO #3 SETUP

f. Instructions for shift: Continue with downpower to HOT STANDBY conditions at 10% per hour.

12 BAST may be restored from recirculation after 30 minutes.

____ 10. Allow crew 3-5 minutes to acclimate themselves with their positions.

____ 11. Instructions for the Booth Operator.

a. When directed by the lead evaluator, using a panel override, set 12 SGFP Bias Adjust to 2.0.

b. Activate malfunctions F1-F6 as each is cued by the lead evaluator.

c. When the RO attempts to close 1-RC-403-MOV, panel override the red open light to OFF.

SCENARIO #3 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	OMC/I&C investigate 12 SGFP speed controller malfunction.	Acknowledge request.
2.	ABO checkout 12 BA Pump and also checkout its supply breaker 52-10406.	Acknowledge request. After about 4 minutes report the breaker is tripped and nothing observed to be wrong with the pump.
3.	OMC investigate trip of 12 BA Pump.	Acknowledge request.
4.	OMC/I&C investigate failure of 1-PT-100X.	Acknowledge request.
5.	PWS/TBO locally check turbine CV-1.	After approximately 3 minutes report the valve is nearly shut and no sign of any leaks.
6.	System Engineer investigate problem with turbine CV-1.	Acknowledge request. If asked for a recommendation on turbine load change, recommend not moving turbine load.
7.	Directs ABO to verify Switchgear ventilation is in service.	After 3 minutes report 12 switchgear ventilation is in service.
8.	Electricians investigate trip of 1-RC-403-MOV breaker.	After about 10 minutes report tripped on overload and are investigating.
9.	Chemistry place the Hydrogen Monitors in service.	Acknowledge request.
10.	Chemistry sample both SGs for activity.	Acknowledge request.

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SCENARIO #3 SETUP

SHIFT TURNOVER

.	Present Plant Conditions	Approximately 83%
II.	Burnup:	8400 MWD/MTU (MOC) - Boron 734 PPM
III.	Power History	100% for previous 96 days. Decreasing power at 10%/hour to comply with ACTION statement of Technical Specification 3.7.3.
IV.	Equipment out of Service:	11 AFW Pp has failed turbine blades and is under repair. The pump has been unavailable for 9 1/2 days and may possibly be returned to service within 24 hours. Operations Management decided to initiate a plant shutdown about 2 hours ago to ensure compliance with the Technical Specification ACTION statement. Channel "C" TM/LP trip bypassed at 0235 for troubleshooting.
V.	Abnormal Conditions:	12 AFW Pp is aligned for auto start. 12 SG has tube leakage of approximately 3 gpd. Leakage has been constant at 3 gpd for the last two weeks.
VI.	Surveillances Due:	12 BAST is currently on recirculation IAW OI-2C, section 6.3 for 30 minutes for planned sampling.
VII.	Instructions for Shift	Continue with downpower to HOT STANDBY conditions at 10% per hour. 12 BAST may be restored from recirculation after 30 minutes.
VIII.	U2 Status and Major Equipment OOS:	Mode 6.

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Simulation Facility	Calvert Cliffs	Scenario No.: 4	Op Test No.:	1
Examiners:	____________	Operators:	____________	SRO
	____________		____________	RO
	____________		____________	BOP

Objectives: To evaluate the applicants' ability to initiate a power decrease due to a transformer cooling problem, to implement the ARMs, OIs, AOPs, as appropriate, for a Power Summer failure, a leaking PORV, MFRV Controller Failure, trip of a SRW Pump and SRW rupture in the Turbine Bldg. To evaluate on the reactor trip, a stuck out CEA, and PZR instrument line failure resulting in a 300 gpm LOCA. Once in EOP-5, a Main Steam Safety will open on 11 SG requiring the crew to implement the Functional Recovery Procedure.

Initial Conditions: The plant is at 100% Power, MOC (IC-13)

1. 1 transformer at Waugh Chapel is OOS.

2. 13 CCW Pp is OOS.

3. A moderate earthquake occurred 6 hours ago with the epicenter near Dunkirk.

Turnover: Present plant conditions: 100% power, MOC; Unit 2 is in MODE 6 for refueling

Power history: 100% power for the previous 72 days.

Equipment out of service:

1. 1 of the 3 main transformers at Waugh Chapel is OOS.

2. 13 CCW Pp is OOS.

3. A moderate earthquake occurred 6 hours ago with the epicenter near Dunkirk. The quake registered 3.1 on the Richter scale. No ERPIP declaration was deemed necessary. A plant inspection for damage is under way. No damage has been identified to this point.

Surveillances due: None.

Instructions for shift:

1. Maintain 100% power.

2. Continue plant inspection for damage due to the earthquake, notify GS-NPO immediately if any damage found.

WRITTEN BY: FACILITY

APPROVED BY: J H Williams

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Event No.	Malf. No.	Event Type*		Event Description
Preload	CCW002_03 CEDS010_30			Failure of 13 CCW Pp. Stuck CEA.
	N/A	R N	RO BOP	The System Operator informs the Control Room of a cooling problem on one of the two inservice transformers at Waugh Chapel and requests the Unit reduce to 750 MWe within the next 15 minutes. The candidates will commence a rapid power reduction to 750 MWe per OP-3.
2	NI010_01 (HI)	I	RO	Approximately 5 minutes after commencing the power decrease and with at least 5% load reduction, a Power Range Summer fails high. The candidates refer to the ARM and determine the power summer has failed. The RPS trip units (1,2,7,8,10) are bypassed per OI-6 and the actions of Tech Spec. 3.3.1 implemented.
3	RCS021 (0-20% over 2 min)	C	RO	Approximately 5 minutes after the RPS channels are bypassed, PORV 402 starts to leak. The candidate refers to the ARM and determines 402 is leaking. PORV-402 is blocked by shutting RC-403. After 403 is closed and the leakage is verified stopped, Tech. Spec. 3.4.11 is implemented.
4	FW018_01 (LO)	I	BOP	Approximately 3 minutes after reviewing the Tech. Spec., 11 MFRV Controller FIC-1111 fails LO. The candidate should note the failure and inform the CRS. The candidates should then implement AOP-3G for the feedwater malfunction. The candidate should place the FRV CONTR HS for the PDI in the MAIN FAIL position and adjust the PDI CONT to maintain level at approximately zero inches.
5	SRW003_02	C	BOP	Approximately 3 minutes after SG level has been stabilized, 12 SRW Pump trips. The ARM is referenced and a check is made for common mode failure. 13 SRW Pump will be started and AOP-7B implemented.
6	SRW002_02 (0-20% over 2 min)	M	ALL	When 13 SRW pump is started a leak that grows into a rupture over 2 minutes will begin in the Turbine Bldg. The candidates will remain in AOP-7B, isolate SRW to the Turbine Bldg. and trip the reactor. On the reactor trip, one CEA will remain stuck out and the candidate will implement EOP-0 and initiate boration for one stuck CEA.
7	RCS023_01 (LO) RCS024_02 (LO) RCS026_01 (HI) RCS002 - 300gpm	M	All	After the first review of the EOP-0 Safety Functions, a PZR reference leg fails and results in a 300 gpm LOCA. The candidates will reassess the Safety Functions and determine a LOCA is taking place apparently from a failed instrument line. The RO should also note 2 Charging Pumps stopped due to the failed high PZR level instrument and select channel Y. The crew will trip 2 RCPs and verify SIAS is initiated when RCS pressure reaches 1725 and 1740 respectively. The crew will implement EOP-5.
8	MS016_02	M	ALL	When the crew implements EOP-5, they will ensure SIAS actuation and RCP trip strategy have been addressed. After a plant cooldown is begun is EOP-5, a Main Steam Safety Valve Fails open on 11 SG. The candidates now recognize a second event is occurring and implement Functional Recovery Procedure, EOP-8. The crew will select the Success Paths for the Safety Functions out in EOP-0 & 5, then implement HR-3 and PIC-3. When HR-3 and PIC-3 are implemented the scenario can be terminated.

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

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SCENARIO 4 OVERVIEW

From 100% power, the System Operator informs the Control Room of a cooling problem on one of the two inservice transformers at Waugh Chapel and requests the Unit reduce to 750 MWe within the next 15 minutes. The candidates will commence a rapid power reduction to 750 MWe per OP-3, section 6.4..

Approximately 5 minutes after commencing the power decrease and with at least 5% load reduction, a Power Range Summer fails high. The candidates refer to the ARM and determine the power range summer has failed. The RPS channels are bypassed per OI-6 and the actions of Tech Spec. 3.3.1 implemented.

Approximately 5 minutes after the RPS channels are bypassed, PORV 402 starts to leak. The candidate refers to the ARM and determines 402 is leaking. PORV-402 is blocked by shutting RC-403. After 403 is closed and the leakage is verified stopped, Tech. Spec. 3.4.11 is implemented.

Approximately 3 minutes after reviewing the Tech. Spec., 11 MFRV Controller FIC-1111 fails LO. The candidate should note the failure and inform the CRS. The candidates should then implement AOP-3G for the feedwater malfunction. The candidate should place the FRV CONTR HS for the PDI in the MAIN FAIL position and adjust the PDI CONT to maintain level at approximately zero inches.

Approximately 3 minutes after SG level has been stabilized, 12 SRW Pump trips. The ARM is referenced and a check is made for common mode failure. 13 SRW Pump will be started and AOP-7B implemented.

When 13 SRW pump is started a leak that grows into a rupture over 2 minutes will begin in the Turbine Bldg. The candidates remain in AOP-7B, isolate SRW to the Turbine Bldg. and trip the reactor. On the reactor trip, one CEA will stick out and the candidate will implement EOP-0 and initiate boration for one stuck CEA.

After the first review of the EOP-0 Safety Functions, a PZR reference leg fails and results in a 300 gpm LOCA. The candidates will reassess the Safety Functions and determine a LOCA is taking place apparently from a failed instrument line. The RO should also note 2 Charging Pumps stopped due to the failed high PZR level instrument and select channel Y. The crew will trip 2 RCPs and verify SIAS is initiated when RCS pressure reaches 1725 and 1740 respectively. The crew will implement EOP-5.

When the crew implements EOP-5 they will ensure SIAS actuation and RCP trip strategy have been addressed. After a plant cooldown is begun is EOP-5 a Main Steam Safety Valve Fails open on 11 SG. The candidates now recognize a second event is occurring and implement Functional Recovery Procedure, EOP-8. The crew will select the Success Paths for the Safety Functions out in EOP-0 & 5, then implement HR-3 and PIC-3. When HR-3 and PIC-3 are implemented the scenario can be terminated.

Event Description:	Power reduction to 750 MWe.

Time	Position	Applicant's Actions or Behavior
	CUE	The System Operator informs the Control Room of a cooling problem on one of the two inservice transformers at Waugh Chapel and requests the Unit reduce to 750 MWe gross within the next 15 minutes.

	SRO	• Directs crew to begin a rapid power reduction per OP-3 Appendix B.
		• Instructs crew on reactor trip criteria: (may have been covered previously in a brief)
		  • Any valid low S/G pressure pre-trip
		  • Any valid high PZR pressure pre-trip
		  • Any valid TM/LP pre-trip
		  • S/G level approaching +50 or -45 inches
		
		• Informs chemistry if power reduction is greater than 15% in one hour

	RO	• Initiates PZR spray flow to equalize RCS Boron:
		  • Energize all PZR backup heater banks
		  • Adjust PZR Pressure Controller setpoint to maintain 2250 psia
		
		• Commences boration from the BASTs followed by shifting suction to the RWT:
		  • Opens BA direct makeup valve
		  • Verifies two charging pumps running
		  • Runs a BA pump for 30 seconds
		  • After BA Pump is secured, shuts BA direct makeup valve
		  • Opens RWT outlet valve
		  • Shuts VCT outlet
		
		• Inserts CEAs if necessary and maintains ASI within the limits of the COLR
		
		• Requests Peer checks for reactivity manipulations

	BOP	• Lowers TBV controller setpoint to 885 PSIA and requests peer check
		• If power is reduced below 70%, opens the LP FW heater HI LVL Dumps
		• Reduces turbine load to maintain Tc within 5°F of program (Maintains Main Steam header pressure 850-880 psia)
		
		• Monitors turbine parameters not to exceed
		  • 150°F/hr rate of change of 1st stage shell inner metal temperature (Point 6 on TR-4404)
		  • 75°F 1st stage shell metal temperature differential (Diff between Points 6 & 7 on TR-4404)
		  • Unloading rate of 10% step change or 5%/min

	SRO	• When the Unit reaches 750 MWe:
		  • Directs RO to shift Charging suction back to the VCT
		  • Directs RO/BOP to stabilize the unit at current power level

Scenario No:	4	Event No.	2	Page 5 of 18
Event Description:	Power Range Summer Fails High.			

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm - D-5, PROT CH TRIP D-12, POWER LVL CH PRE-TRIP Various other alarms
	RO	• Notes alarms on 1C05 and Channel A trip units tripped on RPS and informs SRO • Refers to ARM • Determines the channel A summer has failed high
	SRO	• Acknowledges report of malfunction. • Concurs with diagnosis of Power Range Summer failure • Refers to Tech. Spec. 3.3.1 and determines Trip Units 1,2,7,8, and 10 need to be bypassed. • Directs BOP (or RO) to bypass RPS Channel A Trip Units 1,2,7,8 and 10 per OI-6.
	BOP	• Acknowledges request, refers to OI-6 and obtains bypass keys for Trip units. • Bypasses trip units per OI-6 and requests RO (or BOP) to perform a peer check.
	RO	• Performs peer check of bypass of trip units per OI-6.
	SRO	• Contacts OMC/I&C to investigate failure of Channel A Power Range Summer.

Scenario No:	4	Event No.	3	Page 6 of 18

Event Description:	PORV 402 Leakage.

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator Alarm - E-1, Quench TK TEMP LVL PRESS Acoustic Monitor indication of leakage
	RO	• Notes alarms on 1C06 and informs SRO • Refers to ARM • Determines, based on acoustic monitor indications that PORV 402 or Safety RV-200 is leaking
	SRO	• Acknowledges report and concurs with the ROs diagnosis. • Directs RO to close PORV 402 block valve 1-RC-403 (may direct RO to take PORV 402 to Override Close)
	RO	• Performs action as directed by the SRO • When Block valve 403 is closed informs the SRO PORV leakage to the Quench Tank has stopped
	SRO	• Directs RO to return Quench Tank parameters to normal per OI-1B, Quench Tank Operations • Refers to T.S. 3.4.11
	RO	• Performs actions directed by SRO

Scenario No:	4	Event No.	4
Event Description:	11 Main FRV Controller FIC-1111 Fails Low		

Time	Position	Applicant's Actions or Behavior
	CUE:	SG 11 FW SYSTEM TROUBLE on alarm display FIC-1111 indicates "**F**"
	BOP	• Identifies and reports failure of FIC-1111 to the SRO

	SRO	• Acknowledges report and concurs with the BOP diagnosis
		• Directs implementation of AOP-3G, MALFUNCTION OF MAIN FEEDWATER SYSTEM
		  • Directs the BOP to place the HS for the PDI in the "Main Fail" position
		  • Directs BOP to adjust the affected PDI Controller to maintain SG level approximately zero inches

	BOP	• Performs actions directed by SRO • Restores/maintains SG level approximately zero inches
	SRO	• Contacts OMC/I&C to investigate failure of 1-FIC-1111

Scenario No: 4	Event No. 5	Page 8 of 18

Event Description: Trip of 12 SRW Pump.

Time	Position	Applicant's Actions or Behavior
	CUE	Annunciator alarm - 12 SRW HDR PRESS LO U-1 4KV ESF MOTOR OVERLOAD Loss of 12 SRW header pressure
	BOP	• Identifies and reports loss of 12 SRW Pp • Refers to ARM
	SRO	• Acknowledges report and directs BOP to check for common mode failure
	BOP	• Checks for Motor overload alarm, 12 SRW Head tank level and 11 SRW header parameters • Reports no common mode failure cause exists to SRO

	SRO	• Directs 12 SRW Pump be placed in P-T-L
		• Directs BOP to start 13 SRW Pump
		• Implements AOP-7B, <u>LOSS OF SERVICE WATER</u>
		  • Directs monitoring of Turbine/Generator parameters
		  • Directs Main Generator MVARs be reduced to zero (may not since 13 SRW Pump is started)

	CREW	• Perform actions directed by the SRO
		  • Verifies normal parameters on the 12 SRW header
		  • Verifies component temperatures return to normal

	SRO	• Contacts Electricians to investigate trip of 12 SRW Pump

Scenario No:	4	Event No.	6
Event Description:	SRW Header Rupture in the Turbine Bldg.		

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm 1C13 12 SRW HEAD TK LVL 12 SRW Head Tank level
	BOP	• Acknowledges alarm and reports lowering level in 12 SRW Head tank. • Dispatches a plant operator to check SRW Head Tank makeup CV is open

	SRO	• Acknowledges report and refers to the beginning of AOP-7B
		• Directs the crew to:
		  • Monitor turbine/generator temperatures
		  • Reduce MVARs to zero

	CREW	• Perform actions as directed by SRO • Determines SRW Head Tank level is lowering rapidly (may initially attempt some isolation/leak locations actions as long as head tank level exists)

	SRO	• Briefs crew on plan of action
		• Directs crew to:
		  • Isolate SRW to the Turbine Bldg
		  • Stop 13 SRW Pump
		  • Start of the SWACs
		  • Trip the Reactor
		  • Implement EOP-0, <u>POST TRIP IMMEDIATE ACTIONS</u>

	RO/BOP	• Perform actions as directed by SRO
		NOTE: EOP-0 actions continued in event 7

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Event Description:	Reactor Trip and SBLOCA.

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs the implementation of EOP-0, POST-TRIP IMMEDIATE ACTIONS

	RO	• Depresses one set of Manual RX TRIP buttons
		
		• Checks reactor tripped:
		    • Prompt drop in NI power
		    • Negative SUR
		
		• Checks ALL CEAs fully inserted
		    • Notes one CEA failed to insert
		    • Informs SRO
		    • Commences RCS Boration as follows:
		        • Shuts VCT Outlet
		        • Opens BA Direct Makeup Valve
		        • Opens BAST Gravity Feed Valves
		        • Verifies M/U Mode Sel SW in Manual
		        • Starts a BA Pump
		        • Starts all available Charging Pumps
		
		• Verifies demin water makeup to RCS is secured
		    • 11 & 12 RCMU pumps secured
		    • VCT M/U valve 1-CVC-512-CV is shut
		    • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut
		
		Reports Reactivity Control Safety Function is complete

	BOP	• Checks reactor has tripped
		
		• Ensures Turbine has tripped:
		    • Depresses Turbine TRIP button.
		    • Checks the Turbine MAIN STOP VALVES shut.
		    • Checks Turbine SPEED drops
		    • Verifies turbine generator output breakers open:
		
		        • 11 GEN BUS BKR, 0-CS-552-22
		        • 11 GEN TIE BKR, 0-CS-552-23
		
		    • Verifies 11 GEN and EXCITER FIELD BKRs 1-CS-41 and 1-CS-41E are open.
		
		Informs SRO the Turbine is Tripped.

Scenario No:	4	Event No.	7	Page 11 of 18
Event Description:	Reactor Trip and SBLOCA.			

Time	Position	Applicant's Actions or Behavior
	BOP	• Checks 11 OR 14 4KV Vital Bus energized • Checks 125 VDC and 120 VAC busses energized • Verifies CCW flow to RCPs • Verifies Switchgear Ventilation in service Informs SRO Vital Auxiliaries Safety Function is complete.
	RO	• Ensures PZR pressure stabilizes between 1850 psia and 2300 psia AND is trending to 2250 psia • Ensures PZR level stabilizes between 80 and 180 inches and is trending to 160 inches • Ensures RCS subcooling GREATER THAN 30°F Reports RCS Pressure and Inventory Safety Function is Complete

	BOP	• Verifies Turbine Bypass Valves or ADVs operating to maintain-
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		
		• Check at least one SG available for controlled heat removal
		  • SG level between -170 and +130 inches
		  • Main or Aux Feedwater are operating to maintain level
		
		• Check at least one RCP operating in loop with available SG
		
		• If any RCP operating, check Thot minus Tcold LESS THAN 10°F in loop with available SG
		
		Reports Core and RCS heat removal is complete

	CREW	• Checks Containment pressure less than 0.7 psig
		
		• Check Containment temperature less than 120°F
		
		• Check containment radiation monitor alarms CLEAR with NO unexplained trends-
		
		• Check RMS alarms CLEAR with NO unexplained trends-
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		
		Reports CNMNT Environment and Rad Levels External to CNMNT complete

	SRO	• Conducts EOP-0 mid-brief and directs RO/BOP to reverify safety functions
	CUE	Various annunciators associated with PZR level and pressure Lowering RCS pressure and PZR level

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Scenario No:	4	Event No.	7	
Event Description:	Reactor Trip and SBLOCA.			

Time	Position	Applicant's Actions or Behavior

	RO	• Notes PZR level and Pressure alarms and lowering PZR pressure and level
		• Informs SRO
		
		• Notes loss of 2 Ch. Pps due to failed PZR Level high
		• Selects Channel Y for failed instruments and verifies all Ch. Pps running
		
		• On reverification of RCS Pressure and Inventory:
		
		• Determines PZR pressure is continuing to drop
		• Manually operates heaters and sprays to attempt to restore pressure
		• If PZR pressure falls to 1725 psia, verifies SIAS actuates
		
		• Performs RCP Trip Strategy:
		  • If pressure drops to 1725 psia, trips either
		    • 11A and 12B RCPs OR
		    • 11B and 12A RCPs
		
		• Determines PZR level is not stabilizing between 80 and 180 inches or trending to 160 inches
		• Ensures RCS subcooling GREATER THAN 30°F
		
		Informs SRO that RCS Pressure and Inventory Safety Function can NOT be met due to low PZR pressure and PZR level.

	BOP	• On reverification of CNMNT Environment:
		
		• Checks Containment pressure less than 0.7 psig
		  • If pressure exceeds 0.7 psig:
		    • Verifies ALL available CACs operating
		    • Opens CAC EMERGENCY OUT valves for operating CACs (may not open 12 SRW HDR valves)
		• Checks Containment temperature less than 120°F
		  • If temperature exceeds 120°F:
		    • Verifies ALL available CACs operating
		    • Opens CAC EMERGENCY OUT valves for operating CACs (may not open 12 SRW HDR valves)
		
		• Checks containment radiation monitor alarms CLEAR with NO unexplained trends:
		  • If alarm received, starts the IODINE FILT FANS
		
		• Checks RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		
		Reports CNMNT Environment Safety Function can NOT be met due to high CNMNT temperature and pressure
		
		Reports Radiation levels external to CNMNT Safety Function is complete

Scenario No:	4	Event No.	7	Page 13 of 18
Event Description:	Reactor Trip and SBLOCA.			

Time	Position	Applicant's Actions or Behavior

	SRO	• Determines Recovery Procedure per Diagnostic Flowchart:
		  • NO for RCS press/inv safety function
		  • NO SG pressure <800 psia
		  • NO SG B/D or Offgas RMS alarm
		  • NO to SG level response mismatch
		• Consider EOP-5 (LOCA)
		  • NO for Cont Envir safety function
		  • NO SG pressure <800 psia
		  • YES PZR pressure or level low
		• Consider EOP-5 (LOCA)
		• Single Event Diagnosis - EOP-5

Scenario No:	4	Event No.	8	Page 14 of 18
Event Description:	SBLOCA and Main Steam Safety Valve Fails Open.			

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs transition to EOP-5, LOSS OF COOLANT ACCIDENT • Conducts EOP-5 pre-implementation brief

	CREW	• If PZR pressure <1725 psia or CNTMT pressure > 2.8 psig:
		  • Verifies SIAS actuation or
		  • If SIAS has not yet actuated, then manually aligns SI System Pps and valves and blocks SIAS
		
		• Determines maximum safety injection flow exists:
		  • 11 and 13 HPSI pumps running
		  • HPSI flow per ATTACHMENT (10) when pressure below 1270 psia
		  • 11 and 12 LPSI pumps running
		  • LPSI flow per ATTACHMENT (11) when pressure below 185 psia
		  • All charging pumps running

	RO	• Performs RCP Trip Strategy:
		  • When pressure drops to 1725 psia, trip either
		    • 11A AND 12B RCPs or
		    • 11B and 12A RCPs
		
		• If CIS actuates or Component Cooling flow to RCPs can NOT be verified, trips ALL RCPs
		
		• Monitors RCS pressure for minimum head requirements per Attachment 1 if any RCPs running
		
		• Attempts leak isolation:
		  • Verifies L/D CNTMT Isol. shut
		    • 1-CVC-515-CV
		    • 1-CVC-516-CV
		  • Checks PORV leakage
		    • Quench Tank parameters
		    • PORV disch temp, computer points:
		      • T107
		      • T108
		    • Acoustic Monitor indication
		
		  • Shuts 1-PS-5464-CV RCS SAMPLE ISOL
		  • Shuts RXV Vent valves:
		    • 1-RC-103-SV
		    • 1-RC-104-SV
		  • Shuts PZR VENT valves:
		    • 1-RC-105-SV
		    • 1-RC-106-SV
		
		  • Determine NO leakage into CC System by:
		    • Alarm clear on rad monitor 1-RI-3819 with NO rising trend
		    • CCW HEAD TK LVL alarm (1C13 K-17) clear
		  • Determines leak is inside CNTMT

Scenario No:	4	Event No.	8
Event Description:	SBLOCA and Main Steam Safety Valve Fails Open.		

Time	Position	Applicant's Actions or Behavior
	CREW	• Observe CNTMT Sump level rises as RWT level drops

	RO	• With SIAS actuated, verifies boration in progress:
		  • 1-CVC-512-CV VCT M/U valve shut
		  • 1-CVC-514-MOV BA DIRECT M/U valve open
		  • BAST GRAVITY FD valves open:
		    • 1-CVC-508-MOV
		    • 1-CVC-509-MOV
		  • ALL available (11 BA Pump) BA pumps running
		  • 1-CVC-501-MOV VCT OUT valve shut
		  • ALL available charging pumps running
		• Records time boration started
		• Records BAST levels:
		  • 11 BAST
		  • 12 BAST
		• Continues boration until ONE condition met:
		  • Shutdown Margin requirements met per NEOPs
		  • BAST level lowered a total of 71 inches
		  • Boration has been in progress for:
		    • 35 minutes with THREE charging pumps running
		    • 53 minutes with TWO charging pumps running
		    • 105 minutes with ONE charging pump running

	BOP	• If pressure exceeds 2.8 psig, verifies actuation
		  • SIAS
		  • CIS
		• If CIS actuated, trips ALL RCPs
		• Verifies SRW Pump Room Ventilation per OI-15
		• Directs Chemistry to place Hydrogen Monitors in service
		• If hydrogen conc rises to 0.5%, OR hydrogen conc can NOT be determined, directs Hydrogen Recombiners be placed in service per OI-41A

	BOP	• Determines Main Feedwater is not available (loss of SRW to Turbine Bldg.)
		  • Verifies AFW flow is established and SG FW isolation valves shut
		    • Verifies AFW Pp Room ventilation is in service
		  • Establishes SG levels between +10 and +50 inches
		  • Ensures cooldown does not exceed 100°F/hr
		  • Secures the Main Feed System
		    • Trips SGFPs (previously done)
		    • Places Cond, Cond Bstr, and Heater Drain Pps in P-T-L
		    • Shuts the hotwell to CST dump CV

Scenario No:	4	Event No.	8	Page 16 of 18
Event Description:	SBLOCA and Main Steam Safety Valve Fails Open.			

Time	Position	Applicant's Actions or Behavior

	CREW	• With Tcold > 300°F:
		  • When SGIS A and B BLOCK PERMITTED alarms are received, blocks SGIS
		  • Conducts a rapid cooldown to 300°F using ADVs, NOT to exceed 100°F in any one hour

	CUE	Audible Steam release taking place Rapidly lowering RCS temperature and pressure
	CREW	• Notes steam release and changing plant parameters • Determines a second event is occurring
	SRO	• Directs implementation of EOP-8

	SRO	• Performs RCP Trip Strategy:
		  • When pressure drops to 1725 psia, trip either
		    • 11A AND 12B RCPs or
		    • 11B and 12A RCPs
		
		• If CIS actuates or Component Cooling flow to RCPs can NOT be verified, trips ALL RCPs
		• Monitors RCS pressure for minimum head requirements per Attachment 1 if any RCPs running
		
		• Directs Chemistry to sample both S/Gs for activity and place the H2 monitors in service
		• Directs RO to determine Success Path for RCS Pressure and Inventory
		• Directs BOP to determine Success Paths for Core and RCS Heat Removal and for CNMNT Environment

	CREW	• Notes SGIS Block Permitted Alarm and verifies SGIS (SRO may have directed MSIVs closed previously)
	CREW	• Determines 11 SG has the failed open Safety valve
	SRO	• Directs the BOP to isolate AFW to 11 SG
	BOP	• Isolates AFW to 11 SG
	RO	• Evaluates RAT, selects PIC-3 as appropriate Success Path and informs SRO
	BOP	• Evaluates RAT, selects HR-3 and CE-3 as appropriate Success Paths and informs SRO
	SRO	• Directs RO/BOP to implement selected Success Paths PIC-3 and HR-3
	RO/BOP	• Commence PIC-3 and HR-3 This scenario may be terminated once the RO and BOP implement PIC-3 and HR-3

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SCENARIO #4 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicant's ability to initiate a power decrease due to a transformer cooling problem, to implement the ARMs, OIs, AOPs, as appropriate, for a Power Summer failure, a leaking PORV, MFRV Controller Failure, trip of a SRW Pump and SRW rupture in the Turbine Bldg. To evaluate on the reactor trip, a stuck out CEA, and PZR instrument line failure resulting in a 300 gpm LOCA. Once in EOP-5, a Main Steam Safety will open on 11 SG requiring the crew to implement the Functional Recovery Procedure.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-13. Draft Spin #805

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

5. Enter Malfunctions

____ a. 13 CCW Pump Breaker Failure
CCW002_03 at time zero

____ b. CEA 30 Fails to Insert on Trip
CEDS010_30 at time zero

____ c. Power Summer Fails HIGH
NI010_01 High on F1

____ d. PORV 402 Seat Leakage
RCS021 ramp 0 to 20 % over 2 minutes on F2

____ e. 11 SGFP MFRV Controller 1-FIC-1111 Fails LOW
FW018_01 LO on F3

____ f. 12 SRW Pump Breaker Failure
SRW003_02 on F4

____ g. 12 SRW Header Leak in the Turbine Bldg.
SRW002_02 ramp 0 to 20% over 2 minutes on F5

____ h. 1-PT-100X Pressurizer Pressure Fails LOW
RCS023_01 LO on F6

____ i. 1-PT-102B Pressurizer Pressure Fails LOW
RCS024_02 LO on F7

j. 1-LT-110X Pressurizer Level Fails HIGH
RCS026_01 HI on F8

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SCENARIO #4 SETUP

k. RCS Leak
RCS002 - 300 gpm on F9

l. 11 SG Safety Valve Fails Open
MS016_02 on F10

6. Enter Panel Overrides

____ a. 13 CCW Pump AUTO START BLOCKED Alarm (K-13), to OFF.

____ b. 13 CCW Pump Green Light Out on 1C13 at time zero

7. Enter Remote Functions/Administrative

____ a. Place 13 CCW Pump in PTL and Danger Tag.

____ 8. Set simulator time to real time, then place simulator in CONTINUE.

____ 9. Give crew briefing.

a.	Present plant conditions:	Approximately 100% power, MOC - 8,400 MWD/MTU. Unit 2 is in Mode 6. RCS Boron - 679 PPM.
b.	Power history:	100% for previous 72 days.
c.	Equipment out of service:	13 CCW Pp is OOS due to a cracked pump shaft. 3 days until returned to service.
d.	Abnormal conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. A moderate earthquake occurred 6 hours ago with the epicenter near Dunkirk. The quake registered 3.1 on the Richter scale. No ERPIP declaration was deemed necessary. A plant inspection for damage is under way. No damage has been identified to this point.
e.	Surveillances due:	None.
f.	Instructions for shift:	Maintain 100% power. Continue plant inspection for damage due to the earthquake, notify GS-NPO immediately if any damage found.

____ 10. Allow crew 3-5 minutes to acclimate themselves with their positions.

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SCENARIO #4 SETUP

___ 11. Instructions for the Booth Operator.

a. When directed by the lead evaluator, call as the System Operator and inform the Control Room that there is a cooling problem on one of the two in service main transformers at Waugh Chapel and Unit 1 needs to reduce load to 750 MWe within the next 15 minutes.

b. Activate malfunctions F1-F5 as each is cued by the lead evaluator.

c. When cued by the lead evaluator, activate malfunction F6-F9 as rapidly as possible.

d. Activate malfunction F-10 in EOP-5 when cued by the lead evaluator.

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CONFI

SCENARIO #4 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	OMC/I&C investigate power range channel A summer failure.	Acknowledge request.
2.	OMC/I&C investigate failure of 11 MFRV Controller, 1-FIC-1111.	Acknowledge request.
3.	Electricians investigate trip of 12 SRW Pump.	Acknowledge request. After 10 minutes report the pump appears to have tripped on overcurrent.
4.	ABO check SRW Head Tank CV is making up.	After approximately 2 minutes report the SRW CV is fully open.
5.	TBO/PPO attempt to locate the source of the leak.	Acknowledge request.
6.	OSO isolate starting air to 1B DG.	After about 5 minutes enter malf. DG001_02, 1B DG Start Failure and report to the Control Room that starting air has been isolated.
7.	Directs ABO to verify Switchgear ventilation is in service.	After 3 minutes report 12 switchgear ventilation is in service.
8.	Chemistry place the Hydrogen Monitors in service.	Acknowledge request.
9.	Chemistry sample both SGs for activity.	Acknowledge request.

SCENARIO #4 SETUP

SHIFT TURNOVER

I.	Present Plant Conditions:	Approximately 100%.
II.	Burnup:	8400 MWD/MTU (MOC) - Boron 679 PPM.
III.	Power History:	100% for previous 72.
IV.	Equipment out of Service:	13 CCW Pp is OOS due to a cracked pump shaft. 3 days until returned to service.
V.	Abnormal Conditions:	1 of the 3 main transformers at Waugh Chapel is OOS. A moderate earthquake occurred 6 hours ago with the epicenter near Dunkirk. The quake registered 3.1 on the Richter scale. No ERPIP declaration was deemed necessary. A plant inspection for damage is under way. No damage has been identified to this point.
VI.	Surveillances Due:	STP-O-8 on 1B DG when it is returned to service.
VII.	Instructions for Shift:	Maintain 100% power. Continue plant inspection for damage due to the earthquake, notify GS-NPO immediately if any damage found.
VIII.	U2 Status and Major Equipment OOS:	Mode 6.

Facility: Calvert Cliffs Examination Level: RO Revised 1/14/99		Date of Examination: 1/25/99 Operating Test Number: 1
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Shift Staffing	K/A 2.1.3//R3.0/S3.4// Shift Turnover - RO turnover Checklist
		K/A 2.1.2 //R3.0/S4.0// Reactor Shutdown- CRO responsibility
	Plant Parameter Verification	K/A 2.1.7//R3.7/S4.4// Evaluate plant heat balance performance
		K/A 2.1.25//R2.8/S3.1// Obtain and interpret reference material for SW Heat Exchangers
A2	Surveillance Testing	K/A 2.2.12//R3.0/S3.4// Knowledge of surveillance required for CEA deviation circuit
		K/A 2.2.13//R3.6/S3.8// Knowledge of Tagging clearance procedures for surveillance test of HPSI pump with LTOP controls in effect
A.3	Radiation Control	K/A 2.3.10//R2.9/S3.3/ Knowledge of SWP Requirements
		K/A 2.3.11//R2.7/S3.2// Conditions to secure a liquid waste release
A.4	Emergency Procedures/Plan	K/A 2.4.39//R3.3/S3.7// RO responsibility in Emergency plan implementation
		K/A 2.4.43//R2.8/S3.5// Knowledge ERPIP notification requirements during assignment as Control Room Communicator

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Shift Staffing

Shift Turnover - RO Turnover Checklist

K/A 2.1.3 [3.0/3.4]

Question a:

The RO turnover checklist requires that the "reactor power distribution and boration/dilution patterns have been reviewed." What is the reason for reviewing these?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Shift Staffing

Shift Turnover - RO Turnover Checklist

K/A 2.1.3 [3.0/3.4]

Question a:

The RO turnover checklist requires that the "reactor power distribution and boration/dilution patterns have been reviewed." What is the reason for reviewing these?

Answer:
Knowing patterns of boration/dilution provides indication to the operator of changes occurring in the core, such as xenon buildin, xenon burnup. Power distribution provides indication to the operator of flux perturbations caused by power changes, CEA motion, changes in burnable poisons. Both of these enable RO to proactively manage core reactivity.

Reference Use Allowed ? NO

Reference 1 General Fundamentals

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Shift Staffing

Reactor Shutdown - CRO Responsibility

K/A 2.1.2 [3.0/4.0]

Question b:

Plant procedures describe two conditions for the CRO or RO to trip the reactor, what are they?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Shift Staffing

Reactor Shutdown - CRO Responsibility

K/A 2.1.2 [3.0/4.0]

Question b:

Plant procedures describe two conditions for the CRO or RO to trip the reactor, what are they?

Answer:

1. When any plant parameter reaches a RPS setpoint, trip the reactor if an automatic trip has not occurred.

2. When directed by the SM or CRS.

Reference Use Allowed? NO

Reference 1 NO-1-200 Section 5.4.B

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Plant Parameter Verification

SW Heat Exchangers

K/A 2.1.25 [2.8/3.1]

Question b:

Given Tables 1 and 5 from OI-29 (Saltwater System Unit 2) explain the difference in maximum allowable ΔP across the heat exchanger for the same saltwater inlet temperature and the same saltwater flow with all CACs in service and having one isolated.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

21 SRW HX MAX ALLOWABLE ΔP WITH 21 OR 23 SRW PUMP (PLANT COMPUTER, CW001) [B0083]

SW Temp (F)	SW Flow (1000 gpm)									
	15	16	17	18	19	20	21	22	23	24
55	5.23	5.94	6.67	7.45	8.27	9.12	10.02	10.96	11.95	12.98
56	5.10	5.79	6.51	7.27	8.06	8.90	9.78	10.70	11.65	12.67
57	4.97	5.64	6.34	7.08	7.86	8.68	9.53	10.43	11.36	12.35
58	4.85	5.50	6.18	6.90	7.66	8.46	9.29	10.16	11.08	12.04
59	4.72	5.36	6.02	6.72	7.46	8.24	9.05	9.90	10.79	11.73
60	4.60	5.22	5.87	6.55	7.27	8.03	8.82	9.65	10.51	11.43
61	4.47	5.08	5.71	6.38	7.08	7.82	8.59	9.39	10.24	11.13
62	4.35	4.94	5.55	6.20	6.89	7.60	8.35	9.14	9.96	10.82
63	4.23	4.81	5.40	6.04	6.70	7.40	8.13	8.89	9.69	10.53
64	4.12	4.67	5.25	5.87	6.52	7.19	7.91	8.65	9.43	10.25
65	4.00	4.54	5.11	5.71	6.34	7.00	7.69	8.41	9.17	9.97
66	3.89	4.42	4.97	5.55	6.16	6.80	7.48	8.18	8.92	9.69
67	3.78	4.29	4.82	5.39	5.99	6.61	7.26	7.95	8.66	9.42
68	3.67	4.17	4.69	5.24	5.82	6.42	7.06	7.73	8.42	9.15
69	3.56	4.04	4.55	5.08	5.64	6.23	6.85	7.50	8.17	8.88
70	3.45	3.92	4.41	4.93	5.48	6.05	6.65	7.28	7.93	8.62
71	3.34	3.80	4.28	4.78	5.31	5.86	6.45	7.05	7.69	8.36
72	3.24	3.68	4.15	4.63	5.15	5.69	6.25	6.84	7.46	8.11
73	3.14	3.57	4.02	4.49	4.99	5.51	6.06	6.63	7.23	7.86
74	3.04	3.46	3.89	4.35	4.83	5.34	5.87	6.42	7.00	7.61
75	2.94	3.35	3.77	4.21	4.68	5.17	5.69	6.22	6.78	7.38
76	2.84	3.23	3.64	4.07	4.53	5.00	5.50	6.02	6.56	7.13
77	2.75	3.13	3.52	3.94	4.38	4.84	5.32	5.82	6.35	6.90
78	2.65	3.02	3.40	3.80	4.23	4.67	5.14	5.63	6.13	6.67
79	2.56	2.92	3.29	3.68	4.09	4.52	4.97	5.44	5.93	6.45
80	2.47	2.81	3.17	3.54	3.94	4.36	4.79	5.25	5.72	6.22
81	2.38	2.71	3.06	3.42	3.80	4.20	4.63	5.06	5.52	6.01
82	2.29	2.61	2.95	3.30	3.67	4.05	4.46	4.88	5.33	5.79
83	2.21	2.52	2.84	3.18	3.53	3.91	4.30	4.71	5.13	5.58
84	2.12	2.42	2.73	3.05	3.40	3.76	4.13	4.53	4.94	5.37
85	1.97	2.25	2.54	2.85	3.17	3.50	3.85	4.22	4.61	5.01

IF using 2-TR-17 for temperature indication,
THEN SUBTRACT .15 PSI from Delta P limit in the table to determine 2-TR-17 limit.

21 SRW HX MAX ALLOWABLE ΔP WITH A CAC ISOLATED (PLANT COMPUTER, CW001)[B0083]

SW Temp (F)	SW Flow (1000 gpm)									
	15	16	17	18	19	20	21	22	23	24
85 or less	5.10	5.79	6.51	7.28	8.09	8.93	9.82	10.75	11.73	12.75
86	4.74	5.38	6.05	6.77	7.52	8.31	9.13	10.00	10.90	11.86
87	4.39	4.98	5.61	6.27	6.97	7.70	8.46	9.27	10.10	10.99
88	4.05	4.60	5.18	5.79	6.44	7.11	7.82	8.56	9.33	10.15
89	3.69	4.19	4.72	5.28	5.86	6.48	7.12	7.80	8.50	9.25
90	3.27	3.71	4.18	4.68	5.20	5.74	6.31	6.91	7.54	8.20

IF using 2-TR-17 for temperature indication,
THEN SUBTRACT .3 PSI from Delta P limit in the table to determine 2-TR-17 limit.

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Plant Parameter Verification

SW Heat Exchangers

K/A 2.1.25 [2.8/3.1]

Question b:

Given Tables 1 and 5 from OI-29 (Saltwater System Unit 2) explain the difference in maximum allowable ΔP across the heat exchanger for the same saltwater inlet temperature and the same saltwater flow with all CACs in service and having one isolated.

Answer:

The allowed ΔP is higher for a given SW inlet temperature and flow with a CAC isolated. This is based on reduced heat input to the system from the containment atmosphere during accident conditions. This will leave a greater margin for the heat input from other components, primarily the diesels. With the CAC unisolated the heat input is greater and therefore the maximum allowable ΔP for a given SW flow and temperature must be lower.

Reference Use Allowed ? YES

Reference 1 OI-29 Saltwater System (U2) Table 1 and 5

Reference 2 Engineering memo regarding bay temperature versus ΔP limits for system operability

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Plant Parameter Verification

Plant Heat Balance Performance

K/A 2.2.12 [3.0/3.4]

Question a:

Explain why OI-30 Manual Secondary Calorimetric Calculation requires the S/G heat rate be corrected for blowdown flow rate.

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
ADMIN A1 Topics
Plant Parameter Verification

Plant Heat Balance Performance

K/A 2.1.7 [3.7/4.4]

Question a:

Explain why OI-30 Manual Secondary Calorimetric Calculation requires the S/G heat rate be corrected for blowdown flow rate.

Answer:

Feed flow is used vice steam flow due to it being a more accurate measurement. The calculation then "assumes" that all feed flow is converted to steam. This assumption must be corrected for the blowdown which leaves the system as a saturated liquid.

Reference Use Allowed? YES

Reference 1 OI-30 Section 6.4, Manual Secondary Calorimetric Calculation

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Surveillance Testing

Knowledge of Tagging Clearance Procedures

K/A 2.2.13 [3.6/3.8]

Question a:

Unit 1 is in Mode 5, LTOP controls are in place per OP-5. 12 HPSI Pump is aligned for boration/makeup, per NO-1-103. Post maintenance testing of 11 HPSI Pump is required. Can 11 HPSI Pump be tested in the present plant configuration. If not, what must be done to perform required testing?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Surveillance Testing

Knowledge of Tagging Clearance Procedures

K/A 2.2.13 [3.6/3.8]

Question a:

Unit 1 is in Mode 5, LTOP controls are in place per OP-5. 12 HPSI Pump is aligned for boration/makeup, per NO-1-103. Post maintenance testing of 11 HPSI Pump is required. Can 11 HPSI Pump be tested in the present plant configuration. If not, what must be done to perform required testing?.

Answer:
The LTOP tagout must be modified in accordance with NO-1-112 ensuring the requirements of T.S. LCO 3.4.12 are met.

Reference Use Allowed ? YES

Reference 1 TS LCO 3.4.12

Reference 2 OP-5

Reference 3 NO-1-112

Reference 4 NO-1-103

Reference 5 Log Basis Document

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Knowledge of Surveillance Required for CEA Deviation Circuit

K/A 2.2.12 [3.0/3.4]

Question b:

What actions are required for the Secondary CEA Position indication system being inoperable, with all CEAs fully withdrawn (full out indication and primary position indication operable).

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Surveillance Testing

Knowledge of Surveillance Required for CEA Deviation Circuit

K/A 2.2.12 [3.0/3.4]

Question b:

What actions are required for the Secondary CEA Position indication system being inoperable, with all CEAs fully withdrawn (full out indication and primary position indication operable).

Answer:
Verify the indicated position of each CEA to be within 7.5 inches of all other CEAs in its group (SR 3.1.4.1) within 1 hour and every 4 hours thereafter (T.S. 3.1.4 Actions D.1 and E.1). Restore CMI to operable or fully withdraw Groups 3 and 4 and withdraw Group 5 to less than 5% inserted (T.S. 3.1.4 Actions D.2.1, D.2.2).

Reference Use Allowed? YES

Reference 1 Tech Spec 3.1.4 Actions D.1, D.2.1, D.2.2

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Radiation Control

SWP Requirements

K/A 2.3.10 [2.9/3.3]

Question a:

While you are in the Auxiliary Building (during this walkthrough under the current SWP), the Control Room calls and requests that you start the standby Waste Gas Compressor when you get to the 5 foot elevation.

What is (and Why) the expected response?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Radiation Control

SWP Requirements

K/A 2.3.10 [2.9/3.3]

Question a:

While you are in the Auxiliary Building (during this walkthrough under the current SWP), the Control Room calls and requests that you start the standby Waste Gas Compressor when you get to the 5 foot elevation.

What is (and Why) the expected response?

Answer:

The evolution can NOT be performed due to it is not within the scope of the present SWP requirements. (Radiation level can change and it is hands-on work)

(The SWP that is assumed to be used for the walkthrough is SWP 99-1 General inspections)

Reference Use Allowed ? YES

Reference 1 SWP 99-1

Reference 2 CCNPP Radiation Safety Manual Section 6.2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Radiation Control
Conditions to Secure a Liquid Waste Release

K/A 2.3.11 [2.7/3.2]

Question b:

12 RCWMT discharge is in progress. An alarm is received on RI-2201. RI-2201 indicates low off scale and the liquid waste discharge control valves are open. What actions are required?

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Radiation Control

Conditions to Secure a Liquid Waste Release

K/A 2.3.11[2.7/3.2]

Question b:

12 RCWMT discharge is in progress. An alarm is received on RI-2201. RI-2201 indicates low off scale and the liquid waste discharge control valves are open. What actions are required?

Answer:

Shut the liquid waste discharge control valves and secure the discharge lineup.

Reference Use Allowed? YES

Reference 1 OI-17C-4

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A4 Topics
Emergency Procedures

RO responsibility during ERPIP Implementation

K/A 2.4.39 [3.3/3.1]

Question a:

You are the Unit 1 RO and you have been temporarily relieved by an extra licensed operator. You are in the cafeteria when you hear the plant emergency alarm and intructions for all personnel to report to their assembly area. What location are you to report to?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A4 Topics
Emergency Procedures

RO responsibility during ERPIP Implementation

K/A 2.4.39 [3.3/3.1]

Question a:

You are the Unit 1 RO and you have been temporarily relieved by an extra licensed operator. You are in the cafeteria when you hear the plant emergency alarm and intructions for all personnel to report to their assembly area. What location are you to report to?

Answer:

Control Room.

Reference Use Allowed ? NO

Reference 1 ERPIP 103

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A4 Topics
Emergency Procedures

ERPIP Communication

K/A 2.4.43 [2.8/3.5]

Question b:

You are an extra licensed operator on shift when an ALERT condition has been declared. You are assigned the responsibilities of Control Room Communicator by the Shift Manager and directed to make the initial notifications.

What are the time limits for notifying local and state government agencies and the NRC?

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
ADMIN A4 Topics
Emergency Procedures

ERPIP Communication

K/A 2.4.43 [2.8/3.5]

Question b:

You are an extra licensed operator on shift when an ALERT condition has been declared. You are assigned the responsibilities of Control Room Communicator by the Shift Manager and directed to make the initial notifications.

What are the time limits for notifying local and state government agencies and the NRC?

Answer:

15 minutes for local government agencies and 1 hour for the NRC

Reference Use Allowed? Yes
Reference 1 ERPIP 105

Reference 2 RM 1-101

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

SRO Admin w/ Outline

Facility: Calvert Cliffs Examination Level: SRO-I	REVISED 1/22/99	Date of Examination: 1/25/99 Operating Test Number: 1

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Shift Turnover	K/A 2.1.3//R3.5:S 3.4// Complete Fuel Handling Supervisor turnover checklist items.
		K/A 00022K401// R3.1: S3.4// Verify WR NIs operable per FHS turnover checklist.
	Plant parameter verification	JPM - K/A 2.1.33//R3.4:S4.0// Surveillance Test results review- entry level conditions for Tech Specs
A2	Troubling Shooting - Configuration Control	K/A 2.2.20//R2.20:S3.3// - Administrative Procedure "Trouble Shooting & Procedure Controlled Activities". MN-1-110
		K/A 2.2.19//R2.1/S3.1// - Knowledge of Maintenance Order process for unscheduled work
A.3	Control of Radiation Releases	K/A 2.3.20//R2.1:S3.1// - Review for approval of Containment Purge release
		K/A 2.3.11//R2.7/S3.2// - Ability to control release during SGTR event
A.4	Event Classification	JPM - K/A 2.4.41//R2.3: S4.1// - Emergency Response Plan Implementation Procedures - Declare event and make notification(s)

CORRECTED

Facility: Calvert Cliffs Examination Level: SRO-U	REVISED 1/22/99	Date of Examination: 1/25/99 Operating Test Number: 1

	Administrative Topic/Subject Description	Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Shift Turnover	K/A 2.1.3//R3.5:S 3.4// Complete Fuel Handling Supervisor turnover checklist items.
		K/A 00022K401// R3.1: S3.4// Verify WR NIs operable per FHS turnover checklist.
	Plant parameter verification	JPM - K/A 2.1.33//R3.4:S4.0// Surveillance Test results review- entry level conditions for Tech Specs
A2	Troubling Shooting - Configuration Control	K/A 2.2.20//R2.20:S3.3// - Administrative Procedure "Trouble Shooting & Procedure Controlled Activities". MN-1-11+0
		K/A 2.2.19//R2.1:S3.1// - Knowledge of Maintenance Order process for unscheduled work
A.3	Control of Radiation Releases	K/A 2.3.6//R2.1:S3.1// - Review for approval of Containment Purge release
		K/A 2.3.11//R2.7/S3.2// - Ability to control release during SGTR event
A.4	Event Classification	JPM - K/A 2.4.41//R2.3: S4.1// - Emergency Response Plan Implementation Procedures - Declare event and make notification(s)

CORRECTED

Facility: Calvert Cliffs Date of Examination: 1/25/99
Examination Level: SRO-I REVISED 12/20/98 Operating Test Number: 1

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Shift Turnover	JPM K/A 2.1.3//R3.5:S 3.4// Complete Fuel Handling Supervisor turnover checklist.
	Plant parameter verification	JPM - K/A 2.1.33//R3.4:S4.0// Surveillance Test results review- entry level conditions for Tech Specs
A2	Troubling Shooting - Configuration Control	K/A 2.2.20//R2.20:S3.3// - Administrative Procedure "Trouble Shooting & Procedure Controlled Activities". MN-1-110
		K/A 2.2.19//R2.1/S3.1// - Knowledge of Maintenance Order process for unscheduled work
A.3	Control of Radiation Releases	K/A 2.3.20//R2.1:S3.1// - Review for approval of Containment Purge release
		K/A 2.3.11//R2.7/S3.2// - Ability to control release during SGTR event
A.4	Event Classification	JPM - K/A 2.4.41//R2.3: S4.1// - Emergency Response Plan Implementation Procedures - Declare event and make notification(s)

Facility: Calvert Cliffs Examination Level: SRO-U	REVISED 12/20/98	Date of Examination: 1/25/99 Operating Test Number: 1

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A1	Shift Turnover	JPM K/A 2.1.3//R3.5:S 3.4// Complete Fuel Handling Supervisor turnover checklist.
	Plant parameter verification	JPM - K/A 2.1.33//R3.4:S4.0// Surveillance Test results review- entry level conditions for Tech Specs
A2	Troubling Shooting - Configuration Control	K/A 2.2.20//R2.20:S3.3// - Administrative Procedure "Trouble Shooting & Procedure Controlled Activities". MN-1-110
		K/A 2.2.19//R2.1:S3.1// - Knowledge of Maintenance Order process for unscheduled work
A.3	Control of Radiation Releases	K/A 2.3.6//R2.1:S3.1// - Review for approval of Containment Purge release
		K/A 2.3.11//R2.7/S3.2// - Ability to control release during SGTR event
A.4	Event Classification	JPM - K/A 2.4.41//R2.3: S4.1// - Emergency Response Plan Implementation Procedures - Declare event and make notification(s)

Calvert Cliffs Nuclear Power Plant
Admin A1 Topics
Title
Fuel Handling Supervisor Turnover

K/A 2.1.3 [3.0/3.4]

Question a:
You are relieving the Fuel Handling Supervisor. You have dressed out and are entering Unit 1 Containment. You are informed that the PAL interlocks are defeated. Is this permissible?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
Admin A1 Topics
Title
Fuel Handling Supervisor Turnover

K/A 00027A403 [3.3/3.2]

Question a:
You are relieving the Fuel Handling Supervisor. You are dressed out and are entering Unit 1 Containment. You are informed that the PAL interlocks are defeated. Is this permissible?

Answer:

Yes, this is permissible as long as there is an individual immediately outside the PAL to close the door.

Reference Use Allowed? YES

Reference 1 N0-1-207 Attachment 9, Shift Turnover Checklist Fuel Handling Supervisor, item #7

Reference 2 Tech Spec 3.9.3

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
Admin A1 Topics
Title
Fuel Handling Supervisor Turnover

K/A 00022K401 [3.1/3.4]

Question b:
Fuel Handling is in progress. You are relieving the Fuel Handling Supervisor. One item on the FHS Turnover Checklist is to verify at least two WRNIs are operable.
How would you verify their operability?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
Admin A1 Topics
Title
Fuel Handling Supervisor Turnover

K/A 00022K401 [3.1/3.4]

Question b:
Fuel Handling is in progress. You are relieving the Fuel Handling Supervisor. One item on the FHS Turnover Checklist is to verify at least two WRNIs are operable.
How would you verify their operability?

Answer:

SR 3.9.2.1 requires a channel check be performed once per 12 hours. This surveillance is verified to be current, or have a channel check peformed per T.S. 1.1 definition of CHANNEL CHECK (A CHANNEL CHECK shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameter.)

Reference Use Allowed? Yes

Reference 1 Tech Spec LCO 3.9.2 Surveillance SR 3.9.2.1; Tech Spec Applications and Use Section 1.1 Definition of CHANNEL CHECK.

Reference 2 NO-1-207

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

SYSTEM: Surveillance Testing

TASK: 032040504 Perform the initial review of a completed STP

PURPOSE: Evaluates an Operator's Ability to perform a review of a complete STP and determine if acceptance criteria are met.

JOB PERFORMANCE MEASURE

CALVERT CLIFFS NUCLEAR POWER PLANT

LICENSED OPERATOR TRAINING

ORIGINAL:

PREPARED BY: ______________________ DATE: 6/29/97

REVISION/CHANGES:

REVISED/CHANGED BY: ______________________ DATE: __________
Operations Instructor - Nuc

REVIEWED BY: ______________________ DATE: __________
SRO License Holder

APPROVED BY: ______________________ DATE: __________
Ops Training Supervisor

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

TASK: 032040504 Perform the initial review of a completed STP

PERFORMER'S NAME: ____________________________

APPLICABILITY:

SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for Calvert Cliffs Instructions.

EVALUATION LOCATION:

_____ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ACTUAL PERFORMANCE _____DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
15 MINUTES	____ MINUTES	NO

TASK LEVEL:

T

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

STP O-63-1
EN-4-104

TASK STANDARDS:

This JPM is complete when STP O-63-1 has been reviewed and completed.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

TASK: 032040504 Perform the initial review of a completed STP

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **<u>NOTE:</u> Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

ELEMENT (* = CRITICAL STEP)		STANDARD
TIME START ____		
____	Identify and locate Step 6.4 (Acceptance Criteria) of STP O-63-1.	

CUE: CRO has initiated an IR for Hot Leg Temp deviation.

	A.	Did all the instruments listed in ATTACHMENT 1 meet the Acceptance Criteria?	Reviews ATTACHMENT 1. Determines Step 4 (RCS Hot Leg Temp) is unacceptable.} Refers to footnote 2 and determines IR is required but STP failure is not required. Circles YES.
*____	B.	Did all the instruments listed in ATTACHMENT 2 meet the Acceptance Criteria?	Reviews ATTACHMENT 2. Determines Step 5 (12 S/G LvL) is unacceptable. Refers to footnote 1 and determines reading was taken at >90% power. Circles NO.
*____	C.	This surveillance is considered satisfactory is YES was answered in all steps above	Circles UNSAT.
*____	1.	IF UNSAT, **THEN** notify the SM, declare the affected equipment inoperable and take actions as required by Technical Specifications and administrative actions stated in EN-4-104.	Notifies SM. Refer to T.S. 3.3.10 Condition C.

CUE: CRO has initiated an IR for 12 S/G LvL deviation.

____	2.	INITIATE an Issue Report for any equipment deficiencies.	Determines an IR is required (Not required to write one for JPM).

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

ELEMENT (* = CRITICAL STEP)	STANDARD

NOTE TO EVALUATOR: ***It is not required to reference EN-4-104, however STP "Additional Cover Sheet Information" is required to be completed.***

	ELEMENT	STANDARD
	Identify and locate EN-4-104 Section 5.5 (Test Completion and Review) and/or STP Additional Cover Sheet Information page.	
	A. After the test has been completed the Test Coordinator shall:	
____	1. Verify all steps have been completed or deleted according to PR-1-101 or PR-1-103.	Verifies all steps completed. Note: May have been done during review.
____	2. Review test results and answer the test questions on the STP over sheet as follows:	
____	a. Check "No" in the acceptance criteria block if any acceptance criteria has not been met - verify condition documentation on cover sheet, IR initiated, and Shift Manager informed; otherwise check "Yes".	Circles NO. Documents Hot Leg Temp and S/G LvL deviations in Section B Remarks of STP "Additional Cover Sheet Information".
____	b. Check "No" in the AS FOUND reading block if any AS FOUND readings were not in specification - verify condition documented on cover sheet; otherwise check "Yes".	Circle NO.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

ELEMENT (* = CRITICAL STEP)			STANDARD
____	c.	Check "Yes" in the adjustment made block if adjustments were made - verify condition documented on cover sheet; otherwise check "No".	Circles NO.
____	d.	Check "No" in the AS LEFT block if AS LEFT conditions were not in specification - verify conditions documented on cover sheet, IR initiated, and Shift Manager informed; otherwise check "Yes"	Circles NO.
____	e.	Check "Yes" in the MALFUNCTION INDICATED block if malfunctions were encountered during performance of the Surveillance Test - verify condition documented on cover sheet; otherwise check "No".	Circles YES.
____	f.	Check "Yes" in the IR WRITTEN block if an IR was written as a result of the STP performance - verify condition documented on STP cover sheet and Shift Manager informed; otherwise check "No".	Circles Yes. Documents IRs in Section B Remarks of STP "Additional Cover Sheet Information".

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

ELEMENT (* = CRITICAL STEP)			STANDARD
____	3.	Sign "Test Completed By" block on the STP cover sheet.	Signs STP.
____	4.	Present completed STP to the Shift Manager for completion acknowledgment.	STP given to SM.

TIME STOP ____

TERMINATING CUE:	The JPM is complete when STP Additional Cover Sheet Information Step B is completed and STP given to SM for review. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EN-4-104-1

TASK: 032040504

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 032040504

DIRECTIONS TO TRAINEE:

1. Initial Conditions:

   You are an extra SRO on shift.

2. Initiating Cue: The Shift Manager request that you perform a review of STP O-63-1 for completion. Are there any questions? You may begin.

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Troubleshooting and Configuration Control
Troubleshooting

K/A 2.2.20 [2.2/3.3]

Question a:

As the Shift Manager, a Responsible Maintenance Group Supervisor requests for you to review and approve a Troubleshooting Control Form (TCF). The TCF describes proposed troubleshooting on PT-102A and PT-102B indication on 1C07 by opening the slide links and installing a recorder on each sigma to monitor for loop current stability. The troubleshooting will be complete on the same shift.

What is the Risk Level for this proposed activity and what level of approvals are required?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Troubleshooting and Configuration Control
Troubleshooting

K/A 2.2.20 [2.2/3.3]

Question a:

As the Shift Manager, a Responsible Maintenance Group Supervisor requests for you to review and approve a Troubleshooting Control Form (TCF). The TCF describes proposed troubleshooting on PT-102A and PT-102B indication on 1C07 by opening the slide links and installing a recorder on each sigma to monitor for loop current stability. The troubleshooting will be complete on the same shift.
What is the Risk Level for this proposed activity and what level of approvals are required?

Answer:
The Risk Level is level 1 which requires the approval of GS-NPO in addition to the RMGS, System Manager, CRS and Shift Manager on attachment TS-1.

Reference Use Allowed ? YES

Reference 1 MN-1-110 Appendix TS, page 17

Reference 2

Comments:
Supply copy of attachment for examiners.

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

NRC EXAM (A.2)

APPENDIX TS, TROUBLESHOOTING (Page 9 of 13)

ATTACHMENT TS-1, TROUBLESHOOTING CONTROL FORM (Page 1 of 2)

Initiating Document No.: IR3-008-761 Unit [✓] 1 [ ] Common [ ] 2 System: 58/48

Affected Components ESFAS / RPS / PZR PRESSURE INDICATIONS AT 1C06

Description: MONITOR LOOP SIGNALS FOR 1PT102A AND 1PT102B AT K25A AND 1C25B WITH RECORDER

Special Plant/Equipment Conditions BYPASS PP AND PPB, DSS AT ESFAS AND BYPASS RPS TU 6 & 7

Trouble Shooting Approach: INSTALL RECORDER ACROSS LOOP RESISTOR FOR 1PI 102 A/B

Boundaries: K25 A/B, RPS, ESFAS

Expected Plant Response: NO CHANGE IN PLANT CONDITIONS / INDICATIONS

Worst Potential Consequence of Activity: REACTOR TRIP AND/OR ESFAS ACTUATION (SIAS)

How is this consequence considered in the UFSAR/Tech Specs?: TECH SPECS ALLOW BYPASS OF CHANNELS FOR MAINTENANCE

Trouble Shooting Plan Complete:

Name (Print)	Signature	Extension	Work Group	Date
MITCHELL BECKMAN	[signature]	6952	I&C	1/27/A4

Risk Level: ______ Approved: ______ Signature ______ Title ______ Date

Approval: ______ System Manager ______ Date N/A for Routine Troubleshooting Activity

Approval: ______ Control Room Supervisor ______ Date ______ Shift Manager ______ Date

Comments: (NOTE ANY REQUIRED OPERABILITY TESTING HERE)

Complete By:

Name (Print)	Signature	Extension	Work Group	Date

Component Operability Testing Complete (If Applicable) ______ Shift Manager ______ Date

APPENDIX TS, TROUBLESHOOTING (Page 10 of 13)

ATTACHMENT TS-1, TROUBLESHOOTING CONTROL FORM (Page 2 of 2)

Initiating Document No.: I23-008-761 Page: 1 Continued ~~No~~ [✓] Yes on Page 2

Step #	Proposed Step-By-Step Troubleshooting Instruction and Restoration:	Performed By	Verified by (if required)
1)	Brief CRS on approach to installing recorder.		
2)	At U-1 ESFAS sensor channel ZD Bypass PZR pressure inputs for 1PT102A (Bistable 2,3+19)		
3)	Bypass TMLP + PZR Press Trip Units #6 + #7 at RPS channel A.		
4)	Install Recorder at 1C25A Across loop resistor for 1PI102A, P4 + P5 ref. 60933 sh/A.		
5)	Reset any trips at ESFAS sensor channel ZD And remove Bypass Keys.		
6)	Reset Trips at RPS channel A 6+7 then Remove Bypass keys.		
7)	At ESFAS sensor Cabinet ZE Bypass Bistables 2,3+19 For PZR inputs		
8)	At RPS channel B Bypass TU #6+#7		
9)	Install second channel of Recorder at 1C25B for 1PI102B Across P4 + P5 ref. 60933 sh/B.		

Results of Troubleshooting:

APPENDIX TS, TROUBLESHOOTING (Page 10 of 13)

ATTACHMENT TS-1, TROUBLESHOOTING CONTROL FORM (Page 2 of 2)

Initiating Document No.: ER3-008-761 Page: 2 Continued ☑ No ☐ Yes on Page ____

Step #	Proposed Step-By-Step Troubleshooting Instruction and Restoration:	Performed By	Verified by (if required)
10)	When Data has been gathered + Reviewed by Engineering Coordinate w/ops to Remove Recorder.		
11)	At ESFAS/RPS Bypass ~~ZE~~ ZD 2,3+19 ~~and~~ T/u #6 + 7 chan A RPS		
12)	Remove Recorder, Reset Any trips @ Esfas/RPS.		
13)	Remove Esfas sensor ZE Keys + RPS chan A 6+7 keys		
14)	At Esfas/RPS Bypass sensor ZE 2,3+19 ~~and~~ RPS chan B T/u #6 + #7.		
15)	Remove Recorder, Reset Any trips @ ESFAS/RPS.		
~~16)~~	~~Brief ops of Results.~~ 1/27/87		
16)	Remove Bypass keys at ESFAS ZD + RPS chan B.		
17)	Brief ops of Results		

Results of Troubleshooting:

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Troubleshooting and Configuration Control

Maintenance Orders

K/A 2.2.19 [2.1/3.1]

Question b:

Describe the duties and responsibilities of the OWC regarding unscheduled maintenance orders

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A2 Topics
Troubleshooting and Configuration Control

Maintenance Orders

K/A 2.2.19 [2.1/3.1]

Question b:

Describe the duties and responsibilities of the OWC regarding unscheduled maintenance orders

Answer:

The OWC reviews the Maintenance order package to determine if the proposed work will conflict with the current work. The OWC ensures that the Operational Risk Assessment and PRA or the emergent work is completed, as well as any compensatory actions.

Reference Use Allowed? Yes

Reference 1 MN 1-120, section 4.8, page 13

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Control of Radiation Releases

Containment Purge Release

K/A 2.3.6 [2.1/3.1]

Question a:
Given a Containment Purge Release Permit and the following data, evaluate the release criteria for acceptablity for signing as Shift Manager/SCRO reviewer:

Main Vent (RI 5415) reading 140 CPM

WRNGM (RIC 5415) reading 5.56 E-0

Main Vent flow reading 42,565 SCFM

☐ Satisfactory ☐ Unsatisfactory Candidate ________________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Control of Radiation Releases

Containment Purge Release

K/A 2.3.6 [2.1/3.1]

Question a:
Given a Containment Purge Release Permit and the following data, evaluate the release criteria for acceptablity for signing as Shift Manager/SCRO reviewer:

Main Vent (RI 5415) 140 CPM WRNGM (RIC 5415) 5.56 E-0

Main Vent flow 42,565 SCFM

Answer:
The permit should be sent back to Chemistry for recalculation due to the change in Main Vent RMS backround reading

Reference Use Allowed ? Yes

Reference 1 Containment Purge Permit

Reference 2 OI 36 and CP-604

Comments:
Supply copy of permit for examiners.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Control of Radiation Releases

K/A 001000A212 [3.6/4.2]

Question b:

Describe the strategy in EOP 6 (SGTR Event) used control the radionuclides that may be released to the General Public.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
ADMIN A3 Topics
Control of Radiation Releases

K/A 001000A212 [3.6/4.2]

Question b:

Describe the strategy in EOP 6 (SGTR Event) used control the radionuclides that may be released to the General Public.

Answer:

In a SGTR Event the radionuclide control is accomplished in steps that:

Cool down the RCS to prevent lifting the Safety valves
isolating the damaged SG
control RCS inventory and pressure

Reference Use Allowed? Yes

Reference 1 EOP 6 Technical Basis page 3

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE ERPIP-3-3

SYSTEM: Emergency Response Plan and Implementation Procedures

TASK: 032170413 Evaluate Weather Conditions Against Emergency Action Levels

PURPOSE: Evaluates an Operator's Ability to Determine the Appropriate Emergency Action Level for Existing Weather Conditions

JOB PERFORMANCE MEASURE

CALVERT CLIFFS NUCLEAR POWER PLANT

LICENSED OPERATOR TRAINING

ORIGINAL:

PREPARED BY: W. P. Birney DATE: 8/8/94

REVISION/CHANGES:

REVISED/CHANGED BY: ____________________ DATE: __________
Operations Instructor - Nuc

REVIEWED BY: ____________________ DATE: __________
SRO License Holder

APPROVED BY: ____________________ DATE: __________
Ops Training Supervisor

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE ERPIP-3-3

TASK: 032170413 Evaluate Weather Conditions Against Emergency Action Levels

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for Safety Injection and Containment Spray.

EVALUATION LOCATION:

_____ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEL:

LEVEL 1

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

ERPIP 3.0

TASK STANDARDS:

This JPM is complete when an EAL classification is determined based on given weather conditions.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE ERPIP-3-3

TASK: 032170413 Evaluate Weather Conditions Against Emergency Action Levels

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE ERPIP-3-3

ELEMENT (* = CRITICAL STEP)		STANDARD

TIME START ____

____	Identify and locate ERPIP 3.0.	Same as element.
____1.	Identify the proper category from the listing located on page 1 of ERPIP 3.0 Immediate Actions.	Determines proper category to be "Severe Weather".

NOTE: **If EAL classification is recognized, it is permissable to refer to Attachment 1 (EAL Criteria) before Attachment 17.**

____2.	Refer to Attachment 17 for "Severe Weather" category.	Same as element.

CUE: Attachment 17 has been completed through step C.2.0.

ATTACHMENT 17

____C.	Monitor Weather Conditions.	
____	3.0 **IF** Nuclear Security reports a tornado onsite **THEN** evaluate the damage. **GO TO** ERPIP 3.0, Attachment 2, Emergency Classification. Do not return to this part.	Refers to Attachment 2.

ATTACHMENT 2

NOTE: The decision to classify an emergency may **NOT** be delegated.

* ____1.	**EVALUATE** current conditions against Attachment 1, Emergency Action Levels (EAL) criteria.	Evaluates Attachment 1 and determines an UNUSUAL EVENT (NU1 2) exists, due to tornado striking switchyard or protected area.

TIME STOP ____

TERMINATING CUE: The task is complete when an EAL classification based on weather conditions is declared. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE ERPIP-3-3

TASK: 032170413 Evaluate Weather Conditions Against Emergency Action Levels

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 032170413

DIRECTIONS TO TRAINEE:

1. Initial Conditions:

   a. A tornado warning has been in effect for several hours in Calvert County.

   b. Severe thunderstorms have been passing through the area.

   c. A reactor and turbine trip occur on Unit-1 & Unit-2.

   d. Several people report seeing a tornado briefly touch down in the 500 kV switchyard.

   e. Security reports heavy damage to parts of switchyard and vehicles in the parking lot.

   f. Meteorological instrumentation indicates wind gusts > 75 MPH.

   g. You are performing the duties of the Shift Supervisor.

2. Initiating Cue: You are called to the control room to implement the Emergency Response Plan. Are there any questions? You may begin.

JPMS w/301 Line ✓

Facility: Calvert Cliffs Units 1 & 2   Date of Examination: January 25, 1999
Examination Level: RO   REVISED 1/14/99   Operating Test Number: 1

System / JPM Title / Type Codes*	Safety Function	Planned Followup Questions: K/A/G – Importance - Description
1. Control Element Drive System / Recover a Misaligned CEA	I	a. 000001A113 4.0/4.2 Evaluation of PDIL with changes in primary parameters
N S		b. 000001A212 3.6/4.2 Evaluation of ECP
2. Electrical AC / Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power	VI	a. 000062K102 4.1/4.4 Loss of Offsite Power in MODE 5 - evaluation of sources
M A S		b. 000064G112 2.9/4.0 Evaluation of DG OPERABILITY requirements
3. Reactor Protection System / Pre starup checks	VII	a. 000012K401 3.7/4.0 Design features of trip logic with 1 channel OOS
N S L		b. 000012K604 3.3/3.6 Effect from loss of Block circuit
4. ESFAS/ RAS Verification	II	a. 000027A403 3.3/3.2 Containment Iodine Removal design flow rate
M S		b. 000022K402 3.1/3.4 Containment Air Cooler design speeds
5. Shut Down Cooling / Respond to a loss of SDC with RCS pressurization possible	IV	a. 00024AA206 3.6/3.7 Sources of RCS dilution during startup
D A S L		b. 00025AK101 3.9/4.3 Evalution of "Time to Boil" calculations during Reduced Inventory Operation
6. RCS / Align Charging header to the Aux HPSI header with RCS leakage greater than one charging pump capacity (isolable leak on Charging header)	II	a. 000004K604 2.8/3.1 Charging pump protection during SIAS/Non-SIAS conditions
M S		b. 000002K201 4.3/4.4 Calculation of RCS leakrate
7. Component Cooling/ Shifting Component Cooling Heat Exchangers	VIII	a. 000003K404 3.1/3.4 RCP component cooling flow requirements
N A S		b. 000008A102 2.9/3.1 Component Cooling system temperature control
8. STM DUMP / Lineup for ADV control at 1(2)C43 Safe Shutdown Panel due to Control Room Evacuation	IV	a. 000061K404 3.1/3.4 AFW System flow rate limits
D P		b. 00068AK312 4.1/4.5 Securing CEDM MGs during Control Room Evacuation
9. AC Distribution/ Tie Vital MCCs (1Y09 and 1Y10)	VI	a. 00055EK301 2.7/3.4 Battery design limit during SBO
D P		b. 000062K103 3.5/4.0 Sources of DC power

10. Chemical and Volume Control / Isolate Dilution Paths D P R	I	a.	004000A110 3.7/3.9 Determination of dilution that would activate S/D Monitor alarm
		b.	010000G132 3.4/3.8 Limitations on use of Aux. Spray

Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA

Facility: Calvert Cliffs Units 1 & 2 Date of Examination: January 25, 1999
Examination Level: SRO-U REVISED 1/14/99 Operating Test Number: 1

System / JPM Title / Type Codes*	Safety Function	Planned Followup Questions: K/A/G – Importance - Description
1. Electrical AC/ Transfer 11/17/ 4KV Bus loads from 1A DG to Offsite power M A S	VI	a. 000062K102 4.1/4.4 Loss of Offsite power in Mode 5 - evaluation of sources
		b. 000064G112 2.9/4.0 Evaluation of DG operability
2. ESFAS / RAS Verification M S	II	a. 000027A403 3.3/3.2 Containment Iodine Removal design flow rate
		b. 000022K402 3.1/3.4 Containment Air Cooler design speed
3. Reactor Protection System / Pre startup checks N S L	VII	a. 000012K401 3.7/4.0 Design features of trip logic with 1 channel OOS
		b. 000012K604 3.3/3.6 Effect of loss of Block circuit
4. STM DUMP / Lineup for ADV control at 1(2)C43 Safe Shutdown Panel due to Control Room Evacuation D P	IV	a. 000061K404 3.1/3.4 AFW System flow rate limit
		b. 00068AK312 4.1/4.5 Securing CEDM Mgs during Control Room Evacuation
5. Chemical and Volume Control / Isolate Dilution Paths D P R	I	a. 004000A110 3.7/3.9 Determination of dilution that would activate S/D Monitor alarm
		b. 010000G132 3.4/3.8 Limitations on use of Aux. Spray

Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA

Facility: Calvert Cliffs Units 1 & 2 Date of Examination: January 25, 1999
Examination Level: SRO-I REVISED 1/14/99 Operating Test Number: 1

System / JPM Title / Type Codes*	Safety Function	Planned Followup Questions: K/A/G – Importance - Description
1. Control Element Drive System / Recover a Misaligned CEA	I	a. 001000A113 4.0/4.2 Evaluation of PDIL with changes in primary parameters
N S		b. 001000A212 3.6/4.2 Evaluation of ECP
2. Electrical AC / Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power	VI	a. 062000K102 4.1/4.4 Loss of Offsite Power in MODE 5 - evaluation of sources
M A S		b. 064000G112 2.9/4.0 Evaluation of DG OPERABILITY requirements
3. Reactor Protection System / Pre startup checks	VII	a. 000012K401 3.7/4.0 Design features of trip logic with 1 channel OOS
N S L		b. 000012K604 3.3/3.6 Effect of loss of Block circuit
4. ESFAS / RAS Verification	II	a. 000027A403 3.3/3.2 Containment Iodine Removal design flow rate
M S		b. 000022K402 3.1/3.4 Containment Air Cooler design speed
5. Shut Down Cooling/ Respond to a loss of SDC with RCS pressurization possible	IV	a. 00024AA206 3.6/3.7 Sources of RCS dilution during startup
D A S L		b. 00025AK101 3.9/4.3 Evaluation of "Time to Boil" calculations during Reduced Inventory Operation
6. RCS/ Align Charging header to the Aux HPSI header with RCS leakage greater than one charging pump capacity (isolable leak on charging header)	II	a. 000004K604 2.8/3.1 Charging pump protection during SIAS/Non-SIAS conditions
M S		b. 000002K201 4.3/4.4 Calculation of RCS leakrate
7. Component Cooling/ Shifting Component Cooling heat Exchangers	VIII	a. 000003K404 3.1/3.4 RCP component cooling flow requirements
N A S		b. 000008A102 2.9/3.1 Component Cooling system temperature control
8. STM DUMP / Lineup for ADV control at 1(2)C43 Safe Shutdown panel due to Control Room evacuation	IV	a. 000061K404 3.1/3.4 AFW Sytem flow rate limits
D P		b. 00068AK312 4.1/4.5 Securing CEDM Mgs during Control Room Evacuation
9. AC Distribution/ Tie vital MCCs (1Y09 and 1Y10)	VI	a. 00055EK301 2.7/3.4 Battery design limit during SBO
		b. 000062K103 3.5/4.0 Sources of DC power

D P		
10. Chemical and Volume Control / Isolate Dilution Paths	I	a. 004000A110 3.7/3.9 Determination of dilution that would activate S/D Monitor alarm
D P R		b. 010000G132 3.4/3.8 Limitations on use of Aux. Spray
Type Codes: (D) Direct from bank, (M)odified from bank, (N)ew, (A)lternate Path, (C)ontrol Room, (S)imulator, (P)lant, (L)ow Power, (R)CA		

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1B

TASK: 020600311 Recover a Misaligned CEA

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the Control Element Drive System.

EVALUATION LOCATION:

_____ PLANT __X__ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
15 MINUTES	____ MINUTES	NO

TASK LEVEL:

NO TRAIN

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

AOP-1B

TASK STANDARDS:

This JPM is complete when CEA 6 is returned to greater than 129 inches and within ± 4 inches of remaining CEAs in its Shutdown Group B.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1B

TASK: 020600311 Recover a Misaligned CEA

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedures or personnel injury. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

5. Questions should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1B

TASK: 020600311 Recover a Misaligned CEA

DIRECTIONS TO TRAINEE:

1. Initial Conditions:

    a. The unit is stabilized at ~96 % power.

    b. CEA 6 during movement for STP O-29-1 became misaligned by 10 inches from the remaining CEAs in its Group.

    c. Actions of AOP-1B have been completed through Section IV.A.7.

    d. The cause of the misalignment has been determined and repaired.

    e. The total time for misalignment is 10 minutes.

    f. All applicable Tech Spec actions reviewed and required actions identified

2. Initiating Cue: The CRS has directed you to attempt to realign the CEA per AOP-1B, Section IV.A.8 Are there any questions? You may begin.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1B

ELEMENT (* = CRITICAL STEP)			STANDARD

TIME START ____

NOTE: Operator may review prior steps of AOP-1B.

____		Identify AOP-1A, Section IV.A. step 8	Same as element
*____	8.	**IF** ANY CEA is misaligned by greater than 7.5 inches, OR ANY Shutdown CEA is withdrawn less than 129 inches, **THEN** determine the appropriate section: d. **IF**. one or more CEAs are misaligned by greater than 7.5 inches but less than or equal to 15 inches, **THEN PROCEED** to Section VII., ONE OR MORE CEAs MISALIGNED BT GREATER 7.5 INCHES BUT LESS THAN, Page 32.	Determines step 8.d is appropriate section and proceeds to section VII, page 32

CUE: CEA misalignment cause has been determined by the system engineer and CRS directs realignment.

CAUTION

CEA movement should be minimized until the cause of the misalignment has been determined.

CUE: CEA has been misaligned for 10 minutes.

NOTE

Per ITS 3.1.4, CEA realignment time is 1 hour for this condition

____	Identify AOP-1A, Section VII.A. step 1	Same as element

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1B

ELEMENT (* = CRITICAL STEP)			STANDARD
CUE: Reactor Power is stable with boration completed as necessary.			
____	1.	Attempt to realign the affected CEA(s):	
____	a.	Maintain Reactor Power as required by: Boration per OI-2B, CVCS BORATION DILUTION AND MAKEUP OPERATIONS OR Adjust Regulating CEAs	Determines CEA Regulating Group motion or boration NOT required.
*____	b.	Select the desired group.	Selects and depresses GROUP SELECTION - Shutdown B.
*____	c.	Select the desired CEA.	Selects and depresses INDIVIDUAL CEA SELECTION - Shutdown B "6".
*____	d.	Select the Manual Individual CEA control mode.	Selects and depresses MANUAL INDIVIDUAL - MI.
*____	e.	**IF** CMI is in effect, **THEN** override CMI as follows: **NOTE** **CMI will be bypassed to the affected group and applied to all other groups, and CMI Bypass annunciator will alarm.**	Determines CMI is IN effect.
*____	(1)	Depress the Group Inhibit Bypass pushbutton.	Depress and release Group B Inhibit Bypass pushbutton.
*____	(2)	Depress and hold the Motion Inhibit Bypass pushbutton for at least 5 seconds before AND 5 seconds after CEA motion.	Same as element.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1B

ELEMENT (* = CRITICAL STEP)			STANDARD

CUE:	Reactor Power was stablized at ____% in PRELIMINARY Step A.2.

CAUTION

Do NOT allow Reactor Power to rise above the power the unit was stabilized at in Section IV., PRELIMINARY, Step A.2 while the CEA is being realigned. Turbine load shall NOT be raised until the CEA is within its alignment requirements.

* ____	f.	Realign the CEA:	
		(1) IF the CEA must be withdrawn, THEN withdraw the CEA using the "PULL and WAIT" method:	
____		(a) For Shutdown CEAs, pull 10 seconds and wait 10 seconds.	Determines IS applicable.
____		(b) For regulating CEAs, pull 10 seconds and wait 15 seconds.	Determines NOT applicable.
____		(2) IF the CEA must be inserted. THEN insert the CEA.	Determines NOT applicable.
____	g.	REMOVE CMI override.	Removes CMI override by releasing Motion Inhibit Bypass and depressing and releasing Group B Inhibit Bypass.

TIME STOP ____

TERMINATING CUE:	This JPM is complete when CEA 6 is withdrawn greater than 129 inches and is within ± 4 inches of remaining CEAs in Shutdown Group B. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1B

TASK: 020600311 Recover a Misaligned CEA

Document below any instances of failure to comply with industrail safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ____________________________ DATE: _________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Recover A Misaligned CEA

K/A 001000A113 [4.0/4.2]

Question a:
Given the following information for Unit 2 power reduction:

	Reactor Power	Tcold	PZR Pressure
Prior to CEA insertion	100%	547.8	2250 psia
After CEA insertion	56%	540.2	2250 psia

1. How does the CEA Group Insertion Limits change?
2. (SRO only): What is the basis of the Tech Spec CEA alignment to its Group?

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

Recover A Misaligned CEA

K/A 001000A113 [4.0/4.2]

Question a:
Given the following information for Unit 2 power reduction:

	Reactor Power	Tcold	PZR Pressure
Prior to CEA insertion	100%	547.8	2250 psia
After CEA insertion	56%	540.2	2250 psia

1. How does the CEA Group Insertion Limits change?
2. (SRO only): What is the basis of the Tech Spec CEA alignment to its Group?

Answer

1. Prior to CEA motion, limit was Group 5 at 35%(±0%) insertion
   (88.4 inches withdrawn (± 3%))
   136 inches X (100% - 35%) = 88.4 inches

   Following the CEA motion the limit changed to Group 4 at 50% (± 0%)
   (68 inches withdrawn (± 3%))
   136 inches X (100% - 50%) = 68 inches

2. The CEA alignment requirement (7.5 inches) is to ensure acceptable power peaking factors, Linear Heat Rates and adequate SDM. (All are initial conditions of the Safety Analysis)

Reference Use Allowed? YES (question 1 only)

Reference 1 Calvert Cliffs, Cycle 12 COLR Rev. 3 Figure 3.1.6, page 10

Reference 2 Tech Spec Bases 3.1.4, page B3.1.4-4

Comments:
Supply copy of graph for examiners.

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Recover A Misaligned CEA

K/A 001000A212 [3.6/4.2]

Question b:
Given ECC attachment 2A complete the ECC section, the ECC tolerance band section, evaluate and provide corrective actions, if applicable.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Recover A Misaligned CEA

K/A 001000A212 [3.6/4.2]

Question b:
Given ECC attachment 2A complete the ECC section, the ECC tolerance band section, evaluate and provide corrective actions, if applicable.

Answer

Critical Boron Concentration is 460 PPM See attached answer worksheet.

Reference Use Allowed? YES

Reference 1 NEOP-302 ESTIMATED CRITICAL CONDITION, Rev. 1

Reference 2 NEOP-23 Technical Data Book, Rev. 8

Comments:
Supply ECC form for candidates and examiner **CUES** candidate that B10 correction factor is **.921**.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

#________

Attachment 2A,
ESTIMATED CRITICAL CONDITION - Estimated Critical Boron (ECB)

Previous Critical Conditions

6.2.A.1.a Unit: 2 Cycle: 12

6.2.A.1.b Date:________ Time:________

6.2.A.1.c Burnup: 18825 MWD/MTU

Estimated Critical Condition

6.2.A.2 Excess Reactivity:________% $\Delta\rho$

6.2.A.3 Date:________

Time:________

6.2.A.4 Time After Shutdown: >84 hrs

6.2.A.5 Xenon Worth:________% $\Delta\rho$

6.2.A.7 CEA Position (Inches)

Grp 3: ARO Grp 4: 90" Grp 5: 0"

CEA Worth:________% $\Delta\rho$

6.2.A.8 Corrected HZP IBW:________ppm/%$\Delta\rho$

6.2.A.9 Critical Boron Worth: (6.2.A.2)-[(6.2.A.7)+(6.2.A.5)] = ________%$\Delta\rho$

6.2.A.10 Estimated Critical Boron Concentration: (6.2.A.9)*(6.2.A.8) = ________ ppm

ECC Tolerance Band

6.2.A.11 ECC Lower Bound: (6.2.A.7) + (0.5) = ________%$\Delta\rho$

6.2.A.12 ECC Lower Bound CEA Position (Inches): Grp 3:_____ Grp 4:_____ Grp 5:_____

6.2.A.14 ECC Upper Bound: (6.2.A.7) - (0.5) = ________%$\Delta\rho$

6.2.A.15 ECC Upper Bound CEA Position (Inches): Grp 3:_____ Grp 4:_____ Grp 5:_____

6.2.A.17 Prepared by:________

Date/Time: /

Review and Approval

6.2.A.23 SRO Review:________

Date/Time: /

NOTE: Obtain a sequence number from the Attachment Log Sheet, Attachment 1.

K/A 001000A212 [3.6/4.2]

Question b:
Given ECC attachment 2A complete the ECC section, the ECC tolerance band section, evaluate and provide corrective actions, if applicable.

Answer

Critical Boron Concentration is 460 PPM See attached answer worksheet.

Reference Use Allowed? YES

Reference 1 NEOP-302 ESTIMATED CRITICAL CONDITION, Rev. 1

Reference 2 NEOP-23 Technical Data Book, Rev. 8

Comments:
Supply ECC form for candidates and examiner **CUES** candidate that B10 correction factor is **.921**.

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

JPM #1

CORRECTED 1/26/

#________

Attachment 2A,
ESTIMATED CRITICAL CONDITION - Estimated Critical Boron (ECB)

Previous Critical Conditions

6.2.A.1.a Unit: 2 Cycle: 12

6.2.A.1.b Date:________ Time:________

6.2.A.1.c Burnup: 18825 MWD/MTU

Estimated Critical Condition

6.2.A.2 Excess Reactivity: 5.958 % Δρ ±.1

6.2.A.3 Date:________
Time:________

6.2.A.4 Time After Shutdown: >84 hrs

6.2.A.5 Xenon Worth: 0 % Δρ ±0

6.2.A.7 CEA Position (inches)
Grp 3: ARO Grp 4: 90" Grp 5: 0"
CEA Worth: 1.005 % Δρ ±.025

6.2.A.8 Corrected HZP IBW: 109.59 ppm/%Δρ ±1 (100.93/.921)

6.2.A.9 Critical Boron Worth: (6.2.A.2)-[(6.2.A.7)+(6.2.A.5)] = 4.953 %Δρ ±.1

6.2.A.10 Estimated Critical Boron Concentration: (6.2.A.9)*(6.2.A.8) = 542.8 ppm ±2

ECC Tolerance Band

6.2.A.11 ECC Lower Bound: (6.2.A.7) + (0.5) = 1.505 %Δρ ±.025

6.2.A.12 ECC Lower Bound CEA Position (inches): Grp 3: 80.75 Grp 4: 30.75 Grp 5: 0 ±2

6.2.A.14 ECC Upper Bound: (6.2.A.7) - (0.5) = .505 %Δρ ±.025

6.2.A.15 ECC Upper Bound CEA Position (inches): Grp 3: ARO Grp 4: 131.25 Grp 5: 41.25 ±2

6.2.A.17 Prepared by:________
Date/Time: /

Review and Approval

6.2.A.23 SRO Review:________
Date/Time: /

NOTE: Obtain a sequence number from the Attachment Log Sheet, Attachment 1.

prepared: [signature] 1/26/99

VERIFIED [signature] 1/26/99

#________

Attachment 2A, ESTIMATED CRITICAL CONDITION - Estimated Critical Boron (ECB)

Previous Critical Conditions

6.2.A.1.a Unit: 2 Cycle: 12
6.2.A.1.b Date:________ Time:________
6.2.A.1.c Burnup: 18825 MWD/MTU

Estimated Critical Condition

6.2.A.2 Excess Reactivity: 5.958 % Δρ ± .1
6.2.A.3 Date:________
Time:________
6.2.A.4 Time After Shutdown: >84 hrs
6.2.A.5 Xenon Worth: 0 % Δρ ± 0
6.2.A.7 CEA Position (inches)
Grp 3: ARO Grp 4: 90" Grp 5: 0
CEA Worth: 1.005 % Δρ ± .025
6.2.A.8 Corrected HZP IBW: 92.957 ppm/%Δρ ± 1 (100.93)(.921)
6.2.A.9 Critical Boron Worth: (6.2.A.2)-[(6.2.A.7)+(6.2.A.5)] = 4.953 %Δρ ± .1
6.2.A.10 Estimated Critical Boron Concentration: (6.2.A.9)*(6.2.A.8) = 460 ppm ± 2

ECC Tolerance Band

6.2.A.11 ECC Lower Bound: (6.2.A.7) + (0.5) = 1.505 %Δρ ± 0
6.2.A.12 ECC Lower Bound CEA Position (inches): Grp 3: ARO Grp 4: 30.75 Grp 5: 0 ± 2
6.2.A.14 ECC Upper Bound: (6.2.A.7) - (0.5) = .505 %Δρ ± 0
6.2.A.15 ECC Upper Bound CEA Position (Inches): Grp 3: ARO Grp 4: 131.25 Grp 5: 41.25 ± 2
6.2.A.17 Prepared by:________
Date/Time: /

Review and Approval

6.2.A.23 SRO Review:________
Date/Time: /

NOTE: Obtain a sequence number from the Attachment Log Sheet, Attachment 1.

FIGURE 2-II.A.2
INVERSE BORON WORTH vs. BURNUP
NO BORON-10 DEPLETION CORRECTION APPLIED
Unit 2 Cycle 12
(Page 1 of 3)

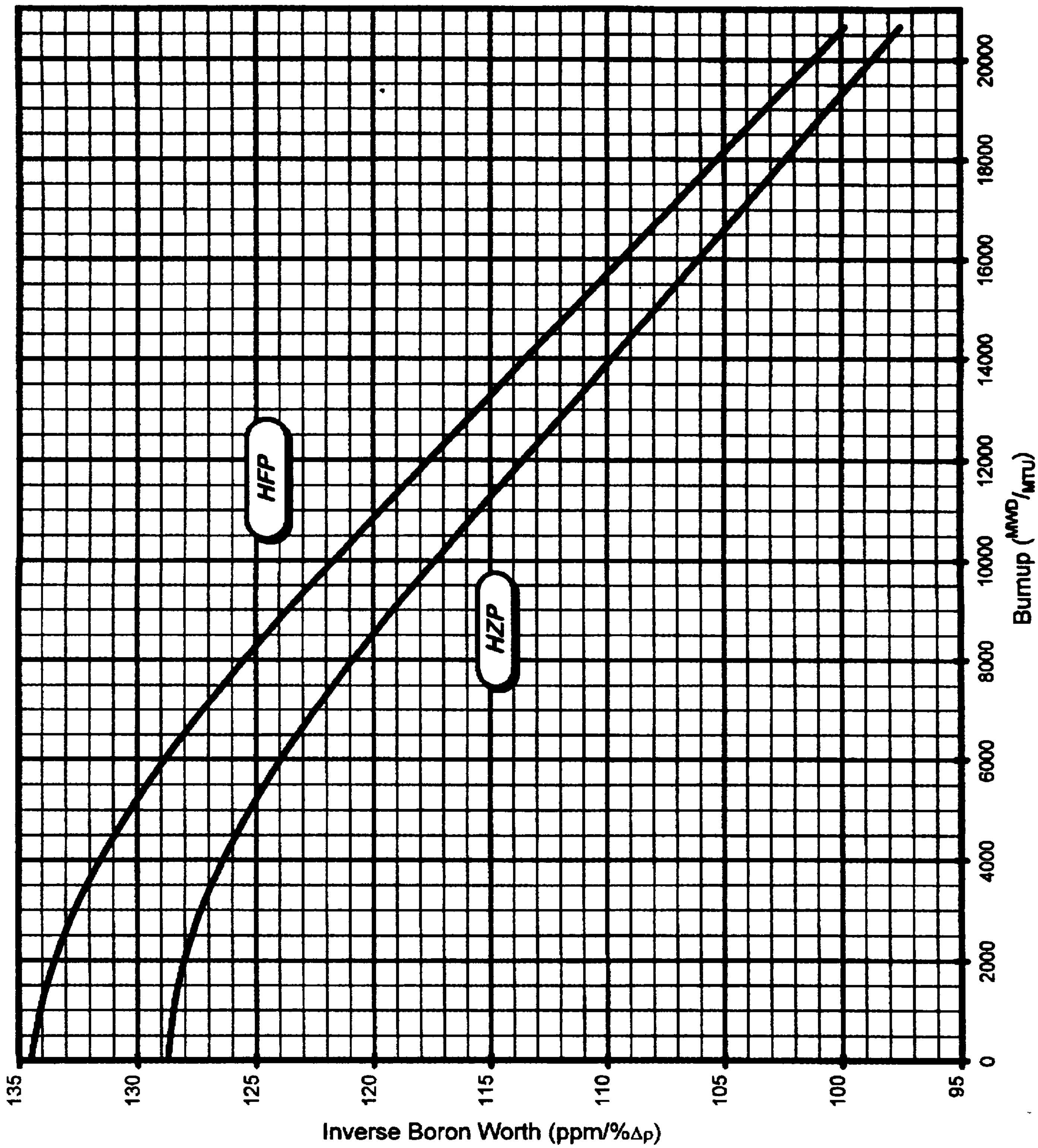


FIGURE 2-II.A.2
INVERSE BORON WORTH vs. BURNUP
NO BORON-10 DEPLETION CORRECTION APPLIED
Unit 2 Cycle 12
(Page 2 of 3)

Burnup ($^{MWD}/_{MTU}$)	HZP Inverse Boron Worth (ppm/%Δρ)	HFP Inverse Boron Worth (ppm/%Δρ)
0	128.72	134.48
100	128.70	134.44
200	128.68	134.41
300	128.66	134.37
400	128.64	134.34
500	128.62	134.30
600	128.59	134.26
700	128.57	134.22
800	128.54	134.17
900	128.51	134.13
1000	128.48	134.08
1100	128.45	134.03
1200	128.41	133.98
1300	128.37	133.93
1400	128.33	133.87
1500	128.28	133.81
1600	128.24	133.75
1700	128.19	133.68
1800	128.14	133.61
1900	128.08	133.54
2000	128.02	133.47
2100	127.96	133.40
2200	127.90	133.32
2300	127.84	133.24
2400	127.77	133.16
2500	127.70	133.08
2600	127.63	132.99
2700	127.55	132.90
2800	127.48	132.81
2900	127.40	132.72
3000	127.32	132.62
3100	127.24	132.52
3200	127.15	132.42
3300	127.06	132.32
3400	126.97	132.22
3500	126.88	132.11
3600	126.79	132.00
3700	126.69	131.89
3800	126.59	131.78
3900	126.49	131.67
4000	126.39	131.55
4100	126.28	131.43
4200	126.18	131.31
4300	126.07	131.19
4400	125.96	131.07
4500	125.85	130.94
4600	125.73	130.81
4700	125.62	130.68
4800	125.50	130.55
4900	125.38	130.42
5000	125.26	130.28
5100	125.13	130.15
5200	125.01	130.01
5300	124.88	129.87
5400	124.75	129.72
5500	124.62	129.58
5600	124.49	129.43
5700	124.36	129.29
5800	124.22	129.14
5900	124.09	128.99
6000	123.95	128.84
6100	123.81	128.68
6200	123.67	128.53
6300	123.52	128.37
6400	123.38	128.21
6500	123.23	128.05
6600	123.08	127.89
6700	122.93	127.73
6800	122.78	127.56
6900	122.63	127.40
7000	122.48	127.23
7100	122.32	127.06
7200	122.17	126.89
7300	122.01	126.72
7400	121.85	126.55
7500	121.69	126.38
7600	121.53	126.20
7700	121.37	126.03
7800	121.21	125.85
7900	121.04	125.67
8000	120.88	125.49
8100	120.71	125.31
8200	120.54	125.13
8300	120.37	124.95
8400	120.20	124.76
8500	120.03	124.58
8600	119.86	124.39
8700	119.69	124.20
8800	119.51	124.02
8900	119.34	123.83
9000	119.16	123.64
9100	118.99	123.45
9200	118.81	123.25
9300	118.63	123.06
9400	118.45	122.87
9500	118.27	122.67
9600	118.09	122.48
9700	117.91	122.28
9800	117.73	122.09
9900	117.54	121.89
10000	117.36	121.69
10100	117.18	121.49

FIGURE 2-II.A.2
INVERSE BORON WORTH vs. BURNUP
NO BORON-10 DEPLETION CORRECTION APPLIED
Unit 2 Cycle 12
(Page 3 of 3)

Burnup ($^{MWD}/_{MTU}$)	HZP Inverse Boron Worth (ppm/%Δρ)	HFP Inverse Boron Worth (ppm/%Δρ)
10200	116.99	121.29
10300	116.81	121.09
10400	116.62	120.89
10500	116.43	120.69
10600	116.25	120.49
10700	116.06	120.29
10800	115.87	120.09
10900	115.68	119.88
11000	115.49	119.68
11100	115.31	119.47
11200	115.12	119.27
11300	114.93	119.07
11400	114.74	118.86
11500	114.54	118.65
11600	114.35	118.45
11700	114.16	118.24
11800	113.97	118.04
11900	113.78	117.83
12000	113.59	117.62
12100	113.39	117.41
12200	113.20	117.21
12300	113.01	117.00
12400	112.82	116.79
12500	112.62	116.58
12600	112.43	116.38
12700	112.24	116.17
12800	112.05	115.96
12900	111.85	115.75
13000	111.66	115.54
13100	111.47	115.34
13200	111.29	115.13
13300	111.10	114.93
13400	110.92	114.72
13500	110.73	114.52
13600	110.54	114.31
13700	110.36	114.10
13800	110.17	113.90
13900	109.99	113.69
14000	109.80	113.49
14100	109.61	113.28
14200	109.43	113.08
14300	109.24	112.87
14400	109.06	112.67
14500	108.87	112.46
14600	108.69	112.26
14700	108.50	112.05
14800	108.32	111.85
14900	108.13	111.64
15000	107.95	111.44
15100	107.76	111.23
15200	107.57	111.03
15300	107.39	110.82
15400	107.20	110.62
15500	107.02	110.41
15600	106.83	110.21
15700	106.65	110.00
15800	106.46	109.80
15900	106.28	109.59
16000	106.09	109.39
16100	105.91	109.18
16200	105.72	108.98
16300	105.54	108.77
16400	105.36	108.57
16500	105.17	108.36
16600	104.99	108.16
16700	104.80	107.95
16800	104.62	107.75
16900	104.43	107.54
17000	104.25	107.34
17100	104.06	107.13
17200	103.88	106.93
17300	103.69	106.72
17400	103.51	106.52
17500	103.32	106.31
17600	103.14	106.11
17700	102.96	105.90
17800	102.77	105.70
17900	102.59	105.49
18000	102.40	105.29
18100	102.22	105.08
18200	102.03	104.88
18300	101.85	104.67
18400	101.66	104.47
18500	101.48	104.26
18600	101.30	104.06
18700	101.11	103.85
18800	100.93	103.65
18900	100.74	103.44
19000	100.56	103.24
19100	100.38	103.04
19200	100.19	102.83
19300	100.01	102.63
19400	99.82	102.42
19500	99.64	102.22
19600	99.45	102.01
19700	99.27	101.81
19800	99.09	101.60
19900	98.90	101.40
20000	98.72	101.19
20100	98.53	100.99
20200	98.35	100.78
20300	98.17	100.58
20400	97.98	100.37
20500	97.80	100.17
20600	97.61	99.96
20656	97.51	99.85

FIGURE 2-II.A.7
EXCESS REACTIVITY vs. BURNUP
HZP, ARO, NO XENON, EQUILIBRIUM SAMARIUM
Unit 2 Cycle 12
(Page 2 of 2)

Burnup (MWD/MTU)	HZP Excess Reactivity (%Δρ)	Burnup (MWD/MTU)	HZP Excess Reactivity (%Δρ)	Burnup (MWD/MTU)	HZP Excess Reactivity (%Δρ)	Burnup (MWD/MTU)	HZP Excess Reactivity (%Δρ)
0	16.442	5200	13.912	10400	11.328	15600	8.173
100	16.364	5300	13.868	10500	11.274	15700	8.106
200	16.286	5400	13.823	10600	11.220	15800	8.039
300	16.208	5500	13.779	10700	11.165	15900	7.972
400	16.131	5600	13.734	10800	11.110	16000	7.905
500	16.053	5700	13.689	10900	11.055	16100	7.837
600	15.975	5800	13.644	11000	11.000	16200	7.770
700	15.897	5900	13.598	11100	10.945	16300	7.702
800	15.819	6000	13.553	11200	10.890	16400	7.634
900	15.742	6100	13.507	11300	10.835	16500	7.566
1000	15.664	6200	13.461	11400	10.780	16600	7.498
1100	15.622	6300	13.414	11500	10.725	16700	7.430
1200	15.581	6400	13.368	11600	10.669	16800	7.362
1300	15.541	6500	13.321	11700	10.614	16900	7.293
1400	15.500	6600	13.274	11800	10.558	17000	7.224
1500	15.460	6700	13.227	11900	10.503	17100	7.156
1600	15.419	6800	13.180	12000	10.447	17200	7.087
1700	15.379	6900	13.132	12100	10.392	17300	7.017
1800	15.338	7000	13.084	12200	10.336	17400	6.948
1900	15.298	7100	13.036	12300	10.280	17500	6.879
2000	15.257	7200	12.987	12400	10.225	17600	6.809
2100	15.217	7300	12.939	12500	10.169	17700	6.739
2200	15.176	7400	12.890	12600	10.113	17800	6.669
2300	15.135	7500	12.840	12700	10.057	17900	6.599
2400	15.094	7600	12.791	12800	10.002	18000	6.528
2500	15.053	7700	12.741	12900	9.946	18100	6.458
2600	15.013	7800	12.691	13000	9.890	18200	6.387
2700	14.972	7900	12.641	13100	9.826	18300	6.316
2800	14.930	8000	12.591	13200	9.760	18400	6.245
2900	14.889	8100	12.540	13300	9.695	18500	6.173
3000	14.848	8200	12.490	13400	9.629	18600	6.102
3100	14.807	8300	12.439	13500	9.563	18700	6.030
3200	14.765	8400	12.388	13600	9.497	18800	5.958
3300	14.724	8500	12.336	13700	9.432	18900	5.885
3400	14.682	8600	12.285	13800	9.366	19000	5.813
3500	14.641	8700	12.233	13900	9.300	19100	5.740
3600	14.599	8800	12.181	14000	9.234	19200	5.667
3700	14.557	8900	12.129	14100	9.169	19300	5.594
3800	14.515	9000	12.077	14200	9.103	19400	5.520
3900	14.473	9100	12.024	14300	9.037	19500	5.446
4000	14.430	9200	11.971	14400	8.971	19600	5.372
4100	14.388	9300	11.919	14500	8.905	19700	5.298
4200	14.346	9400	11.866	14600	8.839	19800	5.223
4300	14.303	9500	11.813	14700	8.772	19900	5.149
4400	14.260	9600	11.759	14800	8.706	20000	5.073
4500	14.217	9700	11.706	14900	8.640	20100	4.998
4600	14.174	9800	11.652	15000	8.574	20200	4.922
4700	14.131	9900	11.599	15100	8.507	20300	4.847
4800	14.087	10000	11.545	15200	8.441	20400	4.770
4900	14.044	10100	11.491	15300	8.374	20500	4.694
5000	14.000	10200	11.437	15400	8.307	20600	4.617
5100	13.956	10300	11.383	15500	8.240	20656	4.574

FIGURE 2-II.A.7
EXCESS REACTIVITY vs. BURNUP
HZP, ARO, NO XENON, EQUILIBRIUM SAMARIUM
Unit 2 Cycle 12
(Page 1 of 2)

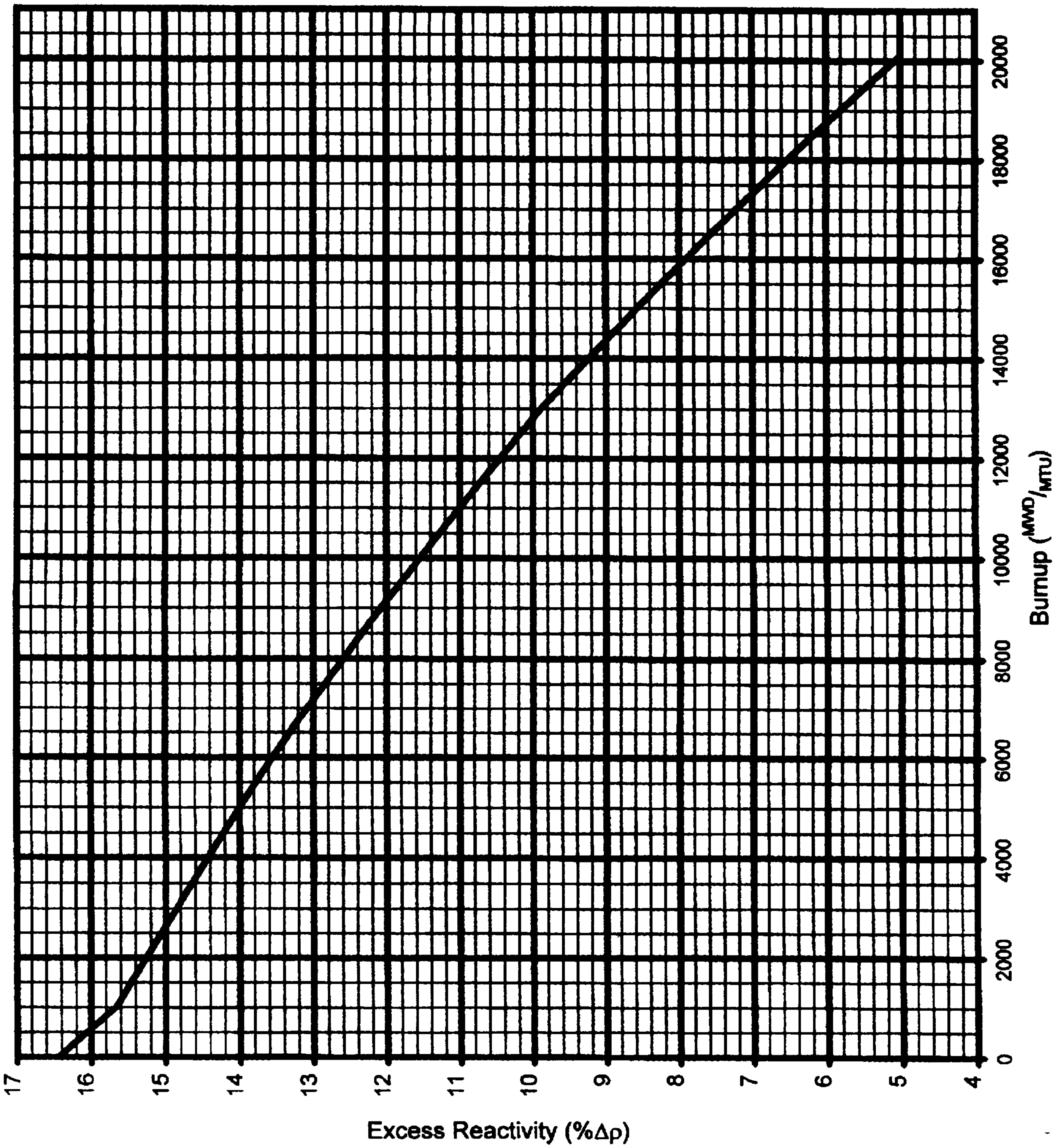


FIGURE 2-II.B.1
HZP INTEGRAL CEA WORTH WITH OVERLAP
16,500 MWD/MTU to EOC
Regulating Bank Worth = 3.699 %Δρ
Unit 2 Cycle 12
(Page 1 of 6)

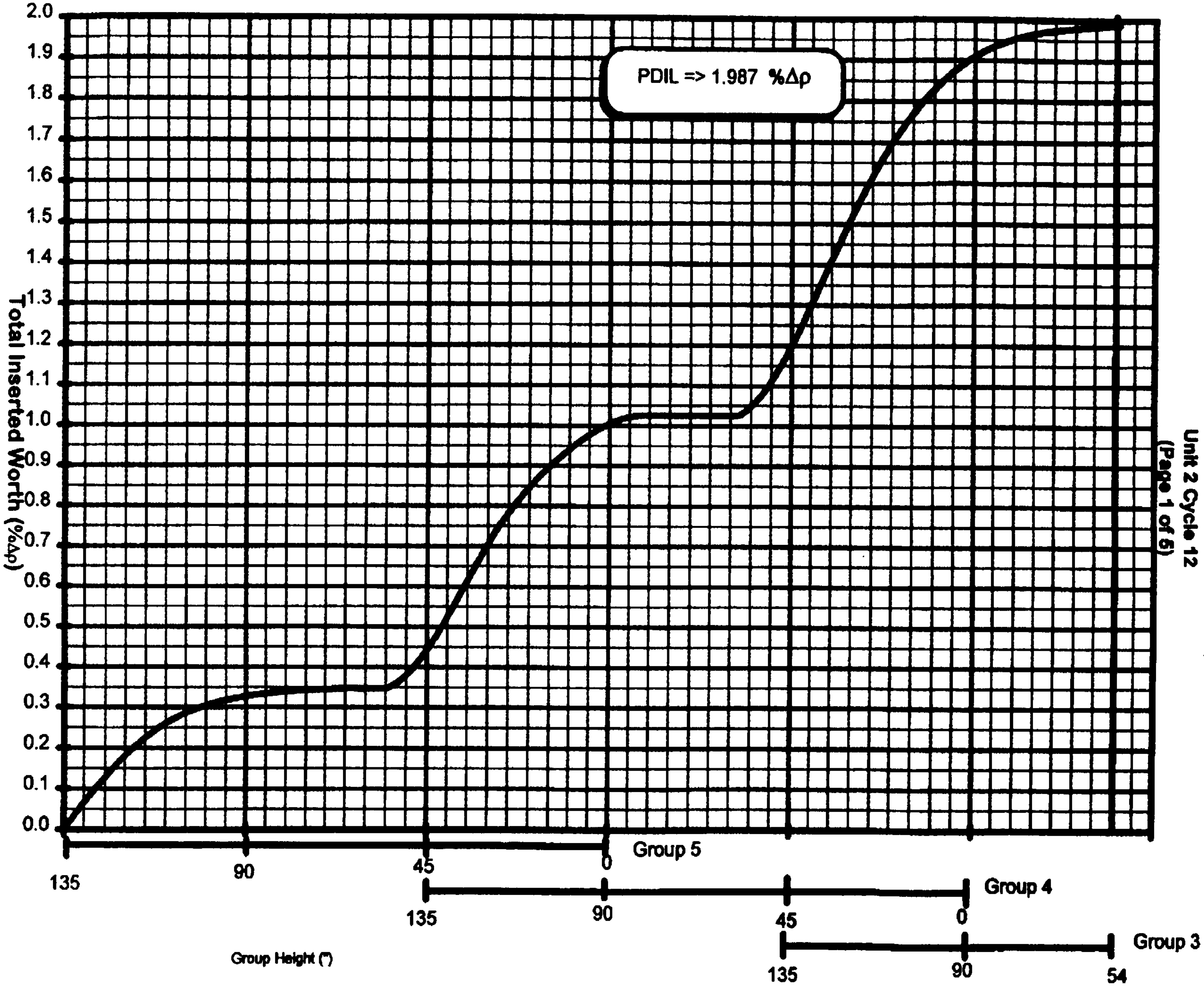


FIGURE 2-II.B.1
HZP INTEGRAL CEA WORTH WITH OVERLAP
16,500 $^{MWD}/_{MTU}$ TO EOC
Regulating Bank Worth = 3.699 %$\Delta\rho$
Unit 2 Cycle 12
(Page 2 of 5)

Group 5 (inches W/D)	Group 4 (inches W/D)	Group 3 (inches W/D)	HZP Integral CEA Worth (%$\Delta\rho$)
135.00			0.000
134.25			0.010
133.50			0.020
132.75			0.030
132.00			0.040
131.25			0.050
130.50			0.059
129.75			0.069
129.00			0.079
128.25			0.088
127.50			0.097
126.75			0.107
126.00			0.116
125.25			0.125
124.50			0.133
123.75			0.142
123.00			0.150
122.25			0.158
121.50			0.166
120.75			0.174
120.00			0.181
119.25			0.189
118.50			0.196
117.75			0.203
117.00			0.209
116.25			0.216
115.50			0.222
114.75			0.228
114.00			0.233
113.25			0.239
112.50			0.244
111.75			0.249
111.00			0.254
110.25			0.259
109.50			0.263
108.75			0.268
108.00			0.272
107.25			0.276
106.50			0.279
105.75			0.283
105.00			0.286
104.25			0.289
103.50			0.292
102.75			0.295
102.00			0.298
101.25			0.300
100.50			0.303
99.75			0.305
99.00			0.307
98.25			0.310
97.50			0.312

Group 5 (inches W/D)	Group 4 (inches W/D)	Group 3 (inches W/D)	HZP Integral CEA Worth (%$\Delta\rho$)
96.75			0.313
96.00			0.315
95.25			0.317
94.50			0.319
93.75			0.320
93.00			0.322
92.25			0.323
91.50			0.325
90.75			0.326
90.00			0.327
89.25			0.328
88.50			0.329
87.75			0.330
87.00			0.331
86.25			0.332
85.50			0.333
84.75			0.334
84.00			0.335
83.25			0.336
82.50			0.337
81.75			0.337
81.00			0.338
80.25			0.339
79.50			0.339
78.75			0.340
78.00			0.341
77.25			0.341
76.50			0.342
75.75			0.342
75.00			0.342
74.25			0.343
73.50			0.343
72.75			0.343
72.00			0.344
71.25			0.344
70.50			0.344
69.75			0.344
69.00			0.345
68.25			0.345
67.50			0.346
66.75			0.346
66.00			0.347
65.25			0.347
64.50			0.347
63.75			0.347
63.00			0.347
62.25			0.347
61.50			0.347
60.75			0.347
60.00			0.347
59.25			0.347

FIGURE 2-II.B.1
HZP INTEGRAL CEA WORTH WITH OVERLAP
16,500 $^{MWD}/_{MTU}$ TO EOC
Regulating Bank Worth = 3.699 %$\Delta\rho$
Unit 2 Cycle 12
(Page 3 of 5)

Group 5 (inches W/D)	Group 4 (inches W/D)	Group 3 (inches W/D)	HZP Integral CEA Worth (%$\Delta\rho$)
58.50			0.347
57.75			0.347
57.00			0.347
56.25			0.347
55.50			0.347
54.75			0.348
54.00			0.351
53.25			0.355
52.50			0.359
51.75			0.365
51.00			0.371
50.25			0.378
49.50			0.385
48.75			0.393
48.00			0.402
47.25			0.411
46.50			0.421
45.75			0.432
45.00	135.00		0.442
44.25	134.25		0.454
43.50	133.50		0.465
42.75	132.75		0.477
42.00	132.00		0.490
41.25	131.25		0.502
40.50	130.50		0.515
39.75	129.75		0.528
39.00	129.00		0.542
38.25	128.25		0.555
37.50	127.50		0.569
36.75	126.75		0.582
36.00	126.00		0.596
35.25	125.25		0.610
34.50	124.50		0.624
33.75	123.75		0.637
33.00	123.00		0.651
32.25	122.25		0.664
31.50	121.50		0.678
30.75	120.75		0.691
30.00	120.00		0.704
29.25	119.25		0.717
28.50	118.50		0.729
27.75	117.75		0.741
27.00	117.00		0.753
26.25	116.25		0.764
25.50	115.50		0.775
24.75	114.75		0.786
24.00	114.00		0.796
23.25	113.25		0.806
22.50	112.50		0.816
21.75	111.75		0.825
21.00	111.00		0.835

Group 5 (inches W/D)	Group 4 (inches W/D)	Group 3 (inches W/D)	HZP Integral CEA Worth (%$\Delta\rho$)
20.25	110.25		0.843
19.50	109.50		0.852
18.75	108.75		0.860
18.00	108.00		0.868
17.25	107.25		0.876
16.50	106.50		0.884
15.75	105.75		0.891
15.00	105.00		0.898
14.25	104.25		0.905
13.50	103.50		0.912
12.75	102.75		0.918
12.00	102.00		0.925
11.25	101.25		0.931
10.50	100.50		0.937
9.75	99.75		0.943
9.00	99.00		0.949
8.25	98.25		0.955
7.50	97.50		0.960
6.75	96.75		0.966
6.00	96.00		0.971
5.25	95.25		0.976
4.50	94.50		0.980
3.75	93.75		0.985
3.00	93.00		0.989
2.25	92.25		0.994
1.50	91.50		0.998
0.75	90.75		1.001
0.00	90.00		1.005
	89.25		1.008
	88.50		1.011
	87.75		1.014
	87.00		1.016
	86.25		1.018
	85.50		1.020
	84.75		1.022
	84.00		1.023
	83.25		1.024
	82.50		1.025
	81.75		1.025
	81.00		1.025
	80.25		1.025
	79.50		1.025
	78.75		1.025
	78.00		1.025
	77.25		1.025
	76.50		1.025
	75.75		1.025
	75.00		1.025
	74.25		1.025
	73.50		1.025
	72.75		1.025

FIGURE 2-II.B.1
HZP INTEGRAL CEA WORTH WITH OVERLAP
16,500 $^{MWD}/_{MTU}$ TO EOC
Regulating Bank Worth = 3.699 %$\Delta\rho$
Unit 2 Cycle 12
(Page 4 of 5)

Group 5 (inches W/D)	Group 4 (inches W/D)	Group 3 (inches W/D)	HZP Integral CEA Worth (%$\Delta\rho$)
	72.00		1.025
	71.25		1.025
	70.50		1.025
	69.75		1.025
	69.00		1.025
	68.25		1.025
	67.50		1.025
	66.75		1.025
	66.00		1.025
	65.25		1.025
	64.50		1.025
	63.75		1.025
	63.00		1.025
	62.25		1.025
	61.50		1.025
	60.75		1.025
	60.00		1.025
	59.25		1.025
	58.50		1.025
	57.75		1.027
	57.00		1.032
	56.25		1.037
	55.50		1.044
	54.75		1.051
	54.00		1.059
	53.25		1.067
	52.50		1.076
	51.75		1.086
	51.00		1.097
	50.25		1.108
	49.50		1.119
	48.75		1.131
	48.00		1.144
	47.25		1.157
	46.50		1.170
	45.75		1.184
	45.00	135.00	1.198
	44.25	134.25	1.213
	43.50	133.50	1.228
	42.75	132.75	1.243
	42.00	132.00	1.258
	41.25	131.25	1.274
	40.50	130.50	1.290
	39.75	129.75	1.306
	39.00	129.00	1.322
	38.25	128.25	1.339
	37.50	127.50	1.355
	36.75	126.75	1.371
	36.00	126.00	1.388
	35.25	125.25	1.405
	34.50	124.50	1.421
	33.75	123.75	1.437
	33.00	123.00	1.454
	32.25	122.25	1.470
	31.50	121.50	1.486
	30.75	120.75	1.502
	30.00	120.00	1.518
	29.25	119.25	1.533
	28.50	118.50	1.549
	27.75	117.75	1.564
	27.00	117.00	1.578
	26.25	116.25	1.593
	25.50	115.50	1.607
	24.75	114.75	1.620
	24.00	114.00	1.634
	23.25	113.25	1.647
	22.50	112.50	1.660
	21.75	111.75	1.672
	21.00	111.00	1.684
	20.25	110.25	1.696
	19.50	109.50	1.708
	18.75	108.75	1.719
	18.00	108.00	1.730
	17.25	107.25	1.740
	16.50	106.50	1.751
	15.75	105.75	1.761
	15.00	105.00	1.770
	14.25	104.25	1.780
	13.50	103.50	1.789
	12.75	102.75	1.798
	12.00	102.00	1.806
	11.25	101.25	1.815
	10.50	100.50	1.823
	9.75	99.75	1.831
	9.00	99.00	1.838
	8.25	98.25	1.845
	7.50	97.50	1.852
	6.75	96.75	1.859
	6.00	96.00	1.866
	5.25	95.25	1.872
	4.50	94.50	1.878
	3.75	93.75	1.884
	3.00	93.00	1.889
	2.25	92.25	1.894
	1.50	91.50	1.900
	0.75	90.75	1.904
	0.00	90.00	1.909
		89.25	1.914
		88.50	1.918
		87.75	1.922
		87.00	1.926
		86.25	1.929

FIGURE 2-II.B.1
HZP INTEGRAL CEA WORTH WITH OVERLAP
16,500 MWD/MTU TO EOC
Regulating Bank Worth = 3.699 %Δρ
Unit 2 Cycle 12
(Page 5 of 5)

Group 5 (inches W/D)	Group 4 (inches W/D)	Group 3 (inches W/D)	HZP Integral CEA Worth (%Δρ)
		85.50	1.933
		84.75	1.936
		84.00	1.939
		83.25	1.942
		82.50	1.945
		81.75	1.948
		81.00	1.951
		80.25	1.953
		79.50	1.955
		78.75	1.957
		78.00	1.959
		77.25	1.961
		76.50	1.963
		75.75	1.965
		75.00	1.966
		74.25	1.968
		73.50	1.969
		72.75	1.970
		72.00	1.971
		71.25	1.972
		70.50	1.973
		69.75	1.974
		69.00	1.975
		68.25	1.976
		67.50	1.977
		66.75	1.978
		66.00	1.979
		65.25	1.979
		64.50	1.980
		63.75	1.981
		63.00	1.981
		62.25	1.982
		61.50	1.982
		60.75	1.983
		60.00	1.983
		59.25	1.984
		58.50	1.984
		57.75	1.985
		57.00	1.985
		56.25	1.986
		55.50	1.986
		54.75	1.987
		54.40	1.987
		54.00	1.987

6.1 Plant Computer ECC (Continued)

I. **IF** the Upper CEA Bound is **GREATER** than 135 inches withdrawn on Reg Group 5, **THEN PERFORM** step 6.1.E - 6.1.H again with the CEA critical position inserted further into the core.

J. **REVIEW** the ECC for acceptability.

K. **IF** the ECC is acceptable, **THEN SIGN** the ECC form **AND SUBMIT** the ECC to a Shift SRO for review and approval.

L. **VERIFY** that the ECC Upper and Lower CEA Bounds are between 135 inches withdrawn on Reg Group 5 and zero power PDIL, **AND** that the ECC date and time are within the allowable range.

M. **IF** an error is found, **THEN INSTRUCT** the preparer to make the necessary corrections, **AND REPEAT** the review.

N. **IF** the ECC is acceptable, **THEN** the reviewing Shift SRO shall **SIGN** the print-out and issue it an Attachment 2 sequence number from Attachment 1, Attachment Log Sheet.

O. **CONTINUE** the startup **PER** OP-2.

6.2 MANUAL ECC CALCULATION

NOTE:

If a procedure step requires an entry on an attachment the entry blank will have the same number as the procedure step.

A. Estimated Critical Boron (ECB)

1. **COMPLETE** the previous critical conditions section of Attachment 2A.

    a. **RECORD** the unit and cycle numbers.

    b. **RECORD** the date and time the unit shut down.

    c. **RECORD** the current burnup for the cycle from the plant computer point "CEBURNUP".

2. **RECORD** the excess reactivity from Figure 1-II.A.7 of NEOP-13 (Figure 2-II.A.7 of NEOP-23) on Attachment 2A.

CAUTION:

The actual time of criticality **MUST** be within four hours of the estimated time (TS [illegible]). **IF** the actual time of criticality **WILL NOT** be within 4 hours of the estimated time, another ECC **MUST** be calculated with a more accurate time. **IF** the actual time of criticality will be within 84 hours of the previous shutdown, the actual time of criticality **MUST** be within 2 hours of the estimated time. **IF** the actual time of criticality **WILL NOT** be within 2 hours of the estimated time for this situation, another ECC **MUST** be calculated with a more accurate time.

3. **RECORD** the estimated date and time of reactor criticality for the ECC, on ATTACHMENT 2A.

6.2.A Estimated Critical Boron (ECB) (Continued)

4. **RECORD** the elapsed time from reactor shutdown to the estimated time of criticality on Attachment 2A.

   a. **IF** the elapsed time is greater than 84 hours **THEN USE** "> 84" hours for 6.2.A.4.

5. **DETERMINE** the post shutdown xenon worth.

   a. **IF** the elapsed time is less than 84 hours, **THEN DETERMINE** the post shutdown xenon worth at the estimated time of criticality using the plant computer **OR** the XENON RHO Report, **AND RECORD** on Attachment 2A.

   b. **IF** the elapsed time is greater than 84 hours, **THEN RECORD** the post shutdown xenon worth as zero (0) on Attachment 2A.

6. **PLACE** the hard copy XENON RHO Report with Attachment 2A, if used.

7. **RECORD** the desired CEA criticality position and the associated CEA reactivity inserted using Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23) on Attachment 2A.

8. **RECORD** the Corrected HZP IBW from the XENON RHO Report on Attachment 2A,

   OR

   CALCULATE AND RECORD on Attachment 2A the Corrected HZP IBW using Figure 1-II.A.2 of NEOP-13 (Figure 2-II.A.2 of NEOP-23) and the formula:

   Corrected HZP IBW = (HZP IBW)/B10 Correction Factor.

9. **CALCULATE** the Critical Boron Worth by using the formula below **AND RECORD** on Attachment 2A.

   Excess Reactivity - (CEA Worth + Xenon Worth) = Critical Boron Worth

10. **MULTIPLY** the Critical Boron Worth by the Corrected HZP IBW, **AND RECORD** on Attachment 2A. This is the Estimated Critical Boron Concentration.

11. **ADD** the ECC Tolerance (0.5 %ρ) to the estimated CEA Worth from step 6.2.A.7 **AND RECORD** on Attachment 2A. This result will be used to determine the ECC Lower CEA Bound.

12. **DETERMINE** the ECC Lower CEA Bound by finding the CEA position from Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23) associated with the reactivity worth found in step 6.2.A.11 **AND RECORD** on Attachment 2A.

6.2.A Estimated Critical Boron (ECB) (Continued)

13. IF the Lower CEA Bound is LESS than the Zero Power Dependent Insertion Limit, THEN PERFORM step 6.2.A again with the CEA critical position further out of the core.

14. SUBTRACT the ECC Tolerance (0.5 %Δρ) from the estimated CEA Worth from step 6.2.A.7 AND RECORD on Attachment 2A. This result will be used to determine the ECC Upper CEA Bound.

15. DETERMINE the ECC Upper CEA Bound by finding the CEA position from Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23), associated with the reactivity worth found in step 6.2.A.14 AND RECORD on Attachment 2A.

16. IF the Upper CEA Bound is GREATER than 135 inches withdrawn on Reg Group 5, THEN PERFORM step 6.2.A again with the CEA critical position inserted further into the core.

17. SIGN the ECC form AND SUBMIT the ECC to a Shift SRO for review and approval.

18. VERIFY that the previous critical condition is correct. [B-8]

19. VERIFY that the ECC date and time are within the allowable range.

20. VERIFY that the ECC was calculated correctly.

21. VERIFY that the ECC Upper and Lower CEA Bounds were calculated correctly and are between 135 inches withdrawn on Reg Group 6 and zero power PDIL.

22. IF an error is found, THEN INSTRUCT the preparer to make the necessary corrections, AND REPEAT the review.

23. IF the calculation is acceptable, THEN the reviewing Shift SRO shall SIGN the attachment.

24. CONTINUE the startup PER OP-2.

> **NOTE:**
> If a procedure step requires an entry on an attachment the entry blank will have the same number as the procedure step.

B. Estimated Critical Position (ECP)

1. COMPLETE the previous critical conditions section of Attachment 2B.

   a. RECORD the unit and cycle numbers.

   b. RECORD the date and time the unit shut down.

   c. RECORD the current burnup for the cycle from the plant computer point "CEBURNUP".

6.2.B Estimated Critical Position (ECP) (Continued)

2. **RECORD** the excess reactivity from Figure 1-II.A.7 of NEOP-13 (Figure 2-II.A.7 of NEOP-23) on ATTACHMENT 2B.

> **CAUTION:**
>
> The actual time of criticality MUST be within four hours of the estimated time ([illegible]). IF the actual time of criticality WILL NOT be within 4 hours of the estimated time, another ECC MUST be calculated with a more accurate time. IF the actual time of criticality will be within 24 hours of the previous shutdown, the actual time of criticality MUST be within 2 hours of the estimated time. IF the actual time of criticality WILL NOT be within 2 hours of the estimated time for this situation, another ECC MUST be calculated with a more accurate time.

3. **RECORD** the estimated date and time of reactor criticality for the ECC, on ATTACHMENT 2B.

4. **RECORD** the elapsed time from reactor shutdown to the estimated time of criticality on Attachment 2B.

   a. IF the elapsed time is greater than 84 hours **THEN USE** "> 84" hours for 6.2.B.4.

5. **DETERMINE** the post shutdown xenon worth.

   a. IF the elapsed time is less than 84 hours, **THEN DETERMINE** the post shutdown xenon worth at the estimated time of criticality using the plant computer **OR** the XENON RHO Report, **AND RECORD** on Attachment 2B.

   b. IF the elapsed time is greater than 84 hours, **THEN RECORD** the post shutdown xenon worth as zero (0) on Attachment 2B.

6. **PLACE** the hard copy XENON RHO Report with Attachment 2B, if used.

7. **RECORD** the desired Critical Boron Concentration on Attachment 2B.

8. **RECORD** the Corrected HZP IBW from the XENON RHO Report on Attachment 2B,

OR

CALCULATE AND RECORD on Attachment 2B the Corrected HZP IBW using Figure 1-II.A.2 of NEOP-13 (Figure 2-II.A.2 of NEOP-23) and the formula:

Corrected HZP IBW = (HZP IBW)/B10 Correction Factor.

9. **CALCULATE** the Critical Boron Worth by using the formula below **AND RECORD** on Attachment 2B.

Critical Boron Concentration/Corrected HZP IBW = Critical Boron Worth

6.2.B Estimated Critical Position (ECP) (Continued)

10. **CALCULATE** the Critical CEA Worth by using the formula below **AND RECORD** on Attachment 2B.

    Excess Reactivity - (Critical Boron Worth + Xenon Worth) = Critical CEA Worth

11. **DETERMINE** the Critical CEA Position associated with the Critical CEA Worth using Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23) **AND RECORD** on Attachment 2B.

12. **ADD** the ECC Tolerance (0.5 %Δρ) to the Critical CEA Worth from step 6.2.B.10 **AND RECORD** on Attachment 2B. This result will be used to determine the ECC Lower CEA Bound.

13. **DETERMINE** the ECC Lower CEA Bound by finding the CEA position from Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23) associated with the reactivity worth found in step 6.2.B.12 **AND RECORD** on Attachment 2B.

14. **IF** the Lower CEA Bound is **LESS** than the Zero Power Dependent Insertion Limit, **THEN PERFORM** step 6.2.B again with a higher Critical Boron Concentration.

15. **SUBTRACT** the ECC Tolerance (0.5 %Δρ) from the Critical CEA Worth from step 6.2.B.10 **AND RECORD** on Attachment 2B. This result will be used to determine the ECC Upper CEA Bound.

16. **DETERMINE** the ECC Upper CEA Bound by finding the CEA position from Figure 1-II.B.1 of NEOP-13 (Figure 2-II.B.1 of NEOP-23), associated with the reactivity worth found in step 6.2.B.15 **AND RECORD** on Attachment 2B.

17. **IF** the Upper CEA Bound is **GREATER** than 135 inches withdrawn on Reg Group 5, **THEN PERFORM** step 6.2.B again with a lower Critical Boron Concentration.

18. **SIGN** the ECC form **AND SUBMIT** the ECC to a Shift SRO for review and approval.

19. **VERIFY** that the previous critical condition is correct. [B-8]

20. **VERIFY** that the ECC date and time are within the allowable range.

21. **VERIFY** that the ECC was calculated correctly.

22. **VERIFY** that the ECC Upper and Lower CEA Bounds were calculated correctly and are between 135 inches withdrawn on Reg Group 5 and zero power PDIL.

23. **IF** an error is found, **THEN INSTRUCT** the preparer to make the necessary corrections, **AND REPEAT** the review.

24. **IF** the calculation is acceptable, **THEN** the reviewing Shift SRO shall **SIGN** the attachment.

Tab 2

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-21A-1

TASK: 020520206 Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the 4160 VAC System.

EVALUATION LOCATION:

_____ PLANT ___X__ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
15 MINUTES	____ MINUTES	NO

TASK LEVEL:

LEVEL 1

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

OI-21A

1C18-ALM

1C188-ALM

TASK STANDARDS:

This JPM is complete when bus feeder breaker 152-1115 has been paralleled with 1A Diesel Generator on 4 KV bus 11 and 1A Diesel Generator is shutdown.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-21A-1

TASK: 020520206 Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion
   - "U" for unsatisfactory completion
   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of safety procedure or personnel injury. **NOTE: Violation of safety procedures will result in failure of the JPM.**

5. Questions should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-21A-1

TASK: 020520206 Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power

DIRECTIONS TO TRAINEE:

1. Initial Conditions:

   a. 1A Diesel Generator is supplying power to 4 KV bus 11.

   b. 4 KV bus 11 feeder breakers 152-1115 and 152-1101 are open.

   c. You are performing the duties of the Unit 1 CRO.

2. Initiating Cue: The CRS directs you to parallel bus feeder breaker 152-1115 with the Diesel Generator in preparation to shut down the diesel. Are there any questions? You may begin.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-21A-1

ELEMENT (* = CRITICAL STEP)			STANDARD

TIME START _____

CUE: The General Precautions and Initial Conditions have been met. Begin at step 6.4.B.1 in OI-21A-1.

____	Identify and locate OI-21A, Step 6.4.B.1.		Same as element.

CUE: Will remain available.

____1.	**CHECK** the selected 11/17 4KV Bus offsite power source is expected to remain available:		
	.	11 4KV BUS ALT FDR, 152-1101	
	OR .	11 4KV BUS NORMAL FDR, 152-1115	
____2.	**VERIFY** DC control power is available by observing the 11/17 4KV Bus Normal **OR** Alternate Feeder breaker position light being illuminated at the control switch.		Same as element.
*____3.	**PLACE** 1A DG in the TRANSFER MODE by performing the following:		
*____	a.	**DEPRESS** 1A DG EMERGENCY START, 1-HS-1707, pushbutton.	Same as element
*____	b.	**INSERT** the Sync Stick for 1A DG OUT BKR, 1-CS-152-1703.	Inserts Sync Stick for 1-CS-152-1703 at 1C18A.
*____	c.	**DEPRESS** 1A DG SLOW START, 1-HS-1708, pushbutton.	Same as element

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-21A-1

ELEMENT (* = CRITICAL STEP)			STANDARD
*____	d.	**MOMENTARILY PLACE 1A DG SPEED CONTR, 1-CS-1705, to RAISE OR LOWER.**	Same as element
*____	e.	**MAINTAIN** 1A DG at approximately 60 Hz using 1A DG SPEED CONTR, 1-CS-1705.	Same as element
*____	f.	**REMOVE** the Sync Stick from 1A DG OUT BKR, 1-CS-152-1703.	Removes Sync Stick.
*____	g.	**INSERT** the Sync Stick for the 11/17 4KV Bus Normal **OR** Alternate Feeder breaker handswitch: . 11 4KV BUS ALT FDR, 1-CS-152-1101 **OR** . 11 4KV BUS NORMAL FDR, 1-CS-152-1115	Places sync stick in sync jack next to control switch for 152-1115.
____	h.	**CHECK** the associated Synchroscope **AND** Sync Lights are operating.	Checks 1C19 synchroscope.

NOTE: Offsite power voltage indication will be on the INCOMING voltmeter.

____	i.	**ADJUST** RUNNING VOLTS equal to INCOMING VOLTS using 1A DG AUTO VOLT CONTR, 1-CS-1704.	Adjusts running volts to match incoming volts (± 1 Volt between 1-EI-4000A and B on 1C19) using 1-CS-1704.

NOTE: The Synchroscope works in the opposite direction from normal when 1A DG is the RUNNING power source.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-21A-1

ELEMENT (* = CRITICAL STEP)			STANDARD
____	j.	**ADJUST** 1A DG frequency **so** the synchroscope pointer is rotating slowly in the FAST direction using 1A DG SPEED CONTR, 1-CS-1705.	Adjusts synchroscope to slowly in fast direction.

CAUTION: To avoid improper paralleling, do **NOT** start **OR** stop any large loads on the 11/17 4KV Bus.

CUE:	CRS directs closing the normal feeder breaker.

____	k.	**WHEN** the Synchroscope pointer is approximately 5 degrees prior to the 12 o'clock position, **THEN CLOSE** the 11/17 4KV Bus Normal **OR** Alternate Feeder breaker: . 11 4KV BUS ALT FDR, 1-CS-152-1101 **OR** . 11 4KV BUS NORMAL FDR, 1-CS-152-1115.	Closes to 1-CS-152-1115 at 5 degrees to 12 o'clock position.

NOTE TO EVALUATOR: Simulator operator to input: Annunciators M06 (1A DG CONTR BOARD 1C18A)on 1C18 and AA01 (1A DG)) to actuate.

____	Respond to DG 1A alarm.	Identify and locate 1C18A-ALM, Window AA01.
	Dispatch local operator to troubleshoot local alarm for the 1A DG.	Same as element.

CUE: Local operator calls from 1A DG local panel. Reports alarm window SL-40 "1E 125 VDC PWR SUPPLY FAILURE" is alarming due to a loss of 125 VDC to 1C188. There are 2 operators in the 1A DG Room standing by, provide copy of 1C188 Local Control Panel Alarm "SL 40". The DG Operator has implemented step 1.a (Monitor all operable DG parameters).

NOTE TO EVALUATOR: Simulator operator to trip 1A DG after directed by the Operator.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-21A-1

ELEMENT (* = CRITICAL STEP)			STANDARD
____1	b.	Determine 1A DG is running and NOT absolutely necessary	Same as element. (NOTE: May refer to 1C188-ALM SL 40)
* ____		(1) Open 1A DG OUT BKR 152-1703.	Operator opens the 1A DG Output Breaker, 152-1703
* ____		(2) IF two operators are available, THEN PULL AND HOLD trip lever on both engines until DG comes to a complete stop.	Directs DG operators to PULL AND HOLD trip lever on both engines until DG comes to a complete stop.
____	c.	IF DG is NOT running, THEN PLACE the HT Radiator Fans handswitches in OFF to stop the fans.	Directs DG Operator to perform step.
____	d.	DECLARE DG inoperable.	Notifies the CRS that 1A DG is inoperable.

TIME STOP _____

TERMINATING CUE:	This JPM is complete when offsite power is restored to 11 4KV bus with 1A DG is shutdown and declared inoperable. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-21A-1

TASK: 020520206 Transfer 11/17 4KV Bus Loads from 1A DG to Offsite Power

Document below any instances of failure to comply with industrial safety practices, radiation safety practice and use of event free tools. **NOTE:** **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Electrical AC / Transfer 11/ 17 4KV Bus
K/A 062000K102 [4.1/4.4]

Question a:
During a Loss of Off site power with Unit 1 in Mode 1 and Unit 2 in Mode 5, both 2A and 2B DGs are unavailable for Unit 2 and the 0C DG is being used as the emergency power source. Describe the limitations for use of the 0C Diesel with regards to the number of Safety Related buses it can supply at one time.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

Electrical AC / Transfer 11/ 17 4KV Bus

K/A 062000K102 [4.1/4.4]

Question a:

During a Loss of Off site power with Unit 1 in Mode 1 and Unit 2 in Mode 5, both 2A and 2B DGs are unavailable for Unit 2 and the 0C DG is being used as the emergency power source. Describe the limitations for use of the 0C Diesel with regards to the number of Safety Related buses it can supply at one time.

Answer:

The 0C Diesel can be connected to only one Safety Related bus at a time by procedure.

Reference Use Allowed? NO

Reference 1 OI-21C section 5.0 precaution F

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Electrical AC / Transfer 11/ 17 4KV Bus

K/A 064000G112 [2.9/4.0]

Question b:

Given the following information concerning Fuel Oil tanks for the Unit 1 Emergency Diesel Generators:

TANK	**LEVEL**
1A DG Fuel Oil Day Tank	23 inches
1B DG Fuel Oil Day Tank	26 inches
1A Fuel Oil Storage Tank	18' 1"
11 Fuel Oil Storage Tank	6' 6"
21 Fuel Oil Storage Tank	17' 0"

Evaluate the OPERABILITY of the Diesel Generators and any ACTIONS required.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

Electrical AC / Transfer 11/ 17 4KV Bus

K/A 064000G112 [2.9/4.0]

Question b:
Given the following information concerning Fuel Oil tanks for the Unit 1 Emergency Diesel Generators:

TANK	LEVEL
1A DG Fuel Oil Day Tank	23 inches
1B DG Fuel Oil Day Tank	26 inches
1A Fuel Oil Storage Tank	18' 1"
11 Fuel Oil Storage Tank	6' 6"
21 Fuel Oil Storage Tank	17' 0"

Evaluate the OPERABILITY of the Diesel Generators and support systems and any ACTIONS required.

Answer: Both diesels are operable (based on SR 3.8.1.5) and 21 FOST is in IAS 3.8.3 .B .

Technical Specifications actions are:

1. Verify the combined available fuel oil volume of 21 FOST and the OPERABLE 11 FOST is greater than or equal to 72,860 gallons. AND
2. Verify the combined available fuel oil volume of 21 FOST and OPERABLE 11 FOST is greater than or equal to 85,000 gallons within 48 hours.

Reference Use Allowed? YES

Reference 1 Calvert Cliffs - Unit 1 Technical Specification 3.8.1, Amendment 227, pages 3/4 3.8.1-11 and TS 3.8.3, page 3.8.3-1.

Reference 2 OI -21A table 2, OI-21B table 2 and OI-21D table 1 and 2

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

TAB 3

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

TASK: 020590505 RPS Startup Test

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the Engineered Safety Feature Actuation System.

EVALUATION LOCATION:

_____ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEL:

TRAIN

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

STP O-6-1

TASK STANDARDS:

This JPM is complete when one Turbine Loss of Load Channel Test has been conducted per STP O-6-1 Section 6.2.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

TASK: 020590505 RPS Startup Test

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion
   - "U" for unsatisfactory completion
   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **NOTE: Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

8. Setup instructions:

   a. Reset to IC-9.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

ELEMENT (* = CRITICAL STEP)			STANDARD
TIME START ____			
CUE:		STP is complete through section 6.1. Begin at 6.2.A.	
____		Identify and locate STP O-6-1, Section 6.2	Same as element
CUE:		All CEAs inserted, count rate 18 CPS.	
____	A.	**VERIFY** Reactor is shutdown	Checks all CEAs inserted and Reactor Power level on 1C05 or 1C15.
		1. **IF** Low Pressure S/G Trip Units (TU-5) are tripped, **THEN** **PLACE** the LOW S/G PRESSURE trip bypass keyswitch for Channels A, B, C and D to BYPASS. (N/A if Trip Units are **NOT** tripped.)	N/A
		2. **IF** Low Flow and TM/LP Trip Units are tripped, **THEN** **PLACE** the ZERO POWER MODE trip bypass keyswitch for Channels A, B, C and D to BYPASS. (N/A if Trip Units are **NOT** tripped.)	N/A
____	B.	**INITIATE** the Turbine Loss of Load Channel Test by performing steps C through J for a single RPS Channel. When completed, repeat steps C through J for each of the remaining RPS Channels to be tested.	

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

ELEMENT (* = CRITICAL STEP)			STANDARD
CUE:		Turbine Tripped Annunciator ON. STOP valves closed.	
____	C.	**VERIFY** the Turbine Generator tripped.	Checks "TURB TRIP" Annunciator on 1C02 and Turbine Stop valve position.
*____	D.	**PLACE** the LINEAR POWER CHANNEL, OPERATOR/TEST switch in the TEST position.	Places switch in Test position.
CUE:		Level 2 light energizes.	
*____	E.	**ROTATE** Lower Subchannel TEST level potentiometer until the amber LEVEL 2 light energizes.	Rotates switch until Level 2 light energizes.
CUE:		Loss of load trip unit trips, and 3 matrix lights are on, and 1C05 "PROT CH TRIP" Annunciator is on.	
____	F.	**VERIFY** the Loss of Load Trip Unit (TU-8) TRIPS **AND**:	Verifies Loss of load Trip unit trips.
		1. Loss of Load Trip Unit red TRIP light and three (3) matrix lights energized.	Verifies red trip light and three matrix lights are energized.
		2. 1C05 "PROT CH TRIP" Annunciator alarms. (N/A if any other Trip Unit tripped)	Verifies "PROT CH TRIP" Annunciator is in Alarm on 1C05. (N/A if other trip units are tripped.)
*____	G.	**ROTATE** Lower Subchannel TEST level potentiometer fully in the counter-clockwise direction.	Rotates potentiometer fully counter-clockwise.
*____	H.	**PLACE** the LINEAR POWER CHANNEL, OPERATE/TEST switch in the OPERATE position.	Places switch in OPERATE.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

ELEMENT (* = CRITICAL STEP)	STANDARD

CUE:	Loss of load trip unit resets and 1C05 "PROT CH TRIP" Annunciator is off (Annunciator N/A if other trip units tripped).

		ELEMENT	STANDARD
____	I.	**RESET** the Loss of Load Trip Unit (TU-8).	Resets Loss of Load Trip Unit
		1. **CHECK** 1C05 "PROT CH TRIP" Annunciator clear. (N/A if any other Trip Unit tripped.)	Checks "PROT CH TRIP" Annunciator clear. (N/A if other trip units are tripped.)

TIME STOP _____

TERMINATING CUE:	This task is complete when the Channel A has been tested (through Step I). No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE STP O-6-1

020590505 RPS Startup Test

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ____________________________ DATE: __________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 020590505

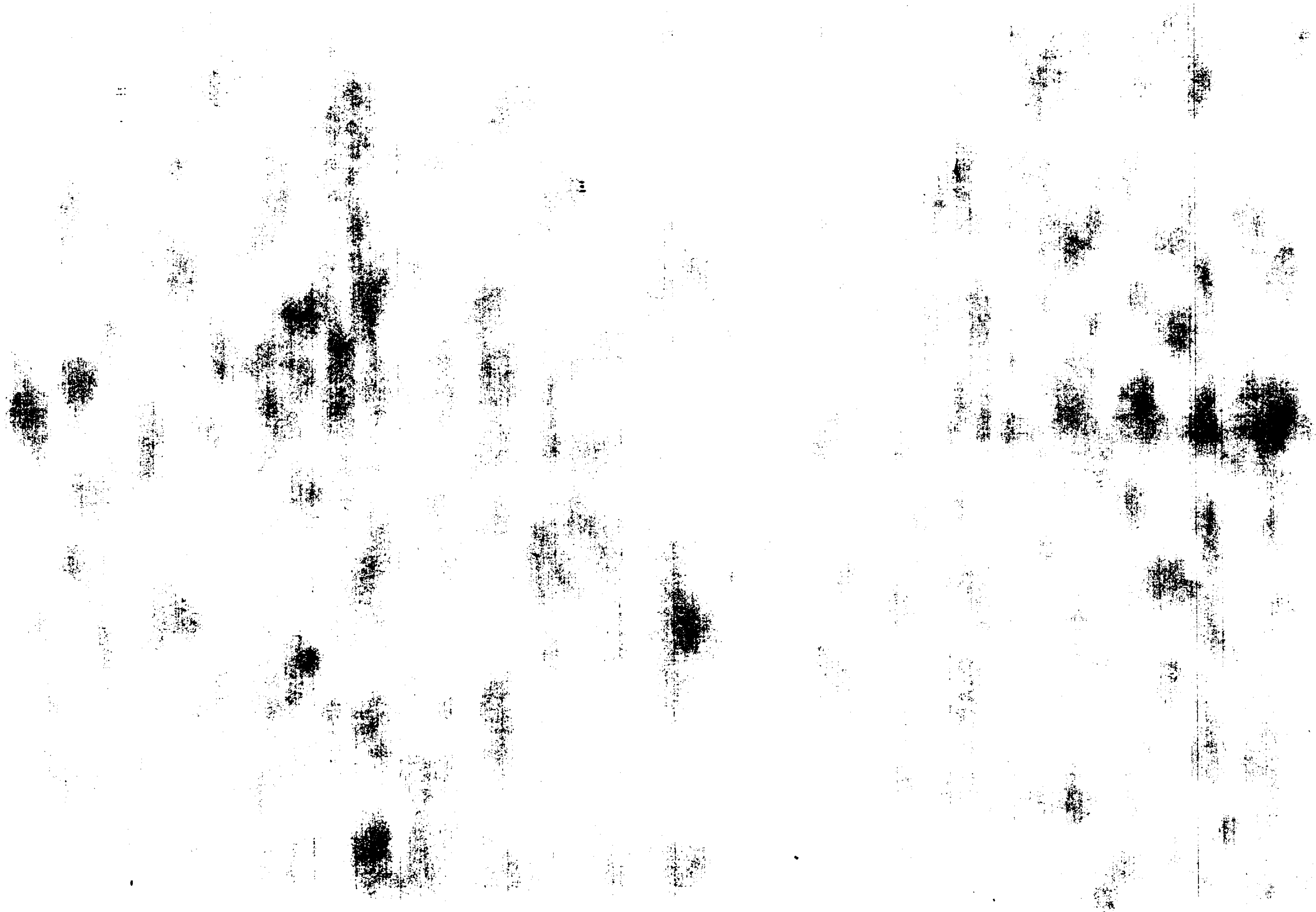
DIRECTIONS TO TRAINEE:

1. Initial Conditions:

   a. Unit 1 is in Mode 3.

   b. You are performing the duties of a spare licensed operator.

2. Initiating Cue: The CRS directs you to perform Section 6.2 of STP O-6-1. Are there any questions? You may begin.



Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
RPS Instrumentation

K/A 000012K401 [3.7/4.0]

Question a:
When a RPS cabinet is de-energized, what would be the resulting trip logic?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
RPS Instrumentation

K/A 000012K401 [3.7/4.0]

Question a:
When a RPS cabinet is de-energized, what would be the resulting trip logic?

Answer:

One out of three

Reference Use Allowed? NO

Reference 1 OI-6, Section 6.2 pg. 8 Rev.11

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
RPS Instrumentation

K/A 000012K604 [3.3/3.6]

Question b:
1. When de-energizing 2 RPS Cabinets, how is opening of the PORVs prevented?

2. (SRO only) What are the Reporting Requirements, if any, if a PORV opened due to a missed procedure step when the Unit is in Mode 3?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

RPS INSTRUMENTATION
K/A 012000K6.04 [3.3/3.6]

Question b:
1. When de-energizing 2 RPS Cabinets, how is opening of the PORVs prevented?

2. (SRO only) What are the Reporting Requirements, if any, if a PORV opened due to a missed procedure step when the Unit is in Mode 3?

Answer:

1. Place each PORV handswitch to the OVERRIDE TO CLOSE position.

2. 4 Hour report per RM 1-101

Reference Use Allowed? NO (YES for question 2)

Reference 1 OI-6, Section 6.2 Page 7 Rev. 11

Reference 2 RM 1-101, attachment 1 and 3

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ________________

TAB 4

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EOP-5-3 (MODIFIED)

SYSTEM: Engineered Safety Features Actuation

TASK: 020630402 Verify a Recirculation Actuation Signal (RAS)

PURPOSE: Evaluates an Operator's ability to throttle HSPI flow to prevent HPSI pump cavitation during RAS conditions.

PERFORMER'S NAME: ____________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for Safety Injection and Containment Spray.

EVALUATION LOCATION:

_____ PLANT ____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ACTUAL PERFORMANCE _____DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
15 MINUTES	____ MINUTES	NO

TASK LEVEL:

TRAIN

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

EOP-5
EOP Attachment (6) and Attachment (10)

TASK STANDARDS:

This JPM is complete when HPSI flow has been throttled.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EOP-5-3 (MODIFIED)

ELEMENT (* = CRITICAL STEP)	STANDARD

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion
   - "U" for unsatisfactory completion
   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **NOTE: Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

8. Simulator Setup

   a. IC-13, U1, 100%

   b. Insert Malfunction RCS 001, Cold Leg Rupture

   c. Run simulator until RAS (complete EOP 0 and applicable EOP 5 steps, including ESFAS Checklists)

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EOP-5-3 (MODIFIED)

ELEMENT (* = CRITICAL STEP)			STANDARD

TIME START ________

____		Locate EOP-5, Section IV.V.	Same as element.

> CUE: When checked:
> - 1-LIA-4142 indicates off-scale low.
> - 1-LIA-4143 indicates approximately 2 feet.
> - "ACTUATION SYS RAS TRIPPED" alarm has actuated.

____	1.	**WHEN** RWT level drops to less than 0.5 feet **OR** the "ACTUATION SYS RAS TRIP" alarm is received, **THEN** perform the following actions:	Checks RWT level at 1-LIA-4142 and 1-LIA-4143, on 1C08 and 1C09. Verifies "ACTUATION SYS RAS TRIPPED" alarm actuation, on 1C08.
*____	a.	Verify RAS actuation.	Verifies RAS actuation. (LPSI Pp off. Cont Sump MOVs open)

> CUE: When checked, 1-LI-4146 and 1-LI-4147 indicate approximately 60.0 inches of water in the containment sump.

____	b.	Ensure that a minimum containment sump level of at least 28 inches is indicated on the CNTMT WR WATER LVL indication, 1-LI-4146 or 1-LI-4147.	Checks Containment sump level 1-LI-4146 or 1-LI-4147, on 1C10.
____	c.	Place a second CC HX in service as follows:	

> CUE: When positioned/checked, 1-CC-3824-CV and 1-CC-3826-CV indicate OPEN.

____	(1)	Open the appropriate CC HX CC OUT valve: · 1-CC-3824-CV · 1-CC-3826-CV	Places HS-3824 (3826) to OPEN and checks position indication for CC-3824 (3826).

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EOP-5-3 (MODIFIED)

ELEMENT (* = CRITICAL STEP)			STANDARD

CUE: When throttled/checked throttled, 1-SW-5206/5208-CV position indicating lights indicate intermediate valve position.

EXAMINER NOTE: The controller outputs will have to be raised the ~ 20% to get intermediate indication.

____	(2)	Throttle open the appropriate Saltwater CC HX OUT VLV: · 1-HIC-5206 · 1-HIC-5208	Raises output of HIC-5206 (5208) and checks position indicating lights on SW-5206 (5208).

CUE: When started:
- Component Cooling Pump breaker indicates closed.
- Ammeter indicates running amps approximately 150-160 amps.

____	(3)	Start a second CC PP.	Starts a Second Component Cooling Pump, on 1C13. Checks Pump breaker indication closed. Checks Pump running amps at approximately 150-160 amps.

CUE: When implemented, the pumps/valves listed on EOP Attachment (6), RAS Verification Checklist are in the condition specified.

____	d.	Ensure the RAS lineup is appropriate **PER** ATTACHMENT (6), RAS VERIFICATION CHECKLIST.	References EOP Attachment (6), RAS Verification Checklist. Places equipment listed in the condition specified.

CUE: When repositioned, 1-SI-4142-MOV and 1-SI-4143 MOV indicate CLOSE.

____	e.	**IF** RAS lineup is verified, **THEN** shut RWT OUT valves: · 1-SI-4142-MOV · 1-SI-4143-MOV	Places 1-HS-4142 and 1-HS-4143 in CLOSE position, on 1C08 and 1C09.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EOP-5-3 (MODIFIED)

ELEMENT (* = CRITICAL STEP)		STANDARD
CUE: When throttled, HPSI header flow indicates approximately 250 GPM per header.		
* ___ f.	**IF** TWO HPSI PPs are running, **THEN** throttle HPSI flow to achieve 250 GPM through each of the four headers.	Positions Main and Aux HPSI headers, on 1C08 and 1C09, as necessary, to throttle HPSI flow to 250 gpm (± 25 gpm) through each HPSI header. Checks HPSI Header flow at flow indicators, on 1C08 and 1C09. Checks HPSI Pump parameters of motor amps and discharge pressure, on 1C08 and 1C09.

TIME STOP ____

TERMINATING CUE:	This JPM is complete when HPSI flow has been throttled. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE EOP-5-3 (MODIFIED)

TASK: 020630402 Verify a Recirculation Actuation Signal (RAS)

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE:** **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 020630402

DIRECTIONS TO TRAINEE:

1. Initial Conditions:

   a. One hour ago, a major transient occurred on Unit 1, resulting in a reactor trip and SIAS actuation.

   b. A LOCA has been diagnosed and EOP-5 has been implemented.

   c. RAS actuation has occurred.

   d. Both 11 and 13 HPSI pumps are running

   e. SIAS, CSAS and CIS Checklists have been completed.

2. Initiating Cue: The CRS directs you to verify RAS actuation per EOP-5, Section IV.V under these conditions. Are there any questions? You may begin.

ATTACHMENT (6)
Page 1 of 1

RAS VERIFICATION CHECKLIST

1C08, 1C09, 1C10

a. 11 and 12 LPSI PPs...Off

b. MINI FLOW RETURN TO RWT ISOL MOVs:

- 1-SI-659-MOV
- 1-SI-660-MOV...Shut

c. CNTMT SUMP DISCH valves:

- 1-SI-4144-MOV
- 1-SI-4145-MOV...Open

1C13

a. 4 CAC SRW INL valves:

- 1-SRW-1581-CV
- 1-SRW-1584-CV
- 1-SRW-1589-CV
- 1-SRW-1592-CV... Open

2C24A

a. 11 CC HX INL valve, 1-SW-5160-CV...Open

b. 11 CC HX OUT VLV, 1-SW-5206-CV...Auto

c. 12 CC HX INL valve, 1-SW-5162-CV...Open

d. 12 CC HX OUT VLVs,

- 1-SW-5208-CV...Auto

- 1-SW-5163-CV...Open

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
ESFAS

K/A 00027A403 [3.3/3.2]

Question a:
Regarding the Containment Iodine Removal System, how many recirculation filter units are required to achieve 100% capacity?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
ESFAS

K/A 00027A403 [3.3/3.2]

Question a:
Regarding the Containment Iodine Removal System, how many recirculation filter units are required to achieve 100% capacity?

Answer:

2 Units (50% capacity each)

Reference Use Allowed? NO

Reference 1 EOP-8, CE-2 Basis Pg. 287 Rev. 17

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
ESFAS

K/A 00022K402 [3.1/3.4]

Question b:
What is the reason for the Containment Air Coolers shifting to low or starting in low on a SIAS?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
ESFAS

K/A 00022K401 [3.1/3.4]

Question b:
What is the reason for the Containment Air Coolers shifting to low or starting in low on a SIAS?

Answer:

The steam water atmosphere from a LOCA or Steam Line break is more dense than air which results in an increased load on the fan motor. Slow speed operation prevents motor overloading the fan motor that would occur if the fan was in high speed.

Reference Use Allowed? NO

Reference 1 L/P CRO 7-1 L.O. 13 page 59

Reference 2 EOP-8, CE-2 Basis, Page 286 Rev. 17 (RPA to be submitted due to wrong inference as basis)

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

TAB 5

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

SYSTEM:	Safety Injection and Containment Spray System	
TASK:	020070303	Respond to a Complete Loss of SDC with Pressurization of the RCS Possible
PURPOSE:	Evaluates an Operator's Ability to Respond to a Loss of Shutdown Cooling, Due to an Inadvertent Closure of 1-SI-652-MOV (Closure of Shutdown Cooling Return Valve)	

JOB PERFORMANCE MEASURE

CALVERT CLIFFS NUCLEAR POWER PLANT

LICENSED OPERATOR TRAINING

ORIGINAL:

PREPARED BY:	Bill Birney	DATE: 10-5-93
REVISION/CHANGES:		
REVISEDCHANGES BY:	______ Operations Instructor - Nuc	DATE: ______
REVIEWED BY:	______ SRO License Holder	DATE: ______
APPROVED BY:	______ Ops Training Supervisor	DATE: ______

Rev. 1

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

ELEMENT (* = CRITICAL STEP)	STANDARD

PERFORMER'S NAME: ______________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the Safety Injection System.

EVALUATION LOCATION:

_____ PLANT   _X_ SIMULATOR   _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE   _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
15 MINUTES	____ MINUTES	NO

TASK LEVEL:

LEVEL 1 PERFORM

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

AOP-3B

TASK STANDARDS:

This JPM is complete when shutdown cooling flow has been restored following automatic closure of the SDC return valves.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

ELEMENT (* = CRITICAL STEP) STANDARD

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **NOTE: Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task..

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

8. Simulator Setup

   a. IC-2 with:U1 Mode 5, RCS temperature 125°, 84 psia, pressurizer level 220", 11 LPSI in service, 1-SI-652 MOV override closed.

   b. Insert malfunction to trip first LPSI pump when started:

      11 LPSI pump xml1si003_01

      12 LPSI pump xml1si003_02

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

ELEMENT (* = CRITICAL STEP)			STANDARD

TIME START ____

____		Identify and locate AOP-3B, Step IV.A.4.	Same as element.
____	4.	Check that the SDC HDR RETURN ISOL valves are open: . 1-SI-651-MOV . 1-SI-652-MOV	1C09 Reports SI-652 indicates shut.

ALTERNATE ACTIONS

<u>**CAUTION:**</u> **Isolation of the LPSI PP suction flow path can cause pump damage if the LPSI PPs are allowed to operate.**

____	4.1	**IF ANY** of the SDC HDR RETURN ISOL valves are **NOT** fully open, **THEN** complete the following:	
*____	a.	Stop the operating LPSI PP(s).	HS-302X, 1C08 breaker light open.
____	b.	Place **BOTH** LPSI PP handswitches in PULL TO LOCK.	HS-302X and 302Y, 1C08 and 1C09

CUE:	RCS pressure is 83 PSIA.

____	c.	Initiate Aux Spray as necessary **PER** Step C.5.b to maintain RCS pressure less than 260 PSIA.	Monitors RCS pressure on PIC-103.

CUE:	Electricians reopened the 1-SI-652-MOV breaker, they put a wire in backwards, they have since restored 1-SI-652-MOV breaker.

____	d.	Attempt to open the affected SDC HDR RETURN ISOL valve(s) from the Control Room: . 1-SI-651-MOV . 1-SI-652-MOV	HS-2652, 1C09 open light.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

ELEMENT (* = CRITICAL STEP)			STANDARD
____	e.	**IF BOTH** SDC HDR RETURN ISOL valves are open, **THEN** attempt to restore SDC **PER ATTACHMENT (3)**, RETURNING SHUTDOWN COOLING TO SERVICE.	Refers to Attachment 3.

ATTACHMENT 3

CUE:	RCS pressure is 83 PSIA.

____	1.	Ensure RCS pressure is less than 260 PSIA.	Monitors RCS pressure on PIC-103 and/or PIC-103-1, 1C06.

CUE:	RCS temperature is 125°F.

____	2.	Ensure RCS temperature is less than 300°F.	Monitors CET temperatures, 1C05.

CUE:	When checked, SI-651 and 652 indicate open.

____	3.	Ensure the SDC HDR RETURN ISOL valves are open: . 1-SI-651-MOV . 1-SI-652-MOV	1-HS-3651 & 3652 @ 1C09 open position light

CUE:	When dispatched, PO reports valves are locked shut.

____	4.	Ensure the LPSI PP NORM SUCT ISOL valves are Locked Shut: . (11 LPSI PP) 1-SI-444 . (12 LPSI PP) 1-SI-432	Dispatches PO to check valve positions.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

ELEMENT (* = CRITICAL STEP)			STANDARD
CUE:		When dispatched, PO reports valves are locked open.	
____	5.	Ensure the LPSI PP SDC SUCT ISOL valves are Locked Open: . (11 LPSI PP) 1-SI-441 . (12 LPSI PP) 1-SI-440	Dispatches PO to check valve positions.
	6.	Verify the LPSI PP DISCH ISOL valves are Locked Open: . (11 LPSI PP) 1-SI-447 . (12 LPSI PP) 1-SI-435	

NOTE: **SDC Return Header Vent valves, 1-SI-563 and 1-SI-562 are located in the 5 foot East Piping Penetration Room along the East wall.**

WARNING: **Venting the SDC System may release high temperature, highly radioactive gasses.**

____	7	IF air is suspected of being trapped in the SDC Return Header,	Determines step is N/A.

WARNING: **Venting the SDC System may release high temperature, highly radioactive gasses.**

____	8	IF air is suspected in the LPSI PPs,	Determines step is N/A.
CUE:		When checked, SI-657 indicates shut.	
*____	9	Shut the S/D COOLING TEMP CONTR valve, 1-SI-657-CV.	Lowers HIC-657 to zero output. Checks position indication for SI-657.
*____	10.	Partially open the SHUTDOWN CLG FLOW CONTR valve, 1-SI-306-CV, as follows:	
____		a. Place the SHUTDOWN CLG FLOW CONTR, 1-FIC-306, to MANUAL.	Shifts FIC-306 to Manual.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

ELEMENT (* = CRITICAL STEP)			STANDARD
CUE:	When adjusted, FIC-306 output indicates 95%.		
* ____	b.	**Adjust the SHUTDOWN CLG FLOW CONTR, 1-FIC-306, to 95% output.**	Adjusts output of FIC-306 to 95%.
____	11.	Verify LPSI HDR flowpath:	
____	a.	**IF** the LPSI HDR valves are in the Reduced Inventory position per OP-7, SHUTDOWN OPERATIONS,	Determines step is N/A.
CUE:	When checked, SI-615, 625, 635, 645 indicate open.		
____	b.	**IF** the LPSI HDR valves are **NOT** in the Reduced Inventory position per OP-7, **THEN** verify open **ALL** LPSI HDR valves: . 1-SI-615-MOV . 1-SI-625-MOV . 1-SI-635-MOV . 1-SI-645-MOV	HS-3615 and 3625, 1C08 & HS-3635 and 3645, 1C09 Open position lights.

<u>CAUTION:</u> Do NOT operate the LPSI PPs at shutoff head.

ELEMENT			STANDARD
CUE:	The LPSI pump starts and trips after several seconds. The ABO reports hearing a loud squeal from the LPSI pump motor and the motor outboard bearing is extremely hot. When recommended, the CRS should acknowledge the request to start the second LPSI pump.		
* ____	12.	**Start a LPSI PP.**	HS-302X, 1C08 or 302Y, 1C09 breaker open light. The cause of the LPSI pump trip is investigated and determines no common mode failure has occurred. Starts (or recommends starting) the other pump.
CUE:	When output lowered, FIC-306 indicates 3000 GPM.		
* ____	13.	**IF** the RCS level is above the 37.6 foot	Slowly lowers output of FIC-306

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

ELEMENT (* = CRITICAL STEP)		STANDARD
	elevation, **THEN** slowly adjust the SHUTDOWN CLG FLOW CONTR, 1-FIC-306, to raise SDC flow to 3000 GPM.	until flow indicates 3000 GPM.
____ 14.	**IF** the RCS level is at or below the 37.6 foot elevation,	Determines step is N/A.
____ 15.	Place the SHUTDOWN CLG FLOW CONTR, 1-FIC-306, in AUTO if desired.	Adjust Auto Setpoint until Auto output matches Manual output and shifts FIC-306 to Auto.

CAUTION: **Do NOT exceed the following cooldown limits in any one hour:**

- **greater than 270°F 100°F/hr**
- **184°F to 270°F 20°F/hr**
- **less than 184°F 10°F/hr**

CAUTION: **Do NOT exceed a heatup rate of 14°F/MIN for the Shutdown Cooling Heat Exchanger as indicated on TI-303X and TI-303Y.**

CAUTION: **Do NOT exceed 4800 GPM flow through one SDC HX.**

CUE:	RCS temperature is stable at 125°F on TR-351 (Examiner discretion based on RCS temperature trend).

*____ 16.	Adjust the S/D COOLING TEMP CONTR, 1-HIC-3657, as necessary to maintain the desired temperature and current mode. . (Mode 4) less than 300°F . (Mode 5) less than 200°F . (Mode 6) less than 140°F	Raises output of HIC-3657 and monitors RCS temperature on TR-351.

NOTE: **The SDC Flow Control valve, 1-SI-306-CV, fails open on a Loss of Instrument Air, therefore SDC flow is controlled by throttling two LPSI HDR valves, to prevent vortexing, if a Loss of Instrument Air were to occur.**

____ 17.	**IF** the RCS level is at or below the 37.6 foot elevation **AND** the LPSI HDR valves are **NOT** in the Reduced Inventory position per OP-7	Determines step is N/A.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

ELEMENT (* = CRITICAL STEP)	STANDARD

TIME STOP _____

TERMINATING CUE:	This JPM is complete when the standby LPSI pump has been started and SDC flow adjusted to maintain RCS temperature. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-3B-6F

TASK: 020070303 Respond to a Complete Loss of SDC with Pressurization of the RCS Possible

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ____________________ DATE: __________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 020070303

DIRECTIONS TO TRAINEE:

1. Initial Conditions:

   a. Unit 1 is in Mode 5 for maintenance.

   b. The RCS is filled and pressurizer level is ~220".

   c. #11 LPSI pump was in service supplying shutdown cooling flow.

   d. RCS temperature is ~125°F.

   e. RCS pressure is ~83 PSIA.

   f. The reactor has been shut down for 72 hours.

   g. Electricians were working the limitorque on 1-SI-652-MOV, they just reclosed the breaker, 1-SI-652-MOV went shut.

   h. You are performing the duties of the Unit 1 CRO.

2. Initiating Cue: The CRS directs you to restore shutdown cooling in accordance with AOP-3B, beginning at Step IV.A.4. Are there any questions? You may begin.

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
SDC

K/A 00024AA206 [3.6/3.7]

Question a:

What are the primary sources of dilution of the RCS during plant startup in Mode 3?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

SDC

K/A 00024AA206 [3.6/3.7]

Question a:

What are the primary sources of dilution of the RCS during plant startup in Mode 3?

Answer:

The two possible causes of dilution of the RCS in Mode 3 are inadvertant injection of water (makeup) or improper operation of an Ion Exchanger.

Reference Use Allowed? YES

Reference 1 AOP 1A Section VII, Step B, page 21

Reference 2 AOP 1A Technical Basis, pages 7 and 11

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
SDC

K/A 00025AK101 [3.9/4.3]

Question b:

During preparation for entering Reduced Inventory Conditions with the Pressurizer manway removed, why must RCS boiling times be considered for Containment closure deviations?

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
SDC

K/A 00025AK101 [3.9/4.3]

Question b:

During preparation for entering Reduced Inventory Conditions with the Pressurizer manway removed, why must RCS boiling times be considered for Containment closure deviations?

Answer:

Because the manway is removed, the RCS is not capable of being pressurized and resulting in the condition where the SGs are considered NOT available for heat removal

Reference Use Allowed? YES

Reference 1 OP 7 Section 6.3 page 37

Reference 2 OP 7, Section 5.1, page 14

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

TAB 6

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

TASK: 020050305 Respond to RCS leakage exceeding one charging pump, Modes 1 and 2

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the Reactor Coolant System.

EVALUATION LOCATION:

_____ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEL:

LEVEL 1 PERFORM

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

AOP-2A

TASK STANDARDS:

This JPM is complete when the leak is isolated in accordance with AOP-2A and charging has been lined up to the Auxiliary HPSI header.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

TASK: 020050305 Respond to RCS leakage exceeding one charging pump, Modes 1 and 2

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

8. Simulator Setup/Booth Operator Instructions

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

TASK: 020050305 Respond to RCS leakage exceeding one charging pump, Modes 1 and 2

a. IC-13

b. Charging Line Break 5.0 value; CVCS 008 (Charging header break inside Containment)

NOTE: For this size leak, charging hdr pressure will be greater than RCS pressure with 3 Charging Pps running.

c. Run simulator until the backup charging pumps start.

d. Shut 1-CVC-183 when requested.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)		STANDARD
TIME START ____		
____	Locate AOP-2A, Section VI.	Same as element.
CUE: When checked, pressurizer level is slowly lowering.		
____B.1.	**IF**, at **ANY** time, PZR pressure reaches the TM/LP pretrip setpoint, **THEN**, with the permission of the SM/CRS, perform the following actions:	Monitors alarm window D14, on 1C05.
	a. Trip the reactor.	Determines step is N/A at this time.
CUE: When checked, pressurizer level is slowly lowering.		
____C.1.	Verify that Charging Pumps are maintaining PZR level within 15 inches of programmed level.	Monitors pressurizer level (LI-110X-1 and LI-110Y-1 and/or LR-110, on 1C06). Notes that pressurizer level is slowly lowering with all backup charging pumps running.
CUE: When checked, CVC-515 and CVC-516 indicate shut.		
____1.1	**IF** PZR level is **NOT** being maintained by **ALL** available Charging Pumps, **THEN** shut the Letdown CNTMT Isolation valves: • 1-CVC-515-CV • 1-CVC-516-CV	1-HS-2515 & 2516 @ 1C07 closed position lights
____2.	Makeup to the VCT to maintain level as necessary.	If Auto Makeup desired at this time, sets FIC-210X and FIC-210Y to appropriate flow rates (for 675 ppm flow rates are 100 gpm DI and 5 gpm BA). Places FIC-210X and 210Y in AUTO. Places HS-2512 (CVC-512) in AUTO and places HS-210 (M/U Mode Sel SW) in AUTO.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)		STANDARD
CUE:	Condenser Off Gas, BLDN, Main Steam Line Rad Monitors all indicate normal readings. Preliminary check of SG samples indicate no tube leakage. SG levels are normal.	
_____D.1.	Determine if a SG Tube Leak exists by observing a rise in **ANY** of the following:	Monitors RI-1752, RI-4014 and/or RI-4095 (N/A for simulator) on 1C22, and RIC-5421 and 5422, on 2C24B.
	. SG sample activities	
	. Condenser Off-Gas radiation levels at 1-RI-1752	Monitors LIA-1105 and LIA-1106 and/or LR-1111 and LR-1121, on 1C03.
	. SG Blowdown radiation levels at 1-RI-4095 or 1-RI-4014	
	. MAIN STEAM EFFL RAD MONITOR radiation levels at 1-RIC-5421 or 1-RIC-5422	Monitors Main Steam Rad Monitors.
	. MAIN STM N-16 RAD MONITOR levels at 1-RIC-5421A or 1-RIC-5422A	
	. SG water level (Unexplained)	
	. Feed flow mismatch	
_____ 2.	**IF** a SG Tube Leak is indicated,	Determines step is N/A.
_____E.1.	Verify that the Letdown CNTMT Isolation valves are shut: • 1-CVC-515-CV • 1-CVC-516-CV	1-HS-2515 & 2516 @ 1C07 closed position lights.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)		STANDARD
CUE:	When checked, Quench Tank parameters, discharge piping temperatures and acoustic monitor indications are normal.	
_____ 2.	**CHECK** there is **NO** PORV leakage by the following indications: . Quench Tank Parameters . PORV discharge piping temperatures, computer points T107 and T108 . Acoustic Monitor indication	Monitors Quench Tank parameters (LIA-116, PA-116 and PA-116A and TIA-116, on 1C06). Monitors computer point T107 and T108. Monitors acoustic monitor indication.
CUE:	When checked, PS-5464 indicates shut.	
_____ 3.	Verify that RCS SAMPLE ISOL valve, 1-PS-5464-CV, is shut.	1-HS-5464 @ 1C10 close position light.
CUE:	When checked, RC-103 and RC-104 indicate shut.	
_____ 4.	Verify that the Reactor Vessel Vent valves are shut: • 1-RC-103-SV • 1-RC-104-SV	1-HS-103 & 104 @ 1C06 closed position lights.
CUE:	When checked, RC-105 and RC-106 indicate shut.	
_____ 5.	Verify that the PZR Vent valves are shut: • 1-RC-105-SV • 1-RC-106-SV	1-HS-105 & 106 @ 1C06 closed position lights

NOTE: **A leak on the Charging header which exceeds the capacity of the charging pumps can be identified by Charging header pressure indicating less than RCS pressure. Identification of the leak may be missed if more than one charging pump is running.**

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)			STANDARD
CUE: When checked, charging header pressure is 450 psig with one charging pump.			
*____	6.	**Determine if the leak is on the Charging header by performing the following actions:**	
*____	a.	**Stop all but ONE CHG PP.**	1-HS-224x, 224y, 224z @ 1C07 control switch open lights.
*____	b.	**IF Charging header pressure is less than RCS Pressure, THEN assume the leak is on the Charging header.**	Determines charging header pressure is less than RCS pressure, assumes leak is on the charging header.
____	c.	**IF** the leak is **NOT** on the Charging header,	Determines step is N/A.
____	7.	**IF** the leak is on the Charging header, **THEN** align Charging to the Auxiliary HPSI Header:	Determined by Step 6.
CUE: When monitored, all charging pumps indicate stop.			
CUE: Operator reports the leak was found in the Aux building east penetration room between 1-CVC-183 and the containment penetration.			
*____	a.	**Place ALL CHG PPs in PULL TO LOCK.**	Places HS-224X and 224Y and 224Z in P-T-L. Monitors pump stopped indication.
____	b.	Dispatch an operator to determine the location of the leak.	Dispatch an Operator to investigate in the Aux Building. (Obtain SRO concurrence for investigation in the Containment)
CUE: When checked, CVC-517, 518 and 519 indicates shut.			
	c.	Verify the following valves are shut:	
____	•	Auxiliary Spray valve, 1-CVC-517-CV	1-HS-2517 @ 1C07 closed position lights.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)			STANDARD
____	•	Loop Charging valves: . 1-CVC-518-CV . 1-CVC-519-CV	1- HS-2518, 1-HS-2519 @ 1C07 closed position lights

NOTE **The Auxiliary HPSI Header is out of service and T.S. 3.5.2 applies when 1-SI-656-MOV is shut.**

CUE:	When checked, SI-656 indicates shut.

*____	d.	**Shut the HPSI AUX HDR ISOL valve, 1-SI-656-MOV.**	1-HS-3656 @ 1C08 closed position light.

CUE:	Selected valve indicates open.

*____	e.	**Open ONE of the following AUX HPSI HDR valves:** • 1-SI-617-MOV • 1-SI-627-MOV • 1-SI-637-MOV • 1-SI-647-MOV	1-HS-3617 or 1-HS-3627 @ 1C08 open position lights. **OR** 1-HS-3637 or 1-HS-3647 @ 1C09 open position lights.

CUE:	When checked, CVC-269 indicates open.

*____	f.	**Open the SI TO CHG HDR** valve, 1-CVC-269-MOV.	1-HS-269 @ 1C07 open position light.

NOTE **REGEN HX CHG INLET, 1-CVC-183, is located in the 27 foot West Penetration Room.**

CUE:	When dispatched, PO reports CVC-183 is shut. Cue Booth Operator to shut CVC-183.

*____	g.	**IF** the leak is downstream of the REGEN HX CHG INLET valve, 1-CVC-183, **THEN** shut 1-CVC-183.	Determines leak is downstream of CVC-183. Dispatches PO to shut CVC-183.

NOTE **CHG PP HDR XCONN, 1-CVC-182, is located near 12 Charging Pump.**

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

ELEMENT (* = CRITICAL STEP)			STANDARD
_____	h.	**IF** the leak is upstream of 1-CVC-183,	Determines step is N/A.

CAUTION: When a Charging Pump is started, Reactor power will lower due to the concentration of Boric Acid in the Auxiliary HPSI header being 2300 PPM or greater.

_____	i.	**IF** the leak is upstream of 1-CVC-183 **AND** shutting 1-CVC-182 isolates the leak,	Determines step is N/A.

CUE:	Selected Charging Pump indicates running.

*_____	j.	**IF shutting 1-CVC-183 isolates the leak, THEN start any available CHG PP.**	1-HS-224x, or 224Y, or 224z @ 1C07 Bkr closed light, Norm Amps, System response, Alarm response.

CUE:	When checked, pressurizer level is rising.

_____	k.	Verify charging flow by observing a rise in PZR level.	Monitors pressurizer level on LI-110X and LI-110Y and/or LR-110, on 1C06.

CUE:	CRS will review LCO actions.

_____	l.	Declare the Auxiliary HPSI Header out of service and enter T.S. 3.5.2 <u>ECCS SUBSYSTEMS</u>.	No action required.

TIME STOP _____

TERMINATING CUE:	This JPM is complete when charging is lined up to the Aux HPSI header and the header is declared OOS. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-2A-1

TASK: 020050305 Respond to RCS leakage exceeding one charging pump, Modes 1 and 2

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ____________________ DATE: ________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 020050305

DIRECTIONS TO TRAINEE:

1. Initial Conditions:

   a. Unit 1 is at 100% power and operating with steady state conditions.

   b. Pressurizer level starts to steadily decrease and the backup charging pumps automatically start.

   c. Pressurizer level is slowly decreasing.

   d. You are performing the duties of the Unit 1 RO and CRO.

2. Initiating Cue: The CRS directs you to perform Step VI.B.1 of AOP-2A. Are there any questions? You may begin.

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
CVCS

K/A 000004K604 [2.8/3.1]

Question a:

Describe the Charging pump feature that protects the pump from a loss of NPSH.

☐ Satisfactory ☐ Unsatisfactory Candidate ________________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

CVCS

K/A 000004K604 [2.8/3.1]

Question a:

Describe the Charging pump feature that protects the pump from a loss of NPSH.

Answer:

The (9.5 " vac or ~10 PSIA) low suction pressure trip will protect the pumps during normal operation, but is bypassed during the LOCA by the SIAS actuation

Reference Use Allowed? **Yes**

Reference 1 Setpoint manual and/or CVCS piping drawing OM 73 (OM 461)

Reference 2 System description # 41 page 20

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ________________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
CVCS

K/A 000002K201 [4.3/4.4]

Question b:

Given the data for STP O-27-2, calculate the RCS gross leakrate for Unit 2 in Mode 3.

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
CVCS

K/A 000002K201 [4.3/4.4]

Question b:

Given the data for STP O-27-2, calculate the RCS gross leakrate for Unit 2 in Mode 3.

Answer:

.266 GPM ± .01 (2 significant places)
See worksheet

Reference Use Allowed YES

Reference 1 STP O-27-2 with data supplied on attachments

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

CALVERT CLIFFS NUCLEAR POWER PLANT
SURVEILLANCE TEST PROCEDURE
UNIT TWO

STP O-27-2

REACTOR COOLANT SYSTEM LEAKAGE EVALUATION

REVISION 15

SAFETY RELATED

CONTINUOUS USE

Approval Authority: Nile Al 8/27/98
Signature/Date

Effective Date: 8/28/98

SURVEILLANCE TEST PROCEDURES ADDITIONAL COVER SHEET INFORMATION

A. **Test Performance**

Permission to perform test: ______________________ / ______
Shift Manager Date

B. **Test completion, results review and approval** (Circle appropriate answer)

Accept. Criteria in spec?	YES NO N/A	Adjustments made?	YES NO N/A
As found results in spec?	YES NO N/A	IR submitted?	YES NO N/A
As left results in spec?	YES NO N/A	Malfunctions indicated?	YES NO N/A

REMARKS: ______________________

Test completed by: ______________________ / ______
Date

Analysis of results: ______________________

Shift Manager review: ______________________ / ______
Date

Analysis/Comments: ______________________

Functional Surveillance Test Coordinator: ______________________ Date: ______

EQSE (if required): ______________________ Date: ______

* POSRC Meeting No.: ______________________ Date: ______

* Plant General Manager: ______________________ Date: ______

* Required only if completed test on SR and designated NSR structures, systems and components (per Q List) identified a malfunction or were out of specification.

Attach a separate sheet, if necessary, to document additional comments.

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TABLE OF CONTENTS

6.3 RCS LEAK RATE: ALTERNATE MANUAL CALCULATION

A. IF the Unit is NOT on Shutdown Cooling,
THEN CALCULATE the Gross RCS Leakage normalized to 120° F by use of the following equation showing calculations on ATTACHMENT 3 IF:

1. RCS pressure is less than 2200 PSIA OR:

2. T_{AVG} is less than 530° F.

$$\text{GROSS RCS LEAKAGE } (FT^3) = 153\left[\frac{(V_1 - V_0)}{V_1\,V_0}\right] + \left[\frac{(M/U - DIV)}{7.4805}\right] - \left[3.61\,(LV_1 - LV_0)\right] - .0673\left[\frac{LP_1}{VP_1} - \frac{LP_0}{VP_0}\right]$$

Where:

V_0 = RCS specific volume at initial pressure and temperature from ASME Steam Tables.

V_1 = RCS specific volume at final pressure and temperature from ASME Steam Tables.

M/U = Makeup, in gallons. (RCS M/U plus BA M/U)

DIV = Letdown diverted, in gallons; including RWT M/U.

LP_0 = Initial pressurizer level, in inches.

LP_1 = Final pressurizer level, in inches.

VP_0 = PZR specific volume of water at initial pressure from ASME Steam Tables.

VP_1 = PZR specific volume of water at final pressure from ASME Steam Tables.

LV_0 = Initial VCT level, in inches.

LV_1 = Final VCT level, in inches.

MONTH: YEAR:

INST No.	XAT 011	2-FQI 210X	2-FQI 210Y	2-FQI 2540	L 226	XAP 001	XVL 001											
DAY/ TIME	Tavg	RC M/U INT	BA INT RDG	DIVERT INT	VCT LVL	PZR PRESS	PZR LVL	GROSS LKG	RCDT LKG	SIT LKG	VLV LKG	QT LKG	RWT LKG	CHG PP LKG	NET LKG	PERF INIT	VERF INIT
INIT DATA																	
22 0100																	
23 0100																	
24 0100																	
25 0100	530	0	0	0	88	2000	144	—									
26 0100	520	1000	80	100	87	1800	144										
27 0100																	
28 0100																	

SRO Review: 22:_____ 23:_____ 24:_____ 25:_____ 26:_____ 27:_____ 28:_____

RWT M/U DAY/ AMT
__/_______
__/_______
__/_______
__/_______
__/_______
__/_______
__/_______

COMMENTS: ______________________

_______/_______
PC Validation/Date

ATTACHMENT 3

RCS LEAK RATE CALCULATION WORKSHEET

INITIALS

A. PROCEDURE

1. This attachment is to be used in conjunction with the procedure when an RCS Manual Leak Rate Calculation is required to document the actual performance of the test.

2. Any additional calculations required shall be performed on facsimiles of this attachment and attached to the procedure for review and documentation PER Section 9.0.

3. RCS leak rate manual calculation(s) NOT required to be performed by the body of this procedure shall be marked N/A in the initials block(s).

4. RECORD the following parameters:

   a. Date: TODAY

   b. Time: Now

   c. PZR Pressure: 1800 PSIA

   d. T_{AVG} : 520 °F ______

ATTACHMENT 3

RCS LEAK RATE CALCULATION WORKSHEET

INITIALS

2. ALTERNATE MANUAL CALCULATION (6.3.A)
(No Shutdown Cooling)

$$\text{GROSS RCS LEAKAGE } (FT^3) = 153\left[\frac{(V_1 - V_2)}{V_1\,V_2}\right] + \left[\frac{(M/U - DM)}{7.4805}\right] - \left[3.61\,(LV_1 - LV_2)\right] - .0673\left[\frac{LP_1}{VP_1} - \frac{LP_2}{VP_2}\right]$$

$$\underline{\qquad}\ (FT^3) = 153\left[\frac{(.02065 - .02086)}{(.02065 \times .02086)}\right] + \left[\frac{(1050 - 100)}{7.4805}\right] - \left[3.61\,(87 - 88)\right] - .0673\left[\frac{144}{.02472} - \frac{144}{.02565}\right]$$

$$= 153\left[\frac{-.00021}{.000431}\right] + \left[\frac{950}{7.4805}\right] - \left[-3.61\right] - .0673\left[5825.2 - 5614.0\right]$$

$$= -74.547 + 126.997 + 3.61 - 14.21$$

$$= 41.85$$

STEP D $= 41.85 \times 5.195 \times 10^{-3}$

$= .217 \pm .01$ GPM

prepared [signature] 1/26/…

VERIFIED [signature] 1/26/99

ATTACHMENT 3

RCS LEAK RATE CALCULATION WORKSHEET

INITIALS

2. ALTERNATE MANUAL CALCULATION (6.3.A)
(No Shutdown Cooling)

$$\text{GROSS RCS LEAKAGE } (FT^3) = 153\left[\frac{(V_1 - V_2)}{V_1\ V_2}\right] + \left[\frac{(M/U - D/M)}{7.4805}\right] - \left[3.61\,(LV_1 - LV_2)\right] - .0673\left[\frac{LP_1}{VP_1} - \frac{LP_2}{VP_2}\right]$$

$$\underline{\qquad}\ (FT^3) = 153\left[\frac{(.02065 - .02086)}{(.02065 \times .02086)}\right] + \left[\frac{(1050 - 100)}{7.4805}\right] - \left[3.61\ (87 - 88)\right] - .0673\left[\frac{144}{.02065} - \frac{144}{.02086}\right]$$

$$= 153\left[\frac{-.00021}{.000431}\right] + \left[\frac{950}{7.4805}\right] - \left[-3.61\right] - .0673\left[6973.4 - 6903.2\right]$$

$$= -74.547 + 126.997 + 3.61 - 4.724$$

$$= 51.336$$

Step D = $51.336\ ft^3 / 5.195 \times 10^{-3}$

leakrate (GPM) = $.266 \pm .01$

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

TASK: 020400203 Shifting CC Heat Exchangers

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for Component Cooling System.

EVALUATION LOCATION:

_____ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEL:

TRAIN

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

OI-16

TASK STANDARDS:

This JPM is complete when a CC Heat Exchanger is placed in service per OI 16 Section 6.4.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

TASK: 020400203 Shifting CC Heat Exchangers

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **NOTE: Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

8. NOTE FOR SIMULATOR SETUP: the simulator should be set up with 12 CC HX BLOCKED Malfunction (xmmvsw003_05) and Panel overrides for 5208-CV Red lights off at 1C13 and 2C24A.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

ELEMENT (* = CRITICAL STEP)		STANDARD

TIME START ____

CUE:	Initial Conditions and General Precautions are satisfied. Begin at Step 6.4.B.

CAUTION: **RCS Boron will be affected when CVCS ion exchangers are returned to service if the letdown heat exchanger outlet temperature has changed since they were bypassed [B0270]**

- **lower letdown system temperature will add positive reactivity**
- **higher letdown system temperature will add negative reactivity**

CUE:	The CRS desires the CVCS Ion Exchangers to be bypassed.

	Step	Element	Standard
____	1.	IF it is desired to bypass the CVCS ion exchangers, THEN PLACE IX BYPASS, 1-CVC-520-CV, to BYPASS AND RECORD stop time in the CVCS Ion Exchanger and Filter Log. [B0018] [B0270]	Determines step is applicable and BYPASSES the CVCS ion exchangers by opening 1-CVC-520-CV at 1C07. Records stop time in log
____	2.	THROTTLE the Component Cooling Heat Exchanger saltwater outlet controller for the heat exchanger being placed in service to a value equal to the heat exchanger being removed from service. 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	THROTTLES 12 CC HX SW FLOW CONTR 1-HIC-5208 to match the output on 11 CC HX SW FLOW CONTR 1-HIC-5206 NOTE: The SW Outlet CV will continue to indicate CLOSE due to the failed CV.
____	3.	OPEN the Component Cooling Heat Exchanger outlet on the heat exchanger being placed in service: 11 CC HX CC OUT, 1-CC-3824-CV 12 CC HX CC OUT, 1-CC-3826-CV	Operator OPENS 12 CC HX OUT, 1-CC-3826-CV.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

ELEMENT (* = CRITICAL STEP)		STANDARD
*____4.	CLOSE the Component Cooling Heat Exchanger outlet on the heat exchanger being removed from service: 11 CC HX CC OUT, 1-CC-3824-CV 12 CC HX CC OUT, 1-CC-3826-CV	Operator CLOSES 11 CC HX CC OUT, 1-CC-3824-CV
____5.	CHECK (1C13) "COMPT CLG PPS DISCH PRESS LO" annunciator clear.	Operator checks annunciator clear.

NOTE: **For optimum Reactor coolant Pump seal life and performance, controlled bleed off temperature must be maintained between 110 oF and 200 oF.**

____6.	SHUT the component Cooling Heat Exchanger saltwater outlet on the heat exchanger being removed from service: 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	Operator SHUTS 11 CC HX SW FLOW CONTR, 1-HIC-5206.
*____7.	ADJUST the in service Component Cooling Heat Exchanger saltwater outlet to maintain the component cooling heat Exchanger outlet temperature approximately 95°F: 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	Operator adjusts 12 CC HX SW FLOW CONTR, 1-HIC-5208. NOTE: at this point, the failure of the SW outlet CV to respond should become evident and the Operator should stop and notify the CRS of the malfunction.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

ELEMENT (* = CRITICAL STEP)		STANDARD
CUE:	The CRS will direct the Operator to place 11 CC Heat Exchanger back in service per steps B.2 through B.8 (the same section). The CRS will waive the initial condition A.1 (at least one CC HX inservice)	
____ 2.	THROTTLE the Component Cooling Heat Exchanger saltwater outlet controller for the heat exchanger being placed in service to a value equal to the heat exchanger being removed from service. 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	THROTTLES 11 CC HX SW FLOW CONTR 1-HIC-5206 to match the original output NOTE: output on 12 CC HX SW FLOW CONTR 1-HIC-5208 may still set at this position NOTE: The SW Outlet CV will continue to indicate CLOSE due to the failed CV.
*____ 3.	OPEN the Component Cooling Heat Exchanger outlet on the heat exchanger being placed in service: 11 CC HX CC OUT, 1-CC-3824-CV 12 CC HX CC OUT, 1-CC-3826-CV	Operator OPENS 11 CC HX OUT, 1-CC-3824-CV.
*____ 4.	CLOSE the Component Cooling Heat Exchanger outlet on the heat exchanger being removed from service: 11 CC HX CC OUT, 1-CC-3824-CV 12 CC HX CC OUT, 1-CC-3826-CV	Operator CLOSES 12 CC HX CC OUT, 1-CC-3826-CV
____ 5.	CHECK (1C13) "COMPT CLG PPS DISCH PRESS LO" annunciator clear.	Operator checks annunciator clear.

NOTE: **for optimum Reactor coolant Pump seal life and performance, controlled bleed off temperature must be maintained between 110 oF and 200 oF.**

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

ELEMENT (* = CRITICAL STEP)		STANDARD
____ 6.	SHUT the component Cooling Heat Exchanger saltwater outlet on the heat exchanger being removed from service: 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	Operator SHUTS 12 CC HX SW FLOW CONTR, 1-HIC-5208.
*____ 7.	ADJUST the in service Component Cooling Heat Exchanger saltwater outlet to maintain the component cooling heat Exchanger outlet temperature approximately 95°F: 11 CC HX SW FLOW CONTR, 1-HIC-5206 12 CC HX SW FLOW CONTR, 1-HIC-5208	Operator adjusts 11 CC HX SW FLOW CONTR, 1-HIC-5206.
____ 8.	ADJUST the saltwater flow to the associated train's Service Water Heat Exchanger as required.	Operator determines no adjustment is required.

<u>**CAUTION:**</u> **RCS Boron will be affected when CVCS ion exchangers are returned to service if the letdown heat exchanger outlet temperature has changed since they were bypassed [B0270]**

- **lower letdown system temperature will add positive reactivity**
- **higher letdown system temperature will add negative reactivity**

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

ELEMENT (* = CRITICAL STEP)			STANDARD
*____ 9.	IF the CVCS ion exchangers were bypassed in Step B.1, THEN PERFORM the following:		Operator determines that step is applicable.
____	a.	CHECK the Letdown heat exchanger outlet temperature has stabilized less than or equal to 120°F.	Operator checks temperature at 1C07.
____	b.	PLACE IX BYPASS, 1-CV-520-CV, in AUTO	Operator places 1-CVC-520-CV in AUTO
____	c.	RECORD the flowrate in the CVCS Ion Exchanger and Filter Log for the in service ion exchanger and filter. [B0018]	Operator logs flowrate in log.

TIME STOP ______

TERMINATING CUE:	This task is complete when 1-CVC-520-CV is placed in AUTO. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE OI-16-1

TASK: 020400203 Shifting CC Heat Exchangers

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. **<u>NOTE:</u> Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ____________________________ DATE: _________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK 020400203

DIRECTIONS TO TRAINEE:

1. Initial Conditions:

   a. Unit 1 is at 100% power.

   b. 11 CC Heat Exchanger is in service.

   c. You are performing the duties of the CRO.

2. Initiating Cue: The CRS has directed you to shift CC Heat Exchanger per the OI in preparation for tagging out 11 Salt Water header. Are there any questions? You may begin.

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Component Cooling

K/A 000003K404 [3.1/3.4]

Question a:

Unit 1 has completed a Refueling Outage and is in Mode 3 at NOT and NOP with all RCPs running. The Plant Computer RCP Trend Group shows consistent temperatures for 11A, 11B and 12B RCPs. 12A RCP components are trending consistently higher than the other RCPs. No RCP alarms are presently annunciated on 1C07 and the ABO reports that all RCP CC flowrates have been verified at 200 GPM locally in the containment.

Is any corrective action required?

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

CVC

K/A 000003K404 [3.1/3.4]

Question a:

Unit 1 has completed a Refueling Outage and is in Mode 3 at NOT and NOP with all RCPs running. The Plant Computer RCP Trend Group shows consistent temperatures for 11A, 11B and 12B RCPs. 12A RCP components are trending consistently higher than the other RCPs. No RCP alarms are presently annunciated on 1C07 and the ABO reports that all RCP CC flowrates have been verified at 200 GPM locally in the containment.

Is any corrective action required?

Answer:

12A RCP should be adjusted to approximately 250 GPM due to additional cooling needed for the RCDT Heat Exchanger.

Reference Use Allowed? YES

Reference 1 Alarm manual 1C07A&B window X-10

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Component Cooling

K/A 000008A102 [2.9/3.1]

Question b:

How is Temperature controlled at ~95 °F in the Component Cooling System?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
Component Cooling

K/A 000008A102 [2.9/3.1]

Question b:

How is Temperature controlled at ~95 °F in the Component Cooling System?

Answer:

The temperature of the Component Cooling System is controlled by a Heat Exchanger Temperature Control Bypass Valve (AUTO) on each heat exchanger and by the Operator manually throttling the in service Component Cooling Heat Exchanger SW outlet valve(s).

(Note: During warm weather operations it may be necessary to place the standby Heat Exchanger in service, especially if the RCW Evaporator(s) are in operation.)

Reference Use Allowed? YES

Reference 1 OI 16

Reference 2 System Description # 15 page 13

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

TH/B 8

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-3

TASK: 020190302 Lineup for ADV Control at 1(2)C43

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for Main Steam and MSIV.

EVALUATION LOCATION:

_X_ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEl

NO TRAIN

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

AOP-9A

TASK STANDARDS:

This JPM is complete when both ADVs are aligned for control at 1C43.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-3

TASK: 020190302 Lineup for ADV Control at 1(2)C43

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **<u>NOTE:</u> Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-3

ELEMENT (* = CRITICAL STEP)			STANDARD

TIME START ____

CUE: Give the operator a copy of AOP-9A.

____		Locate AOP-9A step V.	Same as element.

CUE: Output indicates 0.

*____	1.	Place 11 ADV Control, 1-HC-4056A, to SHUT.	Positions 1-HC-4056A to shut until output indicates 0.

CUE: Output indicates 0.

*____	2.	Place 12 ADV Control, 1-HC-4056B, to SHUT.	Positions 1-HC-4056B to shut until output indicates 0.

CUE: Since you are also the RO, you may omit this step and continue.

____	3.	Notify the RO that the ADV Controllers are initialized and to align 11 and 12 ADVs to 1C43 **PER** Step W.	Determines step is N/A.
____		Locate Step W of AOP-9A.	

CUE: Since you are also the RO, you may continue.

____	1.	**WHEN** notified that the ADV Controllers on 1C43 have been initialized, **THEN** go to the ADV Hand Transfer Station **AND** place the following Handvalves to POSITION 2:	

NOTE TO EVALUATOR: ***Opening ADV Hand Transfer Station enclosures will cause AFAS Status alarm in the Control Room. Have operator describe the transfer process.***

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-3

ELEMENT (* = CRITICAL STEP)			STANDARD
*____	a.	11 ADV Aux Shutdown Control Transfer, 1-HV-3938A	Places 1-HV-3938A in position 2.
*____	b.	11 ADV Quick Open Override Handvalve, 1-HV-3938B	Places 1-HV-3938B in position 2.
*____	c.	12 ADV Aux Shutdown Control Transfer, 1-HV-3939A	Places 1-HV-3939A in position 2.
*____	d.	12 ADV Quick Open Override Handvalve, 1-HV-3939B	Places 1-HV-3939B in position 2.
____	2.	Notify the CRO that the ADVs are aligned to 1C43.	Notifies CRO.

TIME STOP: __________

TERMINATING CUE:	The task is complete when both ADV's are aligned for control at 1C43. No further actions are necessary.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-3

TASK: 020190302 Lineup for ADV Control at 1(2)C43

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 020190302

DIRECTIONS TO TRAINEE:

1. Initial Conditions:

   a. A severe fire has resulted in the evacuation of the control room. AOP-9A has been implemented.

   b. You are performing the actions of the Unit-1 CRO and RO.

2. Initiating Cue: You have been directed by the Shift Supervisor to initialize the ADV controllers on 1C43, and to align 11 and 12 ADV's to 1C43, per AOP-9A steps V and W, respectively. Are there any questions? You may begin.

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
STM DUMP

K/A 000016K404 [3.1/3.4]

Question a:

What is the basis for the limitations of 1200 GPM in the common suction header and 600 GPM in the individual suction header is when using AFW?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

STM DUMP

K/A 000016K404 [3.1/3.4]

Question a:

What is the basis for the limitations of 1200 GPM in the common suction header and 600 GPM in the individual suction header when using AFW?

Answer:

to prevent AFW pump cavitation when it is in operation during single pump operation and when multiple pumps are in operation on each Unit.

Reference Use Allowed? NO

Reference 1 OI 32 section 6.3 page 26

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
STM DUMP

K/A 00068AK312 [4.1/4.5]

Question b:

What is the basis for securing the CEDM MG sets during the implementation of AOP-9A for a Control Room evacuation?

☐ Satisfactory ☐ Unsatisfactory Candidate ________________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
STM DUMP

K/A 00068AK312 [4.1/4.5]

Question b:

What is the basis for securing the CEDM MG sets during the implementation of AOP-9A for a Control Room evacuation?

Answer:

This provides an additional method of ensuring power is removed from the CEDMs (Reactivity Safety function) and reduces the noise levels in the 45 foot and 27 foot Switchgear Rooms (which is manned during the Control Room evacuation).

Reference Use Allowed? YES

Reference 1 AOP 9A Technical Basis, Action 7, page 1

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-5

TASK: 010530301 Tie Vital MCCs (1Y09 and 1Y10 AOP-9A scenario)

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the 480 VAC Electrical Power Distribution.

EVALUATION LOCATION:

__X__ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
10 MINUTES	____ MINUTES	NO

TASK LEVEL:

TRAIN

TOOLS AND EQUIPMENT:

Field copy of AOP-9A

REFERENCE PROCEDURE(S):

AOP-9A

TASK STANDARDS:

This JPM is complete when 120 VAC instrument bus 1Y09 is electrically tied to instrument bus 1Y10.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-5

TASK: 010530301 Tie Vital MCCs (1Y09 and 1Y10 AOP-9A scenario)

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion
   - "U" for unsatisfactory completion
   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. **NOTE: Violation of safety procedures will result in failure of the JPM.**

5. Questions to clarify actions taken should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-5

ELEMENT (* = CRITICAL STEP)		STANDARD
TIME START ____		
CUE: Give the operator a copy of AOP-9A.		
____	Locate AOP-9A, Step BS.	Same as element.
CUE: 1X08 breaker is ON.		
* ____ 1.	Check INSTR. TRANSF. 11 1X08 (1Y09 Feeder Breaker) ON.	Verifies instrument Transformer 11 1X08 ON.
CUE: 1X09 breaker is OFF.		
* ____ 2.	Place INSTRUMENT TRANSF-12 1X09 (1Y10 Feeder Breaker) to OFF.	Verifies instrument Transformer 12, 1X09 OFF.
CUE: Bus Tie 208/120V is ON.		
* ____ 3.	Place BUS TIE 208/120V BUS 11 (located on 1Y10), to ON.	Checks Bus Tie 208/120V Bus 11 in ON.
* ____ 4.	Place 1Y09-1Y10 Bus Tie Switch, 1SY09, to ON.	Places 1Y09-1Y10 Bus Tie Switch 1SY09 in ON.
CUE: 1C43 has been notified.		
____ 5.	Notify 1C43 that 1Y09 is energized and 1Y10 is tied to 1Y09.	Notifies 1C43.

TERMINATING CUE:	This task is complete when the 1Y09-1Y10 bus tie switch 1SY09 has been placed to ON and 1C43 has been notified. No other actions are required.

TIME STOP ____

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-9A-5

TASK: 010530301 Tie Vital MCCs (1Y09 and 1Y10 AOP-9A scenario)

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and the use of event free tools. **NOTE: Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ______________________ DATE: ________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE

TASK: 010530301

DIRECTIONS TO TRAINEE:

1. Initial Conditions:

   a. The control room has been evacuated due to a severe fire.

   b. The emergency diesel generators have been started.

   c. Power is systematically being restored to selected plant components.

   d. You are performing the duties of the Unit 1 TBO.

2. Initiating Cue: The CRO has directed you to locally energize bus 1Y09 and tie 1Y10 to 1Y09, per AOP-9A Step BS. Are there any questions? You may begin.

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
AC Distribution

K/A 00055EK301 [2.7/3.4]

Question a:

During a Station Blackout, the Vital Auxiliaries Safety Function is checked and 11 125VDC Bus is 105 Volts.

What is action must be taken and the basis?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

AC Distribution

K/A 00055EK301 [2.7/3.4]

Question a:

During a Station Blackout, the Vital Auxiliaries Safety Function is checked and 11 125VDC Bus is 105 Volts.

What is action must be taken and the basis?

Answer:

Implement EOP 8 due to 11 125 VDC Bus below 106 VDC. The basis for this action is that 106 Volts has been determined to be the minimum voltage for inverter operation to provide power to plant vital instrumentation and control systems.

Reference Use Allowed? YES

Reference 1 EOP 7 Technical Basis, Step V, page 57

Reference 2

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
AC Distribution

K/A 000062K103 [3.5/4.0]

Question b:

What constitues a 125 VDC train and briefly explain the reason for the designation in the Vital Auxiliaries Safety Function?

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
AC Distribution

K/A 000062K103 [3.5/4.0]

Question b:

What constitues a 125 VDC train and briefly explain the reason for the designation in the Vital Auxiliaries Safety Function?

Answer:

A 125 VDC Train is composed of either 11 and 22 DC Busses or 12 and 21 DC Busses. The designation is based on the need to power at least one vital 120 VAC Bus for to supply power to monitor the RCS. The 2 DC trains will supply redundant and reliable power to each 120 VAC Bus on a Unit.

Reference Use Allowed? YES

Reference 1 EOP Vital Auxiliaries Safety Function Status Check

Reference 2 EOP 7 Technical Basis, Step V, page 57

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

PERFORMER'S NAME: ______________________________

APPLICABILITY:

RO and SRO

PREREQUISITES:

Completion of the knowledge requirement of the Initial License class training program for the Chemical and Volume Control System.

EVALUATION LOCATION:

__X__ PLANT _____ SIMULATOR _____ CONTROL ROOM

EVALUATION METHOD:

_______ ACTUAL PERFORMANCE _____ DEMONSTRATE PERFORMANCE

ESTIMATED TIME TO COMPLETE JPM:	ACTUAL TIME TO COMPLETE JPM:	TIME CRITICAL TASK:
15 MINUTES	____ MINUTES	NO

TASK LEVEL:

LEVEL 1

TOOLS AND EQUIPMENT:

None

REFERENCE PROCEDURE(S):

AOP-1A

TASK STANDARDS:

This JPM is complete when the potential dilution paths are verified isolated and a report is made to the control room.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

DIRECTIONS TO EVALUATOR:

1. Read the "Directions to Trainee" to the trainee.

2. Note the time that the task is started. As the task proceeds, indicate completion of each element using the Standard criteria and the following notation:

   - "S" for satisfactory completion

   - "U" for unsatisfactory completion

   - "N" if not observed OR not verifiable

   Critical elements must be observed or the evaluation is invalid.

3. When the Terminating Cue is reached, tell the trainee that no further actions are necessary. Note the completion time.

4. Document any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools in the Notes area. Immediately correct any actions that could result in violation of a safety procedure or personnel injury. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

5. Questions should be asked after completion of the task.

6. Indicate whether the task was completed satisfactorily on the basis of correct performance of all critical elements and completion of the task within the Estimated Time to Complete for Time Critical tasks.

7. This JPM contains the steps, notes, cautions, and standards that are applicable to the initial conditions specified in this JPM. Steps that do not directly relate to this JPM, but appear in the procedure, are not listed here. It is the responsibility of the evaluator and/or observer to become familiar with the procedure prior to use of this JPM.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

DIRECTIONS TO TRAINEE:

1. Initial Conditions:

   a. Unit 1 is in Mode 1 at 100% power.

   b. Regulating CEAs are fully withdrawn.

   c. Reactor power unexpectedly begins to increase.

   d. RCS boron concentration indicated on the boronometer has dropped.

   e. Operator actions as directed in AOP-1A, INADVERTENT BORON DILUTION, Section V have been completed through Step C.1.a.

   f. You are performing the duties of an extra RO on shift.

2. Initiating Cue: The CRS directs you to locally verify the CVCS Lineup and Isolate any potential dilution paths per AOP-1A, Section V.C, Operations actions only. Notify the Control Room if any actions taken. Are there any questions? You may begin.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

ELEMENT (* = CRITICAL STEP)	STANDARD

TIME START ____

NOTE TO EVALUATOR: ***Supply the operator with a copy of AOP-1A.***

V.C. DETERMINE POSSIBLE SOURCES OF DILUTION

1. Verify correct lineup of the CVCS

		Element	Standard
____	a.	Ensure VCT M/U Control Valve Controllers are in MANUAL and 0% output: • __-FIC-210X • __-FIC-210Y	Determines action has been performed.

CUE: The Unit 1 CRO has correctly aligned the VCT Makeup Control Valve Controllers.

NOTE TO EVALUATOR: ***Report of conditions may be made at any time during performance of actions. The last step in JPM provides for summary of these reports.***

		Element	Standard
____	b.	Ensure that any Purification IXs with deborating resin or unborated resin are removed from service **PER** OI-2D <u>PURIFICATION SYSTEM OPERATION</u>.	Determines action is NOT required.

CUE: The inservice purification IX has been in its current alignment for the past 10 months. It does NOT contain deborating resin.

		Element	Standard
____	c.	Ensure IX FLUSH ISOL valve, 0-DW-190, is shut.	Locates valve behind the 11 Boric Acid Batching Tank @ the 27' Aux. Bldg. and determines valve is shut.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

ELEMENT (* = CRITICAL STEP)			STANDARD

CUE: When checked or asked: 0-DW-190 is shut (Stem position, local indication).

2. Isolate any chemical additions.

____	a.	Verify that the Chemical Addition Metering Pump is secure.	Locates Chemical Addition Pump in NW BAST room [BAST room S Wall] @ the 5' Aux. Bldg. and determines pump is secured.

CUE: When checked or asked: The Chemical Addition Metering Pump is NOT running (Control to STOP, Motor/shaft not rotating).

*____	b.	Verify shut RCMW TO CHG PP SUCTION 1-CVC-308.	Locates valve at NE BAST RM [BAST RM E WALL] @ the 5' Aux. Bldg., determines valve is NOT shut. (Simulates shutting the valve)

CUE: When checked or asked 1-CVC-308 is partially open (Stem position, local indication, handwheel rotates in BOTH directions).

____	c.	Verify shut CHEM ADD TK INLET 1-CVC-258.	Locates valve at NW BAST RM [BAST RM S WALL] @ the 5' Aux. Bldg. And determines valve is shut.

CUE: When checked or asked: 1-CVC-258 is shut (Stem position, local indication).

____	d.	Verify shut CHEM ADD& MTRG TK COMB DISCH 1-CVC-338.	Locates valve at NE BAST RM [BAST RM S WALL] @ the 5' Aux. Bldg. And determines valve is shut.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

ELEMENT (* = CRITICAL STEP)		STANDARD
CUE: When checked or asked: 1-CVC-338 is shut (Stem position, local indication).		
____3.	Notify the Control Room of action taken to close 1-CVC-308.	Contact control room and make report on valve operations.
CUE: When notification indicated: Acknowledge report.		

TIME STOP ____

TERMINATING CUE:	This JPM is complete when the chemical addition components are in there correct conditions. No further actions are required.

CCNPP LICENSED OPERATOR

JOB PERFORMANCE MEASURE AOP-1A

TASK: Respond to Inadvertent Dilution While Critical

Document below any instances of failure to comply with industrial safety practices, radiation safety practices and use of event free tools. <u>**NOTE:**</u> **Violation of safety procedures will result in failure of the JPM.**

NOTES:

The operator's performance was evaluated against the standards contained in this JPM and determined to be

SATISFACTORY UNSATISFACTORY

EVALUATOR'S SIGNATURE: ____________________________ DATE: _________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
CVC

K/A 004000A110 [3.7/3.9]

Question a:

Unit 1 is in Mode 5 and the current count rate is 800 cps.

The shutdown monitor ALARM SETPOINT RESET is depressed at this indicated count rate.

At what value (count rate) would the shutdown monitor alarm if a slow dilution event occurred?

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title

CVC

K/A 004000A110 [3.7/3.9]

Question a:

Unit 1 is in Mode 5 and the current count rate is 800 cps.

The shutdown monitor ALARM SETPOINT RESET is depressed at this indicated count rate.

At what value (count rate) would the shutdown monitor alarm if a slow dilution event occurred?

Answer:

1200cps. (800 x 1.5)

Reference Use Allowed? YES

Reference 1 Lesson Plan CRO-57-1-11, LO #3.1 & 3.2, page 32

Reference 2 OP-2 Appendix 1

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate _______________

Calvert Cliffs Nuclear Power Plant
JPM Questions
Title
CVC

K/A 010000G132 [3.4/3.8]

Question b:

1. What is the specified method to lower RCS pressure during a plant shutdown and cooldown to Cold Shutdown?

2. (SRO only) What is the basis for the specified method to lower RCS pressure?

☐ Satisfactory ☐ Unsatisfactory Candidate ______________

K/A 010000G132 [3.4/3.8]

Question b:

1. What is the specified method to lower RCS pressure during a plant shutdown and cooldown to Cold Shutdown?

2. (SRO only) What is the basis for the specified method to lower RCS pressure?

Answer:

1. The Operating Procedure (OP-5) specifies lowering RCS pressure as a constant evolution instead of a series of step changes.

2. Continuous cycling of the valves (whether normal spray or Aux. Spray) may result in excessive thermal transients on the PZR spray nozzles and piping.

Reference Use Allowed? YES

Reference 1 OP-5 Rev. 38 /Unit 1 Precaution 5.0.H, page 13

Comments:

☐ Satisfactory ☐ Unsatisfactory Candidate ______________