12/31/99

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
Sep 13, 14-16, 1999, AT Peach Bottom Units 2 + 3
DOCKET NO. 50-277 + 278

ON Sep 13, 14-16, 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.
(Preliminary Submittals)

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.

Original Submittal Outlines

Facility: Peach Bottom Unit 2 & 3 Date of Examination: Week of Sep. 13, 1999
Examination Level (circle one): RO / SRO Operating Test Number: RO - 1

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Plant Parameter Verification - Rod Position JPM	Verify rod position following a fast power reduction (alternate path).
	Temporary Modifications of Procedures - Partial Procedure JPM	Prepare a "Partial Procedure" for post-maintenance testing of a component.
A.2	Familiarity with and use of P&IDs - P&ID JPM	When an instrument is reported damaged, use P&IDs to determine the effect on system operations.
A.3	Use of portable survey instruments – Rad Survey Instrument Use JPM	Use a portable radiation instrument.
A.4	Emergency Communications – Evacuation JPM	Direct an evacuation for a declared emergency.

A070

Facility: Peach Bottom Unit 2 & 3 Date of Examination: Week of Sep. 13, 1999
Examination Level (circle one): RO SRO Operating Test Number: SRO - 1 .

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Plant Parameter Verification – Rod Position JPM	Verify rod positions following a fast power reduction (alternate path).
	Temporary Modifications of Procedures – Partial Procedure JPM	Prepare a "Partial Procedure" for post-maintenance testing of a component.
A.2	Surveillance Testing – Tech Spec Action Log JPM	Given equipment failing surveillance testing, determine and make appropriate Tech Spec Action Log entries.
A.3	Use of Portable Survey Instruments – Rad Survey instrument use JPM	Use a portable radiation instrument.
A.4	Emergency Protective Action recommendations – PAR JPM	Given General Emergency plant conditions, make a protective action recommendation (PAR).

Facility: Peach Bottom Units 2 & 3 Date of Examination: Sep. 13, 1999
Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: RO-1 .

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. Recirculation/Recirc Pump Trip – Alternate Path (THI)	D, A, S 304CA	1
b. Feedwater/Transfer RFPs to Master Level Control	D,S 155C	2
c. High Pressure Coolant Injection/Shutdown the System with an Injection Signal Present	N, S New–HPCI	4
d. Primary Containment/Vent During a High Drywell Pressure Transient	N, S New-DW Vent	5
e. Diesel Generators/Fast Start – Alternate Path (ESW fails to start)	N, A, S New-DG Start (alt)	6
f. PCIS/PRO Scram Actions – Alternate Path (Isolation Failure)	N, A, S New-PRO Scram (alt)	5
g. Main Generator/Synchronize Turbine Generator Output with Grid at Minimum Load	D, S, L 017C	6

B.2 Facility Walk-Through

a. Instrument N_2/Backup Instrument Nitrogen to ADS	D, P, R 054P	8
b. Injection Systems/Maximizing CRD Flow to the Vessel (Unit 3)	D, P, R 123P	Emergency 2
c. Main Steam/Closing a Stuck Open MSIV (Unit 3)	D, A, P, R 313CA	Abnormal 3

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

Facility: Peach Bottom Units 2 & 3 Date of Examination: Sep. 13, 1999
Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: SRO-1

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. Recirculation/Recirc Pump Trip – Alternate Path (THI)	D, A, S 304CA	1
b. Feedwater/Transfer RFPs to Master Level Control	D,S 155C	2
c. High Pressure Coolant Injection/Shutdown the System with an Injection Signal Present	N, S New–HPCI	4
d. Primary Containment/Vent During a High Drywell Pressure Transient	N, S New-DW Vent	5
e. Diesel Generators/Fast Start – Alternate Path (ESW fails to start)	N, A, S New-DG Start (alt)	6
f. PCIS/PRO Scram Actions – Alternate Path (Isolation Failure)	N, A, S New-PRO Scram (alt)	5
g. Main Generator/Synchronize Turbine Generator Output with Grid at Minimum Load	D, S, L 017C	6

B.2 Facility Walk-Through

System / JPM Title	Type Code*	Safety Function
a. Instrument N_2/Backup Instrument Nitrogen to ADS	D, P, R 054P	8
b. Injection Systems/Maximizing CRD Flow to the Vessel (Unit 3)	D, P, R 123P	Emergency 2
c. Main Steam/Closing a Stuck Open MSIV (Unit 3)	D, A, P, R 313CA	Abnormal 3

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

Scenario Outline

ES-D-1

Simulation Facility Peach Bottom **Scenario No.** #1 **Op Test No.**

Examiners ______________________ **Operators** ______________________ CRS

______________________ ______________________ PRO

______________________ ______________________ URO

Objectives Evaluate the ability of the crew to swap Steam Jet Air Ejectors while maintaining vacuum requiring the manipulation of several components. The crew should recognize and respond to receipt of a control rod withdraw block due to an INOP failure of the "B" Rod Block Monitor (RBM) requiring a Tech Spec determination. Following the Tech Spec determination, the crew will be evaluated in their response to the "F" SRV failing open. The crew will perform a Rapid Power Reduction as part of their procedure directed efforts to close the SRV . A small leak that develops on the SRV mounting boss will result in a rise in drywell pressure. The crew will take action per the Drywell High Pressure Procedure to attempt to identify and isolate the leak but will eventually be required to initiate a manual SCRAM. Twelve control rods will fail to insert when the scram is initiated resulting in an ATWS. Six rods will be able to be inserted using T-220 but an ATWS will still exist. Steam cutting at the break will cause the leak to increase resulting in containment pressure and temperature to continue to degrade requiring use of containment sprays. Pressure instrument failures will prevent use of containment sprays when they are attempted. As containment temperature rises the crew must terminate and prevent all injection per T-240 prior to performing the Emergency Blowdown at 281 F, due to the ATWS.

Initial Condition IC-14, 100% power with the "A" RHR Loop Blocked For MO-154A valve work.

Turnover: See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	PRO CRS	Place "B" SJAE in service, remove "A" SJAE from service.
2	RBM03B	I	URO CRS	"B" Rod Block Monitor failure (Tech Spec)
3	MSS08F	C	URO PRO CRS	"F" Safety Relief Valve fails open
4		R	URO PRO CRS	Rapid power reduction.
5	MSS01	M	URO PRO CRS	Steam Leak In The Drywell, (small progressing to large leak).
6	Pre-inserted Control Rod Malfunctions	C	URO PRO CRS	Twelve control rods will fail to insert or will insert slowly during SCRAM (ATWS)
7	Pre-inserted Instrument Failure	I	URO PRO CRS	Pressure instrument failure prevents using containment sprays.

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

Scenario Outline

ES-D-1

Simulation Facility Peach Bottom **Scenario No.** #2 **Op Test No.**

Examiners ______ **Operators** ______ CRS

______ ______ PRO

______ ______ URO

Objectives Evaluate the crew during the normal evolution of placing the standby CRD pump in service and removing the operating CRD pump from service. Following the CRD pump swap the crew will take action for a control rod drift in IAW ON-121 "Control Rod Drift". The ON will require the crew to perform a Fast Power Reduction. The crew will determine that the control rod is INOP and make a Tech Spec determination. An instrument malfunction will cause a spurious RCIC isolation making the system unavailable for level control during the ATWS. A Tech Spec determination will be made for the RCIC inoperabiity. Following the Tech Spec determination, main condenser vacuum will begin to degrade due to air inleakage. The crew will attempt to maintain vacuum by performing an additional Fast Power Reduction and initiating a leak search IAW OT-106 "Condenser Low Vacuum". The crew is expected to insert a manual scram, prior to the automatic signal, when they determine that vacuum cannot be maintained above 24" Hg vac. When the manual or automatic scram is inserted an electric ATWS will occur. T-101 "RPV Control" and T-117 "Level/Power Control" will be entered to address the ATWS. When ARI is initiated in an attempt to insert control rods, an ARI fuse will blow disabling the system. Level will be lowered to below -60" IAW T-240 "Termination and Prevention of Injection into the RPV". When the main turbine trips due to loss of vacuum, the operators will control reactor pressure manually using SRVs. Standby Liquid Control (SBLC) will be placed in service prior to Torus temperature reaching 110 °F. Panel awareness will alert the operators to a trip the SBLC pump after it has run for approximately one minute. The other SBLC pump should be started and will run. The crew will further lower level to control power when suppression pool temperature reaches 110 °F. When the crew is controlling level in its band, T-214, "Isolating and Venting the Scram Air Header" will be successful in inserting control rods. The crew will then transition to a non-ATWS level control band.

Initial Condition IC-14 100% power

Turnover: See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	URO CRS	Swap CRD Pumps
2	CRH041847	C	URO CRS	Control Rod 18-47 Drifts into the Core
3		R	URO PRO CRS	Fast Power Reduction
4	BATCH FILE RCIC_ISOLATION	I	PRO CRS	RCIC Isolation
5	CAR01 50	M	URO PRO CRS	Main Condenser Air Inleakage

6	RPS01 RPS02 RPS05	M	URO PRO CRS	Electrical ATWS
7	ARIF2A ARI01TO	I	URO CRS	ARI Fuse Failure
8	SLC01A(B)	C	URO CRS	Trip of running Standby Liquid Control Pump

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

Scenario Outline

Simulation Facility Peach Bottom **Scenario No.** #3 **Op Test No.**

Examiners ______________________ **Operators** ______________________ CRS

______________________ ______________________ PRO

______________________ ______________________ URO

Objectives Evaluate the ability of the crew to transfer "B" RPS to the Alternate Feed requiring the reset of the resulting half scrams and isolations. The crew should recognize and respond to the failure of a Drywell Pressure Transmitter which fails to give the expected RPS Trip. Evaluate the crew's response to the closure of an MSIV requiring the crew to enter and execute the High Pressure and Positive Reactivity procedures. The Crew will then perform a Rapid Power Reduction with Control Rods to lower steam flow to within the limitations of the three open steam lines. A steam leak in the Main Steam Tunnel of the Reactor Building will require the shutdown of the plant. A manual Group I isolation will be required due to an isolation failure. One MSIV is mechanically stuck and will not shut to isolate the leak in the Reactor Building. The crew should perform an Emergency Blowdown when the second temperature exceeds its action level in the Secondary Containment. When performing the blowdown, one ADS SRV will not open and an additional SRV must be opened.

Initial Condition IC-14, reduced to 85% power with the "A" RBCCW Pump Blocked For Motor Replacement

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	URO PRO CRS	Transfer the "B" RPS Bus to the Alternate Power Supply
2	Override	I	URO PRO CRS	Drywell Pressure Transmitter Failure Without Giving the Expected RPS Trip (Tech Spec)
3	MSS06G	C	URO PRO CRS	Inboard MSIV Fails Closed
4		R	URO PRO CRS	Fast Power Reduction with Control Rods
5	MSS03	M	URO PRO CRS	Steam Leak In The Steam Tunnel (Inside Secondary Containment)
6	Override	I	URO PRO CRS	Group I Fails To Auto Isolate Due to Failed Temperature Instruments
7	Override	C	URO PRO CRS	Failure Of The Inboard "C" MSIV To Manually Isolate
8	MSS08C	C	PRO CRS	"C" ADS SRV Fails to Open During Manual Blowdown

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

Scenario Outline

ES-D-1

Simulation Facility Peach Bottom **Scenario No.** #4 **Op Test No.**

Examiners ______________________ **Operators** ______________________ CRS

______________________ ______________________ PRO

______________________ ______________________ URO

Objectives Evaluate the ability of the crew to maneuver the plant during power changes and to perform a Main Turbine Stop Valve Routine Test while at power. Evaluate the crew's response to the loss of Feedwater Heaters requiring the crew to enter and execute the positive reactivity procedure. The crew should recognize and respond to the failure of an RPS Low Vacuum Pressure Transmitter. The crew should diagnose a steam leak in the Turbine Building and when the steam leak grows in magnitude, the crew should recognize the need to shutdown the plant. A Reactor Mode Switch failure will require the crew to use the manual pushbuttons or Alternate Rod Insertion (ARI) to terminate the ATWS. A manual Group I isolation will be required due to the isolation failure. The crew should utilize the TRIP procedures to determine the need for an Emergency Blowdown of the RPV via alternate depressurization methods.

Initial Condition IC-20, reduced to 65% power with the "B" RHR Pump Blocked For Motor Replacement

Turnover: See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	URO PRO CRS	Perform the Main Turbine Stop Valve Routine Test
2		R	URO PRO CRS	Raise Power with Control Rods
3	Override	C	URO PRO CRS	Loss Of Extraction Steam To Feedwater Heaters
4	Override	I	URO PRO CRS	Failure of a Vacuum Transmitter (Tech Spec)
5	MSS10	M	URO PRO CRS	Steam Leak In The Turbine Building
6	PCI01 Override	C	URO PRO CRS	Group I Failure To Auto Isolate (Manual works)/Failure Of The "D" MSL To Manually Isolate
7	Override	I	URO PRO CRS	Failure To Scram (Reactor Mode Switch/B RPS Auto Channel Failure)
8	Override MSS08	C	URO PRO CRS	Unable To Restore Drywell Nitrogen/Only 2 SRVs Operate On Emergency Blowdown/Depressurization Via Alternate Methods

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

Scenario Outline

Simulation Facility:	Peach Bottom	**Scenario No.:**	#5	**Op Test No.:**	
Examiners	____________	**Operators**	____________	CRS	
	____________		____________	URO	
	____________		____________	PRO	

Objectives Evaluate the ability of the crew to place a RFP in service and perform a normal power ascension. During the power ascension, a recirc pump will runaway requiring the crew to take action for positive reactivity addition. Evaluate the crew's response to the Tech Spec implications of mismatched Recirc Pump Speed. The crew should recognize the Recirc Pump high vibration and seal failures requiring a manual trip. The recirc pump discharge valve will fail to close resulting in an unisolable leak in the drywell. The main generator will fail to lockout when the turbine is tripped requiring manual operator action. Evaluate crew's ability to spray the drywell with the other loop when the first is not available. Demonstrate the ability to utilize TRIP procedures.

Initial Conditions IC-20, 75% power with the "B" RHR Pump Blocked For Motor Replacement

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malf. No.	Event Type*		Event Description
1		N	URO PRO CRS	Place the "A" Reactor Feed Pump in service
2		R	URO PRO CRS	Continue Power Ascension IAW GP-2
3	RFC01A	I	URO PRO CRS	Recirc Pump Runaway (includes Tech Spec for mismatched flows)
4	RRS11A	C	URO PRO CRS	Recirc Pump High Vibration Requiring Manual Trip
5	RRS13A/ RRS14A	C	URO PRO CRS	"A" Recirc Pump Seals both fail
6	VED01_74	C	URO PRO CRS	Recirc Pump Discharge Valve Trips on Overcurrent
7	RRS20	M	URO PRO CRS	Small Recirc Line Break/LOCA Inside Primary Containment Leading To Drywell Sprays
8	MGA01	I	PRO CRS	Main Generator Fails to Lock Out Automatically
9	Override	C	PRO CRS	CTMT Spray Override 2/3 Core Coverage Switch failure (one loop)

Facility: Peach Bottom Atomic Power Station Form ES-401-2

Exam Date: 09/13/1999 **Exam Level:** RO

Tier	Group	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Point Total
		K/A Category Points											
1. Emergency & Abnormal Plant Evolutions	1	2	3	2				3	1			2	13
	2	3	4	3				4	3			2	19
	3	1	0	0				0	1			2	4
	Totals Tier	6	7	5				7	5			6	36
2. Plant Systems	1	3	2	1	4	3	3	1	3	3	4	1	28
	2	1	2	2	2	2	2	2	2	2	1	1	19
	3	0	0	1	1	0	1	0	0	1	0	0	4
	Tier Totals	4	4	4	7	5	6	3	5	6	5	2	51

3. Generic Knowledge And Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	4	3	3	3	13

Note:

1. Attempt to distribute topics among all K/A Categories: select at least one topic from every K/A category within each tier.
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category tier.

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1** Form ES-401-2

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295007	High Reactor Pressure / 3		X					AK2.01 - Reactor/turbine pressure regulating system	3.5	1
295009	Low Reactor Water Level / 2				X			AA1.01 - Reactor feedwater	3.9	1
295010	High Drywell Pressure / 5			X				AK3.04 - Leak investigation	3.5	1
295010	High Drywell Pressure / 5						X	2.4.11 - Knowledge of abnormal condition procedures.	3.4	1
295014	Inadvertent Reactivity Addition / 1					X		AA2.03 - Cause of reactivity addition	4.0	1
295024	High Drywell Pressure / 5				X			EA1.14 - Drywell ventilation system	3.4	1
295025	High Reactor Pressure / 3				X			EA1.03 - Safety/relief valves: Plant-Specific	4.4*	1
295025	High Reactor Pressure / 3						X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	3.3	1
295031	Reactor Low Water Level / 2	X						EK1.01 - Adequate core cooling.	4.6*	1
295031	Reactor Low Water Level / 2		X					EK2.01 - Reactor water level indication	4.4*	1
295037	SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1		X					EK2.09 - Reactor water level	4.0	1
295037	SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1			X				EK3.07 - Various alternate methods of control rod insertion: Plant-Specific	4.2	1
500000	High Containment Hydrogen Concentration / 5	X						EK1.01 - Containment integrity	3.3	1

K/A Category Totals: 2 3 2 3 1 2 **Group Point Total:** 13

ES - 401 Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2 Form ES-401-2

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295002	Loss of Main Condenser Vacuum / 3				X			AA1.05 - Main turbine	3.2	1
295002	Loss of Main Condenser Vacuum / 3			X				AK3.01 - Reactor SCRAM: Plant-Specific	3.7	1
295003	Partial or Complete Loss of A.C. Power / 6		X					AK2.04 - A.C. electrical loads	3.4	1
295008	High Reactor Water Level / 2					X		AA2.01 - Reactor water level	3.9	1
295016	Control Room Abandonment / 7						X	2.4.11 - Knowledge of abnormal condition procedures.	3.4	1
295016	Control Room Abandonment / 7				X			AA1.06 - Reactor water level	4.0	1
295017	High Off-Site Release Rate / 9				X			AA1.07 - Process radiation monitoring system	3.4	1
295018	Partial or Complete Loss of Component Cooling Water / 8			X				AK3.02 - Reactor power reduction	3.3	1
295019	Partial or Complete Loss of Instrument Air / 8						X	2.4.11 - Knowledge of abnormal condition procedures.	3.4	1
295019	Partial or Complete Loss of Instrument Air / 8		X					AK2.01 - CRD hydraulics	3.8	1
295022	Loss of CRD Pumps / 1	X						AK1.01 - Reactor pressure vs. rod insertion capability	3.3	1
295026	Suppression Pool High Water Temperature / 5	X						EK1.01 - Pump NPSH	3.0	1
295028	High Drywell Temperature / 5					X		EA2.03 - Reactor water level	3.7	1
295029	High Suppression Pool Water Level / 5	X						EK1.01 - Containment integrity	3.4	1
295029	High Suppression Pool Water Level / 5		X					EK2.05 - Containment/drywell vacuum breakers	3.1	1
295030	Low Suppression Pool Water Level / 5			X				EK3.03 - RCIC operation: Plant-Specific	3.6	1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295034	Secondary Containment Ventilation High Radiation / 9				X			EA1.03 - Secondary containment ventilation	4.0	1
295038	High Off-Site Release Rate / 9		X					EK2.03 - Plant ventilation systems	3.6	1
600000	Plant Fire On Site / 8					X		AA2.17 - Systems that may be affected by the fire	3.1	1

K/A Category Totals: 3 4 3 4 3 2

Group Point Total: 19

Facility: Pe˙˙˙ Bottom Atomic Power Stat

ES - 401 **Emergency and Abnormal Plant Evolutions - Tier 1 / Group 3** **Form ES-401-2**

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295021	Loss of Shutdown Cooling / 4	X						AK1.01 - Decay heat	3.6	1
295023	Refueling Accidents / 8						X	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.0	1
295032	High Secondary Containment Area Temperature / 5					X		EA2.02 - Equipment operability	3.3	1
295036	Secondary Containment High Sump/Area Water Level / 5						X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	3.3	1

K/A Category Totals: 1 0 0 0 1 2

Group Point Total: 4

Facility: Peach Bottom Atomic Power Stat

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201001	Control Rod Drive Hydraulic System / 1		X										K2.03 - Backup SCRAM valve solenoids	3.5*	1
201001	Control Rod Drive Hydraulic System / 1											X	2.1.32 - Ability to explain and apply system limits and precautions.	3.4	1
201002	Reactor Manual Control System / 1	X											K1.05 - Rod worth minimizer: Plant-Specific	3.4	1
202002	Recirculation Flow Control System / 1	X											K1.09 - Reactor water level	3.1	1
202002	Recirculation Flow Control System / 1				X								K4.01 - Scoop tube break: Plant-Specific	3.1	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2				X								K4.10 - Dedicated injection system during automatic system initiation (injection valve interlocks)	3.9	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2								X				A2.11 - Motor operated valve failures	3.4	1
206000	High Pressure Coolant Injection System / 2					X							K5.05 - Turbine speed control: BWR-2, 3, 4	3.3	1
209001	Low Pressure Core Spray System / 2			X									K3.02 - ADS logic	3.8	1
209001	Low Pressure Core Spray System / 2										X		A4.05 - Manual initiation controls	3.8	1
211000	Standby Liquid Control System / 1							X					A1.03 - Pump discharge pressure	3.6	1
216000	Nuclear Boiler Instrumentation / 7					X							K5.09 - Recirculation flow effects on level indications: Design-Specific	2.9	1

Facility: Peach Bottom Atomic Power Stat

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-2**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
216000	Nuclear Boiler Instrumentation / 7									X			A3.01 - Relationship between meter/recorder readings and actual parameter values: Plant-Specific	3.4	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2		X										K2.01 - Motor operated valves	2.8*	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2								X				A2.15 - Steam line break	3.8	1
218000	Automatic Depressurization System / 3										X		A4.02 - ADS logic initiation	4.2*	1
223001	Primary Containment System and Auxiliaries / 5										X		A4.12 - Drywell coolers/chillers	3.5	1
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5									X			A3.02 - Valve closures	3.5	1
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5								X				A2.06 - Containment instrumentation failures	3.0	1
239002	Relief/Safety Valves / 3				X								K4.07 - Minimum steam pressure required to keep SRV open or to open SRV	3.1	1
241000	Reactor/Turbine Pressure Regulating System / 3						X						K6.01 - A.C. electrical power	2.8	1
241000	Reactor/Turbine Pressure Regulating System / 3					X							K5.04 - Turbine inlet pressure vs. reactor pressure	3.3	1

Facility: Peach Bottom Atomic Power Stat

ES - 401   **Plant Systems - Tier 2 / Group 1**   **Form ES-401-2**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
259001	Reactor Feedwater System / 2				X								K4.11 - Recirculation runbacks: Plant-Specific	3.5	1
259002	Reactor Water Level Control System / 2						X						K6.05 - Reactor water level input	3.5	1
259002	Reactor Water Level Control System / 2									X			A3.01 - Runout flow control: Plant-Specific	3.0*	1
261000	Standby Gas Treatment System / 9						X						K6.01 - A.C. electrical distribution	2.9	1
264000	Emergency Generators (Diesel/Jet) / 6										X		A4.04 - Manual start, loading, and stopping of emergency generator: Plant-Specific	3.7	1
264000	Emergency Generators (Diesel/Jet) / 6	X											K1.01 - A.C. electrical distribution	3.8	1
	K/A Category Totals:	3	2	1	4	3	3	1	3	3	4	1	**Group Point Total:**		28

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201003	Control Rod and Drive Mechanism / 1											X	2.4.48 - Ability to interpret control room indications to verify the status and operation of system, and understand how operator action s and directives affect plant and system conditions.	3.5	1
201006	Rod Worth Minimizer System (RWM) (Plant Specific) / 7					X							K5.13 - Insert block: P-Spec(Not-BWR6)	3.5	1
202001	Recirculation System / 1				X								K4.02 - Adequate recirculation pump NPSH	3.1	1
202001	Recirculation System / 1						X						K6.03 - A.C. power: Plant-Specific	2.9	1
204000	Reactor Water Cleanup System / 2							X					A1.04 - System flow	2.8	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4		X										K2.02 - Motor operated valves	2.5*	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4								X				A2.05 - System isolation	3.5	1
214000	Rod Position Information System / 7					X							K5.01 - Reed switches	2.7	1
245000	Main Turbine Generator and Auxiliary Systems / 4	X											K1.06 - Component cooling water systems	2.6	1
245000	Main Turbine Generator and Auxiliary Systems / 4										X		A4.14 - Generator megavar output	2.5	1
256000	Reactor Condensate System / 2							X					A1.01 - System flow	2.9	1

Facility: Peach Bottom Atomic Power Stat

ES - 401   **Plant Systems - Tier 2 / Group 2**   **Form ES-401-2**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
262001	A.C. Electrical Distribution / 6								X				A2.06 - Deenergizing a plant bus	2.7	1
262001	A.C. Electrical Distribution / 6			X									K3.06 - Reactor protection system	3.8	1
271000	Offgas System / 9									X			A3.01 - Automatic system isolations	3.3	1
272000	Radiation Monitoring System / 7				X								K4.02 - Automatic actions to contain the radioactive release in the event that the predetermined release rates are exceeded	3.7	1
290003	Control Room HVAC / 9									X			A3.01 - Initiation/reconfiguration	3.3	1
300000	Instrument Air System (IAS) / 8			X									K3.01 - Containment air system	2.7	1
400000	Component Cooling Water System (CCWS) / 8		X										K2.01 - CCW pumps	2.9	1
400000	Component Cooling Water System (CCWS) / 8						X						K6.06 - Heat exchangers and condensers	2.9	1
	K/A Category Totals:	1	2	2	2	2	2	2	2	2	1	1	**Group Point Total:**		19

Facility: Peach Bottom Atomic Power Stat

ES - 401 **Plant Systems - Tier 2 / Group 3** **Form ES-401-2**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
215001	Traversing In-Core Probe / 7				X								K4.01 - Primary containment isolation: Mark-I&II(Not-BWR1)	3.4	1
233000	Fuel Pool Cooling and Clean-up / 9									X			A3.02 - Pump trip(s)	2.6	1
288000	Plant Ventilation Systems / 9						X						K6.03 - Plant air systems	2.7	1
290002	Reactor Vessel Internals / 5			X									K3.07 - Nuclear boiler instrumentation	3.1	1
	K/A Category Totals:	0	0	1	1	0	1	0	0	1	0	0	**Group Point Total:**		4

Generic Knowledge and Abilities Outline (Tier 3)

Printed: 06/24/199?

BWR RO Examination Outline

Form ES-401-5

Facility: Peach Bottom Atomic Power Stat

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.30	Ability to locate and operate components, including local controls.	3.9	1
	2.1.29	Knowledge of how to conduct and verify valve lineups.	3.4	1
	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	3.0	1
	2.1.3	Knowledge of shift turnover practices.	3.0	1
			Category Total:	**4**
Equipment Control	2.2.13	Knowledge of tagging and clearance procedures.	3.6	1
	2.2.30	Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area / communication with fuel storage facility / systems operated from the control room in support of fueling operations / and supporting instrumentation.	3.5	1
	2.2.13	Knowledge of tagging and clearance procedures.	3.6	1
			Category Total:	**3**
Radiation Control	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	1
	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements.	2.6	1
	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements.	2.6	1
			Category Total:	**3**
Emergency Plan	2.4.25	Knowledge of fire protection procedures.	2.9	1
	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	3.3	1
	2.4.39	Knowledge of the RO's responsibilities in emergency plan implementation.	3.3	1
			Category Total:	**3**
			Generic Total:	**13**

Facility: Peach Bottom Atomic Power Station Form ES-401-1

Exam Date: 09/13/1999 **Exam Level:** SRO

Tier	Group	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Point Total
		K/A Category Points											
1. Emergency & Abnormal Plant Evolutions	1	3	5	3				5	3			7	26
	2	3	2	3				2	4			3	17
	Tier Totals	6	7	6				7	7			10	43
2. Plant Systems	1	2	1	2	2	2	3	1	3	3	2	2	23
	2	1	2	1	1	1	0	1	1	1	0	4	13
	3	0	0	0	1	0	1	1	0	1	0	0	4
	Tier Totals	3	3	3	4	3	4	3	4	5	2	6	40

3. Generic Knowledge And Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	4	4	4	5	17

Note:

1. Attempt to distribute topics among all K/A Categories: select at least one topic from every K/A category within each tier.
2. Actual point totals must match those specified in the table.
3. Select topics from many systems: avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category tier.

ES - 401 | Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 | Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295003	Partial or Complete Loss of A.C. Power / 6						X	2.1.32 - Ability to explain and apply system limits and precautions.	3.8	1
295003	Partial or Complete Loss of A.C. Power / 6		X					AK2.04 - A.C. electrical loads	3.5	1
295006	SCRAM / 1					X		AA2.02 - Control rod position	4.4*	1
295007	High Reactor Pressure / 3		X					AK2.01 - Reactor/turbine pressure regulating system	3.7	1
295009	Low Reactor Water Level / 2				X			AA1.01 - Reactor feedwater	3.9	1
295010	High Drywell Pressure / 5			X				AK3.04 - Leak investigation	3.8	1
295010	High Drywell Pressure / 5						X	2.4.11 - Knowledge of abnormal condition procedures.	3.6	1
295014	Inadvertent Reactivity Addition / 1					X		AA2.03 - Cause of reactivity addition	4.3	1
295015	Incomplete SCRAM / 1						X	2.4.6 - Knowledge symptom based EOP mitigation strategies.	4.0	1
295016	Control Room Abandonment / 7						X	2.4.11 - Knowledge of abnormal condition procedures.	3.6	1
295016	Control Room Abandonment / 7				X			AA1.06 - Reactor water level	4.1	1
295017	High Off-Site Release Rate / 9				X			AA1.07 - Process radiation monitoring system	3.6	1
295024	High Drywell Pressure / 5					X		EA2.01 - Drywell pressure	4.4*	1
295024	High Drywell Pressure / 5				X			EA1.14 - Drywell ventilation system	3.5	1

ES - 401 | Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 | Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295025	High Reactor Pressure / 3				X			EA1.03 - Safety/relief valves: Plant-Specific	4.4*	1
295025	High Reactor Pressure / 3						X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	4.0	1
295026	Suppression Pool High Water Temperature / 5	X						EK1.01 - Pump NPSH	3.4	1
295026	Suppression Pool High Water Temperature / 5						X	2.1.25 - Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	3.1	1
295030	Low Suppression Pool Water Level / 5			X				EK3.03 - RCIC operation: Plant-Specific	3.7	1
295031	Reactor Low Water Level / 2	X						EK1.01 - Adequate core cooling.	4.7*	1
295031	Reactor Low Water Level / 2		X					EK2.01 - Reactor water level indication	4.4*	1
295037	SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1			X				EK3.07 - Various alternate methods of control rod insertion: Plant-Specific	4.3*	1
295037	SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1		X					EK2.09 - Reactor water level	4.2	1
295038	High Off-Site Release Rate / 9		X					EK2.03 - Plant ventilation systems	3.8	1
500000	High Containment Hydrogen Concentration / 5	X						EK1.01 - Containment integrity	3.9	1
500000	High Containment Hydrogen Concentration / 5						X	2.1.20 - Ability to execute procedure steps.	4.2	1

K/A Category Totals: 3 5 3 5 3 7 **Group Point Total:** 26

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295002	Loss of Main Condenser Vacuum / 3				X			AA1.05 - Main turbine	3.2	1
295002	Loss of Main Condenser Vacuum / 3			X				AK3.01 - Reactor SCRAM: Plant-Specific	3.8	1
295008	High Reactor Water Level / 2					X		AA2.01 - Reactor water level	3.9	1
295018	Partial or Complete Loss of Component Cooling Water / 8			X				AK3.02 - Reactor power reduction	3.4	1
295018	Partial or Complete Loss of Component Cooling Water / 8						X	2.4.35 - Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.	3.5	1
295019	Partial or Complete Loss of Instrument Air / 8						X	2.4.11 - Knowledge of abnormal condition procedures.	3.6	1
295019	Partial or Complete Loss of Instrument Air / 8		X					AK2.01 - CRD hydraulics	3.9	1
295021	Loss of Shutdown Cooling / 4	X						AK1.01 - Decay heat	3.8	1
295022	Loss of CRD Pumps / 1	X						AK1.01 - Reactor pressure vs. rod insertion capability	3.4	1
295028	High Drywell Temperature / 5					X		EA2.03 - Reactor water level	3.9	1
295029	High Suppression Pool Water Level / 5	X						EK1.01 - Containment integrity	3.7	1
295029	High Suppression Pool Water Level / 5		X					EK2.05 - Containment/drywell vacuum breakers	3.3	1
295032	High Secondary Containment Area Temperature / 5					X		EA2.02 - Equipment operability	3.5	1
295034	Secondary Containment Ventilation High Radiation / 9				X			EA1.03 - Secondary containment ventilation	3.9	1

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295036	Secondary Containment High Sump/Area Water Level / 5						X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	4.0	1
600000	Plant Fire On Site / 8					X		AA2.17 - Systems that may be affected by the fire	3.6	1
600000	Plant Fire On Site / 8			X				AK3.04 - Actions contained in the abnormal procedure for plant fire on site	3.4	1

K/A Category Totals: 3 2 3 2 4 3

Group Point Total: 17

BWR SRO F mination Outline

Printed: 06/[illegible]999

Facility: Peach Bottom Atomic Power Stat

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-1**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
202002	Recirculation Flow Control System / 1	X											K1.09 - Reactor water level	3.2	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2				X								K4.10 - Dedicated injection system during automatic system initiation (injection valve interlocks)	4.1	1
206000	High Pressure Coolant Injection System / 2					X							K5.05 - Turbine speed control: BWR-2, 3, 4	3.3	1
209001	Low Pressure Core Spray System / 2			X									K3.02 - ADS logic	3.9	1
211000	Standby Liquid Control System / 1							X					A1.03 - Pump discharge pressure	3.6	1
212000	Reactor Protection System / 7											X	2.1.12 - Ability to apply technical specifications for a system.	4.0	1
216000	Nuclear Boiler Instrumentation / 7									X			A3.01 - Relationship between meter/recorder readings and actual parameter values: Plant-Specific	3.4	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2		X										K2.01 - Motor operated valves	2.8*	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2								X				A2.15 - Steam line break	3.8	1
218000	Automatic Depressurization System / 3										X		A4.02 - ADS logic initiation	4.2*	1
223001	Primary Containment System and Auxiliaries / 5										X		A4.12 - Drywell coolers/chillers	3.6	1

Facility: Peach Bottom Atomic Power Stat

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-1**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5									X			A3.02 - Valve closures	3.5	1
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5								X				A2.06 - Containment instrumentation failures	3.2	1
239002	Relief/Safety Valves / 3				X								K4.07 - Minimum steam pressure required to keep SRV open or to open SRV	3.2	1
241000	Reactor/Turbine Pressure Regulating System / 3						X						K6.01 - A.C. electrical power	2.9	1
241000	Reactor/Turbine Pressure Regulating System / 3					X							K5.04 - Turbine inlet pressure vs. reactor pressure	3.3	1
259002	Reactor Water Level Control System / 2						X						K6.05 - Reactor water level input	3.5	1
259002	Reactor Water Level Control System / 2									X			A3.01 - Runout flow control: Plant-Specific	3.0*	1
261000	Standby Gas Treatment System / 9											X	2.2.23 - Ability to track limiting conditions for operations.	3.8	1
261000	Standby Gas Treatment System / 9						X						K6.01 - A.C. electrical distribution	3.0	1
262001	A.C. Electrical Distribution / 6								X				A2.06 - Deenergizing a plant bus	2.9	1
262001	A.C. Electrical Distribution / 6			X									K3.06 - Reactor protection system	4.1*	1

Facility: Peach Bottom Atomic Power Stat

ES - 401   **Plant Systems - Tier 2 / Group 1**   **Form ES-401-1**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
264000	Emergency Generators (Diesel/Jet) / 6	X											K1.01 - A.C. electrical distribution	4.1	1
	K/A Category Totals:	2	1	2	2	2	3	1	3	3	2	2	**Group Point Total:**		23

Facility: Peach Bottom Atomic Power Stat

ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-1**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201001	Control Rod Drive Hydraulic System / 1		X										K2.03 - Backup SCRAM valve solenoids	3.6*	1
201001	Control Rod Drive Hydraulic System / 1											X	2.1.32 - Ability to explain and apply system limits and precautions.	3.8	1
204000	Reactor Water Cleanup System / 2							X					A1.04 - System flow	2.8	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4		X										K2.02 - Motor operated valves	2.7*	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4								X				A2.05 - System isolation	3.7	1
214000	Rod Position Information System / 7					X							K5.01 - Reed switches	2.8	1
215003	Intermediate Range Monitor (IRM) System / 7											X	2.2.34 - Knowledge of the process for determining the internal and external effects on core reactivity.	3.2*	1
234000	Fuel Handling Equipment / 8											X	2.2.27 - Knowledge of the refueling process.	3.5	1
245000	Main Turbine Generator and Auxiliary Systems / 4											X	2.1.25 - Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	3.1	1
245000	Main Turbine Generator and Auxiliary Systems / 4	X											K1.06 - Component cooling water systems	2.6	1
259001	Reactor Feedwater System / 2				X								K4.11 - Recirculation runbacks: Plant-Specific	3.5	1

Facility: Peach Bottom Atomic Power Stat

ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-1**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
290003	Control Room HVAC / 9									X			A3.01 - Initiation/reconfiguration	3.5	1
300000	Instrument Air System (IAS) / 8			X									K3.01 - Containment air system	2.9	1

K/A Category Totals: 1 2 1 1 1 0 1 1 1 0 4 **Group Point Total:** 13

BWR SRO F ˘ mination Outline

Printed: 06/2 ~~999

Facility: Peach Bottom Atomic Power Stat

ES - 401 **Plant Systems - Tier 2 / Group 3** **Form ES-401-1**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
215001	Traversing In-Core Probe / 7				X								K4.01 - Primary containment isolation: Mark-I&II(Not-BWR1)	3.5	1
233000	Fuel Pool Cooling and Clean-up / 9									X			A3.02 - Pump trip(s)	2.6	1
256000	Reactor Condensate System / 2							X					A1.01 - System flow	2.9	1
288000	Plant Ventilation Systems / 9						X						K6.03 - Plant air systems	2.7	1

K/A Category Totals: 0 0 0 1 0 1 1 0 1 0 0 **Group Point Total:** 4

Generic Knowledge and Abilities Outline (Tier 3)

Printed: 06/24/199

BWR SRO Examination Outline

Form ES-401-5

Facility: Peach Bottom Atomic Power Stat

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.6	Ability to supervise and assume a management role during plant transients and upset conditions.	4.3	1
	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	4.0	1
	2.1.3	Knowledge of shift turnover practices.	3.4	1
	2.1.12	Ability to apply technical specifications for a system.	4.0	1
			Category Total:	4
Equipment Control	2.2.11	Knowledge of the process for controlling temporary changes.	3.4*	1
	2.2.13	Knowledge of tagging and clearance procedures.	3.8	1
	2.2.29	Knowledge of SRO fuel handling responsibilities.	3.8	1
	2.2.20	Knowledge of the process for managing troubleshooting activities.	3.3	1
			Category Total:	4
Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.9	1
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	3.1	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1
	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements.	3.0	1
			Category Total:	4

Generic Knowledge and Abilities Outline (Tier 3)

Printed: 06/24/199!

BWR SRO Examination Outline

Form ES-401-5

Facility: Peach Bottom Atomic Power Stat

Generic Category	KA	KA Topic	Imp.	Points
Emergency Plan	2.4.4	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
	2.4.41	Knowledge of the emergency action level thresholds and classifications.	4.1	1
	2.4.27	Knowledge of fire in the plant procedure.	3.5	1
	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions including: 1.Reactivity control 2.Core cooling and heat removal 3.Reactor coolant system integrity 4.Containment conditions 5.Radioactivity release control.	4.3	1
	2.4.38	Ability to take actions called for in the facility emergency plan, including (if required)supporting or acting as emergency coordinator.	4.0	1

Category Total: 5

Generic Total: 17

PECO NUCLEAR
A Unit of PECO Energy

DYNAMIC SIMULATOR SCENARIOs
&
WALK-THROUGH EXAM
Administrative JPMs
Control Room Systems JPMs
Facility Walk-Through JPMs

Peach Bottom Atomic Power Station
Initial License Examination
September 1999

SIMULATOR OPERATOR INSTRUCTIONS FOR SCENARIO (#1)

GENERAL REQUIREMENTS

- Recorders will be rolled prior to the scenario and paper from selected recorders will be retained for the examination team as requested.
- All procedures, flow charts, curves, graphs, etc. will be in their normal storage places.
- All markable procedures, boards, etc. will be erased.
- All paper used by the crew will be retained for the examination team as requested.
- The simulator operators will keep a log of all communications during the scenario as requested by the examination team.

SCENARIO SOURCE HISTORY

- New

INITIAL SETUP

Initial Conditions

- IC- 14, 100% Power
- Ensure recorder power is on, roll recorders as required

Blocking Tags

- RHR Loop "A" blocked.

Malfunctions

The following malfunctions are for the "A" RHR loop equipment block:

- IMF RHR01A, Pump Trip for equipment blocking.
- IMF RHR01C, Pump Trip for equipment blocking
- IMF VED01_39 MO-10-31A, Magnetic Overcurrent for equipment blocking
- IMF VED01_40 MO-10-26A ,Magnetic Overcurrent for equipment blocking
- IMF VED01_42 MO-10-154A ,Magnetic Overcurrent for equipment blocking
- IMF VED01_43 MO-10-38A ,Magnetic Overcurrent for equipment blocking
- IMF VED01_44 MO-10-39A ,Magnetic Overcurrent for equipment blocking
- IMF VED01_46 MO-10-16A ,Magnetic Overcurrent for equipment blocking
- IMF VED01_47 MO-10-16C ,Magnetic Overcurrent for equipment blocking

- IMF CRM023843 Control Rod Stuck
- IMF CRM024223 Control Rod Stuck
- IMF CRM022635 Control Rod Stuck
- IMF CRM022235 Control Rod Stuck
- IMF CRM023435 Control Rod Stuck
- IMF CRM024215 Control Rod Stuck
- IMF RPS061811 Control Rod Fails to SCRAM
- IMF RPS063847 Control Rod Fails to SCRAM
- IMF RPS062651 Control Rod Fails to SCRAM

- IMF CRM051823 95 Control Rod Slow SCRAM Time
- IMF CRM053051 95 Control Rod Slow SCRAM Time
- IMF CRM053015 95 Control Rod Slow SCRAM Time

Overrides

The following overrides are for the "A" RHR Loop equipment block:

- IOR ZLORH03MO1013A_1 OFF Torus Suction MO-10-13A Red Light OFF
- IOR ZLORH03MO1013C_1 OFF Torus Suction MO-10-13C Red Light OFF
- IOR ZLORH03MO1015A_1 OFF Recirc Suction MO-10-15C Green Light OFF
- IOR ZLORH03MO1015C_1 OFF Recirc Suction MO-10-15C Green Light OFF
- IOR ZLORH03MO1034A_1 OFF Full Flow Test MO-10-34A Green Light OFF
- IOR ZLORH03MO1025A_1 OFF MO-10-25A Green Light OFF
- IOR ZLORH03MO1025A_2 OFF MO-10-25A Green Light OFF
- IOR ZLORHGRPMO1034A_1 OFF MO-10-34A Green Light OFF
- IOR ZLORH032AP35_1 OFF, 2A RHR Pump Green Light OFF
- IOR ZLORH032CP35_1 OFF, 2C RHR Pump Green Light OFF
- IOR ZYP12A1S36 STOP 2A RHR Pump Control Switch in OFF
- IOR ZYP12A1S47 STOP 2C RHR Pump Control Switch in OFF

- IOR ZYP12A3S23 CLOSE, Prevents Containment Sprays in simulated instrument failure
- IOR ZYP12A3S19 OFF, Prevents Containment Sprays in simulated instrument failure
- IOR ANO203BB3 ALARM_OFF, Simulates instrument failure by lack of receipt of alarm 225 B-3 "SYSTEM II DRYWELL PRESSURE PERMIT CONTAINMENT SPRAY"

Trip Overrides

None Required in Initial Setup

Turnover Procedures

None

SIMULATOR MACHINE OPERATOR DIRECTIONS

EVENT 1 -- Support the crew as an equipment operator for placing "B" SJAE in service, and removing "A" SJAE from service.

- "MRF MSS05B OPEN" to open AO-2466B per SO 8A.6.A step 4.2.4
- "MRF MSS05A CLOSE" to close AO-2466A per SO 8A.6.A step 4.3.3

EVENT 2 -- Insert malfunction "IMF RBM01B –0.1", to fail RBM Channel B INOP.

EVENT 3 -- Insert malfunction "IMF MSS08F 40", Reactor Pressure Relief Valve F Failure to fail the "F" SRV 40% open. Provide support to pull SRV fuses as requested, by entering "MRF ADS02F REMOVE". Reinstall fuses by entering "MRF ADS 02F INSTALL" Isolate B loop RHR stayfull when requested by entering "MRF RHR02B CLOSE".

EVENT 4 -- After the SRV fuses have been pulled and the GP-9 power reduction is in progress, insert malfunction "IMF MSS01 1 10:00", Steam Leakage Inside the Primary Containment, to cause a 1% steam leak at the SRV flange with a 10 minute ramp time. When requested, report DWCW pressure at 37 psig.

EVENT 5 -- Two minutes after the crew scrams the plant per OT-101, raise the seveity of the steam leak to 50% on a 5 min ramp by inserting "MMF MSS01 50 5:00"

EVENT 6 -- Pre-inserted component failures will cause:

- Three rods to scram slowly, (can be driven in per T-220)
- Three rods to fail to scram, (can be driven in per T-220)
- Six rods to be mechanically stuck, (cannot be inserted by any means)

Support the crew during performance of T-220 as an equipment operator to close HV-2-3-56 "CRD CHARGING HEADER BLOCK VALVE" using MRF T220_2 CLOSE .

EVENT 7 -- Pre-inserted instrument failure will result in the inability of the crew to spray the Torus or the Drywell as evidenced by the lack of the 225 B-3 "SYSTEM II DRYWELL PRESSURE PERMIT CONTAINMENT SPRAY"

Support the crew as an equipment operator in the performance of T-223 as required. Emergency Depressurization per T-112 will be required when Drywell bulk average temperature reaches 281F.

TERMINATION --The scenario may be terminated when the Emergency Blowdown has been initiated.

SHIFT TURNOVER

PLANT CONDITIONS:

- 100% power

INOPERABLE EQUIPMENT/LCOs:

- "A" RHR Loop out of service and drained for MO-154A work, day 2 of the 7 day TSA per LCO 3.5.1, expected return to service in 2 days

SCHEDULED EVOLUTIONS:

- Place the "B" SJAE in service, remove the "A" SJAE from service

SURVEILLANCES DUE THIS SHIFT:

- None

ACTIVE CLEARANCES:

- "A" RHR Loop blocked and drained.

GENERAL INFORMATION:

- Immediately following shift turnover, place "B" SJAE in service and the "A" SJAE in standby IAW SO-8A.6.A-2 to support maintenance on a valve packing leak. Equipment operators are stationed locally to support the evolution.

Scenario Outline

ES-D-1

Simulation Facility Peach Bottom **Scenario No.** #1 **Op Test No.**

Examiners ______________ **Operators** ______________ CRS

______________ ______________ PRO

______________ ______________ URO

Objectives Evaluate the ability of the crew to swap Steam Jet Air Ejectors while maintaining vacuum requiring the manipulation of several components. The crew should recognize and respond to receipt of a control rod withdraw block due to an INOP failure of the "B" Rod Block Monitor (RBM) requiring a Tech Spec determination. Following the Tech Spec determination, the crew will be evaluated in their response to the "F" SRV failing open. The crew will perform a Rapid Power Reduction as part of their procedure directed efforts to close the SRV . A small leak that develops on the SRV mounting boss will result in a rise in drywell pressure. The crew will take action per the Drywell High Pressure Procedure to attempt to identify and isolate the leak but will eventually be required to initiate a manual SCRAM. Twelve control rods will fail to insert when the scram is initiated resulting in an ATWS. Six rods will be able to be inserted using T-220 but an ATWS will still exist. Steam cutting at the break will cause the leak to increase resulting in containment pressure and temperature to continue to degrade requiring use of containment sprays. Pressure instrument failures will prevent use of containment sprays when they are attempted. As containment temperature rises the crew must terminate and prevent all injection per T-240 prior to performing the Emergency Blowdown at 281 F, due to the ATWS.

Initial Condition IC-14, 100% power with the "A" RHR Loop Blocked For MO-154A valve work.

Turnover: See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	PRO CRS	Place "B" SJAE in service, remove "A" SJAE from service.
2	RBM03B	I	URO CRS	"B" Rod Block Monitor failure (Tech Spec)
3	MSS08F	C	URO PRO CRS	"F" Safety Relief Valve fails open
4		R	URO PRO CRS	Rapid power reduction.
5	MSS01	M	URO PRO CRS	Steam Leak In The Drywell, (small progressing to large leak).
6	Pre-inserted Control Rod Malfunctions	C	URO PRO CRS	Twelve control rods will fail to insert or will insert slowly during SCRAM (ATWS)
7	Pre-inserted Instrument Failure	I	PRO CRS	Pressure instrument failure prevents using containment sprays.

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

Event Description: SJAE Swap

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct placing the "B" SJAE inservice and removing the "A" SJAE from service in accordance with SO 8A.6.A-2 "Placing The Standby SJAE In Service and Placing the In Service SJAE In Standby"
	PRO	Place the "B" SJAE in service in accordance with SO 8A.6.A-2: • Verify condensate flow through SJAE inner/after condensers. • Verify Steam Pressure controller (PIC-2239B) in manual and closed • Open second stage SJAE valves • Direct the Equipment Operator to adjust HCS-2-8A-2466B for 35-40 psi. • Slowly raise PIC-2239B setpoint to 115-125 psig on PI-2472B • Open first stage SJAE valves when second stage is >13" Hgv • When steam pressure stabilizes, open the Off Gas Inlets to the "B" SJAE by placing AO-2236D/E/F in AUTO.
	PRO	Place the "A" SJAE in standby in accordance with SO 8A.6.A-2: • Close the Off gas inlets to the "A" SJAE by placing AO-2236A/B/C in CLOSE. • Adjust PIC-2239A to minimum setpoint • Direct the Equipment Operator to adjust HCS-2-8A-2466A to 0 psi. • Close first stage SJAE valves • Close second stage SJAE valves

Op Test No.: **Scenario No.: #1** **Event No.: 2**

Event Description: RBM Channel "B" Fails INOP

Cause: Failure of 5 volt power supply to INOP trip reference circuit.

Effects: Receipt of a Rod Withdraw Block and associated alarms

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize/take action IAW ARC 211 C-3 "RBM HIGH INOPERATIVE" and ARC 211 D-3 "ROD WITHDRAW BLOCK" alarms and inform the CRS.
	CRS	Refer to Tech Spec 3.3.2.1 and determine that the "B" RBM must be restored to OPERABLE status within 24 hours.
	CRS	Determine that the "B" RBM can be bypassed IAW SO 60B.7.A-2 "Rod Block Monitor Bypassing" for up to 24 hours at which time it must be restored to operable status or placed in trip.
	CRS	Direct the URO to bypass the "B" RBM (CRS may elect to maintain the RBM in the tripped condition until troubleshooting has begun).
	URO	If directed, place the Joystick for the "B" RBM in the Bypass position.
	CRS	Direct the URO/PRO to contact the WWM or EDM for troubleshooting support for the RBM.
	URO PRO	Contact the WWM or EDM for troubleshooting support for the RBM as directed.

Op Test No.: **Scenario No.: #1** **Event No.: 3**

Event Description: "F" SRV Fails Open

Cause: Mechanical failure of relief valve pilot.

Automatic Actions: Alarms 210 D-2 "SAFETY RELIEF VALVE OPEN" and 227 B-4 "BLOWDOWN RELIEF VALVES HI TEMP"

Effects: Loss of Generator load, steam/feedwater mismatch, heat input to primary containment.

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize/take action IAW 210 D-2 "SAFETY RELIEF VALVE OPEN" and 227 B-4 "BLOWDOWN RELIEF VALVES HI TEMP"
	CRS	Enter/direct actions IAW OT-114: • Lead crew in confirming an SRV is open • Direct the B loop of Torus cooling be placed in service • Direct attempts to close the open SRV
	URO PRO	Confirm that SRV "F" is open IAW OT-114
	PRO	Place the B loop of Torus cooling in service IAW RRC 10.1-2 "RHR SYSTEM TORUS COOLING DURING A PLANT EVENT", when directed by the CRS and monitor Torus temperature.
	PRO	Cycle the SRV control switch when directed by the CRS.
	URO	Perform a Fast Power Reduction IAW GP-9-2 when directed by the CRS, (See details in Event 4)
	URO PRO	Coordinate removal of fuses by Equipment Operators and monitor valve status during attempts to close the SRV when directed by the CRS.
	PRO	Recognize/take action IAW 226 A4 "TORUS WATER LEVEL OUT OF NORMAL RANGE" Recognize entry condition to T-102 "Primary Containment Control".
	CRS	Enter/direct actions IAW T-102 for Torus water level high.

Op Test No.:	Scenario No.: #1	Event No.: 4	Page 4 of 9

Event Description: Fast Power Reduction

Cause: Directed from OT-114, Inadvertent Opening of a Relief Valve

Automatic Actions: None

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct a Fast Power Reduction until recirculation flow is reduced to approximately 51.25 Mlbs/hr.
	URO	Perform a Fast Power Reduction until recirculation flow is reduced to approximately 51.25 Mlbs/hr. • Reduce Recirculation Flow to 85% power • Insert Table 1 Rods full in • Reduce Recirculation Flow to 51.25 Mlbs/hr
	PRO	Maintain the Main Generator Auto-Manual Regulator Balanced (when it alarms) Monitor Reactor Feed Pump Flows during the power drop. Remove a Reactor Feed Pump from service when required. Notify the Power System Director of the required power change.

Op Test No.: **Scenario No.: #1** **Event No.: 5**

Event Description: Steam leakage inside Primary Containment, (small progressing to large)

Cause: B Main Steam Leak at SRV F Mounting Boss. Steam cutting at break increases size of leak.

Automatic Actions: Initial Alarms: 210 F-2, 225 A-4, "DRYWELL HI-LO PRESS"

Effects: Drywell pressures and temperatures will rise at an increasing rate, eventually leading to a high drywell (DW) pressure alarm and scram if not scrammed manually, ECCS automatic start signals and PCIS isolation signals will be received. Conditions escalate to requiring containment sprays.

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize/take immediate actions IAW OT-101 "HIGH DRYWELL PRESSURE": • Maximize drywell cooling • Verify no drywell inerting
	CRS	Enter/direct follow up actions IAW OT-101: • Direct Fast Power Reduction IAW GP-9-2 and transfer of house loads at drywell pressure of 1.5 psig and rising. • Direct manual scram at drywell pressure of 1.7 psig and rising. • Direct investigation into source of drywell leakage. • Direct drywell venting. • Direct isolation of potential leak sources.
	URO	Take Scram Actions when directed: • Reduce reactor power IAW GP-9-2. • Place the Mode Switch to Shutdown • Verify Rods inserting • Manually control the Reactor Feed Water System to control Reactor Level • Verify APRMs are downscale • Recognize that all rods did not insert, ATWS, (See Event 6) • Report to the CRS
CT	URO	Recognize and report ATWS.

PRO Transfer House Loads and take scram actions when scram occurs:
- Verify House Loads Transferred
- Trip the turbine at 50 Mwe
- Verify the Generator Lockout
- Verify all isolations
- Report to the CRS and get permission to bypass and restore DW Instrument Nitrogen
- Restore Instrument Nitrogen to the DW

Investigate sources of drywell leakage.

URO
PRO Recognize drywell pressure/temperature are continuing to rise, inform CRS.

URO
PRO Recognize and report 2# Drywell T-101, T-102 entry conditions.

URO
PRO Verify and take action for 2# automatic initiations and isolations. (HPCI initiation, Diesel Generator auto start, Group II/III isolations)

CRS Enter/direct actions for T-101, RPV Control
Direct actions for the ATWS condition, (See Event 6 for details)
- Verify URO/PRO Scram Actions
- Direct Level to be restored and maintained +5 to 35 inches
- Direct DW Instrument Nitrogen to be restored
- Direct the reactor to be depressurized not to exceed 100 degrees per hour

CRS Enter/direct actions for T-102, Primary Containment Control
- Monitor Primary Containment Conditions
- Direct restoration of DW Cooling per T-223 "Drywell Cooler Fan Bypass"
- Direct torus sprays and/or DW sprays after verifying that conditions meet the DW Spray Initiation Curve. (See Event 7 for details)

PRO Perform T-223 "Drywell Cooler Fan Bypass" when directed.

Event Description: Twelve Rods Fail to Scram - ATWS

se: Three control rods have slow scram times, three rods Fail to Scram, and six rods are mechanically stuck.

omatic Actions: None, no alarms

cts: Requires the operators to take actions to terminate ATWS, T-117 entry.

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct T-101 RC/Q ATWS actions: • Initiation of ARI • Entry into T-117 "Level/Power Control" • T-220 "Driving Control Rods During a Failure to SCRAM" • T-213 "SCRAM Solenoid Deenergization"
	CRS	Enter and execute T-117 concurrently with T-101: • Direct Inhibit ADS • Direct bypass MSIV -160" isolation using T-221 "Main Steam Isolation Valve Bypass" • Verify reactor power <4% • Direct monitoring of parameters requiring performance of T-240 • Direct level be maintained between -200" and +35"
	URO	Perform T-213, Direct an EO to perform applicable portions of the procedure.
	URO	Perform T-220, direct an EO to close the HV-2-3-56 CRD Charging Header Block valve
	PRO	Inhibit ADS
	URO	Monitor reactor power, level and pressure. Monitor parameters that requiring performance of T-240. Maintain level as directed.
	URO PRO	Direct an EO to perform T-221.

Op Test No.: **Scenario No.: #1** **Event No.: 7**

Event Description: Inability to spray Continiment

use: Drywell pressure input to spray logic permissive not functioning.

Automatic Actions: Alarm 225 B-3 "SYSTEM II DRYWELL PRESSURE PERMIT CONTAINMENT SPRAY" is NOT received

cts: Prevents containment spray.

Time	Position	Applicant's Actions Or Behavior
	PRO	Initiate torus sprays when directed (crew may go directly to DW sprays) • Place CTMT Spray Override 2/3 Core Coverage switch in "Manual Override" • Place CTMT Spray Valve Control switch in "Manual" momentarily • Secure one running RHR Pump (if two were running) • Open MO-39B (if not open for torus cooling already) • Throttle MO-34B to obtain 8000 gpm for Torus sprays, 9000 gpm for Drywell sprays.
CT		• Recognize the inability to throttle MO-38B to obtain 9000 gpm or simultaneously throttle MO-26B and MO-31B. • Recognize the lack of alarm 225 B-3 "SYSTEM II DRYWELL PRESSURE PERMIT CONTAINMENT SPRAY"
	CRS	Recognize the inability to maintain drywell bulk average temperature less than 281 F.
CT	CRS	Per T-117, direct performance of T-240 to terminate and prevent RPV injection prior to directing T-112 Emergency Blowdown.
	PRO	Perform T-240 Termination and Prevention of Injection into the RPV for the following systems: • HPCI • Feedwater/Condensate • Core Spray • RHR • ECCS Stayfull Inform the CRS when T-240 is completed.

CRS	Enter and execute T-112, Emergency Blowdown Direct the PRO to open all 5 ADS SRVs
PRO	Place the switches for all 5 ADS SRVs to the open position

TERMINATION CRITERIA: The scenario may be terminated when the Emergency Blowdown has been initiated.

POST SCENARIO EMERGENCY CLASSIFICATION: Alert on > 50 gpm leakage from the primary system (Table 3) OR on General Conditions (Table 1).

SIMULATOR OPERATOR INSTRUCTIONS FOR SCENARIO (#2)

GENERAL REQUIREMENTS

- Recorders will be rolled prior to the scenario and paper from selected recorders will be retained for the examination team as requested.
- All procedures, flow charts, curves, graphs, etc. will be in their normal storage places.
- All markable procedures, boards, etc. will be erased.
- All paper used by the crew will be retained for the examination team as requested.
- The simulator operators will keep a log of all communications during the scenario as requested by the examination team.

SCENARIO SOURCE HISTORY

- New

INITIAL SETUP

Initial Conditions

- IC- 14, 100% Power
- Ensure recorder power is on, roll recorders as required

Blocking Tags

- NONE

Event Triggers

- TRG E1 ARI_A_ARMED (ZYP02A2S32B==1)
- TRG E2 BREAKER_215_GREEN_LIGHT_ON (ZLOED091HS215_1 == TRUE)
- TRG E3 MAIN_COND_VAC_LE_7.5 (ZAOMC07APR2154_2 >= .75)

Batch File - The following simulate an inst. failure which causes a spurious RCIC isolation. Verify that the following Batch File is available (DO NOT LOAD NOW):

- RCIC_ISOLATION
  IOR ZYP13A2S31 PTL
  MRF RCIC09TO
  IOR ANO204C12 ALARM_OFF
  IOR ZYP13A2S18 MANISOL
  IOR ZYP13A2S80B ARMED
  IOR ZYP13A2S80A ON
  IOR ZYP13A2S37 CLOSE

Malfunctions

- IMF ARIF2A (E1 2), ARI "A" fuse failure on Event Trigger 1 with a 2 sec. time delay
- TRG E2 = MMF CAR01 100, raises main condenser air inleakage to 100%
- IMF EHH02A (E3 0), prevents cycling of the turbine bypass valves at 7.5" vacuum
- IMF EHH02B (E3 0), prevents cycling of the turbine bypass valves at 7.5" vacuum

- IMF EHH02C (E3 0), prevents cycling of the turbine bypass valves at 7.5" vacuum
- IMF EHH02D (E3 0), prevents cycling of the turbine bypass valves at 7.5" vacuum
- IMF EHH02E (E3 0), ensures that the main condenser is unavailable
- IMF EHH02F (E3 0), ensures that the main condenser is unavailable
- IMF EHH02G (E3 0), ensures that the main condenser is unavailable
- IMF EHH02H (E3 0), ensures that the main condenser is unavailable
- IMF EHH02I (E3 0), ensures that the main condenser is unavailable

Overrides

IOR ZLOMC07AM0257G_1 (E3 0 0) ON, maintains vacuum breaker green light on
IOR ZLOMC07AM0257G_2 (E3 0 0) ON, maintains vacuum breaker green light on
IOR ZLOMC07AM0257R_1 (E3 0 0) OFF, maintains vacuum breaker red light off
IOR ZLOMC07AM0257R_2 (E3 0 0) OFF, maintains vacuum breaker red light off
IOR ZYP01A4S26 (E3 0 0) OPEN, Opens vacuum breakers to ensure loss of condenser

Trip Overrides

- MRF RPS01 TO, overrides A1 RPS
- MRF RPS02 TO overrides A2 RPS
- MRF RPS05 TO overrides A3 RPS
- MRF ARI01TO overrides A ARI channel

Turnover Procedures

- SO 3.6.A-2 "U/2 Placing Standby Control Rod Drive Hydraulic System Pump In Service" to place the "B" CRD pump in service and remove the "A" CRD pump from service.

SIMULATOR MACHINE OPERATOR DIRECTIONS

EVENT 1 Support the crew as an equipment operator for placing "B" CRD in service, and removing "A" CRD from service.

- "MRF CRH02 OPEN" to open HV-2-3-36B, CRD PUMP B DISC CHK VLV
- "MRF CRH01 CLOSE" to close HV-2-3-36A, CRD PUMP A DISC CHK VLV

EVENT 2 -- Insert malfunction "IMF CRH041847" to drift in control rod 18-47.
When the rod is being driven in by the operator, enter "DMF CRH041847" to delete the drift malfunction.
Support the crew as an equipment operator during trouble shooting and as a reactor engineer upon request.
Report back as the equipment operator that you cannot determine the cause of the rod drift locally.

EVENT 3 -- Support the crew during the FAST POWER REDUCTION as required.

EVENT 4 -- Activate Batch file "BAT RCIC_ISOLATION" to cause a spurious isolation of the RCIC system. Support the crew as an equipment operator and system manager during trouble shooting.

EVENT 5 -- Insert malfunction "IMF CAR01 50" condenser air in leakage at 50%. Support the crew as equipment operators for an air leak search. Verify the severity of CAR 01 goes to 100% on event trigger 2, when the generator output breakers open.

EVENT 6 -- Preinserted malfunctions cause A RPS to fail resulting in an ATWS. Support the crew as equipment operators in the performance of T-213, T-214, T-220.
Insert malfunction "IMF CRH07 100", SCRAM AIR HEADER LEAK at 100% severity when level is being controlled between -200" and the level to which it was intentionally lowered.

EVENT 7 -- Preinserted malfunctions cause ARI A channel fuse to fail when it is initiated.

EVENT 8 -- Trip the first SBLC pump that is started after a it has run for 1 minute by inserting malfunction "IMF SLC01A" or "IMF SLC01B" .

TERMINATION -- After the ATWS has been terminated and level is restored above -172".

SHIFT TURNOVER

PLANT CONDITIONS:

- 100% Power
- SO 3.6.A-2 is in progress to place the "B" CRD pump in service and remove the "A" CRD pump from service to permit cleaning of the motor fans.

INOPERABLE EQUIPMENT/LCOs:

- NONE

SCHEDULED EVOLUTIONS:

- Maintenance and Equipment Operators are standing by for the "B" CRD pump to be placed in service for a confidence run and the "A" CRD pump to be removed from service.

SURVEILLANCES DUE THIS SHIFT:

- NONE

ACTIVE CLEARANCES:

- NONE

GENERAL INFORMATION:

- Place the standby "B" CRD pump in service in accordance with SO 3.6.A-2 "U/2 PLACING STANDBY CONTROL ROD DRIVE HYDRAULIC SYSTEM IN SERVICE". Procedure SO 3.6.A-2 is complete up through and including step 4.1.8.

Scenario Outline

Simulation Facility Peach Bottom **Scenario No.** #2 **Op Test No.**

Examiners ____________ **Operators** ____________ CRS

____________ ____________ PRO

____________ ____________ URO

Objectives Evaluate the crew during the normal evolution of placing the standby CRD pump in service and removing the operating CRD pump from service. Following the CRD pump swap the crew will take action for a control rod drift in IAW ON-121 "Control Rod Drift". The ON will require the crew to perform a Fast Power Reduction. The crew will determine that the control rod is INOP and make a Tech Spec determination. An instrument malfunction will cause a spurious RCIC isolation making the system unavailable for level control during the ATWS. A Tech Spec determination will be made for the RCIC inoperabiity. Following the Tech Spec determination, main condenser vacuum will begin to degrade due to air inleakage. The crew will attempt to maintain vacuum by performing an additional Fast Power Reduction and initiating a leak search IAW OT-106 "Condenser Low Vacuum". The crew is expected to insert a manual scram, prior to the automatic signal, when they determine that vacuum cannot be maintained above 24" Hg vac. When the manual or automatic scram is inserted an electric ATWS will occur. T-101 "RPV Control" and T-117 "Level/Power Control" will be entered to address the ATWS. When ARI is initiated in an attempt to insert control rods, an ARI fuse will blow disabling the system. Level will be lowered to below -60" IAW T-240 "Termination and Prevention of Injection into the RPV". When the main turbine trips due to loss of vacuum, the operators will control reactor pressure manually using SRVs. Standby Liquid Control (SBLC) will be placed in service prior to Torus temperature reaching 110 °F. Panel awareness will alert the operators to a trip the SBLC pump after it has run for approximately one minute. The other SBLC pump should be started and will run. The crew will further lower level to control power when suppression pool temperature reaches 110 °F. When the crew is controlling level in its band, T-214, "Isolating and Venting the Scram Air Header" will be successful in inserting control rods. The crew will then transition to a non-ATWS level control band.

Initial Condition IC-14 100% power

Turnover: See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	URO CRS	Swap CRD Pumps
2	CRH041847	C	URO CRS	Control Rod 18-47 Drifts into the Core
3		R	URO PRO CRS	Fast Power Reduction
4	BATCH FILE RCIC_ISOLATION	I	PRO CRS	RCIC Isolation
5	CAR01 50	M	URO PRO CRS	Main Condenser Air Inleakage

6	RPS01 RPS02 RPS05	M	URO PRO .CRS	Electrical ATWS
7	ARIF2A ARI01TO	I	URO CRS	ARI Fuse Failure
8	SLC01A(B)	C	URO CRS	Trip of running Standby Liquid Control Pump

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

Op Test No.:	Scenario No.:	#2	Event No.:	1	Page 1 of 11

Event Description: Control Rod Drive pump swap.

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct CRD Pump swap in accordance with SO 3.6.A-2 "U/2 Placing Standby Control Rod Drive Hydraulic System Pump In Service"
	URO	Contact EO and verify pump start prerequisites are complete and standby for B pump start IAW. SO 3.6.A-2 "U/2 Placing Standby Control Rod Drive Hydraulic System Pump In Service"
	URO	Start the B CRD pump and monitor pump amps.
	URO	Direct the EO to open the B pump discharge check valve HV-36B
	URO	Shutdown the A CRD pump.
	URO	Direct the EO to close the A pump discharge check valve HV-36A
	URO	Check CRD system parameters IAW SO 3.8.A "Control Rod Drive Hydraulic System Routine Inspection"

Event Description: Control Rod 18-47 drifts into the core

Cause: Scram outlet valve leaks

Automatic Actions: 211 D4, "ROD DRIFT ALARM"
Full core display rod drift light illuminates

Effects: Small power reduction

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize and report receipt of 211 D4 "Rod Drift" alarm and rod drift light for rod 18-47.
	CRS	• Enter/direct actions IAW ON-121 "Drifting Control Rod" • Select the drifting rod • Monitor: Reactor power, Generator load, Reactor water level, Reactor pressure • Insert the drifting control rod to full-in using Emergency in and hold for 30 sec. • Determine if the rod settles at full-in • Reset "Rod Drift" alarm • Reduce power IAW GP-9 "Fast Reactor Power Reduction" to 950 Mwe (see Event 3) • Demand Official 3D P1 and determine status of thermal limits • Request Reactor Engineering and work week manager support • Declare the rod inop and reference Tech Spec 3.1.3 • Notify the Operations Manager
	URO	• Execute ON-121 actions: • Select the drifting rod • Monitor: Reactor power, Generator load, Reactor water level, Reactor pressure • Insert the drifting control rod to full-in using Emergency in and hold for 30 sec. • Report that the rod settled at full-in • Reset "Rod Drift" alarm • Reduce power IAW GP-9 to 950 Mwe (see Event 3) • Demand Official 3D P1 and determine status of thermal limits • Direct the EO of inspect the HCU for possible cause of the rod drift

Event Description: Fast Power Reduction

Cause: Directed from ON-121, Drifting Control Rod

Automatic Actions: None

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct a Fast Power Reduction IAW GP-9 "Fast Reactor Power Reduction" until generator load is 950 Mwe
	URO	Perform a Fast Power Reduction until generator load is 950 Mwe • Reduce Recirculation Flow to 85% power • Insert Table 1 Rods as required to reduce power to 950 Mwe
	PRO	Maintain the Main Generator Auto-Manual Regulator Balanced (when it alarms) Monitor Reactor Feed Pump Flows during the power drop. Notify the Power System Director of the required power change.

Op Test No.: **Scenario No.: #2** **Event No.: 4**

Event Description: RCIC ISOLATION

Cause: RCIC Logic Failure

Automatic Actions: 222 A1 "RCIC TURB TRIP" and 227 E3 "RCIC RELAYS NOT RESET" ALARMS

Effects: RCIC turbine trip, steam isolation, min flow, Torus suction, and injection valves close

Time	Position	Applicant's Actions Or Behavior
	PRO	Recognize/report RCIC isolation as evidenced by 222 A1 "RCIC TURB TRIP" and 227 E3 "RCIC RELAYS NOT RESET" alarms and valve position
	CRS	Enter/direct actions IAW ARC222 A1 "RCIC TURB TRIP" and 227 E3 "RCIC RELAYS NOT RESET" ALARMS, direct the PRO to verify RCIC isolation status per GP-8G.
	PRO	Verify RCIC isolation status per GP-8G.
	PRO	Determine that the isolation is spurious based on lack of valid isolation signals.
	PRO	Direct an EO to the RCIC room to determine possible causes of the isolation
	CRS	Determine that RCIC is INOP and reference Tech Spec 3.5.3 to determine that HPCI must be verified OPERABLE immediately and RCIC must be restored to OPERABLE status within 14 days.
	CRS	Request technical support in troubleshooting the RCIC isolation

Event Description: Condenser Air Inleakage

Cause: Crack in Condenser weld joint

Automatic Actions: Reactor scram @23" Hg vac
Main Turbine and RFP turbines trip @ 20" Hg vac

Effects: Vacuum drops, Offgas flow rises, generator load reduction

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize, report, and take actions IAW ARC 206 D-2 "Condenser Lo Vacuum"
	URO	Reduce reactor power IAW GP-9-2 "Fast Reactor Power Reduction" until vacuum stops dropping • Insert Table 1 Rods full in • Reduce Recirculation Flow to 51.25 Mlbs/hr
	CRS	Enter/direct actions IAW OT-106 "Condenser Low Vacuum" • Direct a SCRAM if condenser vacuum cannot be maintained or restored above 24" Hg vac and enter T-100 "SCRAM" • Direct performance of SO 5.7.A "Condensate System Vacuum Leak Search"
	PRO	Maintain the Main Generator Auto-Manual Regulator Balanced (when it alarms) Monitor Reactor Feed Pump Flows during the power drop. Remove a Reactor Feed Pump from service when required. Notify the Power System Director of the required power change.
	PRO	Recognize, report, and take actions IAW ARC 203 B-2, or C-2,or D-2 "A Condenser Lo Vac" (or B or C)
	CRS	Direct a Reactor Scram at 24" Hg vac.
CT	URO	Attempt to scram the reactor and report the ATWS and entry into T-101, "RPV Control". (see event 6 for ATWS details)
	URO PRO	Monitor and report main condenser vacuum approaching 7" Hg vac

Time	Position	Applicant's Actions Or Behavior
	CRS	Anticipate lockout of the Main Turbine Bypass Valves at 7" Hg vac and direct reactor pressure be stabilized below 1050 psig using additional SRVs.
	URO PRO	Recognize and report lockout and closure of the Main Turbine Bypass Valves at 7" Hg vac
	PRO	Stabilize reactor pressure below 1050 psig using additional SRVs to compensate for the Bypass valve lockout.
	PRO	Monitor and report the increasing rate of Torus water temperature rise.
	CRS	When vacuum reaches 5 inches, then direct the MSIVs and Main Steam Line Drain valves to be closed.
	CRS	Direct Chemistry personnel to remove Condensate System Oxygen Injection from service.
	URO PRO	Close the MSIVs and Main Steam Line Drain valves when directed.

Event Description: Failure to scram (Electric ATWS)

Cause: RPS Logic Channels A1, A2, A3 fail to de-energize

Automatic Actions: Alarms 211 B-1"A CHANNEL REACTOR AUTO SCRAM & D-1 "A CHANNEL REACTOR MANUAL SCRAM" are NOT received

Effects: All RPS "A" channel automatic and manual scram signals fail to initiate automatic or manual scram

Time	Position	Applicant's Actions Or Behavior
	URO	Carry out Scram actions - Recognize ATWS - Report that control rods are not inserting and the APRMs are NOT downscale
	CRS	Direct T-101 "RPV Control", RC/Q ATWS actions: • Initiation of ARI • Entry into T-117 "Level/Power Control" • T-220 "Driving Control Rods During a Failure to SCRAM" • T-213 "SCRAM Solenoid Deenergization" • T-214 "Isolating and Venting the Scram Air Header"
	URO	Press Manual Scram pushbuttons or ARI manual pushbuttons
	URO	Report that rods are not inserting and receipt of 207 E3 "ARI-RPT SYSTEM INOP LOSS OF POWER" alarm. (see event 7 for details)
	CRS	Enter and execute T-117 concurrently with T-101: • Direct Inhibit ADS • Direct monitoring of parameters requiring performance of T-240 "Termination and Prevention of Injection into the RPV" • Direct level be lowered to below -60" using T-240
	URO	Perform T-213, Direct an EO to perform applicable portions of the procedure.
	URO	Perform T-214, Direct an EO to perform applicable portions of the procedure.

Time	Position	Applicant's Actions Or Behavior
	URO	Perform T-220, direct an EO to close the HV-2-3-56, CRD Charging Header Block valve
	PRO	Inhibit ADS
	PRO	Terminate and prevent RPV injection using T-240 to lower level to below -60"
	URO PRO	Monitor reactor power, level and pressure and parameters that requiring performance of T-240.
	PRO	Recognize, report, and take actions IAW ARC 206 D-1, Condenser Lo Vacuum Trip"
	CRS	Direct that reactor pressure be stabilized below 1050 psig IAW T-101 using SRVs
	PRO	Stabilize reactor pressure using SRVs below 1050 psig
	URO PRO	Recognize, report, receipt of ARC 207 A-1 "Torus Water Hi Temp" as a T-102 "Primary Containment Control" entry condition of >95°F
	CRS	Enter/direct actions IAW T-102 Maximize Torus cooling
	PRO	Maximize Torus cooling, monitor Torus water temperatures
CT	CRS	Before Torus temperature of 110 °F recognize the need to initiate SBLC and direct it be initiated.
	URO	Place SBLC in service (see event 8 for details)
	URO PRO	Recognize, report, receipt of ARC 207 A-2 "Torus Water Hi Hi Temp" for Torus water temperature >110 °F
	CRS	Direct performance of T-240 IAW T-117 until any of the following: • RPV level reaches -172" • Reactor power drops below 4% • All SRVs remain closed

Time	Position	Applicant's Actions Or Behavior
	PRO	Terminate and prevent RPV injection using T-240 until any of the following: • RPV level reaches -172" • Reactor power drops below 4% • All SRVs remain closed
	CRS	Direct that level be restored and maintained between -200" and the level to which it was intentionally lowered.
	PRO	Restore and maintain level between -200" and the level to which it was intentionally lowered.
	URO	Recognize and report receipt of 211 D-2 "SCRAM VALVE PILOT AIR HEADER PRESS HI-LO" and monitor scram air header pressure.
	URO	Recognize and report inward control rod motion.
	URO	Take Scram Actions: • Verify Rods inserting • Verify APRMs are downscale • Verity that all control rods have inserted • Report to the CRS
	CRS	Recognize termination of the ATWS Exit T-117, T-101 RC/Q Enter T-101 RC/L-1 Direct level restoration to +5" to +35".
	PRO	Begin level restoration +5" to +35".

Op Test No.: **Scenario No.:** **#2** **Event No.:** **7**

Event Description: ARI FUSE FAILURE

Cause: ARI "A" power supply fuse blows

Automatic Actions: 207 E3 "ARI RPT SYSTEM INOP LOSS OF POWER" ALARM

Effects: Scram air header remains pressurized requiring other means of terminating the ATWS

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize and report the receipt of 207 E3 "ARI RPT SYSTEM INOP LOSS OF POWER" ALARM
	URO	Recognize and report the loss of the valve position lights for ARI A channel and the failure of ARI to actuate as evidenced by lack of the ARI initiated alarm
	CRS	Acknowledge the report and pursue alternate means of venting the SCRAM air header (T-214)

Op Test No.: **Scenario No.: #2** **Event No.: 8**

Event Description: Trip of Running Standby Liquid Control Pump

Cause: Contact in 42 device fails causing pump to stop

Automatic Actions: None

Effects: SBLC tank level remains constant, red pump running light out, green pump off light on

Time	Position	Applicant's Actions Or Behavior
CT	URO	Recognize, report the trip of the inservice Standby Liquid Control Pump.
	CRS	Direct the start of the other SBLC pump.
	URO	Start the other SBLC pump and verify it is injecting boron into the reactor vessel.

TERMINATION CRITERIA: The scenario may be terminated after the ATWS has been terminated and level is restored above -172".

POST SCENARIO EMERGENCY CLASSIFICATION: Site Area Emergency - Scram condition, Rx NOT shutdown and torus temperature above 110 degrees F. (Table 13).

SIMULATOR OPERATOR INSTRUCTIONS FOR SCENARIO (#3)

GENERAL REQUIREMENTS

- Recorders will be rolled prior to the scenario and paper from selected recorders will be retained for the examination team as requested.
- All procedures, flow charts, curves, graphs, etc. will be in their normal storage places.
- All markable procedures, boards, etc. will be erased.
- All paper used by the crew will be retained for the examination team as requested.
- The simulator operators will keep a log of all communications during the scenario as requested by the examination team.

SCENARIO SOURCE HISTORY

- New

INITIAL SETUP

Initial Conditions

- IC-14
- Reduce power to 85% using recirc flow
- Ensure recorder power is on, roll recorders as required

Blocking Tags

- "A" RBCCW Pump Switch to OFF and Tagged

Event Triggers

- TRG E1 227B2_ALARMING (AN:203AAB2 == 1)

Malfunctions

- IMF MSS08C 0%, Fails shut the "C" ADS Valve

Overrides

- IOR ANO205RH1 (E1 0 0) ALARM_ON, ALARM GROUP 1 A LOGIC ALARM WHEN STEAM TUNNEL TEMPERATURE HIGH TRIP ANNUNCIATES
- IOR ZYP12A4S03 (NONE 0 0) AUT/OPEN, "C" MSIV Inboard AUTO/OPEN
- IOR ZLOSW122AP10_1 OFF, "A" RBCCW Pump Green Light OFF

Batch Files – Verify that the following Batch Files are AVAILABLE (DO NOT LOAD NOW)

- DW_PIS12_TRIP_WITH_RPS_FAILED
  - ♦ IOR ANO205LF1 ALARM_ON
  - ♦ IOR ANO205LD4 ALARM_ON

Verify consumable copies of the following procedures are available

- SBGT log
- GP-25 Appendix 2 & 6

SIMULATOR MACHINE OPERATOR DIRECTIONS FOR SCENARIO #3

EVENT 1 Support the crew acting as Equipment Operators during the "B" RPS Bus transfer to alternate feed. Equipment Operators will be required both at the RPS Alternate feed and Reactor Building Ventilation Panel.
AFTER THE CREW HAS COMPLETED THE RESET OF ISOLATIONS, OVERRIDE THE GROUP I ISOLATION WITH MRF PCI01TO.

EVENT 2 When the crew has completed their recovery from Event 1, then enter:
BAT DW_PIS12_TRIP_WITH_RPS_FAILURE.
Support the crew as an Equipment Operator for the investigation of the High Drywell Pressure Trip. When sent to check, report that the PIS-2-5-12B on the 2BC065D Rack is indicating upscale and has a gross failure alarm lit. When directed to reset the gross failure light, it will not reset

EVENT 3 When the crew has completed GP-25 Appendix 2 for tripping RPS Channel B-1,
Enter Malfunction: IMF MSS06G, "G" Inboard MSIV Fails Shut

EVENT 4 Support the crew during the power drop as requested.

EVENT 5 When the crew has completed dropping power, then enter Malfunction:
IMF MSS03 .2 5:00, to insert a Main Steam Rupture.

EVENT 6 Group I Isolation Failure (pre-inserted)

EVENT 7 "C" Inboard MSIV failure (pre-inserted)

EVENT 8 "C" ADS SRV fails to open manually on blowdown (pre-inserted)

TERMINATION The scenario may be terminated when the Emergency Blowdown has been initiated.

SHIFT TURNOVER

PLANT CONDITIONS:

- Approximately 85% power with a GP-2 Startup in Progress
- GP-2 is complete through step 6.3.50
- Rods are in a full power lineup.

INOPERABLE EQUIPMENT/LCOs:

- "A" RBCCW Pump out of service for Motor Replacement

SCHEDULED EVOLUTIONS:

- Transfer "B" RPS to the Alternate Power Supply

SURVEILLANCES DUE THIS SHIFT:

- None

ACTIVE CLEARANCES:

- "A" RBCCW Pump

GENERAL INFORMATION:

- The "B" RPS MG Set has excessive vibration and is being shutdown for inspection. An Equipment Operator, Maintenance, and the System Manager are standing by at the "B" RPS MG Set to observe the shutdown and conduct the inspection. The EO has a calibrated digital voltmeter and a copy of SO 60F.6.A-2.

- Power is being held at 85% while RPS B is transferred to the Alternate Feed and the REs evaluate the plan for continued power ascension.

Scenario Outline

Simulation Facility Peach Bottom **Scenario No.** #3 **Op Test No.**

Examiners ______________________ **Operators** ______________________ CRS

______________________ ______________________ PRO

______________________ ______________________ URO

Objectives Evaluate the ability of the crew to transfer "B" RPS to the Alternate Feed requiring the reset of the resulting half scrams and isolations. The crew should recognize and respond to the failure of a Drywell Pressure Transmitter which fails to give the expected RPS Trip. Evaluate the crew's response to the closure of an MSIV requiring the crew to enter and execute the High Pressure and Positive Reactivity procedures. The Crew will then perform a Rapid Power Reduction with Control Rods to lower steam flow to within the limitations of the three open steam lines. A steam leak in the Main Steam Tunnel of the Reactor Building will require the shutdown of the plant. A manual Group I isolation will be required due to an isolation failure. One MSIV is mechanically stuck and will not shut to isolate the leak in the Reactor Building. The crew should perform an Emergency Blowdown when the second temperature exceeds its action level in the Secondary Containment. When performing the blowdown, one ADS SRV will not open and an additional SRV must be opened.

Initial Condition IC-14, reduced to 85% power with the "A" RBCCW Pump Blocked For Motor Replacement

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	URO PRO CRS	Transfer the "B" RPS Bus to the Alternate Power Supply
2	Override	I	URO PRO CRS	Drywell Pressure Transmitter Failure Without Giving the Expected RPS Trip (Tech Spec)
3	MSS06G	C	URO PRO CRS	Inboard MSIV Fails Closed
4		R	URO PRO CRS	Fast Power Reduction with Control Rods
5	MSS03	M	URO PRO CRS	Steam Leak In The Steam Tunnel (Inside Secondary Containment)
6	Override	I	URO PRO CRS	Group I Fails To Auto Isolate Due to Failed Temperature Instruments
7	Override	C	URO PRO CRS	Failure Of The Inboard "C" MSIV To Manually Isolate
8	MSS08C	C	PRO CRS	"C" ADS SRV Fails to Open During Manual Blowdown

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

Op Test No.:	Scenario No.:	#3	Event No.:	1	Page 1of 9

Event Description: Transfer the "B" RPS Bus to the Alternate Power Supply

Time	Position	Applicant's Actions Or Behavior
	CRS	Brief the crew on the transfer of the "B" RPS Bus. Direct the transfer of the "B" RPS Bus to its alternate power supply. Direct the reset of PCIS isolations. Direct the reset of the half scram.
	PRO	Transfer the "B" RPS Bus - Verify the "ALT SOURCE AVAILABLE " light is lit on 20C017 - Verify the CRD Scram Solinoid group lights are lit on 20C015 - Place the Transfer Switch in the "ALTERNATE" position Reset the Group I and III half isolations using GP8.D. Restore normal Reactor Building Ventilation
	URO	Monitor the Full Core Display for drifting rods while RPS is transferred. Reset the half scram using GP-11E, Scram Reset.

Op Test No.: **Scenario No.: #3** **Event No.: 2**

Event Description: Drywell Pressure Indicating Switch Fails Upscale Without Sending the Expected RPS Trip

Cause: Spurious Failure of the PIS-12B Drywell Pressure Transmitter Trip Unit

Automatic Actions: Results in a High Drywell Pressure Trip (210 F-1) alarm and the RPS/PCIS Trip Units in Calibration or Gross Failure (210 D-4) alarm.

Effects: Expected half scram fails to occur.

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize and report the annunciators for High Drywell Pressure Trip (210 F-1) and Gross Failure (210 D-4). Recognize and report the failure of the half scram to be initiated with the DW Pressure Trip.
	CRS	Direct and Equipment Operator be sent to investigate the alarms. Use Tech Specs to determine that both RPS and PCIS should have been impacted and that the channels must be tripped using GP-25. Use GP-25, Table 1 to direct the tripping of the B1 RPS Channel using Appendix 2. Use GP-25, Table 1 to direct the tripping of PCIS using Appendix 6.
	PRO	Verify actual Drywell pressure is normal. Trip the B1 RPS channel using GP-25, Appendix 2.
	NOTE	Appendix 6 can not be completed in the simulator, so the scenario must move on before the operators are expected to achieve this.

Op Test No.: **Scenario No.: #3** **Event No.: 3**

Event Description: Inboard Main Steam Isolation Valve (MSIV) fails closed

Cause: Equipment Failure

Automatic Actions: None.

Effects: The closure of the MSIV at this power will result in a significant power and pressure spike but will not result in a reactor scram.

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize rising reactor pressure, inform the CRS and announce entry into the High Reactor Pressure OT (OT-102)
	CRS	Enter/direct actions IAW OT-102 - Lead crew in determining that the high pressure was from a failed shut MSIV - Direct reactor power to be dropped until total steam flow is less that 10.5 Mlbs/hr (See Event #4 for details) Direct troubleshooting of the MSIV problem
	URO PRO	Investigate cause of the pressure rise - Recognize the MSIV closure, inform CRS

Op Test No.: **Scenario No.: #3** **Event No.: 4**

Event Description: Fast Power Reduction

Cause: Directed from OT-102, High Reactor Pressure

Automatic Actions: None

Effects: Power is dropped first with Control Rods and then with Recirculation Flow

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct a Fast Power Reduction until Total Steam Flow is < 10.5 Mlbs/hr using GP-9 Monitor Power to Flow Conditions as directed by the procedure.
	URO	Perform a Fast Power Reduction until Total Steam Flow is < 10.5 Mlbs/hr using GP-9 - Insert Table 1 Rods as required - Monitor Total Steam Flow
	PRO	Monitor Total Steam Flow Maintain the Main Generator Auto-Manual Regulator Balanced (when it alarms) Monitor Reactor Feed Pump Flows during the power drop. Notify the Power System Director of the required power change.

Op Test No.: **Scenario No.: #3** **Event No.: 5**

Event Description: Steam Leak In The Steam Tunnel (Inside Secondary Containment)

Cause: Crack on the "C" Steam Line Between the Inboard and Outboard MSIVs which was created due to the hydraulic shock which occurred when the Outboard MSIV failed closed

Automatic Actions: Initially Reactor Building High Differential Pressure Alarms will be received, high temperatures will be received first in the steam tunnel and spread throughout the reactor building.

Effects: Steam Tunnel temperatures will eventually reach the Group I setpoint.

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize and report REACTOR BUILDING & REFUEL FLOOR HI-LO DIFF PRESSURE (217 K-5 & L-1) Take action IAW the ARCs • Monitor FR-2805 to determine that vent stack flow is high. • Investigate the cause of the high pressure.
	URO PRO	Recognize and report a Potential T-103 Entry on High Temperature Verify which temperature point is alarming and confirm T-103 Entry
	CRS	Enter and execute T-103, Secondary Containment Control. Direct a GP-15, Local Evacuation, of the Reactor Building
	PRO	Perform a GP-15, Local Evacuation, of the Reactor Building
	CRS	Determine that a primary system is discharging into the Reactor Building. Direct a GP-4, Rapid Plant Shutdown. Enter T-101, RPV Control, from T-103.

URO Rapidly Reduce Recirc Flow to Minimum
Place the Mode Selector Switch in Shutdown
Perform Scram Actions:
Report that the Mode Switch is in Shutdown, Rods are going in and that the APRMs are downscale.

URO When level turns, depress Emergency Stop for all Reactor Feed Pumps (RFP) and then for one depress slow or fast raise.
Close the RFP discharge valves and open the Startup Level Controller Isolation Valve.

PRO Transfer House Loads
Trip the Main Turbine at 50 MWe and verify the generator lockout
Verify isolations and that SBGT is aligned and running
Verify that instrument air pressure is > Drywell pressure
Verify that Hydrogen Injection and the Scram Discharge Volume are isolated.
Report Scram Actions to the CRS.
Bypass and restore Drywell Instrument Nitrogen.

Op Test No.: **Scenario No.: #3** **Event No.: 6**

Event Description: Group I Failure To Auto Isolate (Manual works) due to failed Temperature Instruments

Cause: Temperature instruments which input into the "B" Group I logic are failed

Automatic Actions: None, no alarms will be received for initiation of the "B" Group I logic.

Effects: Group 1 failure to isolate, manual isolation will work on all MSL with the exception of the "C" Inboard MSIV (See Event 7 for details).

Time	Position	Applicant's Actions Or Behavior
CT	URO PRO	Recognize and report the failure of the group I isolation (due to the System B High Temperature instruments not giving a proper high temperature isolation).
	CRS	Direct the isolation of the MSIVs (due to the failed Group I isolation and to isolate systems discharging in the the area IAW T-103).

Op Test No.: **Scenario No.: #3** **Event No.: 7**

Event Description: Failure Of The Inboard "C" MSIV To Manually Isolate

Cause: The "C" Inboard MSIV was damaged by the hydraulic shock which occurred when the "C" Outboard MSIV failed closed.

Automatic Actions: None

Effects: The leak which is located between the "C" Main Steam Line Inboard and Outboard MSIVs can not be isolated

Time	Position	Applicant's Actions Or Behavior
	PRO	Close MSIVs with handswitches, recognize and report the "C" Inboard MSIV's Failure to manually isolate.
	URO PRO	Recognize and report additional temperature alarms in the Reactor Building.
CT	CRS	Recognize that the second area has temperatures greater that the Action Level. Enter and execute T-112, Emergency Blowdown. Direct the PRO to Open all 5 ADS SRVs.
	PRO	Place the switches for all 5 ADS SRVs to the open position.

Op Test No.: **Scenario No.: #3** **Event No.: 8**

Event Description: "C" ADS SRV Fails to Open During Manual Blowdown

Cause: SRV is mechanically failed in the closed position

Automatic Actions: None

Effects: When the "C" ADS SRV fails to open, the operator must open one additional non-ADS SRV.

Time	Position	Applicant's Actions Or Behavior
CT	PRO	Recognize and report that the "C" ADS SRV fails to open when the manual emergency blowdown is commensed.
	CRS	Direct an additional SRV to be opened to achieve 5 SRVs open.
	PRO	Open an additional SRV to ensure that 5 SRVs are open.

TERMINATION CRITERIA: The scenario may be terminated when the Emergency Blowdown has been initiated.

POST SCENARIO EMERGENCY CLASSIFICATION: Alert on > 50 gpm leakage from the primary system (Table 3) OR on General Conditions (Table 1).

SIMULATOR OPERATOR INSTRUCTIONS FOR SCENARIO (#4)

GENERAL REQUIREMENTS

- Recorders will be rolled prior to the scenario and paper from selected recorders will be retained for the examination team as requested.
- All procedures, flow charts, curves, graphs, etc. will be in their normal storage places.
- All markable procedures, boards, etc. will be erased.
- All paper used by the crew will be retained for the examination team as requested.
- The simulator operators will keep a log of all communications during the scenario as requested by the examination team.

SCENARIO SOURCE HISTORY

- This scenario is derived from a spare scenario written for the September 1998 Peach Bottom NRC exam. This scenario was never used for any examination or training.

INITIAL SETUP

Initial Conditions

- IC-20, 75% Power
- Reduce power to 65% by driving the first 8 rods of Table 1 to 00
- Ensure recorder power is on, roll recorders as required

Blocking Tags

- Tag the "B" RHR Pump Control Switch

Malfunctions

- IMF RHR01B (Trip B RHR Pump)
- IMF MSS08A 0 (Repeat for MSS08B,C,D,E,F,H,J,L @ 0% to fail SRVs shut)

Overrides

- IOR ZYP12A4S12 AUT/OPEN ("A" MSIV Outboard AUTO/OPEN)
- IOR ZYP12A4S04 AUT/OPEN ("D" MSIV Outboard AUTO/OPEN)
- IOR ZYP12A2S25 AUTOOPEN (Instrument Air to Drywell Valve in AUTO)
- IOR ZYP12A2S31 AUTOOPEN (Instrument Air to Drywell Valve in AUTO)
- IOR ZYP02A4S01 RUN (MSS to RUN)
- IOR ZLORH032BP35_1 OFF ("B" RHR Light to OFF)
- IOR ZLORH032BP35_2 OFF ("B" RHR Light to OFF)
- IOR ZYP12A2S24 CLOSE (FAILS CLOSE AO-8130A)

Trip Overrides

- MRF PCI01TO (Group 1 PCIS Isolation to Override)
- MRF RPS03TO OVERRIDE (Override RPS B1 Channel)
- MRF RPS04TO OVERRIDE (Override RPS B2 Channel)

Batch Files – Verify that the following Batch Files exist – DO NOT ENTER AT THIS TIME

- LOSS_OF_3_AND_4_STAGE_FW_HTRS
  - ♦ IOR ZYP10A2S01 OFF
  - ♦ IOR ZYP10A2S07 OFF
  - ♦ IOR ZYP10A2S02 OFF
  - ♦ IOR ZYP10A2S08 OFF
  - ♦ IOR ZYP10A2S03 OFF
  - ♦ IOR ZYP10A2S09 OFF

- LO_VAC_A2_RPS_TRIP
  - ♦ IOR ANO205LD1 ALARM_ON (Low Vacuum RPS Trip Alarm)
  - ♦ IOR ZYP18A3S4 TRIP (Places RPS A2 Keylock test switch in Trip)

Turnover Procedures

- RT-0-001-400-2 completed through Step 6.1.3 (Scram Margin 21%)
- RE-C-01, Attachment 7, page 13-14 marked up for power ascension - pull Group 20 to position 06, pull group 21 to position 04
- Provide GP-2 copy completed through Step 6.3.48

SIMULATOR MACHINE OPERATOR DIRECTIONS - SCENARIO #4

EVENT 1 Support crew for power ascension. Provide an additional operator for double verification of rod pulls.

EVENT 2 -- Support crew for Main Turbine Stop Valve RT.

EVENT 3 -- Enter BAT LOSS_OF_3_AND_4_ STAGE_FW_HTRS to override the following feedwater heating valves to OFF.

- AO-8711A,B, & C (All 3rd String FW Heater Extraction Steam Isolations)
- AO-8712A,B, & C (All 4th String FW Heater Extraction Steam Isolations)

If sent to investigate by crew, report that there is a broken airline that can be isolated by closing valves HV-2-36B-46290A & B, INST AIR HDR ISOLATION VALVES TO THIRD & FORTH STAGE FW HEATER ROOMS. (These valves are located outside the C3 & C4 F/W Heater Rooms, Turbine Building 135' mezzanine.)

If directed to isolate the leak with the valves listed above, report that the valves are closed and the air leak has stopped.

EVENT 4 -- Insert batch file BAT LO_VAC_A2_RPS_TRIP to cause a low vacuum RPS trip

When requested to investigate, report that the PI-2-05-11C is failed downscale.

EVENT 5 -- Insert the following malfunctions:

- IMF MSS10 3 5:00 (Main Steam Line Rupture)
- IMF FCR01 5 5:00 (Fuel Failure - not to be diagnosed by candidates, just to elevate turbine building rad levels and release rates.)

After the crew requests Dose Assessment Calculations be performed, then provide information periodically as follows to progress to the Emergency Blowdown.

- Call Control Room and report that the calculated offsite dose rate is 50 mr/hr TPARD (Alert level release rates)
- Report that the CO2 truck has broken down and is blocking the Turbine Building Roll Up Door.
- Report that Actual Offsite Dose rate is 300 mr/hr TEDE (General Emergency level).

EVENT 6 -- Preinserted Group 1 Isolation failure. Valves can be manually isolated except for the "D" Main Steam Line MSIVs.

EVENT 7 -- Preinserted failures will maintain the Mode Selector Switch in the RUN position and RPS B Auto Channel will not trip. The scram pushbuttons and ARI pushbuttons will work to scram the reactor

EVENT 8 -- Preinserted malfunctions will prevent restoring normal drywell instrument nitrogen. The AO-8130A will also not open. This will prevent all except 2 SRVs from opening during the Emergency Depressurization. Crew will need to Emergency Depressurize via alternate methods.

TERMINATION -- Scenario may be terminated when alternate depressurization is directed.

SHIFT TURNOVER

PLANT CONDITIONS:

- Approximately 65% power with a GP-2 Startup in Progress
- GP-2 is complete through step 6.3.48
- Rods are being pulled in accordance with RE guidance
- The Unit 2 Turbine Building 116' Cardox Tank is being refilled
- A routine Diesel Fuel Oil delivery is expected this shift

INOPERABLE EQUIPMENT/LCOs:

- "B" RHR Pump out of service for motor replacement, 6 hours into LCO 3.5.1, expected return to service in 2 days

SCHEDULED EVOLUTIONS:

- Perform RT-0-001-400-2, "Individual Full Closure of Main Turbine Stop Valves". It is already completed through step 6.1.3.

- When the RT is complete, raise power with rods as directed by RE-C-01 Attachment 7 (Groups 20 and 21). This will place the rods in a full power rod pattern. Do not exceed 10 Mwe/min. An additional Reactor Operator will be provided to double verify rod movements. When Groups 20 and 21 have been pulled, contact the REs for further power ascension instructions.

SURVEILLANCES DUE THIS SHIFT:

- Perform RT-0-001-400-2, "Individual Full Closure of Main Turbine Stop Valves". It is already completed through step 6.1.3.

ACTIVE CLEARANCES:

- "B" RHR Pump

GENERAL INFORMATION:

- Complete the Main Turbine Stop Valve RT
- Raise power with control rods as directed by the RE.

Scenario Outline

Simulation Facility Peach Bottom **Scenario No.** #4 **Op Test No.**

Examiners ______________ **Operators** ______________ CRS

______________ ______________ PRO

______________ ______________ URO

Objectives Evaluate the ability of the crew to maneuver the plant during power changes and to perform a Main Turbine Stop Valve Routine Test while at power. Evaluate the crew's response to the loss of Feedwater Heaters requiring the crew to enter and execute the positive reactivity procedure. The crew should recognize and respond to the failure of an RPS Low Vacuum Pressure Transmitter. The crew should diagnose a steam leak in the Turbine Building and when the steam leak grows in magnitude, the crew should recognize the need to shutdown the plant. A Reactor Mode Switch failure will require the crew to use the manual pushbuttons or Alternate Rod Insertion (ARI) to terminate the ATWS. A manual Group I isolation will be required due to the isolation failure. The crew should utilize the TRIP procedures to determine the need for an Emergency Blowdown of the RPV via alternate depressurization methods.

Initial Condition IC-20, reduced to 65% power with the "B" RHR Pump Blocked For Motor Replacement

Turnover: See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	URO PRO CRS	Perform the Main Turbine Stop Valve Routine Test
2		R	URO PRO CRS	Raise Power with Control Rods
3	Override	C	URO PRO CRS	Loss Of Extraction Steam To Feedwater Heaters
4	Override	I	URO PRO CRS	Failure of a Vacuum Transmitter (Tech Spec)
5	MSS10	M	URO PRO CRS	Steam Leak In The Turbine Building
6	PCI01 Override	C	URO PRO CRS	Group I Failure To Auto Isolate (Manual works)/Failure Of The "D" MSL To Manually Isolate
7	Override	I	URO PRO CRS	Failure To Scram (Reactor Mode Switch/B RPS Auto Channel Failure)
8	Override MSS08	C	URO PRO CRS	Unable To Restore Drywell Nitrogen/Only 2 SRVs Operate On Emergency Blowdown/Depressurization Via Alternate Methods

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

Op Test No.: **Scenario No.: #4** **Event No.: 1**

Event Description: Main Turbine Stop Valve Routine Test

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct PRO to perform RT-O-001-400-2, the Main Turbine Stop Valve Individual Full Closure Routine Test.

	PRO	Perform RT-O-001-400-2, the Main Turbine Stop Valve Individual Full Closure Routine Test:
		- Review RT
		- Inform the Unit Reactor Operator that the test is going to be conducted and what indications he can expect to receive (this may be covered during a CRS briefing)
		- Place the CV/SV Test Selector to SV TEST
		- Verify all four MSV test button lights are ON
		- Place the backup EHC Pump in Run and document in RT
		- For Each Main Turbine Stop Valve
		  - Depress and Hold the Test pushbutton
		  - Verify the position indicator moves smoothly at low speed to less then 10% open and then fast closes
		  - After 2-3 seconds at full close, release the pushbutton
		  - Verify that the indicator moves smoothly from 0-100%
		- Place the CV/SV Test switch to OFF
		- Verify the lights on all four MSV test buttons are OFF
		- Place the backup EHC Pump in STOP and then AUTO

	URO	Monitor plant parameters/assist as directed

Op Test No.: **Scenario No.:** **#4** **Event No.:** **2**

Event Description: Raise power with Control Rods

Time	Position	Applicant's Actions Or Behavior
	CRS	Review plant status in GP-2, "Plant Startup". Direct continued power ascension in accordance with RE direction and the provided pull sheets.
	URO	Pull rods in accordance with provided RE pull sheets. Have Control Rod movements double verified by the supplied rod verifier (an instructor on the exam team will fill this position). Monitor power during the power ascension.
	PRO	Inform Power Systems Director of the power ascension. Monitor plant parameters/assist as necessary.

Event Description: Loss Of Extraction Steam To Feedwater Heaters

Cause: AO Valves supplying various heaters fail closed due to a common airline break

Automatic Actions: None, no alarms

Effects: Loss of extraction steam to heaters, lowering feed temps, rising reactor power

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize rising reactor power, inform CRS and announce entry into the Positive Reactivity OT (OT-104)
	CRS	Enter/direct actions IAW OT-104 - Monitor position on Figure 1 of OT-104 - Reduce Total Core Flow to 60 M#/hr - Insert control rods as required - Lead crew in determining the cause of the Positive Reactivity - Direct troubleshooting of feedwater heater problem - Direct isolation of the air leak
	URO PRO	Investigate cause of power rise - Recognize lowering feedwater temperatures, inform CRS - Recognize loss of extraction steam to feedwater heaters, inform CRS
	URO	Reduce Total Core Flow as directed by the CRS Maintain power 10% below initial pre-transient level by driving Table 1 Rods as required
	PRO	Assist with troubleshooting feedwater heaters as directed

Op Test No.: **Scenario No.: #4** **Event No.: 4**

Event Description: Failure of a Vacuum Transmitter (Tech Spec)

Cause: PT-2-5-11C fails resulting in an RPS Trip

Automatic Actions: 210 B-1 "CONDENSER LO VACUUM TRIP" Alarm
"A" RPS Channel Half Scram

Effects: "A" RPS Channel Half Scram, no rod motion

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize and report 210 D-1, "CONDENSER LO VACUUM TRIP" Recognize and report the "A" Channel Half Scram Verify actual condenser vacuum is normal
	URO	Take action IAW ARC 210 D-1 "CONDENSER LO VACUUM TRIP" and 211 B-1 ("A" Channel Auto Scram)
	CRS	Direct troubleshooting of failed instrument Refer to Tech Spec 3.3.1.1 to determine that a trip must be inserted in "A2" RPS within 12 hours Initiate GP-25 to insert a redundant trip into the "A2" RPS logic using Appendix 1.
	PRO	Perform GP-25 Appendix 1 to insert a redundant trip into the "A2" RPS logic

Op Test No.: **Scenario No.: #4** **Event No.: 5**

Event Description: Steam Leak In The Turbine Building

Cause: "D" MSL weld cracks

Automatic Actions: Initially alarms will be received indicating vent stack problems and then will progress to Group 1 conditions

Effects: High steam line flow Group 1 isolation condition and resultant reactor scram signal on MSIV closure

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize, report, and take actions IAW ARC 218 B-5 & C-5 (Vent Exhaust Stack Hi Radiation) - Monitor RI-2979 to verify a valid signal - Enter ON-104
	CRS	Enter ON-104 and direct search for source of high vent exhaust rad
	URO PRO	Recognize and report High Area Temperature Alarm with a potential T-103 (Secondary Containment Control) Entry
	PRO	Monitor Area Temperatures and determine that the leak is in the turbine building and NOT a T-103 entry Recognize the Group 1 alarms and failure of the Group 1 to occur - Report Group 1 Failure to the CRS
	CRS	Direct a Reactor Scram and closure of the MSIVs
	URO	Attempt to scram the reactor and report the ATWS and entry into T-101, "RPV Control" SEE EVENT #7 FOR FAILURE TO SCRAM DETAILS
	PRO	- Attempt to manually isolate the MSIVs - Report inability to isolate the "D" Main Steam Line to the CRS SEE EVENT #6 FOR FAILURE TO ISOLATE DETAILS

Op Test No.: **Scenario No.: #4** **Event No.: 6**

Event Description: Group I Failure To Auto Isolate (Manual works)/Failure Of The "D" MSL To Manually Isolate

Cause: Failure of remaining channel of isolation logic to actuate (see Event 4), "D" MSL will not isolate manually

Automatic Actions: None, no alarms

Effects: Group 1 failure to isolate, manual isolation will work on all MSL with the exception of the "D" line, reactor scram signal from MSIV closure will not occur until MSIVs closed by operator

Time	Position	Applicant's Actions Or Behavior
CT	PRO	Recognize indications of major steam leak, MSIVs failing to close, inform CRS - Close MSIVs with handswitches, recognize the "D" Main Steam Line Failure to manually isolate
	CRS	Direct the performance of AO 1A.2-2, Closing Stuck Open MSIVs Direct a GP-15 evacuation of the Turbine Building
	PRO	Direct an EO to perform AO 1A.2-2 for the MSIVs Perform a GP-15 evacuation of the Turbine Building
	URO PRO	Recognize, report alarms 218 B-4 & C-4 (Vent Stack Exhaust Hi Hi Rad), announce T-104 "Radiation Release" Entry
	CRS	Enter/direct actions IAW T-104, "Radiation Release" - Initiate Dose Assessment/Reference ERP101 as appropriate - Continue to attempt to isolate the MSIVs - Continue to take action in T-101, "RPV Control" to shutdown and depressurize the plant (SEE EVENT #7) When the release can not be maintained below the General Emergency Level by Dose Assessment Reports, then direct T-112, "Emergency Blowdown" (SEE EVENT #8 FOR DETAILS)

Op Test No.: **Scenario No.: #4** **Event No.: 7**

Event Description: Failure to scram (Reactor Mode Switch/B RPS Auto Scram Channel failure)

Cause: Mode Selector Switch (MSS) contacts do not make up, MSS remains in "Run", B RPS Channel does not trip

Automatic Actions: Alarms 211 D-1 & E-1 are NOT received

Effects: Manual pushbuttons or ARI will scram the reactor

Time	Position	Applicant's Actions Or Behavior
	URO	Carry out Scram actions - Recognize ATWS - Report that control rods are not inserting and APRMs are NOT downscale
	CRS	Exit T-100 and enter T-101 based upon scram condition with power greater than 4% (MSS failure) - Direct that Manual Scram Pushbuttons be pressed or ARI be initiated
CT	URO	Press Manual Scram pushbuttons or press ARI manual pushbuttons Verify rods inserting and APRMs downscale
	CRS	Verify URO/PRO Scram Actions completed Direct that level be maintained +5 to +35 inches Direct the restoration of drywell instrument nitrogen Direct a depressurization
	URO	Attempt to control level +5 to +35 inches
	PRO	Carry out Scram actions - Verify house loads transferred - Verify main turbine tripped and generator locked out - Attempt to restore Drywell instrument nitrogen (SEE EVENT #8) - Initiate a depressurization (if time allows – RPV is depressurizing slowly through the break)

Op Test No.: **Scenario No.: #4** **Event No.: 8**

Event Description: Only 2 SRVs Operate On Emergency Blowdown/Depressurization Via Alternate Methods

Cause: Drywell nitrogen not available and some SRVs with mechanical failures

Automatic Actions: None

Effects: Only able to open 2 of the required 5 SRVs for the Emergency Blowdown, required to depressurize via alternate methods

Time	Position	Applicant's Actions Or Behavior
	PRO	Attempt to restore DW instrument nitrogen, discover that the valves will not reopen, report to the CRS
CT	CRS	Direct alternate methods of supplying nitrogen to the SRVs Determine that release rates are going to reach General Emergency level Emergency depressurize the reactor using T-112, 'Emergency Blowdown" - Direct URO to control condensate injection - Direct PRO to open all ADS SRVs
	URO	Prevent uncontrolled condensate injection
	PRO	Take the switches to open on all ADS valves Recognize that 5 ADS valves will not open, inform CRS
	CRS	Direct additional SRVs to be opened until 5 are open
	PRO	Attempt to open SRVs until 5 are open Recognize only 2 SRVs can be opened, inform CRS
	CRS	Direct depressurization using alternate means

TERMINATION - Scenario may be terminated when alternate depressurization is directed.

Post Scenario Emergency Classification: GENERAL EMERGENCY based on ERP-101 Table 5 for Radioactive Release.

SIMULATOR OPERATOR INSTRUCTIONS FOR SCENARIO (#5)

GENERAL REQUIREMENTS

- Recorders will be rolled prior to the scenario and paper from selected recorders will be retained for the examination team as requested.
- All procedures, flow charts, curves, graphs, etc. will be in their normal storage places.
- All markable procedures, boards, etc. will be erased.
- All paper used by the crew will be retained for the examination team as requested.
- The simulator operators will keep a log of all communications during the scenario as requested by the examination team.

SCENARIO SOURCE HISTORY

- This scenario is derived from a spare scenario written for the September 1998 Peach Bottom NRC exam. This scenario was never used for any examination or training.

INITIAL SETUP

- IC-20, 75% power
- Ensure recorder power is on, roll recorders as required

LOAD APP 9701#1

EVENT TRIGGERS

- TRG E1 A_RECIRC_PUMP_DRIVE_MOTOR_GREEN_LIGHT_ON
- TRG E2 MO53AGREENON (ZLORR0YAMO253A_1 == TRUE)

MALFUNCTIONS

- IMF RHR01B (Trip B RHR Pump)
- IMF RRS13A (E1 2:00) (A Recirc Seal Failure)
- IMF RRS14A (E1 2:00) (A Recirc Seal Failure)
- IMF VED01_74 (E2 0 5) (Magnetic Trips the Recirc Discharge Valve)
- IMF RRS20 (E1) .3 5:00 (Recirc Rupture)

OVERRIDES

- MRF MGA01TO (OVERRIDES THE MAIN GENERATOR LOCKOUT)

I/O OVERRIDES

- IOR ZLORH032BP35_2 OFF ("B" RHR LIGHT OFF)
- IOR ZLORH032BP35_1 OFF ("B" RHR LIGHT OFF)
- IOR ZYP12A1S51 OFF ("A" RHR LOOP S18 TO OFF)
- IOR ZYP12A1S23 CLOSE (MO-26A TO CLOSE)
- IOR ZYP12A3S50 OFF ("B" RHR LOOP S18 TO OFF)
- IOR ZYP12A3S23 CLOSE (MO-26B TO CLOSE)

REMOTE FUNCTIONS

- MRF RFC03A to 51% (Recirc Mechanical Stop to 51%)

OTHER ACTIONS

- Place the "B" RHR Pump out of service and tagout
- Check the "A" RFP Lineup

TURNOVER PROCEDURES

- Markup copy of GP-2 complete through Step 6.3.53 except step 6.3.50

MACHINE OPERATOR ACTIONS DURING SCENARIO #5

EVENT 1 -- Support crew for Reactor Feed Pump Start as Requested

EVENT 2 -- Support crew for power ascension as needed

EVENT 3 -- Runaway Recirc Pump "A" as follows:
- Verify that Remote Function RFC03A is set to 51% (Preinserted)
- Enter IMF RFC01A ("A" Recirc Flow Controller fails upscale)
- Enter MRF RFC03A 100 3:00 to change RFC03A to 100 on a 3 min ramp

EVENT 4 -- Enter IMF RRS11A 100 10:00 to enter RRS11A @100% on a 10 minute Ramp ("A" Recirc Vibration)

EVENT 5 -- Verify that the Recirculation seals blow (RRS13A and RRS14A) 2 minutes after the Recirc Pump Drive Motor Breaker Trip.

EVENT 6 -- Verify the VED01_74 (MO-53A Trips) occurs 5 seconds after the valve is taken to close and the green light comes on (ET2).

If sent to the LPCI swing bus, then report that the MO-53A is tripped on magnetics.

EVENT 7 -- Verify that RRS20 @ .3% on a 5 minute Ramp (Recirc Leak) goes active 2 minutes and 30 seconds after the Recirc Drive Motor is tripped.

EVENT 8 -- Verify that the Generator Lockout does not occur (preinserted)

EVENT 9 -- When the operator attempts to spray the drywell, the 2/3 Core Coverage Keylock Switch on the loop selected for spray will not work (it is overridden on both loops). **REMOVE THE OVERRIDES ON THE OTHER LOOPS 2/3 CORE COVERAGE KEYLOCK SWITCH AND MO-26 VALVE** to permit spraying with this loop.

TERMINATION -- After control of primary containment is established

SHIFT TURNOVER

PLANT CONDITIONS:

- -- At approximately 75% power with a full power rod pattern performing reactor and plant startup
- -- At Step 6.3.53 of GP-2

INOPERABLE EQUIPMENT/LCOs:

- -- "B" RHR Pump out of service for motor replacement, 6 hours into LCO 3.5.1, expected return to service in 2 days

SCHEDULED EVOLUTIONS:

- -- N/A

SURVEILLANCES DUE THIS SHIFT:

- -- N/A

ACTIVE CLEARANCES:

- -- "B" RHR Pump

GENERAL INFORMATION:

- -- Place the "A" Reactor Feed Pump in service using SO 6C.1.C-2 beginning with step 4.4 to permit continued power ascension

- -- Continue with power ascension to 100%. The RE has determined that power may be raised to 90% using recirc flow not to exceed 10 Mwe/Min. At 90% power contact the REs to reevaluate the power ascension.

Scenario Outline

Simulation Facility:	Peach Bottom	**Scenario No.:**	#5	**Op Test No.:**	
Examiners	____________		**Operators**	____________	CRS
	____________			____________	URO
	____________			____________	PRO

Objectives Evaluate the ability of the crew to place a RFP in service and perform a normal power ascension. During the power ascension, a recirc pump will runaway requiring the crew to take action for positive reactivity addition. Evaluate the crew's response to the Tech Spec implications of mismatched Recirc Pump Speed. The crew should recognize the Recirc Pump high vibration and seal failures requiring a manual trip. The recirc pump discharge valve will fail to close resulting in an unisolable leak in the drywell. The main generator will fail to lockout when the turbine is tripped requiring manual operator action. Evaluate crew's ability to spray the drywell with the other loop when the first is not available. Demonstrate the ability to utilize TRIP procedures.

Initial Conditions IC-20, 75% power with the "B" RHR Pump Blocked For Motor Replacement

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malf. No.	Event Type*	Event Description
1		N URO PRO CRS	Place the "A" Reactor Feed Pump in service
2		R URO PRO CRS	Continue Power Ascension IAW GP-2
3	RFC01A	I URO PRO CRS	Recirc Pump Runaway (includes Tech Spec for mismatched flows)
4	RRS11A	C URO PRO CRS	Recirc Pump High Vibration Requiring Manual Trip
5	RRS13A/ RRS14A	C URO PRO CRS	"A" Recirc Pump Seals both fail
6	VED01_74	C URO PRO CRS	Recirc Pump Discharge Valve Trips on Overcurrent
7	RRS20	M URO PRO CRS	Small Recirc Line Break/LOCA Inside Primary Containment Leading To Drywell Sprays
8	MGA01	I PRO CRS	Main Generator Fails to Lock Out Automatically
9	Override	C PRO CRS	CTMT Spray Override 2/3 Core Coverage Switch failure (one loop)

Op Test No.: **Scenario No.:** **#5** **Event No.:** **1**

Event Description: Continue Power Ascension IAW GP-2

Time	Position	Applicant's Actions Or Behavior
	CRS	Directs placing the "A" Reactor Feed Pump in service
	URO PRO	Place the "A" Reactor Feed Pump (RFP) in service using the normal system operating procedure. - Raise "A" RFP Discharge Pressure to greater than reactor pressure. - Slowly stroke open the RFP Discharge Valve while monitoring RPV Level - Place the "A" RFP in Automatic - Close the "A" RFP Min Flow Valve
	URO PRO	Monitor plant parameters/assist as directed

Op Test No.: **Scenario No.:** **#5** **Event No.:** **2**

Event Description: Continue Power Ascension IAW GP-2

Time	**Position**	**Applicant's Actions Or Behavior**
	CRS	Directs continued power increase using recirc flow per GP-2 not to exceed 10 Mwe/minute
	URO	Raise recirculation flow at a rate not to exceed 10 Mwe/Min - Raises recirc flow with the individual pump controllers, one loop at a time, maintaining loop flow matched -Monitors rate of power rise to prevent exceeding 10 Mwe/Min
	PRO	Informs Power System Director of continued power increase Monitor plant parameters/assists URO as directed

Event Description: "A" Recirc Pump Runaway

Cause: Scoop tube positioner fails to its high speed stop

Initial Automatic Actions: None, no alarms received

Effects (General Sequence): Pump speed rises to high speed stop, flow and power rise, rod blocks may occur, event can be terminated by a manual scoop tube lockup

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize reactor power going up (may notice recirc speed first) -Announce entry into OT-104, Positive Reactivity Addition -Announce entry into OT-112, Unexpected/Unexplained Change in Core Flow
	CRS	Enters and execute OT-104, Positive Reactivity Addition Exit OT-104 when Recirc Pump speed change is identified Enters and executes OT-112, Unexpected/Unexplained Change in Core Flow
CT	URO PRO	Recognize rising "A" Recirc Pump speed, inform CRS
	CRS	Directs scoop tube lockup
	URO PRO	- Locks scoop tube with the selector switch - Verifies post scoop tube lockup actions and indications per SO 2D.7.B-2, Recirculation MG Set Scoop Tube Lockup and Reset - Monitors pump speed, power, level and pressure
	URO PRO	Lower Core Flow to or below initial level using the "B" Recirc Pump Monitor plant parameters/assists as necessary
	CRS	Verify compliance with Tech Specs Section 3.4.1 for mismatched recirculation flows. If flows are outside of the limits, then: - Declare the pump in the low flow loop inoperable - Start a 12 hour time clock per Tech Spec 3.4.1

Op Test No.: **Scenario No.:** **#5** **Event No.:** **4**

Event Description: "A" Recirc Pump High Vibration requiring Manual Trip

Cause: Pump shaft misalignment

Initial Automatic Actions: Rising pump vibrations requiring action per ARC 214 B-1

Effects (General Sequence): Rising pump vibrations, unable to reduce pump speed (due to locking up earlier) or shutdown IAW SO, will require pump trip

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize "A" Recirc Pump high vibration alarm 214 B-1, inform CRS - Monitor pump vibration - Report pump vibration and trend
	CRS	Determine that pump speed cannot be reduced below the "Danger" level due to scoop tube lockup and that pump shutdown is required in accordance with ARC 214 B-1 - Direct "A" Recirc Pump tripped
	PRO	Trip the "A" Recirc Pump when directed - Close "A" Recirc Pump Discharge Valve (MO-053A)
	CRS	Enter OT-112 for the Recirc Pump Trip - Verify URO is driving table 1 rods and monitoring for THI - Plot plant condition on the power to flow map (may find plant to be in Region 1, if so direct an immediate scram)
	URO	Take OT-112 Immediate Operator Actions - Drive in all G-9-2 Appendix 1 Table 1 control rods - Monitor for THI
	PRO	Provide necessary data to the CRS to Plot power to flow as requested

Op Test No.: **Scenario No.:** **#5** **Event No.:** **5**

Event Description: "A" Recirc Pump Seals both Fail

Cause: Excessive vibration of the "A" Recirc Pump fails its seals.

Initial Automatic Actions: Take action in accordance with the OT-101, High Drywell Pressure. Trip and attempt to isolate the Recirc Pump.

Effects (General Sequence): Seal Failure alarms, both seals' pressure will drop to drywell pressure.

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize Recirc Pump Seal Failure Alarms Recognize lowering pressures on both Seals and report to CRS Recognize that Drywell pressure is going up and announce entry into OT for High Drywell Pressure - Maximize Drywell Cooling - Verify that inerting is not in progress Trend the Drywell Pressure Increase
	CRS	Enter/direct actions in accordance with OT-101, High Drywell Pressure - Verify that the URO/PRO have taken their Immediate Operator Actions - Direct the "A" Recirc Pump to be isolated - Direct the following if the rate of rise of DW Pressure permits: - At or before 1.5# DW Pressure direct house loads to be transferred and a GP-9 Shutdown to be commenced - At or before 1.7# DW Pressure, direct a manual scram (continued on event #7)

Op Test No.: **Scenario No.:** **#5** **Event No.:** **6**

Event Description: Recirc Pump Discharge Valve Trips on Overcurrent

Cause: Recirc Discharge Valve trips on magnetic overcurrent

Initial Automatic Actions: Valve stops moving if stroking, both lights (green and red) go out

Effects (General Sequence): Valve can not be operated electrically, "A" Recirc Pump can not be isolated

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize the MO-53A, "A" Recirc Pump Discharge Valve has tripped on Magnetics Report to the CRS Send an Equipment Operator to investigate
	CRS	Direct Investigation to attempt to isolate the "A" Recirc Discharge Valve Recognize that the "A" Recirc Pump and the leak can not be isolated unless the Discharge Valve can be closed

Op Test No.: **Scenario No.:** **#5** **Event No.:** **7**

Event Description: Small Recirc Line Break/LOCA

Cause: Break of the Recirc Line where it attaches to the "A" Recirc Pump

Initial Automatic Actions: Drywell pressures and temperatures will rise at an increasing rate, eventually leading to a high drywell (DW) pressure alarm and scram if not scrammed manually, ECCS automatic start signals and PCIS isolation signals will be received.

Effects (General Sequence): Provides primary containment control problems, conditions escalate to requiring drywell sprays.

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize/take Immediate Operator Actions for rising drywell (DW) pressures and temperatures, inform CRS (These actions were scripted with Event #6 when the recirc pump seals failed)
	CRS	Enter/direct actions for OT-101, High DW Pressure (scripted for Event #6 when the recirc pump seals failed) Enter/direct actions for ON-120, High DW Temperature (basically similar to High DW Pressure actions)
	URO PRO	Recognize drywell pressure/temperature are continuing to rise, inform CRS
	CRS	When or before drywell pressure reaches 1.7#, direct a manual scram

Operator Actions

Op Test	Senario 5	Event # 7 (cont.)	Page 8 of 10

Time	Position	Applicant's Actions Or Behavior
	PRO	Transfer House Loads and take scram actions when scram occurs: - Verify House Loads Transferred - Trip the turbine at 50 Mwe - Verify the Generator Lockout - Verify all isolations - Report to the CRS and get permission to bypass and restore DW Instrument Nitrogen - Restore Instrument Nitrogen to the DW
	URO	Take Scram Actions when directed: - Place the Mode Switch to Shutdown - Verify Rods inserting - Manually control the Reactor Feed Water System to control Reactor Level - Verify APRMs are downscale -Report to the CRS
	CRS	At 2# Drywell Pressure enter/direct actions for T-101, RPV Control - Verify URO/PRO Scram Actions - Direct Level to be restored and maintained +5 to 35 inches - Direct DW Instrument Nitrogen to be restored - Direct the reactor to be depressurized not to exceed 100 degrees per hour
	CRS	At 2# Drywell Pressure enter/direct actions for T-102, Primary Containment Control - Monitor Primary Containment Conditions - Direct restoration of DW Cooling - Direct torus sprays - Direct DW sprays after verifying that conditions meet the DW Spray Initiation Curve

Note: Refer to Event #9 for continuing actions

Event Description: Main Generator Lockout fails when turbine is tripped

Time	Position	Applicant's Actions Or Behavior
	PRO	Recognize and report the failure of the Main Generator Lockout
	CRS	Direct the Manual Lockout of the Main Generator
	PRO	Manually Lockout the Main Generator

Op Test No.: **Scenario No.:** **#5** **Event No.:** **9** **Page 10 of 10**

Event Description: CTMT Spray Override 2/3 Core Coverage Switch Failure

Time	Position	Applicant's Actions Or Behavior
	PRO	Initiate torus sprays when directed (crew may go directly to DW sprays) - Place CTMT Spray Override 2/3 Core Coverage switch in "Manual Override"
CT		Recognize CTMT Spray Override 2/3 Core Coverage switch failure, inform CRS, complete spray lineup on the other loop - Place other CTMT Spray Override 2/3 Core Coverage switch in "Manual Override" - Place CTMT Spray Valve Control switch in "Manual" momentarily - Secure one running RHR Pump (if two were running) - Open MO-39A(B) (if not open for torus cooling already) - Throttle MO-34A(B) to obtain 8000 gpm - Throttle MO-38A(B) to obtain 9000 gpm
	PRO	Initiate DW sprays - Throttle open MO-26A(B) and MO-31A(B) to raise flow to 10,000 gpm - Throttle closed MO-34A(B) to reduce RHR flow - Throttle open MO-26A(B) and MO-31A(B) restore flow to 10,000 gpm - Repeat as necessary to control DW Pressure - Monitor DW pressure

TERMINATION -- After control of primary containment is established

Post Scenario Emergency Classification: ALERT based on ERP-101 Table 3 Reactor Coolant System Leakage > 50 gpm

Facility: Peach Bottom Unit 2 & 3 Date of Examination: Week of Sep. 13, 1999
Examination Level (circle one): RO / SRO Operating Test Number: SRO - 1 .

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Plant Parameter Verification – Rod Position JPM	Verify rod positions following a fast power reduction (alternate path).
	Temporary Modifications of Procedures – Partial Procedure JPM	Prepare a "Partial Procedure" for post-maintenance testing of a component.
A.2	Surveillance Testing – Tech Spec Action Log JPM	Given equipment failing surveillance testing, determine and make appropriate Tech Spec Action Log entries.
A.3	Use of Portable Survey Instruments – Rad Survey instrument use JPM	Use a portable radiation instrument.
A.4	Emergency Protective Action recommendations – PAR JPM	Given General Emergency plant conditions, make a protective action recommendation (PAR).

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: New-Control Rod Verif K/A: 201003A3.01

URO: 3.7 SRO: 3.6

TASK DESCRIPTION: Control Rod Position Verification – (Alternate Path)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Official 3D MONICORE P1 performed before transient.

C. REFERENCES

1. GP-9-2, Rev. 26, "Fast Power Reduction"

2. ON-122, Rev. 5, "Misposition Control Rod"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the trainee has performed a control rod position verification, identified the mispositioned control rod and taken the required Off Normal procedure actions.

2. Estimated time to complete: 10 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to verify control rod positions following a GP-9-2 power reduction. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. A vacuum transient occurred on Unit 2 requiring power to be lowered using GP-9-2.

2. The power drop was stopped 5 minutes ago when vacuum stabilized at 27".

3. Table 1 control rods have been inserted.

4. An Official 3D P1 was completed just prior to the transient.

G. INITIATING CUE

The Control Room Supervisor directs you, the 4th RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain the recent official 3D P1 or control rod position log. (Cue: Provide a copy of the P1 or control rod position log.)	P	Operator gets a copy of the recent official 3D P1 or control rod position log.
2	Compare current control rod position to the position prior to the transient. (Cue: Acknowledge checks in progress.)	P	Operator checks current position as compared to pre-transient position.
*3	Identify control rod 18-07 is not driven to position 00. (Cue: Control rod 18-07 is at position 04.)	P	Operator identifies and reports that control rod 18-07 is not at position 00.
4	Recognize and announce entry into ON-122, "Mispositioned Control Rod". (Cue: Acknowledge entry into ON-122, DIRECT the operator to take appropriate ON-122 actions.	P	Operator recognizes and reports entry into ON-122, "Mispositioned Control Rod".
5	Contact Reactor Engineering for assistance, in accordance with ON-122, "Mispositioned Control Rod",. (Cue: Reactor Engineering acknowledges the request.)	P	Operator contacts the Reactor Engineers and requests their assistance.
6	Notify the Shift Manager in accordance with ON-122, "Mispositioned Control Rod",. (Cue: The Shift Manger acknowledges report.)	P	Operator contacts the Shift Manager and reports the mispositioned control rod.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When Reactor Engineering and Shift Manger is informed, the evaluator will terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. A vacuum transient occurred on Unit 2 requiring power to be lowered using GP-9-2.

2. The power drop was stopped 5 minutes ago when vacuum stabilized at 27".

3. Table 1 control rods have been inserted.

4. An Official 3D P-1 was completed just prior to the transient.

INITIATING CUE

The Control Room Supervisor directs you, the 4th RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

PECO Energy Company
Peach Bottom Unit 2

GP-9-2 FAST REACTOR POWER REDUCTION

1.0 PURPOSE

To rapidly reduce reactor power as required by plant conditions.

2.0 PREREQUISITES

2.1 Plant conditions require a fast reduction in power.

3.0 PERFORMANCE STEPS

NOTES

1. Steps for power reduction may be exited when power reduction is no longer required.

2. Core thermal hydraulic instability may be occurring if ANY of the following conditions exist:

   o APRM oscillations of greater than OR equal to 10 percent peak-to-peak,

   o LPRM OR APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, OR

   o WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.

3.1 IF evidence of core thermal hydraulic instability exists, THEN place the reactor mode switch in "SHUTDOWN" AND enter T-100, "Scram", AND exit this procedure. **CM-1, CM-2**

3.2 Lower recirculation flow until ANY of the following occur:

o percent reactor core thermal power is reduced to the value specified in Step 1 of GP-9-2 Appendix 1

OR

o an "APRM HIGH" alarm occurs, **CM-3**

OR

o FLLLP exceeds 0.995.

3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch OR the Emergency In/Notch Override handswitch. **CM-4**

3.4 Reduce recirculation flow to lower total core flow to approximately 51.25 Mlbs/hr (50% core flow) as indicated on PMS point B015 OR on Reactor Total Core Flow Indicator, DPFR-2-02-3-095, on Panel 20C005A. **CM-5**

NOTE
Pre-transient rod positions may be obtained from a recent OFFICIAL 3D P1, a recent CONTROL ROD POSITION LOG, RE-C-01 Appendix 7, Control Rod Position Data Sheets, RE-C-01, Exhibit RE-C-01-01, Quarter Core Map or RE-C-01, Exhibit RE-C-01-02, Full Core Map.

3.5 WHEN plant conditions permit, THEN a second licensed operator shall verify control rods on GP-9-2 Appendix 1, Table 1, inserted in Step 3.3 are at position 00 and ALL other control rods are at their pre-transient positions AND signoff Step 3 of GP-9-2 Appendix 1, Table 1.

3.6 Demand an OFFICIAL 3D P1 from PMS or 3D MONICORE to obtain thermal limit values (MFLCPR, MFLPD and MAPRAT).

3.7 IF any thermal limit value is equal to or greater than 1.000, THEN take corrective action in accordance with GP-13, "Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern", and RE-C-01, "Reactor Engineering General Instructions".

3.8 IF further power reduction is required, THEN exit this procedure AND enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure AND enter GP-5, "Power Operations".

4.0 REFERENCES

4.1 GP-3, Normal Plant Shutdown

4.2 GP-5, Power Operations

4.3 GP-9-2 Appendix 1, U/2 Fast Reactor Power Reduction Table

4.4 GP-13, Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern

4.5 RE-C-01, Reactor Engineering General Instructions

4.6 RE-C-01 Appendix 7, Control Rod Movement Guidelines PBAPS Only

4.7 Letter from L. F. Rubino to J. T. Budzynski, 11/8/88

4.8 CM-1, NRC Bulletin No. 88-07 Supplement 1 (T00313)

4.9 CM-2, NRC Generic Letter 94-02 (T03567)

4.10 CM-3, OE 5194, Partial Loss of Feedwater Heating

4.11 CM-4, INPO SER 4-88 (T00462)

4.12 CM-5, GE Letter 11-7-88, Recirc Pump Trip Guidelines (T000157)

4.11 INPO SOER 94-01 (T03905)

PECO Energy Company
Peach Bottom Units 2 and 3

ON-122 MISPOSITIONED CONTROL ROD - PROCEDURE

1.0 SYMPTOMS

1.1 An incorrectly selected control rod was moved.

1.2 A correctly selected control rod was moved two or more notches beyond it's targeted position.

1.3 A correctly selected control rod was moved to an incorrect location AND the operator was NOT immediately cognizant.

2.0 OPERATOR ACTIONS

2.1 Halt all control rod motion and power changes.

2.2 Notify Shift Management.

2.3 IF the mispositioned control rod is caused by a Rod Drift THEN:

2.3.1 Perform ON-121, "Drifting Control Rod".

2.3.2 Exit this procedure.

2.4 IF thermal power is below the RWM low power setpoint AND control rods are positioned such that more than two insert errors OR more than one withdraw error exists, THEN manually scram in accordance with GP-4, "Manual Reactor Scram".

2.5 IF the control rod had been mispositioned less than two minutes THEN:

2.5.1 Immediately return the rod to its proper position.

2.5.2 Notify Reactor Engineering.

> **NOTE**
>
> PCIOMR surveillance status sign is posted to inform the Reactor Operator if PCIOMR recommendations are in effect. The sign is posted on the 2(3)0C05A console at the four rod display panel.

2.6 IF the control rod has been mispositioned for longer than two minutes AND PCIOMR surveillance is required, THEN:

2.6.1 Initiate a 100 MWe load drop, do not go below 500 MWe.

2.6.2 Immediately contact Reactor Engineering for assistance per RE-C-01, "Reactor Engineering General Instructions".

2.6.3 Notify the Shift Manager.

2.7 IF the control rod has been mispositioned for longer than two minutes AND PCIOMR surveillance is NOT required, THEN:

2.7.1 Immediately contact the Reactor Engineering for assistance per RE-C-01, "Reactor Engineering General Instructions".

2.7.2 Notify the Shift Manager.

PECO NUCLEAR
PEACH BOTTOM ATOMIC POWER STATION
JOB PERFORMANCE MEASURE

SRO CONDUCT OF OPS

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: New-Partial Proc K/A: 2.2.11

URO: 2.5 SRO: 3.4

TASK DESCRIPTION: Prepare a Partial Procedure

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

ST-O-011-301-2, Rev. 12, “Standby Liquid Control Pump Functional Test for IST”

C. REFERENCES

1. A-3, Rev. 18, “Temporary Changes to Procedures and Partial Procedure Use”

2. ST-O-011-301-2, Rev. 12, “Standby Liquid Control Pump Functional Test for IST”

D. TASK STANDARD

1. Satisfactory task completion is indicated when the candidate has correctly prepared ST-O-011-301-2, “Standby Liquid Control Pump Functional Test for IST” as a partial for the completion of Post Maintenance Testing on the “B” Standby Liquid Control (SBLC) pump.

2. Estimated time to complete: 20 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to prepare a partial procedure for Post Maintenance Testing of the “B” Standby Liquid Control (SBLC) pump using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. The “B” Standby Liquid Control (SBLC) pump has failed step 6.3.23 of ST-O-011-301-2, “Standby Liquid Control Pump Functional Test for IST” due to having insufficient pump flow.

2. Maintenance has completed repairs on the pump and it is ready for Post Maintenance Testing.

G. INITIATING CUE

The Control Room Supervisor directs you to prepare a Partial Procedure from ST-O-011-301-2, “Standby Liquid Control Pump Functional Test for IST” to complete Post Maintenance Testing of the “B” Standby Liquid Control (SBLC) pump. Submit the completed partial procedure for review and approval.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*1	Enter the word "PARTIAL" on the first page of the procedure.	P	The word "PARTIAL" is entered on the front page.
*2	Record the reason for the partial and whether additional testing is required to fulfill surveillance test requirements.	P	Candidate writes words that indicate the partial is being used as Post Maintenance Test and that is will meet the surveillance requirements for the "B" SBLC pump.
*3	Indicate changes on the procedure to those steps or portions of the procedure that are not required to be performed.	P	Steps which do not support the testing of the "B" SBLC pump are changed or crossed out. • Step 6.1.1 should be made to apply to the "B" SBLC Pump Only. • Steps 6.1.2 –6.1.5 should be crossed out. • Steps 6.2.1 –6.2.28 (all of section 6.2) should be crossed out (individual steps or entire pages may be crossed out at a time).
4	Submit the partial for approval. (Cue: Accept partial for approval.)	P	Candidate will give evaluator the marked up procedure for approval.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the candidate submits the Partial Procedure for approval, the evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. The "B" Standby Liquid Control (SBLC) pump has failed step 6.3.23 of ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" due to having insufficient pump flow.

2. Maintenance has completed repairs on the pump and it is ready for Post Maintenance Testing.

INITIATING CUE

The Control Room Supervisor directs you to prepare a Partial Procedure from ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" to complete Post Maintenance Testing of the "B" Standby Liquid Control (SBLC) pump. Submit the completed partial procedure for review and approval.

PORC	YES
SQR	YES
QR	YES
50.59	YES
RESP MGR.	YES

PECO Energy Company
Peach Bottom Atomic Power Station

TEMPORARY CHANGES TO PROCEDURES AND PARTIAL PROCEDURE USE

1.0 PURPOSE

1.1 To establish the administrative requirements, controls, and responsibilities for making Temporary Changes (TCs) to procedures and partial procedure use.

2.0 SCOPE

2.1 This procedure shall be used to initiate, document and control Temporary Changes to approved procedures. A change that would result in a 50.59 Safety Evaluation per LR-C-13 is NOT within the scope of this procedure.

2.2 This procedure contains the requirements for partial procedure use.

3.0 SOURCES AND REFERENCES

3.1 SOURCE DOCUMENTS

3.1.1 ANSI N18.7-1972, Administrative Controls for Nuclear Power Plants

3.1.2 PBAPS Quality Assurance Program, UFSAR Appendix D

3.1.3 NRC Regulatory Guide 1.33 - 1972

3.1.4 PBAPS UFSAR Section 13.6

3.1.5 CM-1, Ltr to NRC 07/22/88 (T00295)

3.1.6 CM-2, Ltr to NRC 08/31/87 (T00364)

3.1.7 CM-3, Ops Incident Rpt 2-89-21 (T00617)

3.1.8 CM-4, NRC PB URI 91-30-02 (T01666)

3.1.9 CM-5, Ltr to NRC 05/15/91 (T01022)

3.1.10 CM-6, Ltr to NRC 12/29/93 (T03245)

3.1.11 CM-7, Failure of Maintenance Procedures to comply with A-3 (Q0001535)

3.1.12 CM-8, Permanent Revisions TC's are not being revised in a timely manner (I0003541)

3.1.13 CM-9, Letter to NRC from G.A. Hunger, Jr. dated Sept. 29, 1994 transmitting TSCR 93-16 (Reference A/R A0905549 E94, Subsequent revisions to these sections require NRB approval)

3.2 **CROSS REFERENCES**

3.2.1 A-C-4.2, Station Qualified and Quality Reviewer Program

3.2.2 DC-CG-2, Processing and Retrieval of Quality Records

3.2.3 LR-C-10, Performance Enhancement Program (PEP)

3.2.4 LR-C-13, 10CFR50.59 Reviews

3.2.5 RE-C-40, Core Component Transfer Authorization Sheet Generation and Administration

4.0 DEFINITIONS

4.1 **CHANGE OF INTENT** - Any change in the function or conceptual method of the activity, the specific task, or goal. Refer to Exhibit A-3-1. **CM-3, CM-4**

4.2 **CONDITIONAL TC** - A Temporary Change approved for use through the duration of a defined plant or component condition, but NOT intended to permanently alter the procedure.

4.3 **EVALUATORS** - All persons involved with a TC, both pre-implementation and post implementation.

4.4 **PARTIAL PROCEDURES** - Properly authorized sections of a procedure when such use is not previously specified in the scope of the procedure. Partial procedures are NOT TCs and are processed in accordance with section 7.7.

4.5 **PERMANENT REVISION TC** - A Temporary Change approved for continuous use until distribution of the next revision of the affected procedure.

4.6 **PLANT MANAGEMENT STAFF** - Those individuals who are authorized to review and approve Temporary Changes at the time of implementation. This consists of two reviews. One review is done by a Station Qualified Reviewer. The second review is done by Senior Reactor Operator.

4.7 **SENIOR REACTOR OPERATOR** - Any individual who is temporarily or permanently assigned to the Operations Section, who currently holds a valid Senior Reactor Operators License.

4.8 **SINGLE USE TC** - A Temporary change that is approved for one procedure performance, not intended for incorporation into a permanent revision and NOT be expected to be used again.

4.9 **TEMPORARY CHANGE (TC)** - An approved alteration to a controlled procedure which clearly does NOT change the intent of the original procedure and is valid over a defined duration.

4.10 **TC-CONTROLLED LOCATION** - Location in which TCs are captured.

4.11 **TC PACKAGE** - Original Exhibit A-3-3 and original altered procedure pages.

5.0 RESPONSIBILITY AND AUTHORITY

5.1 **PLANT MANAGEMENT STAFF** - Reviews and approves proposed Temporary Changes prior to their use. This consists of two Reviews, one done by an SQR, the other by an SRO.

5.2 **DOCUMENT SERVICES (DS)** - Collects, logs, and distributes copies of approved TCs and maintains TC database.

5.3 **INITIATOR** - Identifies the need for a temporary change to a procedure, properly prepares the TC, and completes required documentation.

5.4 **RESPONSIBLE SUPERINTENDENT (RS)** - Approves items within this program in accordance with A-C-4.2. In the post implementation review the SQR CANNOT be the same person as the RS.

5.5 **SENIOR REACTOR OPERATOR (SRO)** - Reviews and approves proposed temporary changes prior to their use and determines potential affect of TC on Operations activities.

5.6 **TC ADMINISTRATOR** - A person designated by Operations to update the TC Log, issue TC numbers and forward TC packages to the designated area at the end of each shift.

5.7 **STATION QUALIFIED REVIEWER (SQR)** - An appointed person knowledgeable in the functional area affected who is NOT the preparer of the item. The SQR may be from the same organization as the preparer.

6.0 PREREQUISITES

None

7.0 **PROCEDURE**

7.1 **GENERAL**

7.1.1 The evaluators shall be responsible for review of Exhibit A-3-1 to ensure no change of intent and the validity of the TC in question. **CM-3, CM-4**

7.1.2 TCs may be initiated for the following circumstances:

1. When the existing procedure is in error and time constraints prevent processing a procedure revision.

2. When the plant or component configuration is temporarily in conflict with that assumed by the procedure and time constraints prevent delay of performance.

7.2 INITIATION

7.2.1 TCs shall be prepared and processed in accordance with Exhibit A-3-2.

7.2.2 TC classification shall be assigned based on whether or not the TC use for subsequent performances of the procedure is appropriate:

1. PERMANENT REV (R) - TCs due to procedure error should be used until incorporation into the next procedure revision.

2. CONDITIONAL (C) - TCs due to a conflict with current Plant or System configuration which will exist until condition is resolved, and it is expected that the procedure is going to be performed more than once while the condition exists.

3. SINGLE USE (S) - TCs that will ONLY be needed for use ONE TIME. Plant or System configuration is expected to return to its initial condition.

7.2.3 The initiator shall present the TC to the SQR and SRO for review and approval PRIOR to obtaining a TC number.

7.3 **PRE-IMPLEMENTATION REVIEW**

7.3.1 Two members of Plant Management Staff who meet the following criteria shall review each TC: **CM-9**

1. The first reviewer shall be an SQR, who is an appointed person knowledgeable in the functional area affected. The SQR may be from the same organization as the preparer.

2. The second reviewer shall be a member of the Operation Section, who currently holds a valid Senior Reactor Operator License. **CM-9**

7.3.2 Reviewers shall verify that the proposed TC will NOT change the intent of the procedure and is within the scope of the TC process. Exhibit A-3-1 will determine the validity of the TC in question. **CM-3, CM-4, CM-9**

7.3.3 The SQR and SRO approval shall be documented on Exhibit A-3-3.

7.4 **PROCESSING AND DISTRIBUTION**

7.4.1 After the pre-implementation reviews and approvals are complete, the initiator shall obtain a TC number from the TC Administrator.

7.4.2 The TC Administrator shall complete appropriate log entries and forward all TC packages to the designated area for post implementation review and approval.

7.4.3 CONDITIONAL and PERMANENT REV TCs shall be distributed by DS to designated TC-controlled locations during the next scheduled distribution.

7.5 **POST IMPLEMENTATION REVIEW**

7.5.1 The SQRs shall review procedures/programs/guidelines that their group, or groups under their purview, have responsibility or sponsorship for revising or generating the entire document, or significant responsibility in performing the entire document. The additional SQR shall be performed to determine if a Change of Intent was made to the procedure in accordance with Exhibit A-3-1. **CM-3, CM-4, CM-9**

7.5.2 The SQR shall recommend either approval or disapproval of the TC to the RS and shall document such on Exhibit A-3-3. The RS and the SQR shall NOT be the same individual.

7.5.3 Should the TC be disapproved, the SQR shall take remedial action to resolve the unsatisfactory aspect of the TC including:

1. Halting the use of the TC.

2. Ensuring removal of the TC from distribution.

3. Presenting documented resolution of the recommended actions to RS.

4. Initiating a PEP in accordance with LR-C-10.

7.5.4 The SQR ensures the required date is entered on Exhibit A-3-3 as follows:

1. Permanent Revision **CM-8**

   o For RT, SI, ST, the test shall be revised and implemented prior to the next scheduled date, except weekly and bi-weekly tests which shall be revised and implemented within 30 days from the initiated date

   o For a procedure that does not have a schedule frequency, from the time the TC was initiated, the procedure shall be revised and implemented within 60 days for station procedures and 120 days for common procedures.

2. Conditional

   o If closure date is known, enter that required date

   o If closure date is not known, enter 1/20/20

7.5.5 The RS shall approve or disapprove TCs within 14 days of implementation. **CM-9**

7.6 **TEMPORARY CHANGE MAINTENANCE CM-1, CM-5**

7.6.1 DS shall maintain a TC database for Responsible Group action and accountability.

7.6.2 Responsible Groups shall use the TC PIMS database to ensure the continued validity of all open TCs and satisfaction of the 14 day requirement.

7.6.3 Responsible Groups shall refer to the TC database during procedure reviews to ensure that coincidental revisions incorporate any open Permanent Revision TCs.

7.6.4 The organization that initiated the TC shall notify DS of conditional TCs which need to be removed from distribution and the TC database.

7.6.5 DS shall update the TC database in response to requests and remove conditional TCs from distribution during their next scheduled distribution.

7.6.6 If a TC for permanent revision has not been revised and implemented by its required date, then initiate a PEP in accordance with LR-C-10.

7.7 **PARTIAL PROCEDURE USE CM-2, CM-7**

7.7.1 If the task authorized for performance is more limited in scope than the procedure being used, authorization to disregard the unnecessary portions of the procedure may be obtained.

For example: Following maintenance on the "A" Core Spray Pump, only the portion of ST-O-014-300-2 which pertains to the "A" Pump need be performed.

7.7.2 With the exception of COLs, if the task to be performed is intended to accomplish the entire scope of a procedure a TC shall be processed.

7.7.3 The SQR shall be a person knowledgeable in the functional area affected and verify the procedure is valid as it is intended to be performed and that it accomplishes its objectives.

1. Enter the word PARTIAL on the first page of the procedure. Record the reasons for partial versus complete performance and whether additional testing is required to fulfill surveillance test requirements, where applicable.
2. Indicate on the procedure those steps or portions of the procedure that are not required to be performed.
3. Review the procedure to verify that the Partial performance will be valid and to confirm that it will accomplish its objective.
4. Initial and date the affected steps or pages.
5. Proper restoration of the affected equipment.

8.0 **DOCUMENTATION**

8.1 The Temporary Change package is filed in accordance with DC-CG-2 following final approval.

8.2 Common Nuclear Procedure TCs initiated by either site, will be available to the other site for **information only** from DS.

8.3 Partial Procedures are forwarded through the governing work and test control processes to DS by the performing organization for final storage.

8.4 The TC Log is not considered to be a permanent record and can be disgarded after all entries are completed.

9.0 **EXHIBITS**

9.1 Exhibit A-3-1, "Temporary Change Screening Matrix"

9.2 Exhibit A-3-2, "Completing and Processing a Temporary Change"

9.3 Exhibit A-3-3, "Temporary Change Form"

ST-O-011-301-2 STANDBY LIQUID CONTROL PUMP FUNCTIONAL TEST FOR IST

TEST FREQUENCY: Once/92 days (See Section 1.0)
TECH SPEC: SR 3.1.7.5, SR 3.1.7.8, SR 3.1.7.10, Section 5.5.6
APPLICABILITY: Modes 1 and 2

1 **CHECK** why this procedure is being performed:

☐ Schedule ☐ OVF ☐ Retest Due To Unsat Test

☐ Other Reason: ____________________

Approved By SMgt: ____________ ______ __/__/__ ________
Printed Name Time Date Initials

2 **INITIAL** one of the following Test Results:

A: All ***/I** steps are **SATISFACTORY** ________

B: One or More ***/I** steps are **UNSATISFACTORY** ________
Refer to Section 9.0 for Tech Spec LCO's

Performed By: ____________ ______ __/__/__ ________
Printed Name Time Date Initials

RO/PRO Informed of
Test Completion: ____________ ______ __/__/__ ________

Reviewed By SMgt: ____________ ______ __/__/__ ________

UNSAT Notification: ____________________
SMgt Discretion: Plant Mgr or Others

Notified By: ____________ ______ __/__/__ ________

3 If other portions of the test did NOT function properly,
Or other discrepancies were noted Then **COMPLETE** the following:

IST Step(s) in ALERT range: ____________________
DESCRIBE discrepancies/actions taken: A/R or ETT #: ________

____

4 Reviewed/Approved
Plant Staff: ____________ ______ __/__/__ ________
Printed Name Time Date Initials

1.0 PURPOSE

This test verifies operability and performance of the Standby Liquid Control (SBLC) Pumps and Discharge Check Valves once/92 days in accordance with the Inservice Testing Program. This test satisfies Tech Spec SR 3.1.7.8. This test partially satisfies SR 3.1.7.5, SR 3.1.7.10, and Inservice Testing requirements for components in compliance with PBAPS Inservice Testing Program Spec. M-710 which implements requirements of Tech Spec Section 5.5.6. **CM-1**

2.0 TEST EQUIPMENT

2.1

Description	Req Min Accuracy	M&TE No.	Cal Due Date
Stopwatch	None	________	___/___/___
Vibration meter Raw Signal Single Integration (Min. Req. Freq. Range 2.8-1000 Hz) **CM-2**	 ± 1.5% ± 3.0%	________	___/___/___
Vibration probe (Min. Req. Freq. Range 2.8-1000 Hz) **CM-2**	± 4.0%	________	___/___/___
Test Gauge 0-1500 psig	± 5.0%	________	___/___/___
Test Gauge 0-1500 psig (N/A if one test rig is to be used)	± 5.0%	________	___/___/___

2.2 (1 or 2) - Test rig(s) with Schrader fitting (see Figure 1)

2.3 SBLC Measuring Stick

2.4 Non-contaminated hose for flushing test tank 20T017 (with quick disconnect).

2.5 Locked Valve Key For:

NUMBER	DESCRIPTION	NORMAL POS
HV-2-11-11	SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040	LOCKED OPEN
HV-2-11-15	SBLC Disch Header To RPV Outboard Isolation Valve	LOCKED OPEN
HV-2-11-26	SBLC Pumps Disch Recirc HDR Block To Tks 20T017 + 20T018	LOCKED CLOSED

2.0 TEST EQUIPMENT (Continued)

NUMBER	**DESCRIPTION**	**NORMAL POS**
HV-2-11-41	SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR	LOCKED CLOSED

3.0 PREREQUISITES Initial

3.1 Test Initiation

3.1.1 **COMPLETE** Section 1 of cover page. ________

3.2 Document Review

3.2.1 **ENSURE** procedure is current revision. ________

3.3 Equipment Configuration

None

3.4 Required Redundant Safety Related Equipment

None

3.5 Other Prerequisite Activities

3.5.1 **VERIFY** at least two operators are available to perform this test. ________

3.5.2 **VERIFY** SBLC Test Tank empty and **NO** foreign objects in tank. ________

3.5.3 **VERIFY** one 55 gallon drum which is empty or near empty available at Rx Bldg 165' by SBLC system drain lines. ________

3.5.4 **VERIFY** that qualified personnel are available for vibration data collection and lube oil sampling. Operators may view the training video for Operations Role in Predictive Maintenance to refresh on proper technique. ________

3.5.5 **OBTAIN** oil sampling equipment from the Oil Sample Drop-off Box located on Turbine Bldg 116' outside the ferrography lab. ________

3.0 PREREQUISITES (Continued)

3.6 Approval to Start Test

3.6.1 **OBTAIN** RO Permission to begin.

______	__/__/__	______
Time	Date	RO

4.0 PRECAUTIONS, LIMITATIONS, AND GENERAL INSTRUCTIONS

4.1 Plant Impact Statement

4.1.1 This test will operate both Standby Liquid Control (SBLC) Pumps using local control. SBLC system will be isolated from the Reactor which will make the system out of service for the duration of the test. This test may be performed in any Reactor Mode.

4.2 Precautions

4.2.1 Do **NOT** START SBLC Pumps from the Control Room. Starting SBLC Pumps from Control Room will fire the explosive valves.

4.2.2 SBLC Pumps should not be lined up to take suction on the Test Tank when the suction is uncovered. The suction comes off the side of the test tank.

4.2.3 **DO NOT PLACE** hands in pump cavity during performance of this procedure.

4.2.4 **OBSERVE** proper safety precautions when working with Sodium Pentaborate solution and avoid contact with the skin.

4.2.5 At least one person shall stay at SBLC area on 195' elevation while the valves are out of normal alignment to restore the system to normal in an emergency situation.

4.3 Limitations

None

4.4 General Instructions

4.4.1 Communications will be required between Control Room and Standby Liquid Control Tank Area, 195', R2-49 and Reactor Bldg West, at Standby Liquid Control System waste water drums on 165'.

4.4.2 This test must be completed in a timely manner. **IF** delays occur during this test, **THEN NOTIFY** SMgt so SBLC System OPERABILITY may be determined.

4.0 PRECAUTIONS, LIMITATIONS, AND GENERAL INSTRUCTIONS (Continued)

4.4.3 **IF** system initiation becomes necessary while performing test, **THEN STOP** test **AND PERFORM** Section 6.4 "Restoring SBLC System to Operable Status" **AND NOTIFY** Control Room.

4.4.4 **IF** procedure is aborted, **THEN RESTORE** SBLC per section 6.4, notify SMgt **AND** write **"TEST ABORTED"** in Section 3 of Cover Page.

4.4.5 **IF** any procedure step can **NOT** be completed **OR** produces an unexpected response **THEN STOP** the test **AND RETURN** the equipment to a safe condition **AND NOTIFY** the RO or SMgt.

4.4.6 **IF** any Black Box is initialed **THEN STOP** the test **AND RETURN** the equipment to a safe condition **AND NOTIFY** the RO or SMgt.

4.4.7 All persons who initial steps in Sections 3.0, 6.0, or 7.0 are responsible for completing Section 10.0.

4.4.8 Initial blanks designated as IV are provided for Independent Verification.

4.4.9 All applicable ***/I** steps are identified immediately in front of the initials.

5.0 ACCEPTANCE CRITERIA

5.1 Each SBLC Pump develops a flow rate of ≥ 43 gpm at a discharge pressure ≥1255 psig.

5.2 SBLC Pump pressures, flows, and vibration are obtained, and vibration and flows are NOT in the action range limits of Section 6.0.

5.3 Operability of CHK-2-11-43A and B is verified in the OPEN and CLOSED directions.

5.4 The combination of SBLC boron concentration, pump flow rate, and boron enrichment is greater than or equal to 1 as determined by Equation specified in Step 6.6.4.

6.0 PERFORMANCE STEPS

	Initial Sat	Initial UnSat
6.1 Test Preparation and Valve Lineup		
< At Standby Liquid Control Tank Area 195', R2-49 >		
6.1.1 **VERIFY** both SBLC Pump oil levels are between the min static and max static level on pump oil sightglasses.	______	______
6.1.2 **REMOVE** cap **AND INSTALL** test rig with 1500 psig test gauge to 2AT076 "Stby Liquid Control N2 Accumulator A".	______	______
6.1.3 **LEAK TEST** test rig as desired.	______	______
6.1.4 **VERIFY** accumulator 2AT076 pressure is from 325 to 450 psig **AND CHARGE** accumulator if necessary.	______	______
6.1.5 **IF** one test rig is to be used, **THEN REMOVE** test rig at 2AT076. **OTHERWISE, N/A** this step.	______	______
6.1.6 **REMOVE** cap **AND INSTALL** test rig with 1500 psig test gauge to 2BT076 "Stby Liquid Control N2 Accumulator B".	______	______
6.1.7 **LEAK TEST** test rig as desired.	______	______
6.1.8 **VERIFY** accumulator 2BT076 pressure is from 325 to 450 psig **AND CHARGE** accumulator if necessary.	______	______
6.1.9 **REMOVE** cover on 20T017 "Standby Liquid Control Test Tank" **AND INSTALL** SBLC measuring stick inside of tank.	______	______
6.1.10 **VERIFY** HV-2-11-11 "SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040" LOCKED OPEN.	______	______
6.1.11 **UNLOCK AND CLOSE** HV-2-11-15 "SBLC Disch Header To RPV Outboard Isolation Valve".	______	______
6.1.12 **UNLOCK AND OPEN** HV-2-11-26 "SBLC Pumps Disch Recirc Hdr Block to Tks 20T017 + 20T018".	______	______
6.1.13 **OPEN** HV-2-11-30 "SBLC Pumps Disch Recirc Blk to SBLC Tank 20T018".	______	______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.2 SBLC Pump A Test **CM-1**

6.2.1 **RECORD** 2BT076 pressure.

_______ psig ______ ______

CAUTION

DO NOT START SBLC Pumps from the Control Room. Starting SBLC Pumps from the Control Room will fire the explosive valves.

6.2.2 **NOTIFY** Reactor Operator 2AP040 "Standby Liquid Control Pump A" will be started. ______ ______

6.2.3 LOCALLY **START** 2AP040. ______ ______

NOTE

Manufacturer recommends running pump for 30 minutes following pump maintenance before operating at full load.

6.2.4 **IF** Surveillance Test is being performed to satisfy pump post maintenance testing, **THEN PERFORM** this step, **OTHERWISE N/A AND PROCEED** to step 6.2.5.

1. **RUN** pump for 5 minutes unloaded **THEN** SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 250 to 350 psig as indicated on PI-2-11-03 **AND RUN** pump for 5 additional minutes. ______ ______

2. SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 550 to 650 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. ______ ______

3. SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 850 to 950 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. ______ ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

NOTE
Fluctuations on PI-2-11-053 may be dampened by throttling IIV-2-11-053. If throttling is used, the valve may be opened and closed to verify pressure indication is valid.

6.2.5 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1200 (1160-1200) psig as indicated on PI-2-11-053. ______ ______

****

CAUTION

DO NOT EXCEED a pump discharge pressure of 1300 psig while throttling HV-2-11-26. Relief valve is set to lift at 1400 psig. Pressure will continue to increase slightly when valve throttling is stopped.

****

6.2.6 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053. ______ ______

6.2.7 **RECORD** 2BT076 pressure.

_______ psig ______ ______

NOTE
The next step verifies CHK-2-11-43B "SBLC Pump 2BP040 Discharge Check Valve" in the CLOSED direction.

6.2.8 **VERIFY** pressure recorded in Step 6.2.7 is less than 100 psig above the pressure recorded in Step 6.2.1. I ______

6.2.9 **RUN** 2AP040 for at least 2 minutes to ensure accurate vibration data. I ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.2.10 **OBTAIN** pump housing vibration data in velocity (in/sec) at inboard locations marked X1 and Y1 and outboard locations marked X1 and Y1 **AND RECORD** vibration data on Data Sheet 1. ______ ______

DATA SHEET 1
2AP040 PUMP HOUSING VIBRATION DATA

MEASURED VIBRATION AT MARKED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
INBOARD			
X1________IN/SEC PK	≤ 0.716	0.716 to 1.719	> 1.719
Y1________IN/SEC PK	≤ 0.225	0.225 to 0.540	> 0.540
OUTBOARD			
X1________IN/SEC PK	≤ 0.803	0.803 to 1.929	> 1.929
Y1________IN/SEC PK	≤ 0.496	0.496 to 1.192	> 1.192

6.2.11 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1220 (1200-1240) psig as indicated on PI-2-11-053. ______ ______

6.2.12 **STOP** 2AP040. ______ ______

6.2.13 **CLOSE** HV-2-11-30. ______ ______

6.2.14 **OPEN** HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 20T017". ______ ______

NOTE

It will take 2 minutes for SBLC Test Tank level to reach the lower mark on the SBLC Measuring Stick therefore Step 6.2.15 must be performed in a timely manner.

6.2.15 LOCALLY **START** 2AP040 **AND THROTTLE** HV-2-11-26 as required to obtain a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053 **AND RECORD** pressure on Data Sheet 2. ______ ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.2.16 **WHEN** Test Tank level reaches the lower mark on the SBLC Measuring Stick, **START** stopwatch, **THEN MEASURE** the time required to raise Test Tank level to the upper mark on the SBLC Measuring Stick. ______ ______

6.2.17 **STOP** 2AP040. ______ ______

6.2.18 **RECORD** time required for level change on Data Sheet 2 to one tenth of a second. ______ ______

NOTES

1. The following step may be performed out of sequence as directed by the step.

2. **IF** it is not possible to obtain sample within 15 minutes after securing pump due to oil being distributed in crankcase, **THEN** attempt to obtain a sample at thirty minute intervals until a sample is successfully obtained **AND** record time elapsed between securing pump and withdrawing sample, in step 6.2.19.6.

6.2.19 **PERFORM** the following to obtain 2AP040 oil samples no more than 15 minutes after the pump has been secured:

1. **LOCATE** oil sample fittings on the pump crankcase **AND** motor housing. ______ ______

2. **RECORD** equipment number, equipment serial number (if available), sample point, sample date, **AND** "Sampled by" name on labels. ______ ______

3. **OBTAIN** oil sample from each reservoir by removing oil sample fitting cap, inserting plastic probe, and drawing vacuum on sample bottle with sampling pump. ______ ______

4. **DISCONNECT** sample probe **AND REPLACE** sampling fitting cap hand tight. ______ ______

5. **REMOVE** sample bottle from sampling pump **AND REPLACE** sample bottle cap. ______ ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6. **IF** sample could not be obtained within 15 minutes after securing pump, **THEN RECORD** time elapsed between securing pump and withdrawing sample **AND RECORD** time elapsed on sample bottle.

_________ min. ______ ______

6.2.20 **CALCULATE** 2AP040 flow rate as follows **AND RECORD** flow rate on Data Sheet 2:

$$\frac{52.8 \text{ gal} \times 60 \text{ sec/min}}{\text{Step } 6.2.16} = \text{Flow Rate}$$

3168 / ______ sec = ______ gpm ______ ______

______ ______
IV

DATA SHEET 2
2AP040 IST DATA

NOTE

Pump flow rate acceptance criteria is based on a reference value of 53.0 gpm at a discharge pressure of 1255.0 psig.

PARAMETER	**ACTUAL VALUE**	**ACCEPTABLE RANGE**	**ALERT RANGE**	**ACTION RANGE**
TIME (Seconds)		N/A	N/A	N/A
FLOW RATE (gpm) (3168/Time)		50.2 to 58.1	< 50.2 to 49.1	< 49.1 or > 58.1
DISCH PRESSURE (psig)		1255-1280	N/A	N/A

6.2.21 **VERIFY** flow and pressure recorded in Data Sheet 2 is ≥43 gpm at ≥1255 psig. * ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

NOTE
The next step verifies CHK-2-11-43A "SBLC Pump 2AP040 Discharge Check Valve" in the OPEN direction.

6.2.22 **VERIFY** pump test data on Data Sheets 1 and 2 do **NOT** fall within Action Range. I ____ ____

6.2.23 **CLOSE** HV-2-11-27. ____ ____

6.2.24 **OPEN** HV-2-11-26. ____ ____

6.2.25 **OPEN** HV-2-11-30. ____ ____

6.2.26 **UNLOCK AND OPEN** HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR". ____ ____

6.2.27 **IF** test tank level reaches top of suction line on side of tank by gravity draining, **THEN N/A** the next 3 sign-offs. **OTHERWISE, PERFORM** the following:

1. **UNLOCK AND CLOSE** HV-2-11-11. ____ ____

CAUTION
Do not run SBLC Pump when Test Tank is empty.

2. LOCALLY **START** 2AP040 **THEN STOP** pump when Test Tank level reaches top of suction line on side of test tank. ____ ____

3. **OPEN** HV-2-11-11. ____ ____

6.2.28 **CLOSE** HV-2-11-41. ____ ____

6.3 SBLC Pump B Test **CM-1**

6.3.1 **IF** one test rig is being used, **THEN REMOVE** test rig at 2BT076 **AND INSTALL** cap. **OTHERWISE, N/A** this step. ____ ____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.3.2 **IF** one test rig is being used, **THEN INSTALL** test rig at 2AT076. **OTHERWISE, N/A** this step. ______ ______

6.3.3 **RECORD** 2AT076 pressure.

_______ psig ______ ______

****
* **CAUTION** *
* *
* **DO NOT START** SBLC Pumps from the Control Room. Starting SBLC Pumps from the Control Room will fire the explosive valves. *
* *
****

6.3.4 **NOTIFY** Reactor Operator 2BP040 "Standby Liquid Control Pump B" will be started. ______ ______

6.3.5 LOCALLY **START** 2BP040. ______ ______

> **NOTE**
>
> Manufacturer recommends running pump for 30 minutes following pump maintenance before operating at full load.

6.3.6 **IF** Surveillance Test is being performed to satisfy pump post maintenance testing, **THEN PERFORM** this step, **OTHERWISE N/A** this step **AND PROCEED** to step 6.3.7.

1. **RUN** pump for 5 minutes unloaded **THEN** SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 250 to 350 psig as indicated on PI-2-11-053 **AND RUN** pump for 5 additional minutes. ______ ______

2. **SLOWLY THROTTLE** HV-2-11-26 to a pressure between 550 to 650 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. ______ ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

3. **SLOWLY THROTTLE** HV-2-11-26 to a pressure between 850 to 950 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. ______ ______

> **NOTE**
>
> Fluctuations on PI-2-11-053 may be dampened by throttling IIV-2-11-053. IIV-2-11-053 may be opened and closed to verify pressure indication is valid.

6.3.7 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1200 (1175-1200) psig as indicated on PI-2-11-053. ______ ______

CAUTION

DO NOT EXCEED a pump discharge pressure of 1300 psig while throttling HV-2-11-26. Relief valve is set to lift at 1400 psig. Pressure will continue to increase slightly when valve throttling is stopped.

6.3.8 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053. ______ ______

6.3.9 **RECORD** 2AT076 pressure.

________ psig ______ ______

> **NOTE**
>
> The next step verifies CHK-2-11-43A in the CLOSED direction.

6.3.10 **VERIFY** pressure recorded in Step 6.3.9 is less than 100 psig above the pressure recorded in Step 6.3.3. I ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.3.11 **RUN** 2BP040 for at least 2 minutes to ensure accurate vibration data. I ______

6.3.12 **OBTAIN** pump housing vibration data in velocity (in/sec) at inboard locations marked X1 and Y1 and outboard locations marked X1 and Y1 **AND RECORD** vibration data on Data Sheet 3. ______ ______

DATA SHEET 3
2BP040 PUMP HOUSING VIBRATION DATA

MEASURED VIBRATION AT MARKED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
INBOARD			
X1________IN/SEC PK	≤ 0.527	0.527 to 1.266	> 1.266
Y1________IN/SEC PK	≤ 0.355	0.355 to 0.853	> 0.853
OUTBOARD			
X1________IN/SEC PK	≤ 0.499	0.499 to 1.197	> 1.197
Y1________IN/SEC PK	≤ 0.404	0.404 to 0.969	> 0.969

6.3.13 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1220 (1200-1240) psig as indicated on PI-2-11-053. ______ ______

6.3.14 **STOP** 2BP040. ______ ______

6.3.15 **CLOSE** HV-2-11-30. ______ ______

6.3.16 **OPEN** HV-2-11-27. ______ ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

NOTE

It will take 2 minutes for SBLC Test Tank level to reach the lower mark on the SBLC Measuring Stick therefore Step 6.3.17 must be performed in a timely manner.

6.3.17 LOCALLY **START** 2BP040 **AND THROTTLE** HV-2-11-26 as required to obtain a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053 **AND RECORD** pressure on Data Sheet 4. ______ ______

6.3.18 **WHEN** Test Tank level reaches the lower mark on the SBLC Measuring Stick, **START** stopwatch, **THEN MEASURE** the time required to raise Test Tank level to the upper mark on the SBLC Measuring Stick. ______ ______

6.3.19 **STOP** 2BP040. ______ ______

6.3.20 **RECORD** time required for level change on Data Sheet 4 to one tenth of a second. ______ ______

NOTES

1. The following step may be performed out of sequence as directed by the step.

2. **IF** it is not possible to obtain sample within 15 minutes after securing pump (due to oil being distributed in crankcase,) **THEN** attempt to obtain a sample at ten or fifteen minute intervals until a sample is successfully obtained **AND** record time elapsed between securing pump and obtaining sample, in step 6.3.21.6.

6.3.21 **PERFORM** the following to obtain 2BP040 oil samples no more than 15 minutes after the pump has been secured:

1. **LOCATE** oil sample fittings on the pump crankcase **AND** motor housing. ______ ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

2. **RECORD** equipment number, equipment serial number (if available), sample point, sample date, **AND** "Sampled by" name on labels. ______ ______

3. **OBTAIN** oil sample from each reservoir by removing oil sample fitting cap, inserting plastic probe, and drawing vacuum on sample bottle with sampling pump. ______ ______

4. **DISCONNECT** sample probe **AND REPLACE** sampling fitting cap hand tight. ______ ______

5. **REMOVE** sample bottle from sampling pump **AND REPLACE** sample bottle cap. ______ ______

6. **IF** sample could not be obtained within 15 minutes after securing pump, **THEN** record time elapsed between securing pump and withdrawing sample **AND RECORD** time elapsed on sample bottle. ______ ______

________ Min.

6.3.22 **CALCULATE** 2BP040 flow rate as follows **AND RECORD** Flow rate on Data Sheet 4:

$$\frac{52.8 \text{ gal} \times 60 \text{ sec/min}}{\text{Step 6.3.18}} = \text{Flow rate}$$

3168 / ______ sec = ______ gpm ______ ______

______ ______
IV

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

DATA SHEET 4
2BP040 IST DATA

NOTE

Pump flow rate acceptance criteria is based on a reference value of 53.0 gpm at a discharge pressure of 1255.0 psig.

PARAMETER	ACTUAL VALUE	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
TIME (Seconds)		N/A	N/A	N/A
FLOW RATE (gpm) (3168/Time)		51.2 to 59.3	< 51.2 to 50.1	< 50.1 or > 59.3
DISCH PRESSURE (psig)		1255-1280	N/A	N/A

6.3.23 **VERIFY** flow recorded in Data Sheet 4 is ≥ 43 gpm **AND** pressure is ≥ 1255 psig. * ______ ☐

NOTE

The next step verifies CHK-2-11-43B "SBLC Pump 2BP040 Discharge Check Valve" in the OPEN direction.

6.3.24 **VERIFY** pump test data on Data Sheets 3 and 4 do **NOT** fall within Action Range. I ______ ☐

6.3.25 **REMOVE** test rig at 2AT076 **AND INSTALL** cap. ______ ______

6.3.26 **IF** two test rigs were used, **THEN REMOVE** test rig at 2BT076 **AND INSTALL** cap. **OTHERWISE, N/A** this step. ______ ______

6.3.27 **CLOSE** HV-2-11-27. ______ ______

6.3.28 **OPEN** HV-2-11-30. ______ ______

6.3.29 **OPEN** HV-2-11-41. ______ ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.3.30 **IF** test tank level reaches top of suction line on side of tank by gravity draining, **THEN N/A** the next 3 sign-offs. **OTHERWISE, PERFORM** the following:

1. **UNLOCK AND CLOSE** HV-2-11-11. ______ ______

```
*********************************************
*                  CAUTION                  *
*                                           *
*   Do not run SBLC Pump when Test Tank     *
*   is empty.                               *
*                                           *
*********************************************
```

2. LOCALLY **START** 2BP040 **THEN STOP** pump when Test Tank level reaches top of suction line on side of test tank. ______ ______

3. **OPEN** HV-2-11-11. ______ ______

6.3.31 **CLOSE** HV-2-11-41. ______ ______

6.4 Restoring SBLC System to Operable Status

6.4.1 **LOCK** closed HV-2-11-41. ______ ______

6.4.2 **VERIFY OR LOCK OPEN** HV-2-11-11. ______ ______

6.4.3 **CLOSE OR VERIFY CLOSED** HV-2-11-30. ______ ______

6.4.4 **CLOSE AND LOCK** HV-2-11-26. ______ ______

6.4.5 **OPEN AND LOCK** HV-2-11-15. ______ ______

6.4.6 **NOTIFY** Reactor Operator SBLC System has been returned to service. ______ ______

6.0 PERFORMANCE STEPS (Continued)

	Initial Sat	Initial UnSat
6.5 Flushing Test Tank 20T017		

CAUTION

DO NOT OVERFILL Waste Water Drum on 165'. If necessary, HV-2-11-23143 may be closed while changing drums.

< At Rx Bldg 165', West Wall>

Step	Action	Sat	UnSat
6.5.1	**OPEN** HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve".	______	______

< At Standby Liquid Control Tank Area, 195', R2-49 >

Step	Action	Sat	UnSat
6.5.2	**REMOVE** SBLC measuring stick from Test Tank.	______	______
6.5.3	**INSTALL** hose at a demin water supply valve HV-2-38D-29 "Demin Wtr Hose Blk Vv for SBLC Test Tank 20T017.	______	______
6.5.4	**OPEN** HV-2-11-28 "SBLC Test Tank 20T017 Inner Drain Valve".	______	______
6.5.5	**OPEN** HV-2-38D-29 **AND FLUSH** Test Tank with demineralized water.	______	______
6.5.6	**CLOSE** HV-2-38D-29.	______	______
6.5.7	**CLOSE** HV-2-11-28.	______	______
6.5.8	**VERIFY** Test Tank empty.	______	______
6.5.9	**INSTALL** cover on Test Tank.	______	______
6.5.10	**REMOVE** hose from demin water supply valve HV-2-38D-29.	______	______

< At Rx Bldg 165', West Wall>

Step	Action	Sat	UnSat
6.5.11	**CLOSE** HV-2-11-23143.	______	______
6.5.12	**PLACE** oil sample bottles in the drop-off box located on Turbine Bldg 116' outside the ferrography lab.	______	______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.6 SBLC System Operability Verification

6.6.1 **RECORD** lowest SBLC Pump flow rate from Data Sheet 2 or 4.
________ gpm ______ ______

6.6.2 **OBTAIN** most recent figures for SBLC Concentration and Enrichment from Chemistry Unit 2 SBLC Sample Log.

______________ ______________ ______ ______
Concentration Enrichment

6.6.3 **PROVIDE** lowest SBLC pump flow rate data to Shift Chemist for entry into Unit 2 SBLC Sample Log. ______ ______

6.6.4 **PERFORM** the following calculation for determination of SBLC System operability:

$$\frac{C}{13\%\ \text{WT}} \times \frac{Q}{86\ \text{gpm}} \times \frac{E}{19.8\%} = O$$

$$\frac{\_\_\_\_\_\_}{13\%\ \text{WT}} \times \frac{\_\_\_\_\_\_}{86\ \text{gpm}} \times \frac{\_\_\_\_\_\_}{19.8\%} = \_\_\_\_$$

Where: C = Concentration from Step 6.6.2
Q = Lowest SBLC Pump flow rate from Step 6.6.1
E = Enrichment from Step 6.6.2
O = Operability factor ______ ______

6.6.5 **VERIFY** Operability Factor calculated in previous step is greater than or equal to 1. * ______ ______

7.0 PROCEDURE COMPLETION Initial

7.1 Independent Verification

7.1.1 **VERIFY** calculation in Step 6.6.4 is correct. ______
IV

< At Standby Liquid Control Tank Area 195', R2-49 >

7.1.2 **VERIFY** HV-2-11-15 "SBLC Disch Header To RPV Outboard Isolation Valve" is LOCKED OPEN.
______
IV

7.0 PROCEDURE COMPLETION (Continued) Initial

7.1.3 **VERIFY** HV-2-11-11 "SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040" is LOCKED OPEN. ______ IV

7.1.4 **VERIFY** HV-2-11-26 "SBLC Pumps Disch Recirc HDR Block To Tks 20T017 + 20T018" is LOCKED CLOSED. ______ IV

7.1.5 **VERIFY** HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR" is LOCKED CLOSED. ______ IV

7.1.6 **VERIFY** HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 20T017" is CLOSED. ______ IV

7.1.7 **VERIFY** HV-2-11-30 "SBLC Pumps Disch/Recirc Blk To SBLC Tank 20T018" is CLOSED. ______ IV

7.1.8 **VERIFY** HV-2-11-28 "SBLC Test Tank 20T017 Drain Valve" is CLOSED. ______ IV

7.1.9 **VERIFY** test rig at 2AT076 "Stby Liquid Control N2 Accumulator A" REMOVED **AND** cap INSTALLED. ______ IV

7.1.10 **VERIFY** test rig at 2BT076 "Stby Liquid Control N2 Accumulator B" REMOVED **AND** cap INSTALLED. ______ IV

7.1.11 **VERIFY** IIV-2-11-053 "PI-2-11-053 Instr Isol SBLC PPs Disch Header Press" is OPEN. ______ IV

< At Rx Bldg 165', West Wall>

7.1.12 **VERIFY** HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve" is CLOSED. ______ IV

7.2 Records Completion

7.2.1 **COMPLETE** Section 2 of Cover Page (and Section 3 if applicable). ______

8.0 REFERENCES

8.1 Governing

8.1.1 Tech Spec SR 3.1.7.5

8.1.2 Tech Spec SR 3.1.7.8

8.1.3 Tech Spec SR 3.1.7.10

8.0 REFERENCES (Continued)

8.1.4 Tech Spec 5.5.6

8.1.5 CM-1, Letter to NRC from G. A. Hunger, Jr. dated Sept. 29, 1994 transmitting TSCR 93-16 (A0902903-10, T03675)

8.1.6 CM-2, Deviation from Instrument Range Requirement, (T03589)

8.1.7 ASME OM Code, Code for Operation and Maintenance of Nuclear Power Plants, 1990 Edition

8.2 Interfacing

8.2.1 A-8, Control of Locked Valves

8.3 Developmental

8.3.1 Prints

M-358, Sht 1, Standby Liquid Control System

M-1-S-46, Sht 5, Electrical Schematic Standby Liquid Control System

8.3.2 M-1-JJ-40, Union Pump Manual

8.3.3 Response to NRC Inspection Report 50-277/78-12

8.3.4 RCM analysis - SBLC, (T02979)

8.3.5 This procedure supersedes ST 6.1.2-3

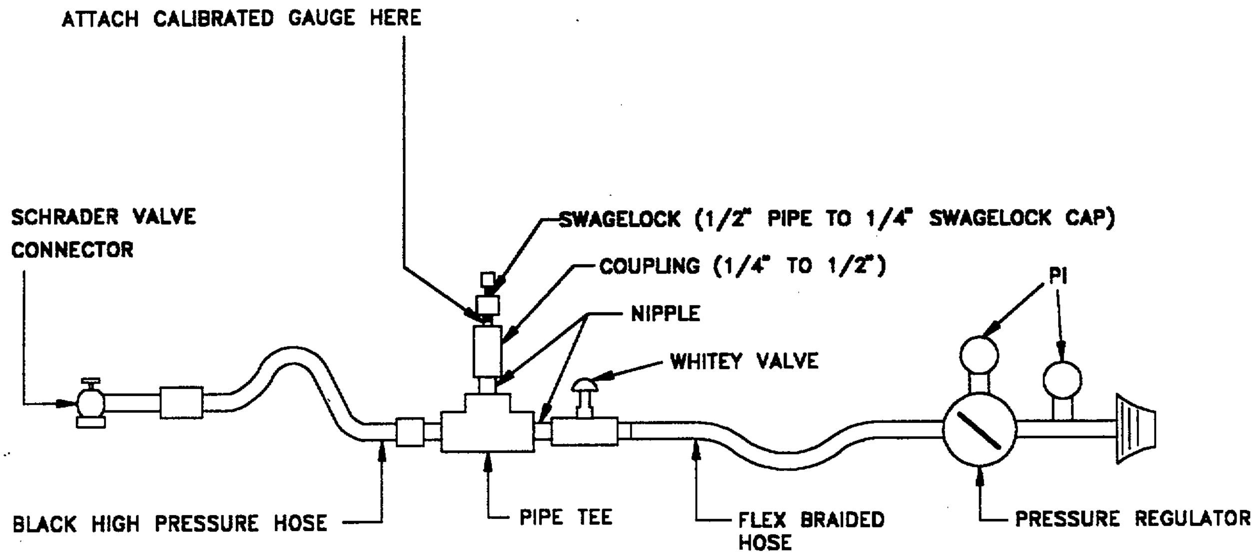
9.0 TECH SPEC LIMITING CONDITIONS FOR OPERATION (LCOs)

Section 3.1.7

10.0 PARTICIPANTS RECORD

Printed Name	Initials

Figure 1
TEST RIG



POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: New-TSA Log K/A: 2.2.23

URO: 2.6 SRO: 3.8

TASK DESCRIPTION: Complete Tech Spec Log Entries

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Blank copies of the Tech Spec Action Log (Exhibit OM-P-12.1:1) from OM-P-12.1, Rev. 7, Operations Manual, Section 12.1, Operations Action Logs.

C. REFERENCES

1. OM-P-12.1, Rev. 7, "Operations Manual, Section 12.1 Operations Actions Logs"
2. M-356 Sh. 1, Rev. 61, "P&ID Control Rod Drive Hydraulic System"
3. ST-O-003-450-2, Rev. 4, "Scram Discharge Vent and Drain Valve Functional Test"
4. Technical Specification 3.1.8, "Scram Discharge Volume (SDV) Vent and Drain Valves"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the Tech Spec Action Log Sheets have been completed for the SDV vents AO-2-03-32A and AO-203-32B (one sheet for each valve).
2. Estimated time to complete: 15 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, complete the manual Tech Spec Action Log sheets for SDV vents AO-203-32A and AO-2-03-32B. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. Unit 2 is operating at full power.
2. At 0800 this morning AO-2-03-032A and AO-2-03-32B were declared inoperable due to failing ST-O-003-450-2, "Scram Discharge Vent and Drain Valve Functional Test", step 6.3.1 due to excessive stroke times.
3. AR A1188549 has been initiated to repair the valves.
4. All other Tech Spec plant equipment is operable.
5. The Unified Control Room Log Computer is not operating.

G. INITIATING CUE

Determine the Tech Spec impact of these inoperabilities, make manual Tech Spec Action Log entries in accordance with the Operations Manual, and submit the completed form to the Shift Manger for review.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*1	Determine the applicable Tech Spec for SDV vents AO-2-03-32A and AO-2-03-032B INOP. (Cue: Acknowledge the determination.)	P	It is determined that Tech Spec 3.1.8 "SDV Vent and Drain Valves" is applicable.
*2	Determine that both INOP vent valves are in different lines. (Cue: Acknowledge the determination.)	P	It is determined that both vent valves are in different lines using P&IDs or Control Room panel mimics.
*3	Determine that Condition A of Tech Spec 3.1.8 is applicable for AO-2-03-032A and AO-2-03-032B INOP. (Cue: Acknowledge the determination.)	P	It is determined that Condition A of Tech Spec 3.1.8 is applicable.
*4	Determine the completion time for Required Action A.1 to be 0800, 7 days from today's date. (Cue: Acknowledge the determination.)	P	It is determined that the completion time for Required Action A.1 is 0800, 7 days from today's date.
*** NOTE *** The following Exhibit OM-P-12.1:1 entries may differ slightly from those listed in the task standard as long as the important information is included.			
*5	Complete Exhibit OM-P-12.1:1 "Technical Specification Action Log" of OM-P-12.1 Operations Manual Section 12.1 "Operator Action Logs" by completing the following fields for AO-2-03-032A: • Unit – "unit experiencing inoperability" Entry # - sequential number consisting of year, unit and sequential TSA # • Tech Spec Number – "Tech Spec number for inoperability" • Discovery Date/Time – "date and time inoperability discovered" • Equipment ID – "alpha-numeric designator for inop equipment" • System Number – "system number for equipment inop"	P	The following data is entered in the fields listed below on Exhibit 1 OM-P-12.1:1 "Technical Specification Action Log". • Unit – "Unit 2" Entry # - "99-2 – next TSA number" • Tech Spec number – "3.1.8" • Discovery Date/Time – "today's date/0800" • Equipment ID – "AO-2-03-032A" • System # - "3"

STEP NO	STEP	ACT	STANDARD
	• Reference # - "AR number associated with the INOP feature". • Condition – "applicable Tech Spec condition letter and condition statement" • Reason – "short reason system is inop" • Required Action 1 – "Applicable required action statement" • Completion Time Date/Time – "Date and time for required action to be completed"		• Reference # - "A1188549" • Condition – "A", one or more SDV vent or drain lines with one valve inoperable. • Reason – "failed step 6.3.1 of ST-O-003-450-2" • Required Action 1 – "restore valve to OPERABLE status" • Completion Time – "0800/7 days from today's date"
6	Complete Exhibit OM-P-12.1:1 "Technical Specification Action Log" of OM-P-12.1 Operations Manual Section 12.1 "Operator Action Logs" by completing the following fields for AO-2-03-032B: • Unit – "unit experiencing inoperability" Entry # - sequential number consisting of year, unit and sequential TSA # • Tech Spec Number – "Tech Spec number for inoperability" • Discovery Date/Time – "date and time inoperability discovered" • Equipment ID – "alpha-numeric designator for inop equipment" • System Number – "system number for equipment inop" • Reference # - "AR number associated with the INOP feature" • Condition – "applicable Tech Spec condition letter and condition statement"	P	The following data is entered in the fields listed below on Exhibit 1 OM-P-12.1:1 "Technical Specification Action Log". • Unit – "Unit 2" Entry # - "99-2 – next TSA number" • Tech Spec number – "3.1.8" • Discovery Date/Time – "today's date/0800" • Equipment ID – "AO-2-03-032B" • System # - "3" • Reference # - "A1188549" • Condition – "A", one or more SDV vent or drain lines with one valve inoperable.

STEP NO	STEP	ACT	STANDARD
	• Reason – "short reason system is inop" • Required Action 1 – "Applicable required action statement" • Completion Time Date/Time – "Date and time for required action to be completed"		• Reason – "failed step 6.3.1 of ST-O-003-450-2" • Required Action 1 – "restore valve to OPERABLE status" • Completion Time – "0800/7 days from today's date"
7	Submit the completed forms to the Shift Manger for review. (Cue: Role play as the Shift Manager and acknowledge receipt of the completed TSA log for review.	P	Completed forms are given to the Shift Manger for review (one sheet for each valve).

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When Tech Spec Action Log sheets for AO-2-03-32A and AO-2-03-32B have been submitted to the Shift Manager, the evaluator will terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. Unit 2 is operating at full power.
2. At 0800 this morning AO-2-03-032A and AO-2-03-32B were declared inoperable due to failing ST-O-003-450-2, "Scram Discharge Vent and Drain Valve Functional Test", step 6.3.1 due to excessive stroke times.
3. AR A1188549 has been initiated to repair the valves.
4. All other Tech Spec plant equipment is operable.
5. The Unified Control Room Log Computer is not operating.

INITIATING CUE

Determine the Tech Spec impact of these inoperabilities, make manual Tech Spec Action Log entries in accordance with the Operations Manual, and submit the completed form to the Shift Manger for review.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 Scram Discharge Volume (SDV) Vent and Drain Valves

LCO 3.1.8 Each SDV vent and drain valve shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----------------------------------NOTE-----------------------------------
Separate Condition entry is allowed for each SDV vent and drain line.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more SDV vent or drain lines with one valve inoperable.	A.1 Restore valve to OPERABLE status.	7 days
B. One or more SDV vent or drain lines with both valves inoperable.	B.1 --------NOTE--------- An isolated line may be unisolated under administrative control to allow draining and venting of the SDV. -------------------- Isolate the associated line.	8 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.8.1	-------------------NOTE-------------------- Not required to be met on vent and drain valves closed during performance of SR 3.1.8.2 or SR 3.3.1.1.9 for Function 13 of Table 3.3.1.1-1. -- Verify each SDV vent and drain valve is open.	31 days
SR 3.1.8.2	Cycle each SDV vent and drain valve to the fully closed and fully open position.	92 days
SR 3.1.8.3	Verify each SDV vent and drain valve closes in ≤ 15 seconds after receipt of an actual or simulated scram signal.	24 months

REVIEW	PB
PORC	YES
SQR	YES
QR	YES
50.59	YES

OPERATIONS MANUAL

SECTION 12.1

OPERATION ACTION LOGS

Effective Date

Sponsor - PBAPS: R. C. Stott

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OPERATION ACTION LOGS

<<T00141, T00220>>

1.0 SCOPE

1.1 This OM Section provides guidance for documenting the following:

1. Entry into Technical Specifications (TS) Actions when an applicable Limiting Condition for Operation (LCO) is not met. These situations will be documented in the TS Action Log.

2. Inoperabilities of TS equipment applicable for the current plant operating Mode that do not result in failure to meet an LCO. These situations will be documented in the Potential TS Action Log. **<<T01723>>**

3. Entry into Technical Requirements Manual (TRM) Compensatory Measures when an applicable Technical Requirements Manual Specification (TRMS) is not met. These situations will be documented in the TRM Log except when documented using AG-CG-12, "Hot Work Guideline".

4. Entry into Offsite Dose Calculation Manual (ODCM) Compensatory Measures when an applicable Offsite Dose Calculation Manual Specification (ODCMS) is not met. These situations will be documented in the ODCM Log.

5. Equipment Inoperabilities which are due to testing required by TS, TRM, or ODCM and Diesel Generator Inoperabilities which are due to normal operations in accordance with System Operating procedures. These situations will be documented in the ST/SI/RT Status Log.

1.2 This OM Section also provides supplemental guidance for interpreting and applying the requirements of TS, TRM, and ODCM.

2.0 RESPONSIBILITY

2.1 Shift Management shall be aware of the status of plant systems and equipment with respect to TS, TRM, and ODCM requirements.

2.2 Shift Management shall ensure that when a TS LCO, TRMS, or ODCMS is not met, the Required Actions/Required Compensatory Measures are undertaken in a timely manner and that further actions are undertaken to correct the problem.

2.3 Shift Management shall carefully review any deficiency associated with TS, TRM, and ODCM systems or equipment in accordance with Chapter 10 and Chapter 15 of this Manual to determine if the plant has entered a degraded level of safety.

2.4 Shift Management shall examine all misoperations, errors, or other non-compliance with Operating Procedures to determine whether the inappropriate operation resulted in a situation in which any TS LCO, TRMS, or ODCMS was not met.

2.5 The Shift Manager shall be responsible for notifying the Senior Manager of Operations or the Operations Services Manager:

1. As soon as reasonable after unplanned events create a situation in which any LCO is not met.

2. When it becomes apparent that compliance with an LCO will not be restored as anticipated.

3. When it is determined that the plant or any plant activity is not in compliance with TS, TRM, ODCM, or applicable rules and regulations.

2.6 Shift Management shall ensure that a PEP Issue is initiated in accordance with procedure LR-C-10 if TS ACTIONS are entered AND the Required Actions require a written report to the NRC. **<<T00219>>**

2.7 LR-C-10 also requires a PEP to be initiated for other events which are reportable to external agencies.

3.0 GENERAL

3.1 For process variables (RPV pressure, Suppression Pool level, etc.), the decision to declare a TS LCO not met should be based on reasonable evidence that the parameter is beyond the limit. "Reasonable evidence" includes (but is not limited to) recorder traces, indicators, alarms, automatic actions, and general knowledge of current plant events. **<<T01075>>**

1. When a parameter is displayed by instruments having different ranges, the instrument with the narrowest range should be used in determining if the parameter is exceeding the LCO limit.

2. In situations where a parameter is displayed by more than one instrument of similar accuracies, declare the LCO not met when any single reliable instrument exceeds the LCO limit.

3.2 TS, TRM, and ODCM provide specific rules and guidance which govern the use and application of the requirements in these documents.

1. The rules/guidance for TS are discussed in TS Chapter 1.0, TS Section 3.0, and TS Bases Section 3.0.

2. The rules/guidance for TRM are discussed in TRM Chapter 1.0 and Section 3.0.

3. The rules/guidance for ODCM are discussed in TRM Chapter 1.0 and Section 3.0.

4. Refer to these rules when determining TS, TRM, and ODCM requirements. This is especially important when determining proper Required Actions/Required Compensatory Measures and Completion Times.

3.3 TRM and ODCM requirements are equivalent to TS requirements.

1. Maintaining compliance to TRMSs and ODCMSs is just as important as maintaining compliance to TS LCOs.

2. Performing TRM/ODCM Required Compensatory Measures within the allowed Completion Time when a TRMS/ODCMS is not met has the same priority as performing TS Required Actions within the allowed Completion Time when a TS LCO is not met.

3. Performing TRM and ODCM required Routine Testing within the specified Frequency has the same priority as performing TS required Surveillance Testing within the specified Frequency.

3.4 Section 1.3 of TS and Section 1.3 of the TRM discuss the rules for Completion Times associated with Required Actions/Required Compensatory Measures. Section 1.3 of the TRM is also applicable to the ODCM.

1. Completion Time extensions are allowed under certain circumstances.

2. For a Completion Time extension to be valid, multiple features must be Inoperable at the same time <u>AND</u> the first Inoperable feature must be the first feature returned to OPERABLE status.

   a. Under these circumstances, a Completion Time extension is allowable for the **subsequent** Inoperable feature.

   b. Only one Completion Time extension is permitted for each Condition entry.

   c. If the Condition is exited and subsequently re-entered, another Completion Time extension is allowable if the provisions stated above are satisfied.

3. Section 12.2 of this Manual also provides limitations for Completion Times and Completion Time extensions when a Safety Function Determination has been performed.

3.5 When ACTIONS or COMPENSATORY MEASURES are entered, restoring the system/component to OPERABLE status within the specified Completion Time is acceptable in lieu of performing the Required Action/Required Compensatory Measure within the specified Completion Time. For example, assume TS 3.3.2.2 Condition A has been entered. It is acceptable to either place the channel in trip within 72 hours or to restore the channel to OPERABLE status within 72 hours.

3.6 LCO 3.0.6 discusses the actions required when an Inoperable support feature makes a supported feature Inoperable.

1. When an Inoperable support feature causes a supported feature to become Inoperable, the supported feature shall be considered Inoperable.

2. If the support feature is not a TS feature, then the supported system shall be declared Inoperable and the ACTIONS for the supported system shall be entered.

3. If the Inoperable support feature is a TS feature and the Required Actions for the Inoperable support feature do not require the supported feature to be declared Inoperable AND do not require entry into Conditions and Required Actions for the supported feature, it is not required to perform the Required Actions for the Inoperable supported feature **unless** a loss of safety function exists.

   a. A Safety Function Determination shall be performed in accordance with TS 5.5.11 and Section 12.2 of this Manual to verify that a loss of safety function does not exist.

   b. If a loss of safety function does exist, the Required Actions for the Condition in the TS in which the loss of function exists shall be performed. Refer to OM Section 12.2 for guidance on determining if a loss of safety function exists.

   c. The Safety Function Determination shall be reviewed each time a feature required by TS subsequently becomes Inoperable to verify that the subsequent Inoperability has not resulted in a loss of safety function. This shall continue until the support feature is restored to OPERABLE status.

4. If the Required Actions for the Inoperable support feature require the supported feature to be declared Inoperable OR require entry into the Conditions and Required Actions for the Inoperable supported feature, then the Required Actions of the Condition in the TS for the Inoperable supported feature shall be performed.

5. As an example, consider the 480 VAC emergency load center timers. Proper operation of these timers is required to ensure that the load center is shed from the associated 4 kV emergency bus and that the load center is re-energized in the correct sequence. Loading in the correct sequence is necessary to ensure that the emergency DG is not overloaded. For this reason, the OPERABILITY of these timers is required for LCO 3.8.1 and LCO 3.8.2 (AC Sources) to be met. These timers are NOT support features for the associated 4 kV bus or load center. The OPERABILITY of these timers does NOT affect the OPERABILITY of the associated 4 kV bus or the associated load center. (The OPERABILITY of the 4 kV bus and the load center is based on energization of the bus or load center.)

   Consider a failure of the load center's timer such that it would re-energize the load center following a LOP/LOCA, but not in the proper sequence. If the failure affects the emergency DG loading such that failure of the DG could result, then LCO 3.8.1 or 3.8.2 (as appropriate) is not met. The DG shall be declared Inoperable and the ACTIONS for an Inoperable DG shall be entered. **<<A0905549 E66>>**

   Now assume that the load center is currently energized but the load center's timer has failed such that it would not re-energize the load center following a LOP/LOCA. In this case, the load center is considered OPERABLE because it is energized. However, all of the loads which are powered by the load center and the systems/subsystems which are prevented from performing their intended safety functions shall be declared Inoperable and the ACTIONS for these Inoperable systems/subsystems shall be entered. This is required because the Inoperable load center timer is NOT a support feature for the load center or its loads.

   If the load center itself should become Inoperable (such as its feeder breaker tripped), then the ACTIONS of TS 3.8.7 or TS 3.8.8 (depending on unit's Mode) shall be entered. Additionally, the systems/subsystems made Inoperable by the loss of the loads powered from the load center shall be considered Inoperable. The ACTIONS for these Inoperable supported systems do not have to be entered. This is allowed by LCO 3.0.6 because the load center is a support feature for the loads powered from the load center. A Safety Function Determination in accordance with Section 12.2 of this Manual shall be performed to verify that a loss of safety function does not exist.

3.7 An Inoperable feature/component/system may require entry into multiple Conditions. Ensure all applicable Conditions are entered and that all appropriate Required Actions are performed. When determining which LCOs, TRMSs, and ODCMSs are not met, consider the Inoperable feature AND combinations of the Inoperable feature and other currently Inoperable features. Some examples are listed below.

1. Refer to TS 3.3.1.1. Assume the Unit is in MODE 1. If APRM E is declared Inoperable but APRMs A and C are OPERABLE, declare all of the Functions for APRM E Inoperable and log these Inoperable Functions in a single Potential TS Action Log entry. This is appropriate because APRM E is not required to be OPERABLE if APRMs A and C are OPERABLE.

2. Refer to TS 3.3.1.1, 3.3.1.2 and TRMS 3.2. If a required WRNM becomes Inoperable while the Unit is in the mode of Applicability, the WRNM Period - Short, WRNM Inop, and WRNM rod block Functions, and the WRNM instrumentation Functions (TS 3.3.1.2) will become Inoperable (for the Inoperable WRNM). Make one TS Action Log entry which documents the Inoperable TS Functions. Make one TRM Log entry which documents the Inoperable TRM rod block Functions.

3. Refer to TS 3.3.1.1 and TRMS 3.2. If a required APRM becomes Inoperable with the Unit in MODE 1, the APRM Startup High Flux Scram, Flow Biased High Scram, Scram Clamp, Downscale, Inop, and Rod Block Functions will all become Inoperable.

   a. Make one TS Action Log entry which documents the Flow Biased High Scram, Scram Clamp, Downscale, and Inop Functions. If Required Action A.1 OR A.2 is not met, then a TS Action Log entry for entry into Condition F is required and an additional TS Action Log entry for entry into Condition G is required.

   b. Make one Potential TS Action Log entry for the APRM Startup High Flux Scram and Inop Functions.

4. Refer to TS 3.5.1. If LPCI subsystem "A" becomes Inoperable, Condition A of TS 3.5.1 will be entered and the information entered in a TS Action Log entry. If HPCI then becomes Inoperable, Condition C of TS 3.5.1 will be entered and the information entered in a second TS Action Log entry AND Condition D of TS 3.5.1 will be entered and the information entered in a third TS Action Log entry.

5. Refer to TS 3.5.1. If LPCI subsystem "A" becomes Inoperable, Condition A of TS 3.5.1 will be entered and the information entered in a TS Action Log entry. If LPCI subsystem "B" then becomes Inoperable, Condition A of TS 3.5.1 also applies to the "B" subsystem. The Completion Time for the Required Action for the "B" subsystem is the same as the Completion Time for the "A" subsystem's Required Action. This will be documented in a second TS Action Log entry. Condition I of TS 3.5.1 will be entered and the information entered in a third TS Action Log entry. If subsystem "A" is returned to OPERABLE status, Condition I is exited. A Completion Time extension for the "B" subsystem is now allowable in accordance with TS Section 1.3.

6. Refer to TS 3.3.4.1 and TRMS 3.1. If one channel of the ARI/ATWS-RPT logic is Inoperable, Condition A of TS 3.3.4.1 will be entered and the information entered in a TS Action Log entry AND Condition A of TRMS 3.1 will be entered and the information entered in a TRM Log entry.

7. LIS 2-2-3-101D (Reactor Low Water Level) inputs into RPS logic channel B2 and also inputs into PCIS logic channel D. If this instrument were to become Inoperable, a TS Action Log entry documenting LCO 3.3.1.1 not being met is required and a separate TS Action Log entry documenting LCO 3.3.6.1 not being met is required and a third TS Action Log entry documenting LCO 3.3.6.2 not being met is also required.

8. Refer to TS 3.1.7. Assume a faulty squib valve has caused one SLC subsystem to become Inoperable. TS 3.1.7 Condition B is entered and a TS Action Log entry is made. If the squib valve/SLC subsystem is not restored to OPERABLE status within 7 days, then Condition D is entered and Required Action D.1 is performed. A second TS Action Log entry is made to document entry into Condition D. Also note that Condition B was not exited (because one SLC subsystem remains Inoperable).

3.8 Separate Condition entry into the ACTIONS for some TS LCOs is allowed.

1. If separate Condition entry is allowed for each Inoperable feature/component, the Required Action's Completion Time is based on the discovery time of each Inoperability. A separate Log entry is also required for each of the Inoperable features/components.

2. If separate Condition entry is not allowed, the Required Action's Completion Time for the subsequent Inoperable features/components is the same as the Completion Time for the initial Inoperable feature/component. However, separate Log entries are required for each of the Inoperable features/components.

3.9 Exhibit OM-P-12.1:7 provides a flow chart which depicts the process of determining required actions and documenting the actions.

4.0 INSTRUCTIONS FOR COMPLETION AND USE OF THE LOGS <<T01932>>

4.1 The following logs contained in the Unified Control Room Log (UCRL) are governed by this OM Section:

1. Technical Specification Action Log
2. Potential Technical Specification Action Log
3. Technical Requirements Manual Log
4. Offsite Dose Calculation Manual Log

4.2 This OM Section also governs the Periodic Required Action/Compensatory Measure Log and the ST/SI/RT Status Log.

4.3 When a feature required by TS, TRM, or ODCM is Inoperable <u>OR</u> a variable does not meet limits specified in a TS LCO, TRMS, or ODCMS, the Inoperability will be documented in the appropriate Log (except for Inoperable TRM required features documented using AG-CG-12, "Hot Work Guideline").

1. Normally, the information will be entered in the computer for the Logs in the UCRL.
2. In the event of computer malfunctions, the information will be entered on Exhibit OM-P-12.1:1 (TS Action Log), Exhibit OM-P-12.1:2 (Potential TS Action Log), Exhibit OM-P-12.1:3 (TRM Log), or Exhibit OM-P-12.1:4 (ODCM Log) as appropriate and the data entered into the computer Logs at a later time.
3. The Periodic Required Action/Compensatory Measure Log (Exhibit OM-P-12.1:5) and the ST/SI/RT Status Log (Exhibit OM-P-12.1:6) are not computerized logs. When these Logs are completed/closed out, then the Logs shall be forwarded to NRMS.

4.4 The following steps provide direction for entering information into the Logs identified in Paragraph 4.1. Refer to Exhibits OM-P-12.1:1 through OM-P-12.1:4.

1. List the Entry Number.

   The Entry Number is a sequential number used for accountability and tracking purposes. Each entry in the Logs must be assigned an Entry Number. The Entry Number consists of the year, the applicable unit, and the sequential number. For example, the third Unit 2 entry in 1996 would be 96-2-003. The UCRL will enter the number automatically but the number may be changed if necessary.

2. Enter the TS number, TRMS number, or ODCMS number.

   For TS Action Log entries, enter the TS number. For Potential TS Action Log entries, enter the TS number. For TRM Log entries, enter the TRMS number. For ODCM Log entries, enter the ODCMS number.

3. Enter the Discovery Date and Time.

   The Discovery Date and Time is the time when it was discovered that a TS LCO, TRMS, or ODCMS was not met. When making entries using the computer, the computer will automatically enter the current date and time. The date and time can be changed if required.

4. Enter the Equipment Identification.

   Enter the alpha-numeric designation of the Inoperable equipment. For example, enter "2BP040" for the 2B SLC Pump.

5. Enter the System Number.

   Enter the system number for the system which contains the Inoperable feature. For example, enter "11" for the SLC system.

6. Enter Reference Numbers.

   Enter any AR numbers, Clearance numbers, Procedure numbers, etc., that are associated with the Inoperable feature.

7. Enter the Condition information. (This entry is not applicable to the Potential TS Action Log.)

   Enter the Condition letter and the Condition description given in the TS, TRM, or ODCM. This entry should be **VERBATIM**. For example, enter "A. One required emergency cooling tower fan Inoperable." if Condition A of TS 3.7.3 is entered.

   Indicate if performance of a Safety Function Determination (SFD) is required for the Inoperable TS equipment. An SFD is required if an Inoperable support system/subsystem/component makes a supported system Inoperable AND if the ACTIONS for the Inoperable supported system are not entered. Refer to OM Section 12.2 for further guidance on performance of SFDs.

8. Enter the Reason that the Condition was entered/the feature was declared Inoperable.

   Give a short description of why the feature is Inoperable.

9. Enter the Required Action(s)/Required Compensatory Measure(s) and associated Completion Time Date and Time for the TS Action Log, TRM Log, and ODCM Log. For the Potential TS Action Log, enter any limitations due to the Inoperable feature.

   Enter the Required Action(s)/Required Compensatory Measure(s) descriptions given in the TS, TRM, or ODCM. This entry should be **VERBATIM.**

   Enter the Completion Time associated with each Required Action/Required Compensatory Measure. **<<T01931>>**

   If a Required Action should have two Completion Times (such as for TS 3.1.7 Required Action B.1), then enter the shorter (i.e., more restrictive) Completion Time.

   The UCRL includes fields for up to five Required Action/Required Compensatory Measure entries. When using the UCRL, a field should contain only one Required Action/Required Compensatory Measure.

   When the Condition allows options, enter only the options which are being utilized. For example, if TS 3.8.1 Condition B is entered and Required Action B.4.2 is being performed but Required Action B.4.1 is not being performed, do not include an entry for Required Action B.4.1.

   If the Required Actions/Required Compensatory Measures require a written report to be submitted to the NRC, initiate a PEP Issue and enter the PEP number in this field. **<<T00219>>**

   When using the UCRL, the computer will compute the Completion Time date and time if the allowed Completion Time (in hours or days) is entered.

   If the Required Action/Required Compensatory Measure is repetitive in nature (i.e., verify system is isolated once per 8 hours) or must be performed when a specific situation occurs (i.e., analyze samples prior to release), document the performance of these actions in the Periodic Required Action/Compensatory Measure Log (Exhibit OM-P-12.1:5). When this Exhibit is completed, forward to NRMS.

10. Enter the Exit Justification.

    If the feature has been restored to OPERABLE status and compliance to the LCO/TRMS/ODCMS restored, enter a description of the activities that have been performed. Include work order numbers, test numbers, etc. as appropriate.

11. Enter the date and time that the feature was restored to OPERABLE status.

12. Enter the initials of the individual who entered the exit information in the Log.

4.5 The following steps document Inoperabilities which result from testing required by TS, TRM, or ODCM.

1. If the test does not affect system/component OPERABILITY, then test performance will be documented in the ST/SI/RT Status Log (Exhibit OM-P-12.1:6). No other Log entries are required. However, it is NOT necessary to log surveillance tests which are performed by Operations Control Room personnel AND which do NOT affect OPERABILITY of any equipment. An example of this would be the daily surveillance logs.

2. If the test makes a system/component Inoperable AND the test returns the system/component to OPERABLE status, test performance will be documented in the ST/SI/RT Status Log (Exhibit OM-P-12.1:6). No other Log entries are required.

3. If the test makes a system/component Inoperable AND the testing is NOT completed during the current shift, then make a Narrative Log entry prior to turnover to alert the on-coming shift to the Inoperability. Test performance will be documented in the ST/SI/RT Status Log (Exhibit OM-P-12.1:6).

4. If the test makes a system/component Inoperable AND the test does NOT return the system/component to OPERABLE status, then a TS Action Log, Potential TS Action Log, TRM Log, or ODCM Log entry (as appropriate) is required to document the Inoperability. Test performance will also be documented in the ST/SI/RT Status Log (Exhibit OM-P-12.1:6).

5. The WCS may complete the ST/SI/RT Status Log for testing scheduled for the upcoming shift except for the times that equipment is made Inoperable and restored to OPERABLE status. These times will be entered by the applicable RO.

4.6 Directions for Completing the ST/SI/RT Status Log (Refer to Exhibit OM-P-12.1:6).

1. Enter the Unit number and the date.

2. Enter the number of the test being performed (ST, SI,or RT).

   This information can be entered in the Log at the beginning of the shift for the tests which are expected to be performed during the shift.

3. Determine if the test makes equipment Inoperable that is required to be OPERABLE.

   If the test does not make equipment Inoperable, circle NO. If the test makes equipment Inoperable but the equipment is not currently required to be OPERABLE, circle NO.

   If the equipment being tested will be made Inoperable during the test and the equipment is required to be OPERABLE, circle YES.

   This information can be entered in the Log at the beginning of the shift for the tests which are expected to be performed during the shift.

4. Determine if delayed entry into ACTIONS/COMPENSATORY MEASURES is allowed for equipment made Inoperable by the test.

   Some tests will make instrumentation Inoperable but TS, TRM, or ODCM allow delaying entry into the ACTIONS/COMPENSATORY MEASURES if the Inoperability is solely due to performance of the test. If this is the case, then circle YES and indicate the delay time allowed by TS, TRM, or ODCM.

   If the test makes required equipment Inoperable and delayed entry into ACTIONS/COMPENSATORY MEASURES is not allowed, then circle NO.

   No entry in this column is required if the test does not make required equipment Inoperable.

   This information can be entered in the Log at the beginning of the shift for the tests which are expected to be performed during the shift.

5. List the Required Actions/Required Compensatory Measures which are required for the equipment made Inoperable by the test.

   List the TS, TRMS, or ODCMS number and the Required Action/Required Compensatory Measure number for the specification which addresses the Inoperability. For example, enter TS 3.1.7 B.1 if the test makes a SLC subsystem Inoperable.

   No entry in this column is required if the test does not make required equipment Inoperable.

   No entry in this column is required if delayed entry into ACTIONS/COMPENSATORY MEASURES is allowed.

   This information can be entered in the Log at the beginning of the shift for the tests which are expected to be performed during the shift.

6. Enter the test start time.

7. Enter the time when the test makes equipment Inoperable.

   For SIs which test instrumentation, this is the time when the applicable RO signs on to the test.

   For STs and RTs, this is the time when the performer informs the control room that the test will make equipment Inoperable.

   If the test does not make any equipment inoperable, then it is not necessary to enter any time in this column.

8. Enter the time when the test returns equipment to OPERABLE status.

   For SIs, this is the test completion time.

   For STs and RTs, this is the time when the test restores the equipment to OPERABLE status.

   If the test does not make any equipment Inoperable, then it is not necessary to enter any time in this column.

   Some tests may alternately make equipment Inoperable, OPERABLE, then Inoperable again, then OPERABLE again, etc. If this is the case, log the test number on one line of the ST/SI/RT Status Log along with the first Inoperable time and the first OPERABLE time. Subsequent times would be logged on the next line on the ST/SI/RT Status Log. For tests such as this, it may be advantageous to list only this test on one ST/SI/RT Status Log page and log other tests on another ST/SI/RT Status Log page.

9. Enter the time the test is complete.

PORC NO
SQR YES
QR NO
50.59 NO

1-18-96

TECHNICAL SPECIFICATION ACTION LOG

UNIT ___________ (2 or 3)
(This revision is a complete rewrite.)

CONTROLLED BY
DS

Entry #	TSS	Discovery Date/Time	Equipment ID	System #	Reference #
Condition Is a SFD required? YES / NO Are any other SFDs currently active? YES / NO (If YES, verify SFD is still valid.)			Reason		Required Action 1 Completion Time Date/Time
Required Action 2 Completion Time Date/Time	Required Action 3 Completion Time Date/Time		Required Action 4 Completion Time Date/Time		Required Action 5 Completion Time Date/Time
Exit Justification				Exit Date/Time	Exit Entries Made By

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: NEW–RAD INST K/A: 2.3.5
URO: 2.3 SRO: 2.5

TASK DESCRIPTION: Use A Portable Radiation Instrument – Alternate Path (Instrument Zero)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

1. Eberline RO-2A with the the following instrument setup items verified:

   a. Calibration Sticker – within calibration for today's date and listing a Beta correction factor of "4". (If using a non-calibrated "Training Only" instrument, ensure the "Training Only" calibration sticker indicates an appropriate calibration due date or replace the sticker and fill in a future due date)

   b. Source Check Sticker – indicates source checked for today's date. (If using a non-calibrated "Training Only" instrument, ensure the "Training Only" Source Check Sticker indicates source checked for today's date or replace the sticker and fill in today's date)

   c. Physical Condition – satisfactory

   d. Battery Check 1 & 2 – ensure both batteries indicate beyond the "Batt OK" range.

   e. Zero Check – Adjust the zero knob to make the meter indicate a value above zero (for use on this alternate path JPM).

C. REFERENCES

1. PLOT-1780, Rev. 10, "Dosimeter & Instrumentation" lesson plan, objective 1A

2. HP-CG-400, Rev. 2, "Health Physics Instrumentation Operations Guideline"

3. HP-CG-400-3, Rev. 0, "Eberline RO-2/2A/20"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the candidate has completed the instrument checks, including rezeroing and properly obtained an on-contact reading for both gamma and beta radiation on an evaluator selected object.

2. Estimated time to complete: 12 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to take an on-contact reading for both gamma and beta on the specified object. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. This Eberline RO-2A has just been obtained from the instrument cage.

G. INITIATING CUE

You are directed to complete the required instrument checks and obtain on-contact gamma and beta readings of the indicated item using the RO-2A provided.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
** NOTE *** Instrument checks may be conducted in any order.			
*1	Perform a calibration check of the RO-2A. (Cue: Calibration is not due until October 1999)	P	The candidate locates the Calibration Sticker on the RO-2A and verifies that the instrument is in calibration.
*2	Verify that the RO-2A has been Source Checked. (Cue: The source check was conducted 4 hours ago)	P	The candidate locates the Source Check Sticker and observes that the RO-2A was source checked today.
*3	Perform a check of the physical condition of the RO-2A. (Cue: Acknowledge physical check completed)	P	The candidate performs a careful physical inspection of the RO-2A for any damage.
*4	Perform a battery check of the RO-2A. (Cue: Positions BAT 1 and BAT 2 indicate that battery voltage is in the Batt OK range)	P	Candidate places the function switch to BOTH positions BAT 1 and BAT 2 and verifies that voltage is indicated in the 'Batt OK" range
*5	Perform a Zero check of the RO-2A. (Cue: Needle is indicating above the Zero indication)	P	Candidate places the function switch to the Zero position and observes that the indication is greater than Zero.
*6	Zero the RO-2A (Cue: acknowledge adjustment of knob to obtain a Zero indication)	P	Candidate adjusts the Zero Knob to obtain a Zero indication.
*7	Take a Closed Window Gamma reading on the selected object. (Cue: Depending on selected scale indicate that the reading is upscale or downscale until the appropriate scale is reached. Then indicate that the meter is reading 10 mR/hr)	P	Candidate holds meter with the beta window closed at approximately one inch and takes readings, shifting scales until an appropriate reading is obtained.

STEP NO	STEP	ACT	STANDARD
*8	Take an Open Window reading on the selected object. (Cue: Depending on selected scale indicate that the reading is upscale or downscale until the appropriate scale is reached. Then indicate that the meter is reading 12 mR/hr)	P	Candidate holds meter with the beta window open at approximately one inch and takes readings, shifting scales until an appropriate reading is obtained.
9	Candidate calculates the Beta Radiation Reading.	P	Candidate subtracts the closed window reading (10 mR/hr) from the open window reading (12 mRem/hr) and multiplies the result times the Beta Correction Factor (BCF) of 4. (12 – 10) X 4 = 8 mR/hr Beta
10	Candidate reports Gamma and Beta Radiation levels on the object. (Cue: Acknowledge report)	P	Candidate reports that the object is reading 10 mR/hr gamma and 8 mR/hr Beta.

Under "ACT" P - must perform
S - must simulate

TERMINATING CUE

When the Gamma and Beta radiation levels are reported, the evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

This Eberline RO-2A has just been checked out from the instrument cage.

INITIATING CUE

You are directed to complete the required instrument checks and obtain on-contact gamma and beta readings of the indicated item using the RO-2A provided.

PORC	NO
SQR	YES
NQA	NO
50.59	NO
RESP MGR	YES

PECO Energy Company
Nuclear Generation Group

HEALTH PHYSICS INSTRUMENTATION OPERATIONS GUIDELINE

1.0 PURPOSE

This guideline establishes the standard technique for the operation and use of the instrumentation described herein.

2.0 SCOPE

This guideline applies to the operation of Health Physics instrumentation described herein (excludes whole body contamination monitors) at PECO Energy nuclear facilities.

3.0 REFERENCES

3.1 Applicable Vendor Technical/Instruction Manual(s)

3.2 CM-1 AR# A0771105 (T02785) (Relates to the operation of the Eberline SAC-4)

4.0 DEFINITIONS

None

5.0 RESPONSIBILITIES

5.1 Each individual who uses an instrument contained in this guideline is responsible for operating it in accordance with this document. The technical manuals can be used to obtain additional usage information.

5.2 The Instrument Physicist/Supervisor or HP Supervisor is responsible for completing all Non-Conformance Reports (Exhibit HP-CG-400-1).

5.3 The Instrument Physicist/Supervisor is responsible for determining the source response check frequency for each type of instrument.

6.0 PREREQUISITES

6.1 The instrument user shall verify the following prior to using an instrument:

6.1.1 Check that the instrument has been response checked for the required frequency.

6.1.2 Verify that the instrument has a current calibration date.

6.1.3 Check the instrument for physical damage.

6.1.4 If applicable, ensure all batteries are checked and in the satisfactory range.

6.1.5 If applicable, ensure that the instrument is properly zeroed.

6.1.6 If any instrument checks are unsatisfactory, then:

1. Refer to the appropriate instrument exhibit for guidance.

6.1.7 If no guidance is given, then:

1. Turn off the instrument.
2. Attach a Health Physics "Out of Service" or a "Defective" tag, and complete documentation required by Instrument Program Procedures.
3. Return the instrument to the instrument facility.
4. Obtain a replacement instrument, and return to Section 6.1.1.

6.2 The user shall receive the appropriate amount of training to use the equipment.

6.3 Properly sign out instrument.

7.0 <u>PROCEDURE</u>

7.1 PRECAUTIONS

7.1.1 Instruments shall not be used beyond the calibration due date specified on the instrument calibration sticker.

7.1.2 With the exception of the RM-14, RM-20, and the E-140N, instruments shall only be operated using the detectors they have been calibrated with.

7.1.3 Instrument shall be calibrated in accordance with the applicable procedures.

7.1.4 Keep the instruments as clean and dry as possible.

7.1.5 A defective cable may produce spuriously high readings or no readings at all.

7.1.6 Instruments declared "Out of Service (OOS)" will be tagged with a "Out of Service" or a "Defective" tag. Portable OOS instruments will be returned to the Instrument Facility (PBAPS) or the Hot Tool Room and placed in the Out of Service locker (LGS). Non-portable instruments (PCM-1, PM-7, etc.) will be appropriately placarded and reported to Instrument Physicist/Supervisor.

7.1.7 Approach suspected source of radiation slowly to avoid rapid over-response which may damage instrument needle. Change scale setting as appropriate.

7.2 GUIDELINES

7.2.1 Each radiological instrument shall be calibrated on a regularly scheduled interval determined by the Instrument Physicist/Supervisor not to exceed one year.

7.2.2 Efficiency determination shall be required as per the appropriate instrument calibration procedure, which shall also define the frequency of efficiency determination.

7.2.3 Any instrument not satisfactorily meeting the schedule requirements for calibrations and efficiencies shall be placed out of service until the efficiency and/or calibration has been performed.

7.2.4 The Instrument Physicist/Supervisor may change the calibration frequency of an instrument under special circumstances. Changes to calibration frequency may be made only if ALARA considerations are not adversely affected. The instrument may be used only during the interval specified on the calibration sticker.

7.2.5 The Instrument Physicist/Supervisor or HP Supervisor may exempt source and /or operational check requirements under special circumstances, (e.g., ALARA considerations or testing purposes). Such an exemption is to be documented and the exemption is to be lifted when it is no longer required.

CAUTION

Monitors that are not routinely source checked are NOT to be relied on for personnel entry and surveys performed are for information only. Only surveys conducted with properly source response checked instruments are to be used for personnel entries.

7.3 NON-CONFORMANCE REPORTS

When an instrument performs outside of its acceptance criteria, the Instrument Physicist/Supervisor or HP Supervisor shall be notified and a HP Instrument Non-Conformance Report initiated. (Exhibit HP-CG-400-1)

7.3.1 Upon notification of an out-of-tolerance instrument the Instrument Physicist/Supervisor shall have a preliminary investigation performed, reviewing the out-of-tolerance condition <u>AND</u> usage history to determine the type of action required.

7.3.2 The results of such investigations should be documented in the HP Instrument Non-Conformance Report.

7.3.3 Completed Non-Conformance Reports should be returned to the Instrument Physicist/Supervisor for final review AND approval. Approved reports should be filed in HP department files.

8.0 EXHIBITS

8.1 Exhibit HP-CG-400-1, Health Physics Instrument Non-Conformance Report

8.2 Exhibit HP-CG-400-2, BICRON ACM-120

8.3 Exhibit HP-CG-400-3, EBERLINE RO-2/2A/20

8.4 Exhibit HP-CG-400-4, EBERLINE RM-14/20

8.5 Exhibit HP-CG-400-5, EBERLINE E-140N

8.6 Exhibit HP-CG-400-6, EBERLINE E-530N with HP-220A PROBE

8.7 Exhibit HP-CG-400-7, DCA AM-2 MODEL 3090-3/3096-3/3092

8.8 Exhibit HP-CG-400-8, EBERLINE R0-7

8.9 Exhibit HP-CG-400-9, EBERLINE E-520 w/HP-270 HAND PROBE

8.10 Exhibit HP-CG-400-10, EBERLINE 6112B (TELETECTOR)

8.11 Exhibit HP-CG-400-11, BICRON MICRO REM

8.12 Exhibit HP-CG-400-12, BICRON ANALYST

8.13 Exhibit HP-CG-400-13, EBERLINE BC-4

8.14 Exhibit HP-CG-400-14, NUCLEAR ENTERPRISES SMALL ARTICLE MONITOR (SAM)

8.15 Exhibit HP-CG-400-15, XETEX 415B-1/425A ALARMING DOSIMETER

8.16 Exhibit HP-CG-400-16, NUCLEAR ENTERPRISES CM-7A

8.17 Exhibit HP-CG-400-17, ALNOR RAD-100R DIGITAL DOSIMETER

8.18 Exhibit HP-CG-400-18, GAST 0522/0523 PORTABLE LOW VOLUME AIR SAMPLER

8.19 Exhibit HP-CG-400-19, EBERLINE SAC-4

8.20 Exhibit HP-CG-400-20, EBERLINE E-530

8.21 Exhibit HP-CG-400-21, EBERLINE PRM-6

8.22 Exhibit HP-CG-400-22, XETEX 503A TELEDOSE SYSTEM

8.23 Exhibit HP-CG-400-23, EBERLINE NRD PORTABLE NEUTRON REM COUNTER

8.24 Exhibit HP-CG-400-24, GILIAN HFS

8.25 Exhibit HP-CG-400-25, GAS TECH GX-4000

8.26 Exhibit HP-CG-400-26, NMC-PC5

8.27 Exhibit HP-CG-400-27, RADECO H-809V1/H810C/H809B2/H809C

8.28 Exhibit HP-CG-400-28, RADECO H809V-II

8.29 Exhibit HP-CG-400-29, EBERLINE RMS-II

8.30 Exhibit HP-CG-400-30, EBERLINE EC4-8/DA1-6

8.31 Exhibit HP-CG-400-31, Rotem RAM ION and SMARTS Survey System

8.32 Exhibit HP-CG-400-32, JOHNSON EXTENDER 2000W

8.33 Exhibit HP-CG-400-33, NUCLEAR ENTERPRISES CM-11/DP-11

8.34 Exhibit HP-CG-400-34, DOSITEC PR-2

8.35 Exhibit HP-CG-400-35, DOSITEC AR-21

8.36 Exhibit HP-CG-400-36, DOSITEC PR-7

8.37 Exhibit HP-CG-400-37, MERLIN GERIN RAM 100 (DPM version)

EBERLINE RO-2/2A/20

DESCRIPTION OF INSTRUMENT

The Eberline Model RO-2, RO-2A, and RO-20 are portable ion chamber survey instruments capable of detecting beta, gamma, and X-ray radiation.

The ion chambers are vented to the atmosphere.

The detector centerline is indicated by the dimples on the side and front end of the instrument case.

PRECAUTIONS

Use of this instrument in concentrations of noble gases should be avoided as leakage of the gases into the ion chamber could make the reading erroneous. To delay this effect, place the instrument in a single plastic bag and secure the opening prior to entering an area where noble gases are present.

Care should be taken when the beta shield is open to avoid damage to the mylar window.

The temperature operating range of the RO-2/RO-2A/RO-20 is from -40°F to 140°F. Meter operability needs to be evaluated when operating in temperatures greater than 120°F and less than 20°F.

The meter reading of the RO-2/RO-2A/RO-20 can be affected by geotropism.

The user should be aware of the angular dependence of the meter in relation to the source of radiation.

CONTROLS

Function Switch - Eight-position rotary switch with the following functions:

1. OFF
2. BAT 1 - Checks condition of first-stage batteries
3. BAT 2 - Checks condition of second-stage batteries
4. Zero - Allows zeroing the meter
5. Scale indicators:

   a. On the RO-2, the four scale ranges are listed as:

      1) 0 - 5 mR/hr
      2) 0 - 50 mR/hr
      3) 0 - 500 mR/hr
      4) 0 - 5,000 mR/hr

   b. On the RO-2A, the four scale ranges are listed as:

      1) 0 - 50 mR/hr
      2) 0 - 500 mR/hr
      3) 0 - 5 R/hr
      4) 0 - 50 R/hr

c. On the RO-20, the five scale ranges are listed as:

1)	0 - 5	mR/hr
2)	0 - 50	mR/hr
3)	0 - 500	mR/hr
4)	0 - 5	R/hr
5)	0 - 50	R/hr

Calibration Adjustment Pots - To be adjusted during calibration only.

Zero Knob - Used to set the meter to zero when zero function is selected.

Beta Shield Release Button - When depressed, opens or closes the beta shield covering the mylar window.

Light Switch (RO-20 only) - Momentary or constant lighted readout available switch positions.

OPERATION

OPERATIONAL CHECK

If instrument fails steps 6.1.1, 6.1.2, 6.1.3
Then tag instrument OOS as per 6.1.7.

If instrument fails Step 6.1.4, then:

BATTERY REPLACEMENT

If the battery checks are unsatisfactory, then:

1. Turn off the instrument.
2. Unhook the latches at both ends of the instrument case and remove.

> **NOTE**
> MODEL RO-2 INSTRUMENTS HAVE THREE 9-VOLT BATTERIES, MODEL RO-2A INSTRUMENTS HAVE FOUR 9-VOLT BATTERIES, AND MODEL RO-20 INSTRUMENTS HAVE FIVE C-CELL, ONE 30V LITHIUM BATTERIES.

3. Turn the instrument over and remove all batteries. Replace the bad batteries with ones obtained from the Instrument Facility.

4. Inspect the desiccant to ensure that crystals are blue. If the crystals have changed color to pink or clear, replace it or tag the instrument Out of Service, as per Section 6.1.7.

Perform Step 6.1.4. again.

If the instrument fails 6.1.5, then:

Turn the function switch to zero position. Check that the meter reads zero. If the meter does not read zero, set it to zero by turning the zero knob.

MEASUREMENT OF GAMMA RADIATION

Set the function knob to appropriate scale for use.

Position the detector centerline of the instrument toward the radiation source.

Take a reading with the beta shield on the bottom of the instrument case in the closed position covering the mylar window (closed window).

For a contact reading, get the radiation source as close to the center of the detector as possible. (Using the dimples on the instrument case, align the center of the detector with the radiation source.)

Turn off the instrument after the survey is completed.

MEASUREMENT OF BETA AND GAMMA RADIATION

Set the function knob to appropriate scale for use.

Position the detector centerline of the instrument toward the radiation source.

Take a reading with the beta shield on the bottom of the instrument case in the closed position covering the mylar window (closed window). Note the gamma measurement.

Hold the RO-2/2A/20 vertical, and press the beta shield release button allowing gravity to uncover the mylar window (open window).

Take a reading with the open window facing the radiation source, and note the measurement.

The beta measurement is determined by subtracting the closed window measurement from the open window measurement, and multiplying the difference by the station beta correction factor.

1. If there is no difference in the open and closed window measurements, then record the beta measurement as no detectable beta (e.g., ND) on the survey form.

2. If no beta measurement was taken or required, then record not taken (e.g., NT) or not applicable (e.g., NA) on the survey form.

Turn off the instrument after the survey is completed.

BETA CORRECTION FACTOR (BCF)

The BCF is based on the beta energies for each station. The routine surveillance (RT-7.36 for PBAPS & ST-0-111-802-0 for LGS) of the isotopic mixture determines the beta energies, and is used to evaluate changes to the BCF.

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: NEW-PRO ACT K/A: 2.4.44
URO: 2.1 SRO: 4.0

TASK DESCRIPTION: Protective Action Recommendation Determination

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Partially completed ERP-200 Appendix 4, Rėv. 3, "General Emergency Initial Actions"

C. REFERENCES

1. ERP-200, Rev. 15, "Emergency Director (ED)"
2. ERP-200 Appendix 4, Rev. 3, "General Emergency Initial Actions"
3. ERP-101, Rev. 20, "Classification of Emergencies"

D. TASK STANDARD

1. Satisfactory task completion is indicated when state agencies have been notified of the PAR to evacuate a full 360 degrees for 5 miles and sectors E, ENE, and ESE for 5 to 10 miles.
2. Estimated time to complete: 15 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to complete step 5 of ERP-200 Appendix 4, "General Emergency Initial Action" using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. Unit 2 is shutdown with a reactor level of +10" and reactor pressure of 200 psig
2. No release in progress.
3. A General Emergency has just been declared based on fuel damage with a steam leak into primary containment.
4. Containment radiation on RI-8103A-D is 4.0 E5 R/hr
5. Containment pressure on PR-2508 is 14 psig.
6. Primary containment is expected to remain intact.
7. MESOREM printout is not yet available.
8. The TSC and EOF are not yet activated.

G. INITIATING CUE

You are directed to complete step 5 of ERP-200 Appendix 4, "General Emergency Initial Actions".

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*** NOTE **** Provide the candidate with a partially completed ERP-200 Appendix 4.			
1	Obtain a copy of ERP-101.	P	A copy of ERP-101 is obtained.
*2	Evaluate plant conditions and determine that Table 2 "Fuel Damage" General Emergency requires: • Evacuate a full 360 degrees for 5 miles • Evacuate affected and 2 adjacent sectors for 5-10 miles.	P	Table 2 "Fuel Damage" General Emergency.
3	Complete the ERP-200, Appendix 4 PAR worksheet portions. • Wind speed 10 mph. • Wind direction "from" instrumentation 270 degrees. • Wind direction "to" +/- 180 = 90 degrees. (Cue: Wind speed 10 mph, wind direction from 270 degrees.)	P	Determine wind speed to be 10 mph determine wind direction "from" to be 270 degrees and subtract 180 to determine wind direction "to" of 90 degrees.
*4	Determine: • Evacuate all sectors 360 degrees 5 miles.	P	Evacuate all sectors 360 degrees, 5 miles determined from ERP-101 Table 2, General Emergency "2" direction.
*5	Determine: • Evacuate sectors E, ENE, and ESE, 5 to 10 miles.	P	Evacuate affected sector E from wind direction "to" and adjacent 2 sectors ENE and ESE 5 to 10 miles from ERP-101 Table 2, General Emergency "2" directions.
*** NOTE *** When the candidate attempts to contact Maryland MDE and Pennsylvania BRP role play as these state agencies to receive the PAR notification.			
*6	Notify Maryland MDE and Pennsylvania BRP of the following PAR: • Evacuate all sectors 360 degrees 5 miles. • Evacuate Sectors E, ENE, ESE 5 to 10 miles. (Cue: Acknowledge receipt of report.)	P	Maryland MDE and Pennsylvania BRP are contacted by OMNI phone using the numbers in ERP-200 Appendix 4 "PAR Worksheet".

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When Maryland MDE or Pennsylvania BRP has been notified of the PAR the evaluator will terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. Unit 2 is shutdown with a reactor level of +10" and reactor pressure of 200 psig

2. No release in progress.

3. A General Emergency has just been declared based on fuel damage with a steam leak into primary containment.

4. Containment radiation on RI-8103A-D is 4.0 E5 R/hr

5. Containment pressure on PR-2508 is 14 psig.

6. Primary containment is expected to remain intact.

7. MESOREM printout is not yet available.

8. The TSC and EOF are not yet activated.

INITIATING CUE

You are directed to complete step 5 of ERP-200 Appendix 4, "General Emergency Initial Actions".

ERP-200 Markup

Verify partially complete ERP-200 Appendix 4 (attached) has the following information:

Page 1:

Items: 1, 2, 3, 4 – checked off

Page 2:

"This is not a Drill" – checked off

1. "Communicators Name" John Doe, "Ext". 4414, "Emergency Ext." 4225
2. "Unit 2" checked-off
   "Initial" checked –off
3. "Brief Non-Technical description of the event".
   Unit 2 shutdown, level +10", reactor pressure 200 psig, fuel failure with a steam leak into primary containment.
4. "No radioactive release in progress" – checked off
5. Blank
   "This is not a drill" – checked off

APPENDIX 4

GENERAL EMERGENCY INITIAL ACTIONS

1. ✓ Complete the General Emergency Notification Form and provide to the ED Communicator.

2. ✓ Ensure the General Emergency Station Public Address Announcement is completed.

3. ✓ Appoint an NRC Communicator to contact the NRC per the Reportability Reference Manual Form, "Event Notification Worksheet" and ensure the Emergency Response Data System (ERDS) is activated.

4. ✓ Direct the shift dose assessment personnel (SDAP) to begin performing dose projections (if appropriate).

5. _____ Complete the PAR Worksheet and notify Maryland MDE and Pennsylvania BRP of the PAR (if the EOF is not activated).

6. _____ Complete the Turnover/Briefing Form.

GENERAL EMERGENCY NOTIFICATION FORM

NOTE:	THE ED COMMUNICATOR SHOULD OBTAIN AND IMPLEMENT ERP-110.

☐ This is a Drill ☑ This is not a Drill

1. This is: John Doe at Peach Bottom Atomic Power Station.
   Communicators Name

   My phone number is: 717-456-7014 Ext. 4414 or Emergency Ext. 4225

2. A GENERAL EMERGENCY is being declared for:

   ☒ Unit 2 ☐ Unit 3 ☐ Units 2 & 3

   THIS REPRESENTS AN: ☐ Escalation In ☒ Initial CLASSIFICATION STATUS:

3. BRIEF NON-TECHNICAL DESCRIPTION OF THE EVENT:
   Unit 2 Shutdown, Level +10", reactor pressure 200 psig
   Fuel Failure with steam leaks into primary containment

4. THERE IS: ☒ No Radioactive Release in Progress
   ☐ Airborne Radioactive Release in Progress
   ☐ Liquid Radioactive Release in Progress

5. Wind Direction is "from" (installed instrumentation) ____ degrees and blowing "to" ____ degrees. Wind speed is ____mph.

☐ This is a Drill ☒ This is not a Drill

APPROVED: E. Director (Emergency Director) XXXX Time 9/XX/99 Date

GENERAL EMERGENCY

STATION PUBLIC ADDRESS ANNOUNCEMENT

NOTE: CIRCLE THE APPROPRIATE PHRASE(S) TO BE ANNOUNCED.

DECLARATION MESSAGE

THIS (IS) (IS NOT) A DRILL. REPEAT, THIS (IS) (IS NOT) A DRILL.

ATTENTION ALL PERSONNEL. ATTENTION ALL PERSONNEL.

THE EMERGENCY DIRECTOR HAS DECLARED A GENERAL EMERGENCY.

ALL MEMBERS OF THE EMERGENCY RESPONSE ORGANIZATION REPORT TO YOUR EMERGENCY FACILITY OR EMERGENCY ASSEMBLY AREA.

ALL NON-ESSENTIAL PERSONNEL AWAIT FURTHER PUBLIC ADDRESS INSTRUCTIONS.

ALL VISITORS WITH THEIR ESCORTS WILL REPORT TO THE GUARDHOUSE AND FOLLOW THE INSTRUCTIONS OF THE SECURITY PERSONNEL.

THIS (IS) (IS NOT) A DRILL. REPEAT, THIS (IS) (IS NOT) A DRILL.

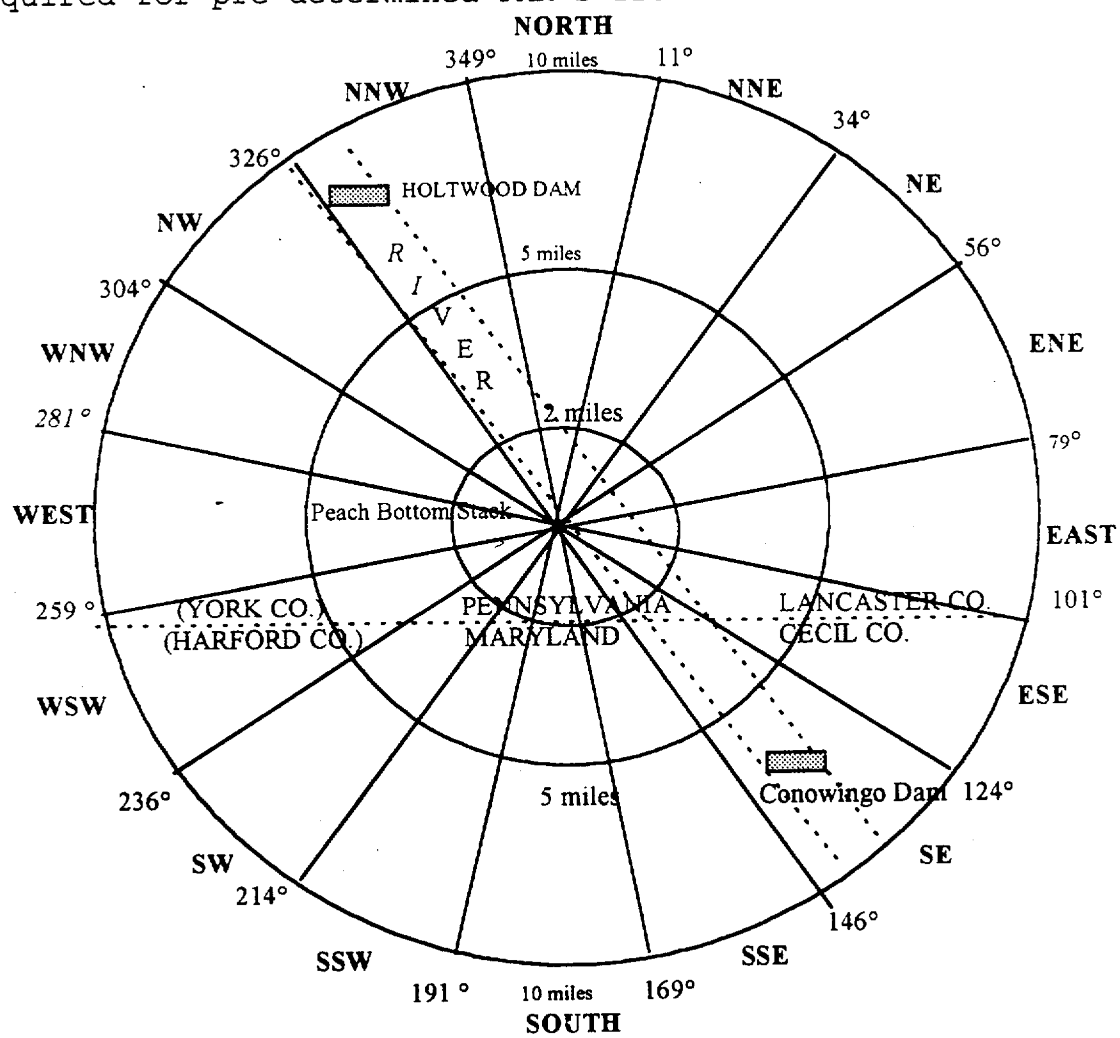
PAR WORKSHEET

PAR DATA: ______ Plant Status (based on ERP-101, table ________)
______ Dose Projection (based on MESOREM run ___________ , ___________
Time Date

METEOROLOGICAL DATA: Wind Direction "from" instrumentation _________ degrees
Windspeed _______ mph Wind Direction "to" +/- 180 = _________ degrees

PAR SECTORS: AREA	SHELTER	EVACUATE	NO ACTION
0-2 miles			
2-5 miles			
5-10 miles			
* >10 miles			

* Not required for pre-determined PAR's from ERP-101.



	PERSON NOTIFIED	TIME	DATE
PENNSYLVANIA BRP (Ext. 236 or 239)			
MARYLAND MDE (Ext. 235 or 292)			

TURNOVER / BRIEFING FORM

CURRENT EMERGENCY CLASSIFICATION: ____________ Time: ____________

EAL TABLE: ____________ Date: ____________

CURRENT PLANT CONDITIONS: ____________

PERSONNEL INJURIES: ____________

EVACUATION STATUS: ____________

ACCOUNTABILITY STATUS: ____________

OFF SITE ELECTRICAL POWER STATUS: ____________

EMERGENCY DIESEL STATUS: ____________

RADIOLOGICAL CONDITIONS IN PLANT: ____________

OFF SITE RELEASE CONDITIONS: ____________

PRIORITIES: ____________

Control Room Shift Manager: ____________

OSC Director: ____________

Emergency Director: ____________ EOF ERM: ____________

NRC contacted: ____________ ERDS data link activated: ____________

TURNOVER/BRIEFING FORM

UNIT 2 STATUS: Reactor Power Level or Mode: ____________________

Reactor Level: ________ Reactor Pressure: ____________________

System Availability: Comments:

System	Yes	No	Comments
HPCI	Yes ____	No ____	____
RCIC	Yes ____	No ____	____
ADS	Yes ____	No ____	____
CONF/FEED	Yes ____	No ____	____
A Loop C/S	Yes ____	No ____	____
B Loop C/S	Yes ____	No ____	____
A Loop RHR	Yes ____	No ____	____
B Loop RHR	Yes ____	No ____	____
HPSW	Yes ____	No ____	____
ESW	Yes ____	No ____	____
SBLC	Yes ____	No ____	____
CRD	Yes ____	No ____	____
SBGTS	Yes ____	No ____	____
RPV Intact	Yes ____	No ____	____
Cont. Intact	Yes ____	No ____	____

UNIT 3 STATUS: Reactor Power Level or Mode: ____________________

Reactor Level: ________ Reactor Pressure: ________

System Availability: Comments:

System	Yes	No	Comments
HPCI	Yes ____	No ____	____
RCIC	Yes ____	No ____	____
ADS	Yes ____	No ____	____
CONF/FEED	Yes ____	No ____	____
A Loop C/S	Yes ____	No ____	____
B Loop C/S	Yes ____	No ____	____
A Loop RHR	Yes ____	No ____	____
B Loop RHR	Yes ____	No ____	____
HPSW	Yes ____	No ____	____
ESW	Yes ____	No ____	____
SBLC	Yes ____	No ____	____
CRD	Yes ____	No ____	____
SBGTS	Yes ____	No ____	____
RPV Intact	Yes ____	No ____	____
Cont. Intact	Yes ____	No ____	____

Complete by: ____________________ Time: ________ Date: ____________

TABLE 1
GENERAL CONDITIONS

NOTE:
This table is to be used as a guide for "big picture" emergency classification. IF conditions listed are met AND specific EALs of other tables do not address current emergency conditions, THEN classify using this table.

UNUSUAL EVENT	1) Situation threatens normal level of plant safety. No releases of radioactive material off-site are expected.
ALERT	1) Situation does or could represent a substantial degradation in the level of plant safety 2) Conditions exist that warrant precautionary activation of Technical Support Center and placing Emergency Operations Facility and other key emergency personnel on standby 3) Release of radioactive material warrants off-site response or monitoring, but does not require protective actions.
SITE AREA EMERGENCY	1) The level of safety has or could be degraded to the point of losing a plant function needed to protect the public 2) Conditions exist that warrant: (a) Activation of EOF/ENC AND (b) Activation of off-site monitoring teams OR Protective measures recommendations to public near the site 3) A significant release of radioactive material has occurred or could take place onsite or near the site boundary.
GENERAL EMERGENCY	1) Substantial core damage AND loss of, or high potential for loss of primary Containment integrity. 2) Conditions exist that warrant all on-site and off-site emergency facilities being activated to aid in implementation of protective actions. 3) A significant release of radioactive material has occurred or could take place offsite in a short period of time. 4) Protective Actions Recommendations for off-site areas are made for PBAPS. * PAR evacuate a full 360 degrees for 2 miles evacuate affected and 2 adjacent sectors for 2-5 miles

TABLE 2
FUEL DAMAGE

UNUSUAL EVENT **CM-5**	1) Off-gas radiation rise of 500 mR/hr within 30 minutes 2) Off-gas radiation >2.5E+03 mR/hr 3) Reactor coolant activity >4 uCi/gm dose equivalent I-131 per Tech. Spec. 3.4.6.	 {RR-2(3)-17-152}
ALERT	1) Containment radiation >4.0E+02 R/hr 2) Off-gas radiation >2.5E+04 mR/hr 3) Reactor coolant activity >300 uCi/gm dose equivalent I-131 with a Rx scram due to main steam line high radiation. 4) Spent fuel damage resulting in refuel floor high radiation <u>OR</u> refuel floor ventilation exhaust high radiation	{RI-8(9)103 A/C} {RI-8(9)103 B/D} {RR-2(3)-17-152} {RIS-2(3)-17-458(A,B,C,D)} {RR-2-(3)-17-456}
SITE AREA EMERGENCY	1) Containment radiation >4.0E+03 R/hr 2) Major spent fuel damage or uncovering of spent fuel confirmed by high fuel floor radiation levels <u>AND</u> (a) observation <u>OR</u> (b) refuel floor high radiation <u>OR</u> (c) refuel floor ventilation exhaust high radiation	{RI-8(9)103 A/C} {RI-8(9)103 B/D} {U/2 ARM 3-7,3-8,3-9,3-10} {U/3 ARM7-9,7-10,7-11,7-12} {RIS-2(3)-17-458(A,B,C,D)} {RR-2(3)-17-456}
GENERAL EMERGENCY	1) Containment radiation >4.0E+04 R/hr with Containment pressure >10 psig (for a known or probable failure of Primary Containment, see Table 4) * PAR - evacuate a full 360 degrees for 2 miles - evacuate affected and 2 adjacent sectors for 2-5 miles 2) Containment radiation >3.0E+05 R/hr with Containment pressure >10 psig (for a known or probable failure of Primary Containment, see Table 4) * PAR - evacuate a full 360 degrees for 5 miles - evacuate affected and 2 adjacent sectors for 5-10 miles	{RI-8(9)103 A/C} {RI-8(9)103 B/D} {PR-2(3)508} {RI-8(9)103 A/C} {RI-8(9)103 B/D} {PR-2(3)508}

TABLE 3
REACTOR COOLANT SYSTEM (RCS)

UNUSUAL EVENT	1) RCS leakage exceeding Tech. Spec. LCO 3.4.4 limits. a. No pressure boundary leakage b. greater than 5 gpm unidentified leakage c. greater than 25 gpm total leakage over the previous 24 hour period d. greater than 2 gpm increase in unidentified leakage within the previous 24 hour period in MODE 1 2) Stuck open relief valve <u>OR</u> safety valve.	
ALERT	1) RCS leakage greater than 50 gpm (25,000 lbm/hr) 2) Scram condition with Reactor level below -160" <u>OR</u> unknown.	{LI-2(3)-02-3-091} {LI-2(3)-02-3-113} {PR/LR-2(3)-02-3-404A} * {LR-2(3)-02-3-110A} * {LR-2(3)-02-3-110B} * (Blue Pen Only)
SITE AREA EMERGENCY	1) Scram condition with Reactor level below -160" <u>OR</u> unknown <u>AND</u> Containment pressure >10 psig.	{LI-2(3)-02-3-091} {LI-2(3)-02-3-113} {PR/LR-2(3)-02-3-404A} * {LR-2(3)-02-3-110A} * {LR-2(3)-02-3-110B} * (Blue Pen Only) {PR-2-(3)508}
GENERAL EMERGENCY **CM-3**	1) Scram condition with Reactor level below -226" for greater than 3 minutes <u>AND</u> Containment pressure >20 psig. * PAR evacuate a full 360 degree for 2 miles evacuate affected and 2 adjacent sectors for 2-5 miles	{LI-2(3)-02-3-091} {LI-2(3)-02-3-113} {PR/LR-2(3)-02-3-404A} * {LR-2(3)-02-3-110A} * {LR-2(3)-02-3-110B} * (Blue Pen Only) {PR-2(3)-508}

TABLE 4
PRIMARY CONTAINMENT

UNUSUAL EVENT	1) Failure of a Primary Containment Penetration to isolate due to a valid isolation condition (both valves in a two valve penetration fail to close).
ALERT	1) Unexpected radiation levels rise by a factor of 1000. 2) Unexpected airborne activity of >1000 DAC hours excluding isotopes with half lives <2 hrs. 3) **Torus room flood (6 inches) with a corresponding level drop in the Torus.** {**panel 2(3)24, alarm E-5**} {**panel 2(3)0C003, LI-2(3)919**}
SITE AREA EMERGENCY	1) Primary Containment radiation >4.0E+2 R/hr {RI-8(9)103A/C} {RI-8(9)103B/D} **AND** Main Stack >6.9E+0 uCi/cc {RR-0-17-051} 2) Primary Containment radiation >4.0E+2 R/hr {RI-8(9)103A/C} {RI-8(9)103B/D} **AND** Vent Stack >1.0E-3 uCi/cc {RR-2(3)979} 3) Primary Containment radiation >4.0E+3 R/hr with a known or probable failure of Primary Containment Integrity. {RI-8(9)103A/C} {RI-8(9)103B/D}
GENERAL EMERGENCY	1) Primary Containment Radiation >4.0E+4 R/hr with a known or probable failure of Primary Containment Integrity. (for Primary Containment Intact, see Table 2) {RI-8(9)103A/C} {RI-8(9)103B/D} * PAR evacuate a full 360 degree for 2 miles evacuate affected and 2 adjacent sectors for 2-5 miles 2) Primary Containment radiation >3.0E+5 R/hr with a known or probable failure of Primary Containment Integrity. (for Primary Containment Intact, see Table 2) {RI-8(9)103A/C} {RI-8(9)103B/D} * PAR evacuate a full 360 degree for 5 miles evacuate affected and 2 adjacent sectors for 5-10 miles

TABLE 5
RADIOACTIVE RELEASE

NOTE:

CDE = COMMITTED DOSE EQUIVALENT
TEDE = TOTAL EFFECTIVE DOSE EQUIVALENT
TPARD = TOTAL PROTECTIVE ACTION RECOMMENDATION DOSE
BASIS EPA-400, "MANUAL OF PROTECTIVE ACTION GUIDES AND PROTECTIVE ACTIONS FOR NUCLEAR INCIDENTS.

UNUSUAL EVENT	1) Gaseous release exceeding ODCMS 3.8.C.1 as evidenced by a calculated offsite dose rate from the Main Stack, Vent Stack, Torus Hardened Vent, or unmonitored release that exceeds either 0.057 mRem/hr TPARD using a 60 minute average release data <u>OR</u> 0.170 mRem/hr child thyroid CDE using a 60 minute average release data. 2) Liquid release exceeding ODCMS 3.8.B.1 3) Iodine Release exceeding ODCMS 3.8.C.1.b
ALERT	1) Calculated offsite dose rate >0.57 mRem/hr TPARD using 15 min. avg. release data. 2) Calculated offsite dose rate >1.7 mRem/hr child thyroid CDE using 15 min. avg. release data.
SITE AREA EMERGENCY	1) Projected offsite total dose >100 mRem TPARD. 2) Projected offsite thyroid dose >500 mRem child thyroid CDE. 3) Projected offsite skin dose >5,000 mRem. 4) Actual offsite dose rate >25 mRem/hr TEDE. 5) Measured offsite air concentration >6.5N8 uCI/cc iodine.
GENERAL EMERGENCY	1) Projected offsite total dose >1000 mRem TPARD. 2) Projected offsite thyroid dose >5000 mRem child thyroid CDE. 3) Projected offsite skin dose >50,000 mRem. 4) Actual offsite dose rate >250 mRem/hr TEDE. 5) Measured offsite air concentration >6.5N7 uCi/cc iodine. * PAR evacuate 360 degrees for 5 miles evacuate affected and 2 adjacent sectors for 5-10 miles

TABLE 6
FIRE

UNUSUAL EVENT	1) Fire in protected area lasting 10 minutes or more after initial attempts to extinguish it.
ALERT	1) Fire which has lasted over 20 minutes after initial attempts to extinguish it and which could make any of the following safety systems INOPERABLE: - ADS - ECW - ESW - HPCI - HPSW - PCIS - RCIC - SBGTS - SLC - RHR - RPS - Core Spray - Control Rod Drive HCU's - Control Room Ventilation - 2 Emergency Diesel Generators - Loss of Emergency Switchgear - Primary Containment - Secondary Containment
SITE AREA EMERGENCY	1) Fire which removes those Safety Systems required to perform a single plant function (i.e., both HPCI & ADS when required by Tech. Specs., all of Low Pressure ECCS when required by Tech. Specs.).
GENERAL EMERGENCY	N/A

TABLE 7
SEVERE NATURAL PHENOMENA

UNUSUAL EVENT	1) Earthquake felt in plant or detected and confirmed on station seismic instrumentation per SO 67.7.A. 2) Conowingo Pond level <104 feet without prior notification by the Power System Director. {LI-2(3)278A,B,C} 3) Conowingo Pond level >111 feet with predicted flow in excess of 600,000 cfs. {LI-2(3)278A,B,C} 4) Hurricane forecasted to hit the station with sustained winds of 75 mph or greater, as notified by the Power System Director. 5) A tornado within site boundaries.
ALERT	1) "OPERATING BASIS EARTHQUAKE" exceeded per SE-5 and felt in the plant. 2) An uncontrollable loss of Conowingo Pond level as confirmed by the Power System Director. 3) Conowingo Pond level >112 feet. 4) Hurricane or tornado which strikes the power block with identifiable plant damage.
SITE AREA EMERGENCY	1) "MAXIMUM CREDIBLE EARTHQUAKE" detected on station seismic instrumentation (0.12g) per UFSAR Sec. 2.5.3, Sec.12.2 and Appendix C. 2) Conowingo Pond level <87 feet as confirmed by the Power System Director. 3) Conowingo Pond level >113 feet.
GENERAL EMERGENCY	N/A

TABLE 8
LOSS OF POWER

UNUSUAL EVENT	1) All offsite power to the emergency buses unavailable for >60 seconds. 2) No diesel generators available when required for >60 seconds.
ALERT	1) Loss of all offsite power AND NO diesel generators energize their associated buses. 2) Loss of DC power as evidenced by verifying <105 volts on all four 125 V distribution panels. {panel 2(3)09, alarms C-3 & C-4} {panel 2(3)20, alarms H-3 & H-4}
SITE AREA EMERGENCY	1) Loss of all offsite power for >15 minutes AND NO diesel generators energize their associated buses for >15 minutes. 2) Loss of DC power for longer than 15 minutes as evidenced by verifying <105 V on all four 125 V distribution panels. {panel 2(3)09, alarms C-3 & C-4} {panel 2(3)20, alarms H-3 & H-4}
GENERAL EMERGENCY	N/A

NOTE:

DIESEL GENERATORS SHUTDOWN DUE TO LACK OF COOLING WATER ARE CONSIDERED "UNAVAILABLE".

TABLE 9
LOSS OF ASSESSMENT OR COMMUNICATIONS

UNUSUAL EVENT	1) Loss of communications capability including (refer to Reportability Reference Manual) Loss of the ENS Network AND Loss of the OMNI Network AND Loss of the GTE System 2) Unplanned loss of most or all safety system annunciators OR indicators for >15 minutes requiring increased surveillance to safely operate the unit(s).
ALERT	1) Unplanned loss of most or all safety system annunciators OR indicators for 15 minutes requiring increased surveillance to safely operate the unit(s) AND EITHER a significant plant transient is in progress OR the plant monitoring system (PMS) is unavailable.
SITE AREA EMERGENCY	1) Loss of safety system annunciators AND indicators AND PMS AND a significant plant transient is in progress.
GENERAL EMERGENCY	N/A

NOTE:

SIGNIFICANT PLANT TRANSIENTS INCLUDE BUT ARE NOT LIMITED TO: SCRAM, RECIRC RUNBACK INVOLVING GREATER THAN 25% THERMAL POWER CHANGE, ECCS INJECTIONS, OR THERMAL POWER OSCILLATIONS OF 10% OR GREATER.

TABLE 10
HAZARDS TO STATION OPERATION

UNUSUAL EVENT	1) Aircraft crash on OR near site OR unusual aircraft activity over facility 2) Significant explosion on OR near site 3) Significant toxic gas OR flammable gas release on OR near site.
ALERT	1) Aircraft crash OR missile impact within the protected area. 2) Significant explosion within the protected area affecting plant operation. 3) Uncontrolled significant release of toxic OR flammable gas within the protected area.
SITE AREA EMERGENCY	HAZARDS WITH EITHER UNIT NOT IN MODE 4 1) Aircraft crash OR missile impact with major damage in any vital area. 2) Explosion causing severe damage to 2 OR more diesel generators OR to ECCS equipment such that the systems required to perform a single plant function become inoperable (i.e., both HPCI & ADS when required by Tech. Specs., all of low pressure ECCS when required by Tech. Specs.). 3) Uncontrolled release of toxic OR flammable gas detected in the Control Room (e.g. Chlorine, Cardox).
GENERAL EMERGENCY	N/A

TABLE 11
CONTROL ROOM EVACUATION

UNUSUAL EVENT	N/A
ALERT	1) Evacuation of Main Control Room is anticipated <u>OR</u> required <u>AND</u> control is established at Remote Shutdown Panels or Alternative Shutdown Panels.
SITE AREA EMERGENCY	1) Evacuation of Main Control Room <u>AND</u> control of Reactor Shutdown Systems <u>is not</u> established at Remote Shutdown Panels or Alternative Shutdown Panels in 15 minutes.
GENERAL EMERGENCY	N/A

TABLE 12
THREAT TO SECURITY

UNUSUAL EVENT	1) Credible sabotage or bomb threat 2) Credible intrusion and attack threat 3) Attempted intrusion and attack 4) Attempted sabotage discovered 5) Hostage situation or extortion threat.
ALERT	1) Actual attack and intrusion into a protected area 2) Suspected bomb or sabotage device discovered.
SITE AREA EMERGENCY	1) Imminent loss of physical control of the facility with imminent occupation of the Control Room or other vital areas.
GENERAL EMERGENCY	1) Actual loss of physical control of the facility with occupation of the Control Room or other vital areas. * PAR evacuate 360 degrees for 2 miles

NOTE:

"CREDIBLE THREAT" MEANS (1) PHYSICAL EVIDENCE SUPPORTING THE THREAT EXISTS, (2) INFORMATION INDEPENDENT FROM THE ACTUAL THREAT MESSAGE EXISTS, THAT SUPPORTS THE THREAT, OR (3) A SPECIFIC GROUP OR ORGANIZATION CLAIMS RESPONSIBILITY FOR THE THREAT.

TABLE 13
PLANT SYSTEMS/EQUIPMENT FAILURE

UNUSUAL EVENT	1) Inability to reach required shutdown mode within Tech. Spec. LCO required action completion time. 2) Turbine rotating component failure causing rapid plant shutdown.
ALERT	1) Cold shutdown unattainable. 2) Failure to initiate a scram when required via the reactor protection system AND via Rx mode switch AND via manual scram pushbuttons AND via alternate rod insertion (ARI). 3) Scram condition AND the Rx is NOT shutdown. 4) Turbine failure causing casing penetration.
SITE AREA EMERGENCY	1) Hot shutdown unattainable. 2) Scram condition, Rx NOT shutdown AND torus temperature above 110 degrees F.
GENERAL EMERGENCY	N/A

NOTE:

THE REACTOR IS CONSIDERED SHUTDOWN WHEN REACTOR POWER IS BELOW MID-RANGE ON IRM RANGE 7 or WRNM indicates below 1.00E0%.

Facility: Peach Bottom Unit 2 & 3 Date of Examination: Week of Sep. 13, 1999
Examination Level (circle one): RO / SRO Operating Test Number: RO - 1 .

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Plant Parameter Verification - Rod Position JPM	Verify rod position following a fast power reduction (alternate path).
	Temporary Modifications of Procedures - Partial Procedure JPM	Prepare a "Partial Procedure" for post-maintenance testing of a component.
A.2	Familiarity with and use of P&IDs - P&ID JPM	When an instrument is reported damaged, use P&IDs to determine the effect on system operations.
A.3	Use of portable survey instruments – Rad Survey Instrument Use JPM	Use a portable radiation instrument.
A.4	Emergency Communications – Evacuation JPM	Direct an evacuation for a declared emergency.

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: New-Control Rod Verif   K/A: 201003A3.01
URO: 3.7   SRO: 3.6

TASK DESCRIPTION: Control Rod Position Verification – (Alternate Path)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Official 3D MONICORE P1 performed before transient.

C. REFERENCES

1. GP-9-2, Rev. 26, "Fast Power Reduction"

2. ON-122, Rev. 5, "Misposition Control Rod"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the trainee has performed a control rod position verification, identified the mispositioned control rod and taken the required Off Normal procedure actions.

2. Estimated time to complete: 10 minutes <u>Non-Time Critical</u>

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to verify control rod positions following a GP-9-2 power reduction. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. A vacuum transient occurred on Unit 2 requiring power to be lowered using GP-9-2.

2. The power drop was stopped 5 minutes ago when vacuum stabilized at 27".

3. Table 1 control rods have been inserted.

4. An Official 3D P1 was completed just prior to the transient.

G. INITIATING CUE

The Control Room Supervisor directs you, the 4th RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain the recent official 3D P1 or control rod position log. (Cue: Provide a copy of the P1 or control rod position log.)	P	Operator gets a copy of the recent official 3D P1 or control rod position log.
2	Compare current control rod position to the position prior to the transient. (Cue: Acknowledge checks in progress.)	P	Operator checks current position as compared to pre-transient position.
*3	Identify control rod 18-07 is not driven to position 00. (Cue: Control rod 18-07 is at position 04.)	P	Operator identifies and reports that control rod 18-07 is not at position 00.
4	Recognize and announce entry into ON-122, "Mispositioned Control Rod". (Cue: Acknowledge entry into ON-122, DIRECT the operator to take appropriate ON-122 actions.	P	Operator recognizes and reports entry into ON-122, "Mispositioned Control Rod".
5	Contact Reactor Engineering for assistance, in accordance with ON-122, "Mispositioned Control Rod",. (Cue: Reactor Engineering acknowledges the request.)	P	Operator contacts the Reactor Engineers and requests their assistance.
6	Notify the Shift Manager in accordance with ON-122, "Mispositioned Control Rod",. (Cue: The Shift Manger acknowledges report.)	P	Operator contacts the Shift Manager and reports the mispositioned control rod.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When Reactor Engineering and Shift Manger is informed, the evaluator will terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. A vacuum transient occurred on Unit 2 requiring power to be lowered using GP-9-2.

2. The power drop was stopped 5 minutes ago when vacuum stabilized at 27".

3. Table 1 control rods have been inserted.

4. An Official 3D P-1 was completed just prior to the transient.

INITIATING CUE

The Control Room Supervisor directs you, the 4th RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

PECO Energy Company
Peach Bottom Unit 2

GP-9-2 FAST REACTOR POWER REDUCTION

1.0 PURPOSE

To rapidly reduce reactor power as required by plant conditions.

2.0 PREREQUISITES

2.1 Plant conditions require a fast reduction in power.

3.0 PERFORMANCE STEPS

NOTES

1. Steps for power reduction may be exited when power reduction is no longer required.

2. Core thermal hydraulic instability may be occurring if ANY of the following conditions exist:

   o APRM oscillations of greater than OR equal to 10 percent peak-to-peak,

   o LPRM OR APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, OR

   o WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.

3.1 IF evidence of core thermal hydraulic instability exists, THEN place the reactor mode switch in "SHUTDOWN" AND enter T-100, "Scram", AND exit this procedure. **CM-1, CM-2**

3.2 Lower recirculation flow until ANY of the following occur:

o percent reactor core thermal power is reduced to the value specified in Step 1 of GP-9-2 Appendix 1

OR

o an "APRM HIGH" alarm occurs, **CM-3**

OR

o FLLLP exceeds 0.995.

3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch OR the Emergency In/Notch Override handswitch. **CM-4**

3.4 Reduce recirculation flow to lower total core flow to approximately 51.25 Mlbs/hr (50% core flow) as indicated on PMS point B015 OR on Reactor Total Core Flow Indicator, DPFR-2-02-3-095, on Panel 20C005A. **CM-5**

NOTE
Pre-transient rod positions may be obtained from a recent OFFICIAL 3D P1, a recent CONTROL ROD POSITION LOG, RE-C-01 Appendix 7, Control Rod Position Data Sheets, RE-C-01, Exhibit RE-C-01-01, Quarter Core Map or RE-C-01, Exhibit RE-C-01-02, Full Core Map.

3.5 WHEN plant conditions permit, THEN a second licensed operator shall verify control rods on GP-9-2 Appendix 1, Table 1, inserted in Step 3.3 are at position 00 and ALL other control rods are at their pre-transient positions AND signoff Step 3 of GP-9-2 Appendix 1, Table 1.

3.6 Demand an OFFICIAL 3D P1 from PMS or 3D MONICORE to obtain thermal limit values (MFLCPR, MFLPD and MAPRAT).

3.7 IF any thermal limit value is equal to or greater than 1.000, THEN take corrective action in accordance with GP-13, "Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern", and RE-C-01, "Reactor Engineering General Instructions".

3.8 IF further power reduction is required, THEN exit this procedure AND enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure AND enter GP-5, "Power Operations".

4.0 REFERENCES

4.1 GP-3, Normal Plant Shutdown

4.2 GP-5, Power Operations

4.3 GP-9-2 Appendix 1, U/2 Fast Reactor Power Reduction Table

4.4 GP-13, Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern

4.5 RE-C-01, Reactor Engineering General Instructions

4.6 RE-C-01 Appendix 7, Control Rod Movement Guidelines PBAPS Only

4.7 Letter from L. F. Rubino to J. T. Budzynski, 11/8/88

4.8 CM-1, NRC Bulletin No. 88-07 Supplement 1 (T00313)

4.9 CM-2, NRC Generic Letter 94-02 (T03567)

4.10 CM-3, OE 5194, Partial Loss of Feedwater Heating

4.11 CM-4, INPO SER 4-88 (T00462)

4.12 CM-5, GE Letter 11-7-88, Recirc Pump Trip Guidelines (T000157)

4.11 INPO SOER 94-01 (T03905)

PECO Energy Company
Peach Bottom Units 2 and 3

ON-122 MISPOSITIONED CONTROL ROD - PROCEDURE

1.0 SYMPTOMS

1.1 An incorrectly selected control rod was moved.

1.2 A correctly selected control rod was moved two or more notches beyond it's targeted position.

1.3 A correctly selected control rod was moved to an incorrect location AND the operator was NOT immediately cognizant.

2.0 OPERATOR ACTIONS

2.1 Halt all control rod motion and power changes.

2.2 Notify Shift Management.

2.3 IF the mispositioned control rod is caused by a Rod Drift THEN:

2.3.1 Perform ON-121, "Drifting Control Rod".

2.3.2 Exit this procedure.

2.4 IF thermal power is below the RWM low power setpoint AND control rods are positioned such that more than two insert errors OR more than one withdraw error exists, THEN manually scram in accordance with GP-4, "Manual Reactor Scram".

2.5 IF the control rod had been mispositioned less than two minutes THEN:

2.5.1 Immediately return the rod to its proper position.

2.5.2 Notify Reactor Engineering.

NOTE
PCIOMR surveillance status sign is posted to inform the Reactor Operator if PCIOMR recommendations are in effect. The sign is posted on the 2(3)0C05A console at the four rod display panel.

2.6 IF the control rod has been mispositioned for longer than two minutes AND PCIOMR surveillance is required, THEN:

2.6.1 Initiate a 100 MWe load drop, do not go below 500 MWe.

2.6.2 Immediately contact Reactor Engineering for assistance per RE-C-01, "Reactor Engineering General Instructions".

2.6.3 Notify the Shift Manager.

2.7 IF the control rod has been mispositioned for longer than two minutes AND PCIOMR surveillance is NOT required, THEN:

2.7.1 Immediately contact the Reactor Engineering for assistance per RE-C-01, "Reactor Engineering General Instructions".

2.7.2 Notify the Shift Manager.

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: New-Partial Proc

K/A: 2.2.11
URO: 2.5 SRO: 3.4

TASK DESCRIPTION: Prepare a Partial Procedure

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

ST-O-011-301-2, Rev. 12, "Standby Liquid Control Pump Functional Test for IST"

C. REFERENCES

1. A-3, Rev. 18, "Temporary Changes to Procedures and Partial Procedure Use"

2. ST-O-011-301-2, Rev. 12, "Standby Liquid Control Pump Functional Test for IST"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the candidate has correctly prepared ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" as a partial for the completion of Post Maintenance Testing on the "B" Standby Liquid Control (SBLC) pump.

2. Estimated time to complete: 20 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to prepare a partial procedure for Post Maintenance Testing of the "B" Standby Liquid Control (SBLC) pump using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. The "B" Standby Liquid Control (SBLC) pump has failed step 6.3.23 of ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" due to having insufficient pump flow.

2. Maintenance has completed repairs on the pump and it is ready for Post Maintenance Testing.

G. INITIATING CUE

The Control Room Supervisor directs you to prepare a Partial Procedure from ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" to complete Post Maintenance Testing of the "B" Standby Liquid Control (SBLC) pump. Submit the completed partial procedure for review and approval.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*1	Enter the word "PARTIAL" on the first page of the procedure.	P	The word "PARTIAL" is entered on the front page.
*2	Record the reason for the partial and whether additional testing is required to fulfill surveillance test requirements.	P	Candidate writes words that indicate the partial is being used as Post Maintenance Test and that is will meet the surveillance requirements for the "B" SBLC pump.
*3	Indicate changes on the procedure to those steps or portions of the procedure that are not required to be performed.	P	Steps which do not support the testing of the "B" SBLC pump are changed or crossed out. • Step 6.1.1 should be made to apply to the "B" SBLC Pump Only. • Steps 6.1.2 –6.1.5 should be crossed out. • Steps 6.2.1 –6.2.28 (all of section 6.2) should be crossed out (individual steps or entire pages may be crossed out at a time).
4	Submit the partial for approval. (Cue: Accept partial for approval.)	P	Candidate will give evaluator the marked up procedure for approval.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the candidate submits the Partial Procedure for approval, the evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. The “B” Standby Liquid Control (SBLC) pump has failed step 6.3.23 of ST-O-011-301-2, “Standby Liquid Control Pump Functional Test for IST” due to having insufficient pump flow.

2. Maintenance has completed repairs on the pump and it is ready for Post Maintenance Testing.

INITIATING CUE

The Control Room Supervisor directs you to prepare a Partial Procedure from ST-O-011-301-2, “Standby Liquid Control Pump Functional Test for IST” to complete Post Maintenance Testing of the “B” Standby Liquid Control (SBLC) pump. Submit the completed partial procedure for review and approval.

PORC	YES
SQR	YES
QR	YES
50.59	YES
RESP MGR.	YES

PECO Energy Company
Peach Bottom Atomic Power Station

TEMPORARY CHANGES TO PROCEDURES AND PARTIAL PROCEDURE USE

1.0 PURPOSE

1.1 To establish the administrative requirements, controls, and responsibilities for making Temporary Changes (TCs) to procedures and partial procedure use.

2.0 SCOPE

2.1 This procedure shall be used to initiate, document and control Temporary Changes to approved procedures. A change that would result in a 50.59 Safety Evaluation per LR-C-13 is NOT within the scope of this procedure.

2.2 This procedure contains the requirements for partial procedure use.

3.0 SOURCES AND REFERENCES

3.1 SOURCE DOCUMENTS

3.1.1 ANSI N18.7-1972, Administrative Controls for Nuclear Power Plants

3.1.2 PBAPS Quality Assurance Program, UFSAR Appendix D

3.1.3 NRC Regulatory Guide 1.33 - 1972

3.1.4 PBAPS UFSAR Section 13.6

3.1.5 CM-1, Ltr to NRC 07/22/88 (T00295)

3.1.6 CM-2, Ltr to NRC 08/31/87 (T00364)

3.1.7 CM-3, Ops Incident Rpt 2-89-21 (T00617)

3.1.8 CM-4, NRC PB URI 91-30-02 (T01666)

3.1.9 CM-5, Ltr to NRC 05/15/91 (T01022)

3.1.10 CM-6, Ltr to NRC 12/29/93 (T03245)

3.1.11 CM-7, Failure of Maintenance Procedures to comply with A-3 (Q0001535)

3.1.12 CM-8, Permanent Revisions TC's are not being revised in a timely manner (I0003541)

3.1.13 CM-9, Letter to NRC from G.A. Hunger, Jr. dated Sept. 29, 1994 transmitting TSCR 93-16 (Reference A/R A0905549 E94, Subsequent revisions to these sections require NRB approval)

3.2 **CROSS REFERENCES**

3.2.1 A-C-4.2, Station Qualified and Quality Reviewer Program

3.2.2 DC-CG-2, Processing and Retrieval of Quality Records

3.2.3 LR-C-10, Performance Enhancement Program (PEP)

3.2.4 LR-C-13, 10CFR50.59 Reviews

3.2.5 RE-C-40, Core Component Transfer Authorization Sheet Generation and Administration

4.0 <u>DEFINITIONS</u>

4.1 **CHANGE OF INTENT** - Any change in the function or conceptual method of the activity, the specific task, or goal. Refer to Exhibit A-3-1. **CM-3, CM-4**

4.2 **CONDITIONAL TC** - A Temporary Change approved for use through the duration of a defined plant or component condition, but <u>NOT</u> intended to permanently alter the procedure.

4.3 **EVALUATORS** - All persons involved with a TC, both pre-implementation and post implementation.

4.4 **PARTIAL PROCEDURES** - Properly authorized sections of a procedure when such use is not previously specified in the scope of the procedure. Partial procedures are <u>NOT</u> TCs and are processed in accordance with section 7.7.

4.5 **PERMANENT REVISION TC** - A Temporary Change approved for continuous use until distribution of the next revision of the affected procedure.

4.6 **PLANT MANAGEMENT STAFF** - Those individuals who are authorized to review and approve Temporary Changes at the time of implementation. This consists of two reviews. One review is done by a Station Qualified Reviewer. The second review is done by Senior Reactor Operator.

4.7 **SENIOR REACTOR OPERATOR** - Any individual who is temporarily or permanently assigned to the Operations Section, who currently holds a valid Senior Reactor Operators License.

4.8 **SINGLE USE TC** - A Temporary change that is approved for <u>one</u> procedure performance, not intended for incorporation into a permanent revision and <u>NOT</u> be expected to be used again.

4.9 **TEMPORARY CHANGE (TC)** - An approved alteration to a controlled procedure which clearly does <u>NOT</u> change the intent of the original procedure and is valid over a defined duration.

4.10 **TC-CONTROLLED LOCATION** - Location in which TCs are captured.

4.11 **TC PACKAGE** - Original Exhibit A-3-3 and original altered procedure pages.

5.0 <u>RESPONSIBILITY AND AUTHORITY</u>

5.1 **PLANT MANAGEMENT STAFF** - Reviews and approves proposed Temporary Changes prior to their use. This consists of two Reviews, one done by an SQR, the other by an SRO.

5.2 **DOCUMENT SERVICES (DS)** - Collects, logs, and distributes copies of approved TCs and maintains TC database.

5.3 **INITIATOR** - Identifies the need for a temporary change to a procedure, properly prepares the TC, and completes required documentation.

5.4 **RESPONSIBLE SUPERINTENDENT (RS)** - Approves items within this program in accordance with A-C-4.2. In the post implementation review the SQR <u>CANNOT</u> be the same person as the RS.

5.5 **SENIOR REACTOR OPERATOR (SRO)** - Reviews and approves proposed temporary changes prior to their use and determines potential affect of TC on Operations activities.

5.6 **TC ADMINISTRATOR** - A person designated by Operations to update the TC Log, issue TC numbers and forward TC packages to the designated area at the end of each shift.

5.7 **STATION QUALIFIED REVIEWER (SQR)** - An appointed person knowledgeable in the functional area affected who is <u>NOT</u> the preparer of the item. The SQR may be from the same organization as the preparer.

6.0 <u>PREREQUISITES</u>

None

7.0 **PROCEDURE**

7.1 **GENERAL**

7.1.1 The evaluators shall be responsible for review of Exhibit A-3-1 to ensure no change of intent and the validity of the TC in question. **CM-3, CM-4**

7.1.2 TCs may be initiated for the following circumstances:

1. When the existing procedure is in error and time constraints prevent processing a procedure revision.

2. When the plant or component configuration is temporarily in conflict with that assumed by the procedure and time constraints prevent delay of performance.

7.2 INITIATION

7.2.1 TCs shall be prepared and processed in accordance with Exhibit A-3-2.

7.2.2 TC classification shall be assigned based on whether or not the TC use for subsequent performances of the procedure is appropriate:

1. PERMANENT REV (R) - TCs due to procedure error should be used until incorporation into the next procedure revision.

2. CONDITIONAL (C) - TCs due to a conflict with current Plant or System configuration which will exist until condition is resolved, and it is expected that the procedure is going to be performed more than once while the condition exists.

3. SINGLE USE (S) - TCs that will ONLY be needed for use ONE TIME. Plant or System configuration is expected to return to its initial condition.

7.2.3 The initiator shall present the TC to the SQR and SRO for review and approval PRIOR to obtaining a TC number.

7.3 **PRE-IMPLEMENTATION REVIEW**

7.3.1 Two members of Plant Management Staff who meet the following criteria shall review each TC: **CM-9**

1. The first reviewer shall be an SQR, who is an appointed person knowledgeable in the functional area affected. The SQR may be from the same organization as the preparer.

2. The second reviewer shall be a member of the Operation Section, who currently holds a valid Senior Reactor Operator License. **CM-9**

7.3.2 Reviewers shall verify that the proposed TC will NOT change the intent of the procedure and is within the scope of the TC process. Exhibit A-3-1 will determine the validity of the TC in question. **CM-3, CM-4, CM-9**

7.3.3 The SQR and SRO approval shall be documented on Exhibit A-3-3.

7.4 **PROCESSING AND DISTRIBUTION**

7.4.1 After the pre-implementation reviews and approvals are complete, the initiator shall obtain a TC number from the TC Administrator.

7.4.2 The TC Administrator shall complete appropriate log entries and forward all TC packages to the designated area for post implementation review and approval.

7.4.3 CONDITIONAL and PERMANENT REV TCs shall be distributed by DS to designated TC-controlled locations during the next scheduled distribution.

7.5 **POST IMPLEMENTATION REVIEW**

7.5.1 The SQRs shall review procedures/programs/guidelines that their group, or groups under their purview, have responsibility or sponsorship for revising or generating the entire document, or significant responsibility in performing the entire document. The additional SQR shall be performed to determine if a Change of Intent was made to the procedure in accordance with Exhibit A-3-1. **CM-3, CM-4, CM-9**

7.5.2 The SQR shall recommend either approval or disapproval of the TC to the RS and shall document such on Exhibit A-3-3. The RS and the SQR shall NOT be the same individual.

7.5.3 Should the TC be disapproved, the SQR shall take remedial action to resolve the unsatisfactory aspect of the TC including:

1. Halting the use of the TC.

2. Ensuring removal of the TC from distribution.

3. Presenting documented resolution of the recommended actions to RS.

4. Initiating a PEP in accordance with LR-C-10.

7.5.4 The SQR ensures the required date is entered on Exhibit A-3-3 as follows:

1. Permanent Revision **CM-8**

   - For RT, SI, ST, the test shall be revised and implemented prior to the next scheduled date, except weekly and bi-weekly tests which shall be revised and implemented within 30 days from the initiated date

   - For a procedure that does not have a schedule frequency, from the time the TC was initiated, the procedure shall be revised and implemented within 60 days for station procedures and 120 days for common procedures.

2. Conditional

   - If closure date is known, enter that required date

   - If closure date is not known, enter 1/20/20

7.5.5 The RS shall approve or disapprove TCs within 14 days of implementation. **CM-9**

7.6 **TEMPORARY CHANGE MAINTENANCE CM-1, CM-5**

7.6.1 DS shall maintain a TC database for Responsible Group action and accountability.

7.6.2 Responsible Groups shall use the TC PIMS database to ensure the continued validity of all open TCs and satisfaction of the 14 day requirement.

7.6.3 Responsible Groups shall refer to the TC database during procedure reviews to ensure that coincidental revisions incorporate any open Permanent Revision TCs.

7.6.4 The organization that initiated the TC shall notify DS of conditional TCs which need to be removed from distribution and the TC database.

7.6.5 DS shall update the TC database in response to requests and remove conditional TCs from distribution during their next scheduled distribution.

7.6.6 If a TC for permanent revision has not been revised and implemented by its required date, then initiate a PEP in accordance with LR-C-10.

7.7 PARTIAL PROCEDURE USE CM-2, CM-7

7.7.1 If the task authorized for performance is more limited in scope than the procedure being used, authorization to disregard the unnecessary portions of the procedure may be obtained.

For example: Following maintenance on the "A" Core Spray Pump, only the portion of ST-O-014-300-2 which pertains to the "A" Pump need be performed.

7.7.2 With the exception of COLs, if the task to be performed is intended to accomplish the entire scope of a procedure a TC shall be processed.

7.7.3 The SQR shall be a person knowledgeable in the functional area affected and verify the procedure is valid as it is intended to be performed and that it accomplishes its objectives.

1. Enter the word PARTIAL on the first page of the procedure. Record the reasons for partial versus complete performance and whether additional testing is required to fulfill surveillance test requirements, where applicable.

2. Indicate on the procedure those steps or portions of the procedure that are not required to be performed.

3. Review the procedure to verify that the Partial performance will be valid and to confirm that it will accomplish its objective.

4. Initial and date the affected steps or pages.

5. Proper restoration of the affected equipment.

8.0 DOCUMENTATION

8.1 The Temporary Change package is filed in accordance with DC-CG-2 following final approval.

8.2 Common Nuclear Procedure TCs initiated by either site, will be available to the other site for **information only** from DS.

8.3 Partial Procedures are forwarded through the governing work and test control processes to DS by the performing organization for final storage.

8.4 The TC Log is not considered to be a permanent record and can be disgarded after all entries are completed.

9.0 EXHIBITS

9.1 Exhibit A-3-1, "Temporary Change Screening Matrix"

9.2 Exhibit A-3-2, "Completing and Processing a Temporary Change"

9.3 Exhibit A-3-3, "Temporary Change Form"

ST-O-011-301-2 **STANDBY LIQUID CONTROL PUMP FUNCTIONAL TEST FOR IST**

TEST FREQUENCY:	Once/92 days (See Section 1.0)
TECH SPEC:	SR 3.1.7.5, SR 3.1.7.8, SR 3.1.7.10, Section 5.5.6
APPLICABILITY:	Modes 1 and 2

1 **CHECK** why this procedure is being performed:

☐ Schedule ☐ OVF ☐ Retest Due To Unsat Test

☐ Other Reason: ______________________________

Approved By SMgt: ____________ ______ __/__/__ ______
Printed Name Time Date Initials

2 **INITIAL** one of the following Test Results:

A: All */I steps are **SATISFACTORY** ______

B: One or More */I steps are **UNSATISFACTORY**
Refer to Section 9.0 for Tech Spec LCO's

Performed By: ____________ ______ __/__/__ ______
Printed Name Time Date Initials

RO/PRO Informed of Test Completion: ____________ ______ __/__/__ ______

Reviewed By SMgt: ____________ ______ __/__/__ ______

UNSAT Notification: ______________________________
SMgt Discretion: Plant Mgr or Others

Notified By: ____________ ______ __/__/__ ______

3 If other portions of the test did NOT function properly,
Or other discrepancies were noted Then **COMPLETE** the following:

IST Step(s) in ALERT range: ______________________________
DESCRIBE discrepancies/actions taken: A/R or ETT #: ____________

____

4 Reviewed/Approved
Plant Staff: ____________ ______ __/__/__ ______
Printed Name Time Date Initials

1.0 PURPOSE

This test verifies operability and performance of the Standby Liquid Control (SBLC) Pumps and Discharge Check Valves once/92 days in accordance with the Inservice Testing Program. This test satisfies Tech Spec SR 3.1.7.8. This test partially satisfies SR 3.1.7.5, SR 3.1.7.10, and Inservice Testing requirements for components in compliance with PBAPS Inservice Testing Program Spec. M-710 which implements requirements of Tech Spec Section 5.5.6. **CM-1**

2.0 TEST EQUIPMENT

2.1 Description	Req Min Accuracy	M&TE No.	Cal Due Date
Stopwatch	None	________	___/___/___
Vibration meter Raw Signal Single Integration (Min. Req. Freq. Range 2.8-1000 Hz) **CM-2**	 ± 1.5% ± 3.0%	________	___/___/___
Vibration probe (Min. Req. Freq. Range 2.8-1000 Hz) **CM-2**	± 4.0%	________	___/___/___
Test Gauge 0-1500 psig	± 5.0%	________	___/___/___
Test Gauge 0-1500 psig (N/A if one test rig is to be used)	± 5.0%	________	___/___/___

2.2 (1 or 2) - Test rig(s) with Schrader fitting (see Figure 1)

2.3 SBLC Measuring Stick

2.4 Non-contaminated hose for flushing test tank 20T017 (with quick disconnect).

2.5 Locked Valve Key For:

NUMBER	DESCRIPTION	NORMAL POS
HV-2-11-11	SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040	LOCKED OPEN
HV-2-11-15	SBLC Disch Header To RPV Outboard Isolation Valve	LOCKED OPEN
HV-2-11-26	SBLC Pumps Disch Recirc HDR Block To Tks 20T017 + 20T018	LOCKED CLOSED

2.0 TEST EQUIPMENT (Continued)

NUMBER	**DESCRIPTION**	**NORMAL POS**
HV-2-11-41	SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR	LOCKED CLOSED

3.0 PREREQUISITES Initial

3.1 Test Initiation

3.1.1 **COMPLETE** Section 1 of cover page. ______

3.2 Document Review

3.2.1 **ENSURE** procedure is current revision. ______

3.3 Equipment Configuration

None

3.4 Required Redundant Safety Related Equipment

None

3.5 Other Prerequisite Activities

3.5.1 **VERIFY** at least two operators are available to perform this test. ______

3.5.2 **VERIFY** SBLC Test Tank empty and **NO** foreign objects in tank. ______

3.5.3 **VERIFY** one 55 gallon drum which is empty or near empty available at Rx Bldg 165' by SBLC system drain lines. ______

3.5.4 **VERIFY** that qualified personnel are available for vibration data collection and lube oil sampling. Operators may view the training video for Operations Role in Predictive Maintenance to refresh on proper technique. ______

3.5.5 **OBTAIN** oil sampling equipment from the Oil Sample Drop-off Box located on Turbine Bldg 116' outside the ferrography lab. ______

3.0 PREREQUISITES (Continued)

3.6 Approval to Start Test

3.6.1 **OBTAIN** RO Permission to begin.

______ __/__/__ ______
Time Date RO

4.0 PRECAUTIONS, LIMITATIONS, AND GENERAL INSTRUCTIONS

4.1 Plant Impact Statement

4.1.1 This test will operate both Standby Liquid Control (SBLC) Pumps using local control. SBLC system will be isolated from the Reactor which will make the system out of service for the duration of the test. This test may be performed in any Reactor Mode.

4.2 Precautions

4.2.1 Do **NOT** START SBLC Pumps from the Control Room. Starting SBLC Pumps from Control Room will fire the explosive valves.

4.2.2 SBLC Pumps should not be lined up to take suction on the Test Tank when the suction is uncovered. The suction comes off the side of the test tank.

4.2.3 **DO NOT PLACE** hands in pump cavity during performance of this procedure.

4.2.4 **OBSERVE** proper safety precautions when working with Sodium Pentaborate solution and avoid contact with the skin.

4.2.5 At least one person shall stay at SBLC area on 195' elevation while the valves are out of normal alignment to restore the system to normal in an emergency situation.

4.3 Limitations

None

4.4 General Instructions

4.4.1 Communications will be required between Control Room and Standby Liquid Control Tank Area, 195', R2-49 and Reactor Bldg West, at Standby Liquid Control System waste water drums on 165'.

4.4.2 This test must be completed in a timely manner. **IF** delays occur during this test, **THEN NOTIFY** SMgt so SBLC System OPERABILITY may be determined.

4.0 PRECAUTIONS, LIMITATIONS, AND GENERAL INSTRUCTIONS (Continued)

4.4.3 **IF** system initiation becomes necessary while performing test, **THEN STOP** test **AND PERFORM** Section 6.4 "Restoring SBLC System to Operable Status" **AND NOTIFY** Control Room.

4.4.4 **IF** procedure is aborted, **THEN RESTORE** SBLC per section 6.4, notify SMgt **AND** write **"TEST ABORTED"** in Section 3 of Cover Page.

4.4.5 **IF** any procedure step can **NOT** be completed **OR** produces an unexpected response **THEN STOP** the test **AND RETURN** the equipment to a safe condition **AND NOTIFY** the RO or SMgt.

4.4.6 **IF** any Black Box is initialed **THEN STOP** the test **AND RETURN** the equipment to a safe condition **AND NOTIFY** the RO or SMgt.

4.4.7 All persons who initial steps in Sections 3.0, 6.0, or 7.0 are responsible for completing Section 10.0.

4.4.8 Initial blanks designated as IV are provided for Independent Verification.

4.4.9 All applicable ***/I** steps are identified immediately in front of the initials.

5.0 ACCEPTANCE CRITERIA

5.1 Each SBLC Pump develops a flow rate of ≥ 43 gpm at a discharge pressure ≥1255 psig.

5.2 SBLC Pump pressures, flows, and vibration are obtained, and vibration and flows are NOT in the action range limits of Section 6.0.

5.3 Operability of CHK-2-11-43A and B is verified in the OPEN and CLOSED directions.

5.4 The combination of SBLC boron concentration, pump flow rate, and boron enrichment is greater than or equal to 1 as determined by Equation specified in Step 6.6.4.

6.0 PERFORMANCE STEPS	Initial Sat	Initial UnSat
6.1 Test Preparation and Valve Lineup		
< At Standby Liquid Control Tank Area 195', R2-49 >		
6.1.1 **VERIFY** both SBLC Pump oil levels are between the min static and max static level on pump oil sightglasses.	_____	_____
6.1.2 **REMOVE** cap **AND INSTALL** test rig with 1500 psig test gauge to 2AT076 "Stby Liquid Control N2 Accumulator A".	_____	_____
6.1.3 **LEAK TEST** test rig as desired.	_____	_____
6.1.4 **VERIFY** accumulator 2AT076 pressure is from 325 to 450 psig **AND CHARGE** accumulator if necessary.	_____	_____
6.1.5 **IF** one test rig is to be used, **THEN REMOVE** test rig at 2AT076. **OTHERWISE, N/A** this step.	_____	_____
6.1.6 **REMOVE** cap **AND INSTALL** test rig with 1500 psig test gauge to 2BT076 "Stby Liquid Control N2 Accumulator B".	_____	_____
6.1.7 **LEAK TEST** test rig as desired.	_____	_____
6.1.8 **VERIFY** accumulator 2BT076 pressure is from 325 to 450 psig **AND CHARGE** accumulator if necessary.	_____	_____
6.1.9 **REMOVE** cover on 20T017 "Standby Liquid Control Test Tank" **AND INSTALL** SBLC measuring stick inside of tank.	_____	_____
6.1.10 **VERIFY** HV-2-11-11 "SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040" LOCKED OPEN.	_____	_____
6.1.11 **UNLOCK AND CLOSE** HV-2-11-15 "SBLC Disch Header To RPV Outboard Isolation Valve".	_____	_____
6.1.12 **UNLOCK AND OPEN** HV-2-11-26 "SBLC Pumps Disch Recirc Hdr Block to Tks 20T017 + 20T018".	_____	_____
6.1.13 **OPEN** HV-2-11-30 "SBLC Pumps Disch Recirc Blk to SBLC Tank 20T018".	_____	_____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.2 SBLC Pump A Test **CM-1**

6.2.1 **RECORD** 2BT076 pressure.

_______ psig ______ ______

****
CAUTION

DO NOT START SBLC Pumps from the Control Room. Starting SBLC Pumps from the Control Room will fire the explosive valves.
****

6.2.2 **NOTIFY** Reactor Operator 2AP040 "Standby Liquid Control Pump A" will be started. ______ ______

6.2.3 LOCALLY **START** 2AP040. ______ ______

NOTE

Manufacturer recommends running pump for 30 minutes following pump maintenance before operating at full load.

6.2.4 **IF** Surveillance Test is being performed to satisfy pump post maintenance testing, **THEN PERFORM** this step, **OTHERWISE N/A AND PROCEED** to step 6.2.5.

1. **RUN** pump for 5 minutes unloaded **THEN** SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 250 to 350 psig as indicated on PI-2-11-03 **AND RUN** pump for 5 additional minutes. ______ ______

2. SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 550 to 650 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. ______ ______

3. SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 850 to 950 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. ______ ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

NOTE

Fluctuations on PI-2-11-053 may be dampened by throttling IIV-2-11-053. If throttling is used, the valve may be opened and closed to verify pressure indication is valid.

6.2.5 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1200 (1160-1200) psig as indicated on PI-2-11-053. _____ _____

****

CAUTION

DO NOT EXCEED a pump discharge pressure of 1300 psig while throttling HV-2-11-26. Relief valve is set to lift at 1400 psig. Pressure will continue to increase slightly when valve throttling is stopped.

****

6.2.6 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053. _____ _____

6.2.7 **RECORD** 2BT076 pressure.

_______ psig _____ _____

NOTE

The next step verifies CHK-2-11-43B "SBLC Pump 2BP040 Discharge Check Valve" in the CLOSED direction.

6.2.8 **VERIFY** pressure recorded in Step 6.2.7 is less than 100 psig above the pressure recorded in Step 6.2.1. I _____ [redacted]

6.2.9 **RUN** 2AP040 for at least 2 minutes to ensure accurate vibration data. I _____ [redacted]

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.2.10 **OBTAIN** pump housing vibration data in velocity (in/sec) at inboard locations marked X1 and Y1 and outboard locations marked X1 and Y1 **AND RECORD** vibration data on Data Sheet 1. ____ ____

DATA SHEET 1
2AP040 PUMP HOUSING VIBRATION DATA

MEASURED VIBRATION AT MARKED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
INBOARD			
X1________IN/SEC PK	≤ 0.716	0.716 to 1.719	> 1.719
Y1________IN/SEC PK	≤ 0.225	0.225 to 0.540	> 0.540
OUTBOARD			
X1________IN/SEC PK	≤ 0.803	0.803 to 1.929	> 1.929
Y1________IN/SEC PK	≤ 0.496	0.496 to 1.192	> 1.192

6.2.11 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1220 (1200-1240) psig as indicated on PI-2-11-053. ____ ____

6.2.12 **STOP** 2AP040. ____ ____

6.2.13 **CLOSE** HV-2-11-30. ____ ____

6.2.14 **OPEN** HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 20T017". ____ ____

NOTE

It will take 2 minutes for SBLC Test Tank level to reach the lower mark on the SBLC Measuring Stick therefore Step 6.2.15 must be performed in a timely manner.

6.2.15 LOCALLY **START** 2AP040 **AND THROTTLE** HV-2-11-26 as required to obtain a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053 **AND RECORD** pressure on Data Sheet 2. ____ ____

6.0 PERFORMANCE STEPS (Continued)

	Initial Sat	UnSat
6.2.16 **WHEN** Test Tank level reaches the lower mark on the SBLC Measuring Stick, **START** stopwatch, **THEN MEASURE** the time required to raise Test Tank level to the upper mark on the SBLC Measuring Stick.	____	____
6.2.17 **STOP** 2AP040.	____	____
6.2.18 **RECORD** time required for level change on Data Sheet 2 to one tenth of a second.	____	____

NOTES

1. The following step may be performed out of sequence as directed by the step.
2. **IF** it is not possible to obtain sample within 15 minutes after securing pump due to oil being distributed in crankcase, **THEN** attempt to obtain a sample at thirty minute intervals until a sample is successfully obtained **AND** record time elapsed between securing pump and withdrawing sample, in step 6.2.19.6.

6.2.19 **PERFORM** the following to obtain 2AP040 oil samples no more than 15 minutes after the pump has been secured:

	Sat	UnSat
1. **LOCATE** oil sample fittings on the pump crankcase **AND** motor housing.	____	____
2. **RECORD** equipment number, equipment serial number (if available), sample point, sample date, **AND** "Sampled by" name on labels.	____	____
3. **OBTAIN** oil sample from each reservoir by removing oil sample fitting cap, inserting plastic probe, and drawing vacuum on sample bottle with sampling pump.	____	____
4. **DISCONNECT** sample probe **AND REPLACE** sampling fitting cap hand tight.	____	____
5. **REMOVE** sample bottle from sampling pump **AND REPLACE** sample bottle cap.	____	____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6. **IF** sample could not be obtained within 15 minutes after securing pump, **THEN RECORD** time elapsed between securing pump and withdrawing sample **AND RECORD** time elapsed on sample bottle.

_______ min. _____ _____

6.2.20 **CALCULATE** 2AP040 flow rate as follows **AND RECORD** flow rate on Data Sheet 2:

$$\frac{52.8 \text{ gal} \times 60 \text{ sec/min}}{\text{Step } 6.2.16} = \text{Flow Rate}$$

3168 / ______ sec = ______ gpm _____ _____

_____ _____
IV

DATA SHEET 2
2AP040 IST DATA

NOTE

Pump flow rate acceptance criteria is based on a reference value of 53.0 gpm at a discharge pressure of 1255.0 psig.

PARAMETER	ACTUAL VALUE	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
TIME (Seconds)		N/A	N/A	N/A
FLOW RATE (gpm) (3168/Time)		50.2 to 58.1	< 50.2 to 49.1	< 49.1 or > 58.1
DISCH PRESSURE (psig)		1255-1280	N/A	N/A

6.2.21 **VERIFY** flow and pressure recorded in Data Sheet 2 is ≥43 gpm at ≥1255 psig. * _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

NOTE

The next step verifies CHK-2-11-43A "SBLC Pump 2AP040 Discharge Check Valve" in the OPEN direction.

6.2.22 **VERIFY** pump test data on Data Sheets 1 and 2 do **NOT** fall within Action Range. I

6.2.23 **CLOSE** HV-2-11-27.

6.2.24 **OPEN** HV-2-11-26.

6.2.25 **OPEN** HV-2-11-30.

6.2.26 **UNLOCK AND OPEN** HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR".

6.2.27 **IF** test tank level reaches top of suction line on side of tank by gravity draining, **THEN N/A** the next 3 sign-offs. **OTHERWISE, PERFORM** the following:

1. **UNLOCK AND CLOSE** HV-2-11-11.

CAUTION

Do not run SBLC Pump when Test Tank is empty.

2. **LOCALLY START** 2AP040 **THEN STOP** pump when Test Tank level reaches top of suction line on side of test tank.

3. **OPEN** HV-2-11-11.

6.2.28 **CLOSE** HV-2-11-41.

6.3 SBLC Pump B Test CM-1

6.3.1 **IF** one test rig is being used, **THEN REMOVE** test rig at 2BT076 **AND INSTALL** cap. **OTHERWISE, N/A** this step.

6.0 PERFORMANCE STEPS (Continued)

		Initial Sat	Initial UnSat
6.3.2	**IF** one test rig is being used, **THEN** **INSTALL** test rig at 2AT076. **OTHERWISE**, **N/A** this step.	____	____
6.3.3	**RECORD** 2AT076 pressure. _______ psig	____	____

```
*********************************************
*                  CAUTION                  *
*                                           *
*  DO NOT START SBLC Pumps from the Control *
*  Room. Starting SBLC Pumps from the       *
*  Control Room will fire the explosive     *
*  valves.                                  *
*                                           *
*********************************************
```

		Initial Sat	Initial UnSat
6.3.4	**NOTIFY** Reactor Operator 2BP040 "Standby Liquid Control Pump B" will be started.	____	____
6.3.5	LOCALLY **START** 2BP040.	____	____

NOTE

Manufacturer recommends running pump for 30 minutes following pump maintenance before operating at full load.

6.3.6 **IF** Surveillance Test is being performed to satisfy pump post maintenance testing, **THEN PERFORM** this step, **OTHERWISE N/A** this step **AND PROCEED** to step 6.3.7.

1. **RUN** pump for 5 minutes unloaded **THEN** SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 250 to 350 psig as indicated on PI-2-11-053 **AND RUN** pump for 5 additional minutes. ____ ____

2. **SLOWLY THROTTLE** HV-2-11-26 to a pressure between 550 to 650 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. ____ ____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

3. **SLOWLY THROTTLE** HV-2-11-26 to a pressure between 850 to 950 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. _____ _____

NOTE

Fluctuations on PI-2-11-053 may be dampened by throttling IIV-2-11-053. IIV-2-11-053 may be opened and closed to verify pressure indication is valid.

6.3.7 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1200 (1175-1200) psig as indicated on PI-2-11-053. _____ _____

CAUTION

DO NOT EXCEED a pump discharge pressure of 1300 psig while throttling HV-2-11-26. Relief valve is set to lift at 1400 psig. Pressure will continue to increase slightly when valve throttling is stopped.

6.3.8 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053. _____ _____

6.3.9 **RECORD** 2AT076 pressure.

_______ psig _____ _____

NOTE

The next step verifies CHK-2-11-43A in the CLOSED direction.

6.3.10 **VERIFY** pressure recorded in Step 6.3.9 is less than 100 psig above the pressure recorded in Step 6.3.3. I _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.3.11 **RUN** 2BP040 for at least 2 minutes to ensure accurate vibration data. I _____

6.3.12 **OBTAIN** pump housing vibration data in velocity (in/sec) at inboard locations marked X1 and Y1 and outboard locations marked X1 and Y1 **AND RECORD** vibration data on Data Sheet 3. _____ _____

DATA SHEET 3
2BP040 PUMP HOUSING VIBRATION DATA

MEASURED VIBRATION AT MARKED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
INBOARD			
X1________IN/SEC PK	≤ 0.527	0.527 to 1.266	> 1.266
Y1________IN/SEC PK	≤ 0.355	0.355 to 0.853	> 0.853
OUTBOARD			
X1________IN/SEC PK	≤ 0.499	0.499 to 1.197	> 1.197
Y1________IN/SEC PK	≤ 0.404	0.404 to 0.969	> 0.969

6.3.13 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1220 (1200-1240) psig as indicated on PI-2-11-053. _____ _____

6.3.14 **STOP** 2BP040. _____ _____

6.3.15 **CLOSE** HV-2-11-30. _____ _____

6.3.16 **OPEN** HV-2-11-27. _____ _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

> **NOTE**
>
> It will take 2 minutes for SBLC Test Tank level to reach the lower mark on the SBLC Measuring Stick therefore Step 6.3.17 must be performed in a timely manner.

6.3.17 LOCALLY **START** 2BP040 **AND THROTTLE** HV-2-11-26 as required to obtain a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053 **AND RECORD** pressure on Data Sheet 4. _____ _____

6.3.18 **WHEN** Test Tank level reaches the lower mark on the SBLC Measuring Stick, **START** stopwatch, **THEN MEASURE** the time required to raise Test Tank level to the upper mark on the SBLC Measuring Stick. _____ _____

6.3.19 **STOP** 2BP040. _____ _____

6.3.20 **RECORD** time required for level change on Data Sheet 4 to one tenth of a second. _____ _____

> **NOTES**
>
> 1. The following step may be performed out of sequence as directed by the step.
> 2. **IF** it is not possible to obtain sample within 15 minutes after securing pump (due to oil being distributed in crankcase,) **THEN** attempt to obtain a sample at ten or fifteen minute intervals until a sample is successfully obtained **AND** record time elapsed between securing pump and obtaining sample, in step 6.3.21.6.

6.3.21 **PERFORM** the following to obtain 2BP040 oil samples no more than 15 minutes after the pump has been secured:

1. **LOCATE** oil sample fittings on the pump crankcase **AND** motor housing. _____ _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

2. **RECORD** equipment number, equipment serial number (if available), sample point, sample date, **AND** "Sampled by" name on labels. ______ ______

3. **OBTAIN** oil sample from each reservoir by removing oil sample fitting cap, inserting plastic probe, and drawing vacuum on sample bottle with sampling pump. ______ ______

4. **DISCONNECT** sample probe **AND REPLACE** sampling fitting cap hand tight. ______ ______

5. **REMOVE** sample bottle from sampling pump **AND REPLACE** sample bottle cap. ______ ______

6. **IF** sample could not be obtained within 15 minutes after securing pump, **THEN** record time elapsed between securing pump and withdrawing sample **AND RECORD** time elapsed on sample bottle. ______ ______

   ________ Min.

6.3.22 **CALCULATE** 2BP040 flow rate as follows **AND RECORD** Flow rate on Data Sheet 4:

$$\frac{52.8\ \text{gal} \times 60\ \text{sec/min}}{\text{Step 6.3.18}} = \text{Flow rate}$$

3168 / ______ sec = ______ gpm ______ ______

______ ______
IV

6.0 **PERFORMANCE STEPS** (Continued)

Initial
Sat UnSat

DATA SHEET 4
2BP040 IST DATA

NOTE

Pump flow rate acceptance criteria is based on a reference value of 53.0 gpm at a discharge pressure of 1255.0 psig.

PARAMETER	ACTUAL VALUE	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
TIME (Seconds)		N/A	N/A	N/A
FLOW RATE (gpm) (3168/Time)		51.2 to 59.3	< 51.2 to 50.1	< 50.1 or > 59.3
DISCH PRESSURE (psig)		1255-1280	N/A	N/A

6.3.23 **VERIFY** flow recorded in Data Sheet 4 is ≥ 43 gpm **AND** pressure is ≥ 1255 psig. * ____ [redacted]

NOTE

The next step verifies CHK-2-11-43B "SBLC Pump 2BP040 Discharge Check Valve" in the OPEN direction.

6.3.24 **VERIFY** pump test data on Data Sheets 3 and 4 do **NOT** fall within Action Range. I ____ [redacted]

6.3.25 **REMOVE** test rig at 2AT076 **AND INSTALL** cap. ____ ____

6.3.26 **IF** two test rigs were used, **THEN REMOVE** test rig at 2BT076 **AND INSTALL** cap. **OTHERWISE, N/A** this step. ____ ____

6.3.27 **CLOSE** HV-2-11-27. ____ ____

6.3.28 **OPEN** HV-2-11-30. ____ ____

6.3.29 **OPEN** HV-2-11-41. ____ ____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.3.30 **IF** test tank level reaches top of suction line on side of tank by gravity draining, **THEN N/A** the next 3 sign-offs. **OTHERWISE, PERFORM** the following:

1. **UNLOCK AND CLOSE** HV-2-11-11. _____ _____

CAUTION

Do not run SBLC Pump when Test Tank is empty.

2. LOCALLY **START** 2BP040 **THEN STOP** pump when Test Tank level reaches top of suction line on side of test tank. _____ _____

3. **OPEN** HV-2-11-11. _____ _____

6.3.31 **CLOSE** HV-2-11-41. _____ _____

6.4 Restoring SBLC System to Operable Status

6.4.1 **LOCK** closed HV-2-11-41. _____ _____

6.4.2 **VERIFY OR LOCK OPEN** HV-2-11-11. _____ _____

6.4.3 **CLOSE OR VERIFY CLOSED** HV-2-11-30. _____ _____

6.4.4 **CLOSE AND LOCK** HV-2-11-26. _____ _____

6.4.5 **OPEN AND LOCK** HV-2-11-15. _____ _____

6.4.6 **NOTIFY** Reactor Operator SBLC System has been returned to service. _____ _____

6.0 PERFORMANCE STEPS (Continued)

	Initial Sat	Initial UnSat
6.5 Flushing Test Tank 20T017		
CAUTION — **DO NOT OVERFILL** Waste Water Drum on 165'. If necessary, HV-2-11-23143 may be closed while changing drums.		
< At Rx Bldg 165', West Wall>		
6.5.1 **OPEN** HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve".	______	______
< At Standby Liquid Control Tank Area, 195', R2-49 >		
6.5.2 **REMOVE** SBLC measuring stick from Test Tank.	______	______
6.5.3 **INSTALL** hose at a demin water supply valve HV-2-38D-29 "Demin Wtr Hose Blk Vv for SBLC Test Tank 20T017.	______	______
6.5.4 **OPEN** HV-2-11-28 "SBLC Test Tank 20T017 Inner Drain Valve".	______	______
6.5.5 **OPEN** HV-2-38D-29 **AND FLUSH** Test Tank with demineralized water.	______	______
6.5.6 **CLOSE** HV-2-38D-29.	______	______
6.5.7 **CLOSE** HV-2-11-28.	______	______
6.5.8 **VERIFY** Test Tank empty.	______	______
6.5.9 **INSTALL** cover on Test Tank.	______	______
6.5.10 **REMOVE** hose from demin water supply valve HV-2-38D-29.	______	______
< At Rx Bldg 165', West Wall>		
6.5.11 **CLOSE** HV-2-11-23143.	______	______
6.5.12 **PLACE** oil sample bottles in the drop-off box located on Turbine Bldg 116' outside the ferrography lab.	______	______

6.0 PERFORMANCE STEPS (Continued) Initial
Sat UnSat

6.6 SBLC System Operability Verification

6.6.1 **RECORD** lowest SBLC Pump flow rate from Data Sheet 2 or 4.
_______ gpm _____ _____

6.6.2 **OBTAIN** most recent figures for SBLC Concentration and Enrichment from Chemistry Unit 2 SBLC Sample Log.

_______ _______ _____ _____
Concentration Enrichment

6.6.3 **PROVIDE** lowest SBLC pump flow rate data to Shift Chemist for entry into Unit 2 SBLC Sample Log. _____ _____

6.6.4 **PERFORM** the following calculation for determination of SBLC System operability:

$$\frac{C}{13\%\ WT} \times \frac{Q}{86\ gpm} \times \frac{E}{19.8\%} = O$$

$$\frac{\_\_\_\_}{13\%\ WT} \times \frac{\_\_\_\_}{86\ gpm} \times \frac{\_\_\_\_}{19.8\%} = \_\_\_\_$$

Where: C = Concentration from Step 6.6.2
Q = Lowest SBLC Pump flow rate from Step 6.6.1
E = Enrichment from Step 6.6.2
O = Operability factor _____ _____

6.6.5 **VERIFY** Operability Factor calculated in previous step is greater than or equal to 1. * _____

7.0 PROCEDURE COMPLETION Initial

7.1 Independent Verification

7.1.1 **VERIFY** calculation in Step 6.6.4 is correct. _______
IV

< At Standby Liquid Control Tank Area 195', R2-49 >

7.1.2 **VERIFY** HV-2-11-15 "SBLC Disch Header To RPV Outboard Isolation Valve" is LOCKED OPEN. _______
IV

7.0 PROCEDURE COMPLETION (Continued) Initial

7.1.3 **VERIFY** HV-2-11-11 "SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040" is LOCKED OPEN. _____ IV

7.1.4 **VERIFY** HV-2-11-26 "SBLC Pumps Disch Recirc HDR Block To Tks 20T017 + 20T018" is LOCKED CLOSED. _____ IV

7.1.5 **VERIFY** HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR" is LOCKED CLOSED. _____ IV

7.1.6 **VERIFY** HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 20T017" is CLOSED. _____ IV

7.1.7 **VERIFY** HV-2-11-30 "SBLC Pumps Disch/Recirc Blk To SBLC Tank 20T018" is CLOSED. _____ IV

7.1.8 **VERIFY** HV-2-11-28 "SBLC Test Tank 20T017 Drain Valve" is CLOSED. _____ IV

7.1.9 **VERIFY** test rig at 2AT076 "Stby Liquid Control N2 Accumulator A" REMOVED **AND** cap INSTALLED. _____ IV

7.1.10 **VERIFY** test rig at 2BT076 "Stby Liquid Control N2 Accumulator B" REMOVED **AND** cap INSTALLED. _____ IV

7.1.11 **VERIFY** IIV-2-11-053 "PI-2-11-053 Instr Isol SBLC PPs Disch Header Press" is OPEN. _____ IV

< At Rx Bldg 165', West Wall>

7.1.12 **VERIFY** HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve" is CLOSED. _____ IV

7.2 Records Completion

7.2.1 **COMPLETE** Section 2 of Cover Page (and Section 3 if applicable). _____

8.0 REFERENCES

8.1 Governing

8.1.1 Tech Spec SR 3.1.7.5

8.1.2 Tech Spec SR 3.1.7.8

8.1.3 Tech Spec SR 3.1.7.10

8.0 REFERENCES (Continued)

8.1.4 Tech Spec 5.5.6

8.1.5 CM-1, Letter to NRC from G. A. Hunger, Jr. dated Sept. 29, 1994 transmitting TSCR 93-16 (A0902903-10, T03675)

8.1.6 CM-2, Deviation from Instrument Range Requirement, (T03589)

8.1.7 ASME OM Code, Code for Operation and Maintenance of Nuclear Power Plants, 1990 Edition

8.2 Interfacing

8.2.1 A-8, Control of Locked Valves

8.3 Developmental

8.3.1 Prints

M-358, Sht 1, Standby Liquid Control System

M-1-S-46, Sht 5, Electrical Schematic Standby Liquid Control System

8.3.2 M-1-JJ-40, Union Pump Manual

8.3.3 Response to NRC Inspection Report 50-277/78-12

8.3.4 RCM analysis - SBLC, (T02979)

8.3.5 This procedure supersedes ST 6.1.2-3

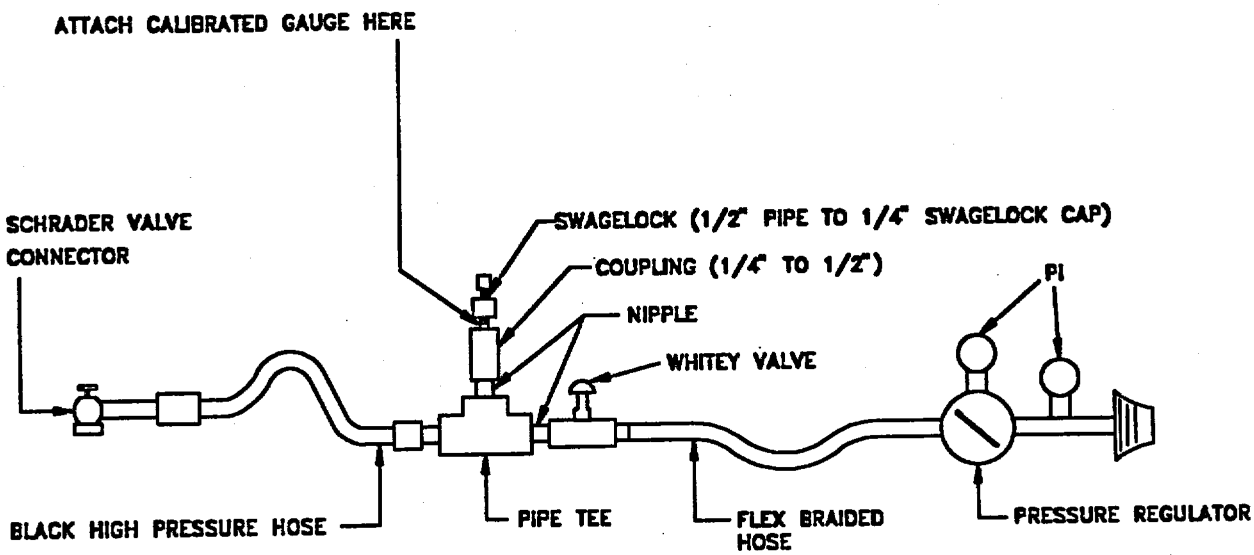
9.0 TECH SPEC LIMITING CONDITIONS FOR OPERATION (LCOs)

Section 3.1.7

10.0 PARTICIPANTS RECORD

Printed Name	Initials

Figure 1
TEST RIG



POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: NEW-P&ID USE K/A: 2.1.24

URO: 2.8 SRO: 3.1

TASK DESCRIPTION: Familiarity and Use of P&IDs

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

1. M-315 Sheet 1, Rev. 62, "Emergency Service Water and High Pressure Service Water System" print

2. M-315 Sheet 4, Rev. 50, "Emergency Service Water and High Pressure Service Water System" print

3. M-330 Sheet 1, Rev. 32, "Emergency Cooling System" print

C. REFERENCES

1. M-315 Sheet 1, Rev. 62, "Emergency Service Water and High Pressure Service Water System" print

2. M-315 Sheet 4, Rev. 50, "Emergency Service Water and High Pressure Service Water System" print

3. M-330 Sheet 1, Rev. 32, "Emergency Cooling System" print

D. TASK STANDARD

1. Satisfactory task completion is indicated when it has been determined that following any start of the Diesel Generators the:

   a. A and B ESW pump will automatically start and continue to run normally.

   b. ECW pump will automatically start and shut down after 45 seconds.

   c. ECW discharge valve (MO-0841) will remain closed.

2. Estimated time to complete: 15 minutes <u>Non-Time Critical</u>

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to determine the impact of a damaged instrument on cooling water operation using the appropriate prints. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

An Equipment Operator reports to the control room that PS-0246B, mounted on the "B" Emergency Service Water Pump (OBP057) discharge pipe has been damaged by scaffolding such that it cannot sense high pressure.

G. INITIATING CUE

The Control Room Supervisor directs you to use P&IDs to determine the impact of the damaged PS-0246B on cooling water operation during a Diesel Generator start without additional operator actions.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain M-315 Sh. 4, "P&I Diagram Emergency Service Water and High Pressure Service Water Sys's".	P	M-315 for ESW is located using the M-300 index. Sheet 4 is located as featuring the "B" ESW pump.
2	Locate the "B" ESW pump on M-315 Sh. 4.	P	"B" ESW is located at coordinates A-5 on M-315 Sh. 4.
3.	Locate PS-0246B on the discharge pipe of the "B" ESW pump.	P	PS-0246B is located at coordinates B-5 on M-315 Sh. 4.
4	Determine that the "B" ESW pump will start on a Diesel Generator Start.	P	Diesel Generator start is identified as a start signal from the logic illustrated on M-315 Sh. 4 coordinates B-5 <u>OR</u> from individuals knowledge base.
5	Determine that if a damaged PS-0246B is unable to sense high pressure it will contribute a "LOW" to the logic.	P	Logical outputs of "LOW" and "NOT LOW" are located on M-315 Sh. 4 coordinates B-5. A logic output of "LOW" is determined.
6	Trace logic lines to M-315 Sh. 1 G-6.		Logic lines are traced to M-315 Sh.1 using continuation identifiers on M-315 Sh. 4 coordinates B-6.
7	Obtain M-315 Sh. 1, "P&I Diagram Emergency Service Water and High Pressure Service Water Sys's".	P	M-315 Sh. 1 is located using continuation identifiers on M-315 Sh. 4.
8	Determine that logic lines from M-315 Sh. 4 input to "AND" logic on M-315 Sh. 1 coordinates G-6.	P	Logic lines from M-315 Sh.4 are traced to "AND" logic on M-315 Sh. 1 coordinates G-6.
9	Determine that the "A" ESW pump will start on a Diesel Generator start.	P	Diesel Generator start is identified as a start signal from the logic illustrated on M-315 Sh. 1 coordinates G-5 OR from individuals knowledge base.
10	Determine that PS-0246A will contribute a "NOT LOW" to the logic.	P	Logical outputs of "LOW" and "NOT LOW" are located on M-315 Sh. 1 coordinates G-7. A logic output of "NOT LOW" is determined.
11	Determine that the "AND" logic will <u>not</u> be satisfied due to <u>lack of</u> "LOW" from PS-0246A and "LOW" from PS-0246B.	P	Logic lines from PS-0246A are traced to "AND" logic on M-315 Sh. 1 coordinates G-6. "AND" logic is not satisfied due to lack of "LOW" from PS-0246A.
12	Determine that the "OR" logic will be satisfied by PS-0246A "NOT LOW".	P	Logic lines from PS-0246A are traced to "OR" logic on M-315 Sh. 1 coordinates G-6. "OR" logic is satisfied by singular input of "NOT LOW" from PS-0246A.
13	Trace logic lines to M-330 Sh. 1 coordinates G-3.	P	Logic lines are traced to M-330 Sh. 1 using continuation identifiers on M-315 Sh. 1 coordinates G-6.
14	Obtain M-330 Sh. 1 "P&I Diagram Emergency Cooling System".	P	M-330 Sh. 1 is located using continuation identifier on M-315 Sh.1.

STEP NO	STEP	ACT	STANDARD
15	Determine that the "AND" logic for the ECW pump will be satisfied by either ESW pump A or B discharge pressure "NOT LOW" and ECW pump not started manually when an auto start has existed for 45 seconds.	P	Logic lines from M-315 Sh. 1 G-6 are traced to "AND" logic on M-330 Sh. 1, coordinates G-3. "AND" logic is determined to be satisfied with inputs from either the A or B ESW pump discharge pressure "NOT LOW" and ECW not started manually when auto has existed for 45 seconds.
16	Determine that the ECW pump will trip 45 seconds after an ECW auto start signal on Diesel Generator start.	P	Logic line from "AND" is traced to ECW "TRIP" when auto start signal has existed for 45 seconds.
17	Determine that the "AND" logic for the ECW discharge valve MO-0841 will <u>NOT</u> be satisfied since ESW A <u>AND</u> B discharge pressure is <u>NOT</u> low. The ECW discharge valve will remain closed following an ECW auto start signal.	P	Logic lines are traced to "AND" logic on M-330 Sh. 1 coordinates H-3.
18	Control Room Supervisor informed of plant impact of damaged PS-0246B on cooling water should a Diesel Generator start occur. (Cue: Acknowledge report.)	P	Inform the Control Room Supervisor that on a Diesel Generator start, the: • A and B ESW pumps will automatically start and continue to run normally. • ECW pump will automatically start and shutdown after 45 sec. • ECW discharge valve (MO-0841) will remain closed.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the impact of the damaged PS-0246B on ESW and ECW operation following a Diesel Generator start has been determined, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

An Equipment Operator reports to the control room that PS-0246B, mounted on the "B" Emergency Service Water Pump (OBP057) discharge pipe has been damaged by scaffolding such that it cannot sense high pressure.

INITIATING CUE

The Control Room Supervisor directs you to use P&IDs to determine the impact of the damaged PS-0246B on cooling water operation during a Diesel Generator start without additional operator actions.

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: NEW–RAD INST K/A: 2.3.5
URO: 2.3 SRO: 2.5

TASK DESCRIPTION: Use A Portable Radiation Instrument – Alternate Path (Instrument Zero)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

1. Eberline RO-2A with the the following instrument setup items verified:

   a. Calibration Sticker – within calibration for today's date and listing a Beta correction factor of "4". (If using a non-calibrated "Training Only" instrument, ensure the "Training Only" calibration sticker indicates an appropriate calibration due date or replace the sticker and fill in a future due date)

   b. Source Check Sticker – indicates source checked for today's date. (If using a non-calibrated "Training Only" instrument, ensure the "Training Only" Source Check Sticker indicates source checked for today's date or replace the sticker and fill in today's date)

   c. Physical Condition – satisfactory

   d. Battery Check 1 & 2 – ensure both batteries indicate beyond the "Batt OK" range.

   e. Zero Check – Adjust the zero knob to make the meter indicate a value above zero (for use on this alternate path JPM).

C. REFERENCES

1. PLOT-1780, Rev. 10, "Dosimeter & Instrumentation" lesson plan, objective 1A

2. HP-CG-400, Rev. 2, "Health Physics Instrumentation Operations Guideline"

3. HP-CG-400-3, Rev. 0, "Eberline RO-2/2A/20"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the candidate has completed the instrument checks, including rezeroing and properly obtained an on-contact reading for both gamma and beta radiation on an evaluator selected object.

2. Estimated time to complete: 12 minutes <u>Non-Time Critical</u>

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to take an on-contact reading for both gamma and beta on the specified object. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. This Eberline RO-2A has just been obtained from the instrument cage.

G. INITIATING CUE

You are directed to complete the required instrument checks and obtain on-contact gamma and beta readings of the indicated item using the RO-2A provided.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
** NOTE *** Instrument checks may be conducted in any order.			
*1	Perform a calibration check of the RO-2A. (Cue: Calibration is not due until October 1999)	P	The candidate locates the Calibration Sticker on the RO-2A and verifies that the instrument is in calibration.
*2	Verify that the RO-2A has been Source Checked. (Cue: The source check was conducted 4 hours ago)	P	The candidate locates the Source Check Sticker and observes that the RO-2A was source checked today.
*3	Perform a check of the physical condition of the RO-2A. (Cue: Acknowledge physical check completed)	P	The candidate performs a careful physical inspection of the RO-2A for any damage.
*4	Perform a battery check of the RO-2A. (Cue: Positions BAT 1 and BAT 2 indicate that battery voltage is in the Batt OK range)	P	Candidate places the function switch to BOTH positions BAT 1 and BAT 2 and verifies that voltage is indicated in the 'Batt OK" range
*5	Perform a Zero check of the RO-2A. (Cue: Needle is indicating above the Zero indication)	P	Candidate places the function switch to the Zero position and observes that the indication is greater than Zero.
*6	Zero the RO-2A (Cue: acknowledge adjustment of knob to obtain a Zero indication)	P	Candidate adjusts the Zero Knob to obtain a Zero indication.
*7	Take a Closed Window Gamma reading on the selected object. (Cue: Depending on selected scale indicate that the reading is upscale or downscale until the appropriate scale is reached. Then indicate that the meter is reading 10 mR/hr)	P	Candidate holds meter with the beta window closed at approximately one inch and takes readings, shifting scales until an appropriate reading is obtained.

STEP NO	STEP	ACT	STANDARD
*8	Take an Open Window reading on the selected object. (Cue: Depending on selected scale indicate that the reading is upscale or downscale until the appropriate scale is reached. Then indicate that the meter is reading 12 mR/hr)	P	Candidate holds meter with the beta window open at approximately one inch and takes readings, shifting scales until an appropriate reading is obtained.
9	Candidate calculates the Beta Radiation Reading.	P	Candidate subtracts the closed window reading (10 mR/hr) from the open window reading (12 mRem/hr) and multiplies the result times the Beta Correction Factor (BCF) of 4. (12 – 10) X 4 = 8 mR/hr Beta
10	Candidate reports Gamma and Beta Radiation levels on the object. (Cue: Acknowledge report)	P	Candidate reports that the object is reading 10 mR/hr gamma and 8 mR/hr Beta.

Under "ACT" P - must perform
S - must simulate

TERMINATING CUE

When the Gamma and Beta radiation levels are reported, the evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

This Eberline RO-2A has just been checked out from the instrument cage.

INITIATING CUE

You are directed to complete the required instrument checks and obtain on-contact gamma and beta readings of the indicated item using the RO-2A provided.

EBERLINE RO-2/2A/20

DESCRIPTION OF INSTRUMENT

The Eberline Model RO-2, RO-2A, and RO-20 are portable ion chamber survey instruments capable of detecting beta, gamma, and X-ray radiation.

The ion chambers are vented to the atmosphere.

The detector centerline is indicated by the dimples on the side and front end of the instrument case.

PRECAUTIONS

Use of this instrument in concentrations of noble gases should be avoided as leakage of the gases into the ion chamber could make the reading erroneous. To delay this effect, place the instrument in a single plastic bag and secure the opening prior to entering an area where noble gases are present.

Care should be taken when the beta shield is open to avoid damage to the mylar window.

The temperature operating range of the RO-2/RO-2A/RO-20 is from -40°F to 140°F. Meter operability needs to be evaluated when operating in temperatures greater than 120°F and less than 20°F.

The meter reading of the RO-2/RO-2A/RO-20 can be affected by geotropism.

The user should be aware of the angular dependence of the meter in relation to the source of radiation.

CONTROLS

Function Switch - Eight-position rotary switch with the following functions:

1. OFF
2. BAT 1 - Checks condition of first-stage batteries
3. BAT 2 - Checks condition of second-stage batteries
4. Zero - Allows zeroing the meter
5. Scale indicators:

   a. On the RO-2, the four scale ranges are listed as:
      1) 0 - 5 mR/hr
      2) 0 - 50 mR/hr
      3) 0 - 500 mR/hr
      4) 0 - 5,000 mR/hr

   b. On the RO-2A, the four scale ranges are listed as:
      1) 0 - 50 mR/hr
      2) 0 - 500 mR/hr
      3) 0 - 5 R/hr
      4) 0 - 50 R/hr

c. On the RO-20, the five scale ranges are listed as:

1) 0 - 5 mR/hr
2) 0 - 50 mR/hr
3) 0 - 500 mR/hr
4) 0 - 5 R/hr
5) 0 - 50 R/hr

Calibration Adjustment Pots - To be adjusted during calibration only.

Zero Knob - Used to set the meter to zero when zero function is selected.

Beta Shield Release Button - When depressed, opens or closes the beta shield covering the mylar window.

Light Switch (RO-20 only) - Momentary or constant lighted readout available switch positions.

OPERATION

OPERATIONAL CHECK

If instrument fails steps 6.1.1, 6.1.2, 6.1.3
Then tag instrument OOS as per 6.1.7.

If instrument fails Step 6.1.4, then:

BATTERY REPLACEMENT

If the battery checks are unsatisfactory, then:

1. Turn off the instrument.
2. Unhook the latches at both ends of the instrument case and remove.

> **NOTE**
> MODEL RO-2 INSTRUMENTS HAVE THREE 9-VOLT BATTERIES, MODEL RO-2A INSTRUMENTS HAVE FOUR 9-VOLT BATTERIES, AND MODEL RO-20 INSTRUMENTS HAVE FIVE C-CELL, ONE 30V LITHIUM BATTERIES.

3. Turn the instrument over and remove all batteries. Replace the bad batteries with ones obtained from the Instrument Facility.

4. Inspect the desiccant to ensure that crystals are blue. If the crystals have changed color to pink or clear, replace it or tag the instrument Out of Service, as per Section 6.1.7.

Perform Step 6.1.4. again.

If the instrument fails 6.1.5, then:

Turn the function switch to zero position. Check that the meter reads zero. If the meter does not read zero, set it to zero by turning the zero knob.

MEASUREMENT OF GAMMA RADIATION

Set the function knob to appropriate scale for use.

Position the detector centerline of the instrument toward the radiation source.

Take a reading with the beta shield on the bottom of the instrument case in the closed position covering the mylar window (closed window).

For a contact reading, get the radiation source as close to the center of the detector as possible. (Using the dimples on the instrument case, align the center of the detector with the radiation source.)

Turn off the instrument after the survey is completed.

MEASUREMENT OF BETA AND GAMMA RADIATION

Set the function knob to appropriate scale for use.

Position the detector centerline of the instrument toward the radiation source.

Take a reading with the beta shield on the bottom of the instrument case in the closed position covering the mylar window (closed window). Note the gamma measurement.

Hold the RO-2/2A/20 vertical, and press the beta shield release button allowing gravity to uncover the mylar window (open window).

Take a reading with the open window facing the radiation source, and note the measurement.

The beta measurement is determined by subtracting the closed window measurement from the open window measurement, and multiplying the difference by the station beta correction factor.

1. If there is no difference in the open and closed window measurements, then record the beta measurement as no detectable beta (e.g., ND) on the survey form.

2. If no beta measurement was taken or required, then record not taken (e.g., NT) or not applicable (e.g., NA) on the survey form.

Turn off the instrument after the survey is completed.

BETA CORRECTION FACTOR (BCF)

The BCF is based on the beta energies for each station. The routine surveillance (RT-7.36 for PBAPS & ST-0-111-802-0 for LGS) of the isotopic mixture determines the beta energies, and is used to evaluate changes to the BCF.

PORC	NO
SQR	YES
NQA	NO
50.59	NO
RESP MGR	YES

PECO Energy Company
Nuclear Generation Group

HEALTH PHYSICS INSTRUMENTATION OPERATIONS GUIDELINE

1.0 PURPOSE

This guideline establishes the standard technique for the operation and use of the instrumentation described herein.

2.0 SCOPE

This guideline applies to the operation of Health Physics instrumentation described herein (excludes whole body contamination monitors) at PECO Energy nuclear facilities.

3.0 REFERENCES

3.1 Applicable Vendor Technical/Instruction Manual(s)

3.2 CM-1 AR# A0771105 (T02785) (Relates to the operation of the Eberline SAC-4)

4.0 DEFINITIONS

None

5.0 RESPONSIBILITIES

5.1 Each individual who uses an instrument contained in this guideline is responsible for operating it in accordance with this document. The technical manuals can be used to obtain additional usage information.

5.2 The Instrument Physicist/Supervisor or HP Supervisor is responsible for completing all Non-Conformance Reports (Exhibit HP-CG-400-1).

5.3 The Instrument Physicist/Supervisor is responsible for determining the source response check frequency for each type of instrument.

6.0 PREREQUISITES

6.1 The instrument user shall verify the following prior to using an instrument:

6.1.1 Check that the instrument has been response checked for the required frequency.

6.1.2 Verify that the instrument has a current calibration date.

6.1.3 Check the instrument for physical damage.

6.1.4 If applicable, ensure all batteries are checked and in the satisfactory range.

6.1.5 If applicable, ensure that the instrument is properly zeroed.

6.1.6 If any instrument checks are unsatisfactory, then:

1. Refer to the appropriate instrument exhibit for guidance.

6.1.7 If no guidance is given, then:

1. Turn off the instrument.
2. Attach a Health Physics "Out of Service" or a "Defective" tag, and complete documentation required by Instrument Program Procedures.
3. Return the instrument to the instrument facility.
4. Obtain a replacement instrument, and return to Section 6.1.1.

6.2 The user shall receive the appropriate amount of training to use the equipment.

6.3 Properly sign out instrument.

7.0 PROCEDURE

7.1 PRECAUTIONS

7.1.1 Instruments shall not be used beyond the calibration due date specified on the instrument calibration sticker.

7.1.2 With the exception of the RM-14, RM-20, and the E-140N, instruments shall only be operated using the detectors they have been calibrated with.

7.1.3 Instrument shall be calibrated in accordance with the applicable procedures.

7.1.4 Keep the instruments as clean and dry as possible.

7.1.5 A defective cable may produce spuriously high readings or no readings at all.

7.1.6 Instruments declared "Out of Service (OOS)" will be tagged with a "Out of Service" or a "Defective" tag. Portable OOS instruments will be returned to the Instrument Facility (PBAPS) or the Hot Tool Room and placed in the Out of Service locker (LGS). Non-portable instruments (PCM-1, PM-7, etc.) will be appropriately placarded and reported to Instrument Physicist/Supervisor.

7.1.7 Approach suspected source of radiation slowly to avoid rapid over-response which may damage instrument needle. Change scale setting as appropriate.

7.2 GUIDELINES

7.2.1 Each radiological instrument shall be calibrated on a regularly scheduled interval determined by the Instrument Physicist/Supervisor not to exceed one year.

7.2.2 Efficiency determination shall be required as per the appropriate instrument calibration procedure, which shall also define the frequency of efficiency determination.

7.2.3 Any instrument not satisfactorily meeting the schedule requirements for calibrations and efficiencies shall be placed out of service until the efficiency and/or calibration has been performed.

7.2.4 The Instrument Physicist/Supervisor may change the calibration frequency of an instrument under special circumstances. Changes to calibration frequency may be made only if ALARA considerations are not adversely affected. The instrument may be used only during the interval specified on the calibration sticker.

7.2.5 The Instrument Physicist/Supervisor or HP Supervisor may exempt source and /or operational check requirements under special circumstances, (e.g., ALARA considerations or testing purposes). Such an exemption is to be documented and the exemption is to be lifted when it is no longer required.

CAUTION

Monitors that are not routinely source checked are NOT to be relied on for personnel entry and surveys performed are for information only. Only surveys conducted with properly source response checked instruments are to be used for personnel entries.

7.3 NON-CONFORMANCE REPORTS

When an instrument performs outside of its acceptance criteria, the Instrument Physicist/Supervisor or HP Supervisor shall be notified and a HP Instrument Non-Conformance Report initiated. (Exhibit HP-CG-400-1)

7.3.1 Upon notification of an out-of-tolerance instrument the Instrument Physicist/Supervisor shall have a preliminary investigation performed, reviewing the out-of-tolerance condition <u>AND</u> usage history to determine the type of action required.

7.3.2 The results of such investigations should be documented in the HP Instrument Non-Conformance Report.

7.3.3 Completed Non-Conformance Reports should be returned to the Instrument Physicist/Supervisor for final review AND approval. Approved reports should be filed in HP department files.

8.0 **EXHIBITS**

8.1 Exhibit HP-CG-400-1, Health Physics Instrument Non-Conformance Report

8.2 Exhibit HP-CG-400-2, BICRON ACM-120

8.3 Exhibit HP-CG-400-3, EBERLINE RO-2/2A/20

8.4 Exhibit HP-CG-400-4, EBERLINE RM-14/20

8.5 Exhibit HP-CG-400-5, EBERLINE E-140N

8.6 Exhibit HP-CG-400-6, EBERLINE E-530N with HP-220A PROBE

8.7 Exhibit HP-CG-400-7, DCA AM-2 MODEL 3090-3/3096-3/3092

8.8 Exhibit HP-CG-400-8, EBERLINE R0-7

8.9 Exhibit HP-CG-400-9, EBERLINE E-520 w/HP-270 HAND PROBE

8.10 Exhibit HP-CG-400-10, EBERLINE 6112B (TELETECTOR)

8.11 Exhibit HP-CG-400-11, BICRON MICRO REM

8.12 Exhibit HP-CG-400-12, BICRON ANALYST

8.13 Exhibit HP-CG-400-13, EBERLINE BC-4

8.14 Exhibit HP-CG-400-14, NUCLEAR ENTERPRISES SMALL ARTICLE MONITOR (SAM)

8.15 Exhibit HP-CG-400-15, XETEX 415B-1/425A ALARMING DOSIMETER

8.16 Exhibit HP-CG-400-16, NUCLEAR ENTERPRISES CM-7A

8.17 Exhibit HP-CG-400-17, ALNOR RAD-100R DIGITAL DOSIMETER

8.18 Exhibit HP-CG-400-18, GAST 0522/0523 PORTABLE LOW VOLUME AIR SAMPLER

8.19 Exhibit HP-CG-400-19, EBERLINE SAC-4

8.20 Exhibit HP-CG-400-20, EBERLINE E-530

8.21 Exhibit HP-CG-400-21, EBERLINE PRM-6

8.22 Exhibit HP-CG-400-22, XETEX 503A TELEDOSE SYSTEM

8.23 Exhibit HP-CG-400-23, EBERLINE NRD PORTABLE NEUTRON REM COUNTER

8.24 Exhibit HP-CG-400-24, GILIAN HFS

8.25 Exhibit HP-CG-400-25, GAS TECH GX-4000

8.26 Exhibit HP-CG-400-26, NMC-PC5

8.27 Exhibit HP-CG-400-27, RADECO H-809V1/H810C/H809B2/H809C

8.28 Exhibit HP-CG-400-28, RADECO H809V-II

8.29 Exhibit HP-CG-400-29, EBERLINE RMS-II

8.30 Exhibit HP-CG-400-30, EBERLINE EC4-8/DA1-6

8.31 Exhibit HP-CG-400-31, Rotem RAM ION and SMARTS Survey System

8.32 Exhibit HP-CG-400-32, JOHNSON EXTENDER 2000W

8.33 Exhibit HP-CG-400-33, NUCLEAR ENTERPRISES CM-11/DP-11

8.34 Exhibit HP-CG-400-34, DOSITEC PR-2

8.35 Exhibit HP-CG-400-35, DOSITEC AR-21

8.36 Exhibit HP-CG-400-36, DOSITEC PR-7

8.37 Exhibit HP-CG-400-37, MERLIN GERIN RAM 100 (DPM version)

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 3440230503 / PLOR-094C **K/A:** 2.4.43
URO: 2.8 SRO: 3.5

TASK DESCRIPTION: Direct a Site Evacuation

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

ERP-130, Rev. 13, "Site Evacuation"

D. TASK STANDARD

1. Satisfactory task completion is indicated when a site evacuation has been directed.

2. Estimated time to complete: 18 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to direct a site evacuation using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

A Site Area Emergency has just been declared by the Emergency Director.

G. INITIATING CUE

The Emergency Director has directed you to implement ERP-130, "Site Evacuation" Step 2.2 in order to evacuate the site of non-essential personnel and have them report to the North Substation.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure ERP-130.	P	A copy of procedure ERP-130 is obtained.
*2	Activate the Page Alert Tone system. (Cue: Siren noise audible on loudspeaker.)	P	Station Alert Tone system pushbutton is momentarily depressed at the Plant Reactor Operator's desk.
*3	Make evacuation announcement twice over the Plant Public Address system. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement.)	P	Depress and hold pushbutton on GAI-Tronics handset while making evacuation announcement twice over the Plant Public Address System.
*4	Rotate "Evacuation Alarm/Mic selector" switch to position 6 (plant). (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is placed in "POSITION 6" at panel 00C026B.
*5	Sound evacuation siren for approximately 1 minute by pulling handle out. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is PULLED OUT for approximately 1 minute at panel 00C026B.
6	Push switch #43 on Diesel Panel IN. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is PUSHED IN at panel 00C026B.

STEP NO	STEP	ACT	STANDARD
*7	Make evacuation announcement twice over the PLANT RADIO SYSTEM. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement)	P	Depress the pushbutton on the radio system microphone while making evacuation announcement twice over the PLANT RADIO SYSTEM.
*8	Rotate the "Evacuation Alarm/Mic selector" switch, (while in the IN mode) to position 2, (microphone river speakers). Activate microphone by pulling handle OUT. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, Switch 43, is placed in "POSITION 2", THEN handle is PULLED OUT at panel 00C026B.
*9	Make evacuation announcement twice over the Pond Paging system. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement.)	P	Key microphone at panel OOC026B while making evacuation announcement twice over Pond Paging System.
10	Push switch #43 selector switch on Diesel Generator Panel IN. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, Switch 43 is PUSHED IN at panel 00C026B.

STEP NO	STEP	ACT	STANDARD
*11	Activate the Page Alert Tone system. (Cue: Siren noise audible on loudspeaker.)	P	Station Alert Tone system pushbutton is momentarily depressed at the Plant Reactor Operator's desk.
*12	Make evacuation announcement <u>twice</u> over the Plant Public Address system. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement.)	P	Depress and hold pushbutton on GAI-Tronics handset while making evacuation announcement <u>twice</u> over the Plant Public Address System.
*13	Rotate "Evacuation Alarm/Mic selector" switch to position 6 (plant). (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is placed in "POSITION 6" at panel 00C026B.
*14	Sound evacuation siren for approximately 1 minute by pulling handle out. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is PULLED OUT for approximately 1 minute at panel 00C026B.
15	Push switch #43 on Diesel Panel <u>IN</u>. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is PUSHED IN at panel 00C026B.

STEP NO	STEP	ACT	STANDARD
*16	Make evacuation announcement twice over the PLANT RADIO SYSTEM. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement)	P	Depress the pushbutton on the radio system microphone while making evacuation announcement twice over the PLANT RADIO SYSTEM.
*17	Rotate the "Evacuation Alarm/Mic selector" switch, (while in the IN mode) to position 2, (microphone river speakers). Activate microphone by pulling handle OUT. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, Switch 43, is placed in "POSITION 2", THEN handle is PULLED OUT at panel 00C026B.
*18	Make evacuation announcement twice over the Pond Paging system. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement.)	P	Key microphone at panel OOC026B while making evacuation announcement twice over Pond Paging System.
19	Push switch #43 selector switch on Diesel Generator Panel IN. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, Switch 43 is PUSHED IN at panel 00C026B.

STEP NO	STEP	ACT	STANDARD
20	Inform Emergency Director of task completion. (Cue: Emergency Director acknowledges report.)	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When a site evacuation has been performed per ERP-130 the Emergency Director should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

A Site Area Emergency has just been declared by the Emergency Director.

INITIATING CUE

The Emergency Director has directed you to implement ERP-130, "Site Evacuation" Step 2.2 in order to evacuate the site of non-essential personnel and have them report to the North Substation.

PEACH BOTTOM UNITS 2 AND 3
EMERGENCY RESPONSE PROCEDURE

ERP-130 SITE EVACUATION

1.0 RESPONSIBILITIES

1.1 The Emergency Director (ED) is responsible for directing the use of this procedure.

1.2 Control Room Licensed Operators are responsible for notifying plant personnel via the evacuation siren, public address system, and plant radio system.

1.3 All non-essential personnel are responsible for evacuating the site and proceeding to the designated off-site assembly area as directed.

1.4 Emergency response personnel are responsible for reporting to their assigned facilities.

1.5 The Security Team is responsible for accountability of personnel and access control during the evacuation.

1.6 Health Physics personnel, as assigned by the Health Physics Team Leader (HPTL), are responsible for establishing and operating the vehicle and evacuee monitoring and decontamination stations.

2.0 INITIAL ACTIONS

> **NOTE**
>
> ATTACHMENT TITLED, "SITE EVACUATION FLOW CHART", MAY BE USED AS A GUIDE FOR THE FOLLOWING ACTIONS.

2.1 The ED shall:

2.1.1 Designate an assembly area while taking into consideration radiological conditions, weather conditions and any other emergency conditions. (Suggested assembly areas are the North Sub Station if wind is from North through West OR Unit 1 if wind is from South through East) (refer to site evacuation map on the flow chart attachment).

2.1.2 Notify the on shift Health Physics Supervisor or the HPTL of impending site evacuation and location of the assembly area.

2.1.3 Notify the Supervisor - Nuclear Security or the Security Team Leader (STL) of impending site evacuation and location of the assembly area.

2.1.4 Direct a Control Room Licensed Operator to make the site evacuation announcement.

2.1.5 Complete attachment 2, "Site Evacuation Notification Form" and delegate notifications to Pennsylvania Emergency Management Agency (PEMA) and Maryland Emergency Management Agency (MEMA).

<u>NOTE</u>

STEPS IN 2.2 SHOULD BE COMPLETED IN QUICK SUCCESSION TO AVOID CONFUSING PLANT PERSONNEL.

2.2 The Control Room Licensed Operator, when directed by the ED, shall:

2.2.1 Activate the Page Alert Tone and make the announcements over the **PLANT PUBLIC ADDRESS SYSTEM** <u>twice</u>, in a clear and distinct voice:

THIS (IS) (IS NOT) A DRILL.
THIS (IS) (IS NOT) A DRILL.
ATTENTION ALL PERSONNEL. THIS IS A SITE EVACUATION NOTIFICATION. ALL NON-ESSENTIAL PERSONNEL EVACUATE TO

____
(North Sub Station or Peach Bottom Unit 1)

ALL MEMBERS OF THE EMERGENCY RESPONSE ORGANIZATION REPORT TO YOUR EMERGENCY RESPONSE FACILITY.
THIS (IS) (IS NOT) A DRILL.
THIS (IS) (IS NOT) A DRILL.

2.2.2 Sound **EVACUATION ALARM.**

2.2.2.1 Rotate the "Evacuation Alarm/MIC Selector" switch to Position 6 (plant).

2.2.2.2 Sound the evacuation siren by pulling the handle <u>OUT</u> to activate.

2.2.2.3 Sound siren for approximately 1 minute.

2.2.2.4 Push switch #43 on Diesel Panel <u>IN</u>.

2.2.3 Repeat announcement over the **PLANT RADIO SYSTEM** (all channels known to be in use) <u>twice</u>, as stated above.

2.2.4 Announce event over the **POND PAGING SYSTEM** as follows:

2.2.4.1 Rotate the "Evacuation Alarm/MIC Selector" switch #43 on the Diesel Generator Panel C26B while in the <u>IN</u> mode to Position 2 (microphone river speakers).

2.2.4.2 Activate the microphone by pulling the handle <u>OUT</u>.

2.2.4.3 Repeat the evacuation announcement twice over the **POND PAGING SYSTEM.**

2.2.4.4 Push switch #43 on Diesel Generator Panel <u>IN</u>.

2.2.5 Repeat steps 2.2.1, 2.2.2, 2.2.3 and 2.2.4.

2.3 Plant personnel (except designated emergency response personnel) shall:

2.3.1 Exit site through the Guardhouse according to instructions of Security personnel.

2.3.2 Deposit security badge and dosimetry as directed.

2.3.3 Follow routes to the off-site assembly area as directed by Security Team members.

2.3.4 Follow instructions of Vehicle and Evacuee Control Group members upon arrival at the assembly area.

2.3.5 Await further instructions on returning to the plant or proceeding home.

2.4 Emergency response personnel shall proceed to their designated emergency response facility and card-in or log-in.

3.0 <u>CONTINUING ACTIONS</u>

3.1 None

4.0 <u>FINAL CONDITIONS</u>

4.1 Emergency has been terminated and personnel are instructed by the ED or Shift Management to return to their normal duty station; or

4.2 Personnel and vehicles have been checked for contamination and are released.

5.0 ATTACHMENTS AND APPENDICES

5.1 Attachment 1, "Site Evacuation Flow Chart"

5.2 Attachment 2, "Site Evacuation Notification Form"

6.0 SUPPORTING INFORMATION

6.1 PURPOSE

To define the actions required to be performed during a site evacuation.

6.2 CRITERIA FOR USE

6.2.1 This procedure shall be implemented when in the judgement of Shift Management or the Emergency Director, the health and safety of on site personnel warrants a full site evacuation.

6.2.2 Shift Management or the Emergency Director may wish to direct a site evacuation if:

a. A Site Area Emergency or General Emergency has been declared,

<u>OR</u>

b. Conditions such as smoke, fire, uncontrolled toxic materials, or flooding preclude habitation of large portions of the site,

<u>OR</u>

c. Airborne radioactivity outside the plant, but within the security fence, is greater than 1 N9 uc/cc unidentified.

6.3 REFERENCES

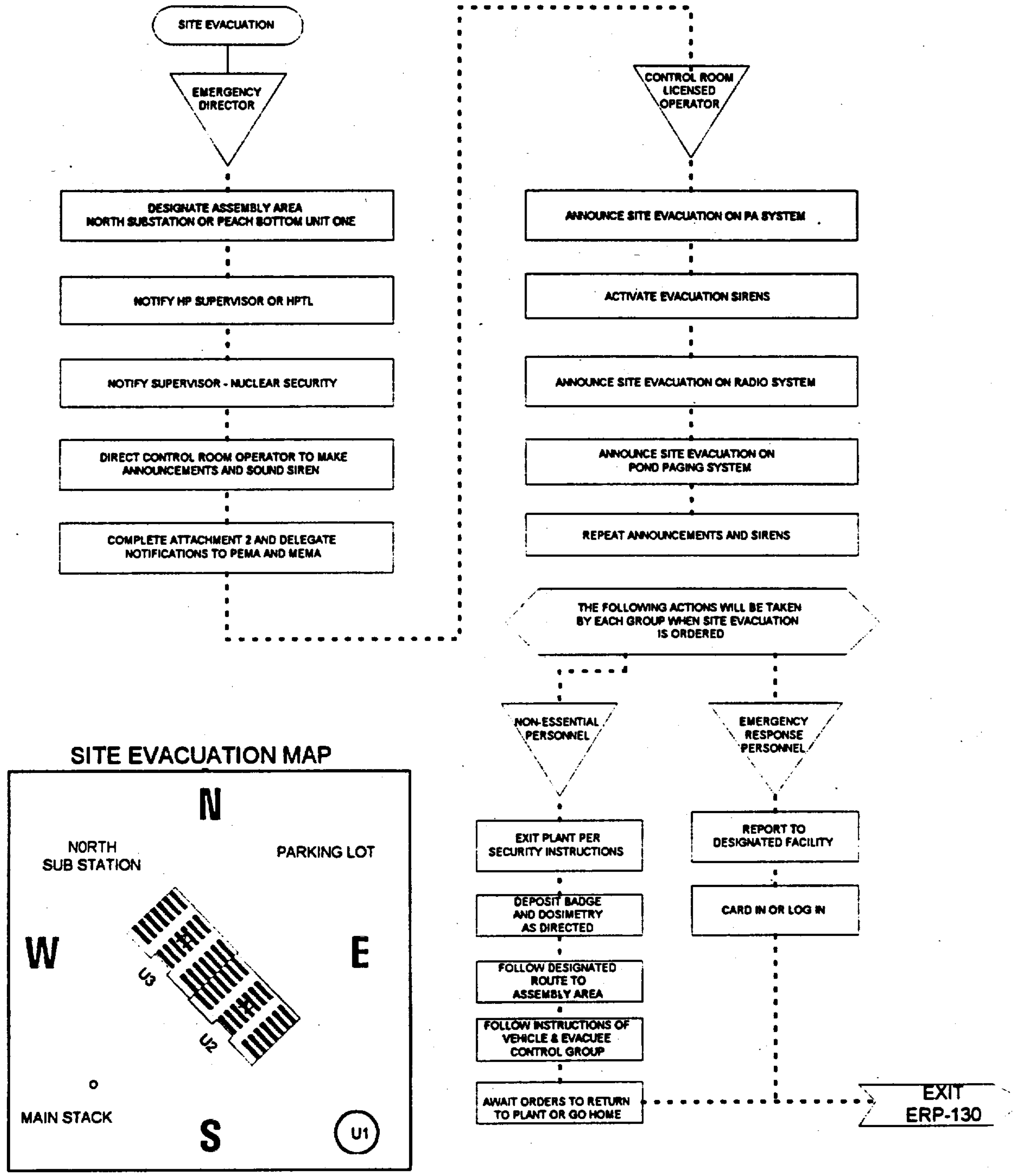
6.3.1 Nuclear Emergency Plan

6.3.2 NUREG-0654 FEMA-REP-1, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"

6.4 COMMITMENT ANNOTATION

6.4.1 None

ATTACHMENT 1
SITE EVACUATION
FLOW CHART



ATTACHMENT 2

SITE EVACUATION NOTIFICATION FORM

NOTE:

NOTIFY THE FOLLOWING TWO (2) AGENCIES OF A SITE EVACUATION.

1.) Maryland Emergency Management Agency (MEMA) 9-1-410-486-4422 or Emergency ext. 213

2.) Pennsylvania Emergency Management Agency (PEMA) 9-1-800-424-7362 or Emergency ext. 216

☐ THIS IS A DRILL ☐ THIS IS NOT A DRILL

This is the Peach Bottom Atomic Power Station.

My name is ____________________

My phone number is (717) 456 - __________ or Emergency ext. ______

The Emergency Director has declared a Site Evacuation

at __________ (time) on __________ (date)

Reason for Site Evacuation:

____

____

____

Site personnel are evacuating to:

____
(North Sub Station OR Peach Bottom Unit 1)

There ☐ IS ☐ IS NOT a Radioactive Release in Progress.

NOTIFICATION COMPLETE:

MEMA	______ (Person notified)	______ (Time)	______ (Date)
PEMA	______ (Person notified)	______ (Time)	______ (Date)

Facility: Peach Bottom Units 2 & 3 Date of Examination: Sep. 13, 1999
Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: SRO-1

B.1 Control Room Systems SRO/RO JPM OUTLINE

System / JPM Title	Type Code*	Safety Function
a. Recirculation/Recirc Pump Trip – Alternate Path (THI)	D, A, S 304CA	1
b. Feedwater/Transfer RFPs to Master Level Control	D,S 155C	2
c. High Pressure Coolant Injection/Shutdown the System with an Injection Signal Present	N, S New–HPCI	4
d. Primary Containment/Vent During a High Drywell Pressure Transient	N, S New-DW Vent	5
e. Diesel Generators/Fast Start – Alternate Path (ESW fails to start)	N, A, S New-DG Start (alt)	6
f. PCIS/PRO Scram Actions – Alternate Path (Isolation Failure)	N, A, S New-PRO Scram (alt)	5
g. Main Generator/Synchronize Turbine Generator Output with Grid at Minimum Load	D, S, L 017C	6
B.2 Facility Walk-Through		
a. Instrument N_2/Backup Instrument Nitrogen to ADS	D, P, R 054P	8
b. Injection Systems/Maximizing CRD Flow to the Vessel (Unit 3)	D, P, R 123P	Emergency 2
c. Main Steam/Closing a Stuck Open MSIV (Unit 3)	D, A, P, R 313CA	Abnormal 3

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

Facility: Peach Bottom Units 2 & 3 Date of Examination: Sep. 13, 1999
Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: RO-1 .

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. Recirculation/Recirc Pump Trip – Alternate Path (THI)	D, A, S 304CA	1
b. Feedwater/Transfer RFPs to Master Level Control	D,S 155C	2
c. High Pressure Coolant Injection/Shutdown the System with an Injection Signal Present	N, S New–HPCI	4
d. Primary Containment/Vent During a High Drywell Pressure Transient	N, S New-DW Vent	5
e. Diesel Generators/Fast Start – Alternate Path (ESW fails to start)	N, A, S New-DG Start (alt)	6
f. PCIS/PRO Scram Actions – Alternate Path (Isolation Failure)	N, A, S New-PRO Scram (alt)	5
g. Main Generator/Synchronize Turbine Generator Output with Grid at Minimum Load	D, S, L 017C	6

B.2 Facility Walk-Through

a. Instrument N_2/Backup Instrument Nitrogen to ADS	D, P, R 054P	8
b. Injection Systems/Maximizing CRD Flow to the Vessel (Unit 3)	D, P, R 123P	Emergency 2
c. Main Steam/Closing a Stuck Open MSIV (Unit 3)	D, A, P, R 313CA	Abnormal 3

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2000010501 / PLOR-304CA K/A: 295001.10

RO: 3.8 SRO: 3.7

TASK DESCRIPTION: Reactor Operator Actions On A Recirc Pump Trip (Alternate Path - Thermal Hydraulic Instabilities Exist)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

1. GP-9-2, Rev. 26, "Fast Power Reduction"

2. OT-112, Rev 30, "Unexpected/Unexplained Change in Core Flow"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the Reactor has been scrammed.

2. Estimated time to complete: 5 minutes from the onset of Thermal Hydraulic Instability
Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to respond to a Recirculation Pump trip. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. The reactor was initially operating at 100% power.

2. The "A" Recirculation Pump has tripped.

3. OT-112, "Unexpected/Unexplained Change in Core Flow", has been entered.

4. The CRS is currently evaluating the plant's position on Exhibit GP-5-1, "PBAPS Power Flow Operation Map".

G. INITIATING CUE

The Control Room Supervisor directs you, the Unit Reactor Operator, to perform the remaining Immediate Operator Actions of OT-112, "Unexpected/Unexplained Change in Core Flow".

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*1	Drive in GP-9-2, Appendix 1, Table 1 control rods. (Cue: Rod select matrix pushbuttons backlight for each selected rod, Full Core Display rod position has green "00" on for each inserted rod.)	P	At least one GP-9-2, Appendix 1, Table 1 control rod is selected and driven in by depressing the corresponding select matrix pushbutton and placing 3A-S2, ROD CONTROL switch <u>OR</u> 3A-S3, EMERGENCY IN/ NOTCH OVERRIDE switch in the IN position at panel 20C005A.
2	Monitor for Thermal Hydraulic Instabilities (THI) on the APRMs. (Cue: APRMs A, B, and D readings are swinging from 45% to 60%.)	P	All APRM recorders are monitored for noise level growing by two or more times or oscillations greater than 10% peak to peak on panel 20C005A.
*3	Recognize Thermal Hydraulic Instabilities (THI) and perform a manual reactor scram. (Cue: Annunciators 211 B1, C1, D1 and E1 are alarming, A & B CHANNEL REACTOR AUTO AND MANUAL SCRAMS, all Full Core display rod positions have green "- -" on.)	P	5A-S1 REACTOR mode switch is placed in the SHUTDOWN position <u>OR</u> 5A-S3A and 5A-S3B Scram pushbuttons are DEPRESSED within 5 minutes of the onset of THI.
4	Inform Control Room Supervisor of the Thermal Hydraulic Instabilities and the insertion of a manual scram. (Cue: Control Room Supervisor acknowledges report.)	P	The presence of Thermal Hydraulic Instabilities and the insertion of a manual scram reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the Reactor has been manually scrammed due to the presence of thermal hydraulic instabilities, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. The reactor was initially operating at 100% power.
2. The "A" Recirculation Pump has tripped.
3. OT-112, "Unexpected/Unexplained Change in Core Flow", has been entered.
4. The CRS is currently evaluating the plant's position on Exhibit GP-5-1, "PBAPS Power Flow Operation Map".

INITIATING CUE

The Control Room Supervisor directs you, the Unit Reactor Operator, to perform the remaining immediate operator actions of OT-112, "Unexpected/Unexplained Change in Core Flow".

PECO Energy Company
Peach Bottom Unit 2

GP-9-2 FAST REACTOR POWER REDUCTION

1.0 PURPOSE

To rapidly reduce reactor power as required by plant conditions.

2.0 PREREQUISITES

2.1 Plant conditions require a fast reduction in power.

3.0 PERFORMANCE STEPS

NOTES

1. Steps for power reduction may be exited when power reduction is no longer required.
2. Core thermal hydraulic instability may be occurring if ANY of the following conditions exist:
   - o APRM oscillations of greater than OR equal to 10 percent peak-to-peak,
   - o LPRM OR APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, OR
   - o WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.

3.1 IF evidence of core thermal hydraulic instability exists, THEN place the reactor mode switch in "SHUTDOWN" AND enter T-100, "Scram", AND exit this procedure. **CM-1, CM-2**

3.2 Lower recirculation flow until ANY of the following occur:

o percent reactor core thermal power is reduced to the value specified in Step 1 of GP-9-2 Appendix 1

OR

o an "APRM HIGH" alarm occurs, **CM-3**

OR

o FLLLP exceeds 0.995.

3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch OR the Emergency In/Notch Override handswitch. **CM-4**

3.4 Reduce recirculation flow to lower total core flow to approximately 51.25 Mlbs/hr (50% core flow) as indicated on PMS point B015 OR on Reactor Total Core Flow Indicator, DPFR-2-02-3-095, on Panel 20C005A. **CM-5**

> **NOTE**
>
> Pre-transient rod positions may be obtained from a recent OFFICIAL 3D P1, a recent CONTROL ROD POSITION LOG, RE-C-01 Appendix 7, Control Rod Position Data Sheets, RE-C-01, Exhibit RE-C-01-01, Quarter Core Map or RE-C-01, Exhibit RE-C-01-02, Full Core Map.

3.5 WHEN plant conditions permit, THEN a second licensed operator shall verify control rods on GP-9-2 Appendix 1, Table 1, inserted in Step 3.3 are at position 00 and ALL other control rods are at their pre-transient positions AND signoff Step 3 of GP-9-2 Appendix 1, Table 1.

3.6 Demand an OFFICIAL 3D P1 from PMS or 3D MONICORE to obtain thermal limit values (MFLCPR, MFLPD and MAPRAT).

3.7 IF any thermal limit value is equal to or greater than 1.000, THEN take corrective action in accordance with GP-13, "Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern", and RE-C-01, "Reactor Engineering General Instructions".

3.8 IF further power reduction is required, THEN exit this procedure AND enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure AND enter GP-5, "Power Operations".

4.0 REFERENCES

4.1 GP-3, Normal Plant Shutdown

4.2 GP-5, Power Operations

4.3 GP-9-2 Appendix 1, U/2 Fast Reactor Power Reduction Table

4.4 GP-13, Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern

4.5 RE-C-01, Reactor Engineering General Instructions

4.6 RE-C-01 Appendix 7, Control Rod Movement Guidelines PBAPS Only

4.7 Letter from L. F. Rubino to J. T. Budzynski, 11/8/88

4.8 CM-1, NRC Bulletin No. 88-07 Supplement 1 (T00313)

4.9 CM-2, NRC Generic Letter 94-02 (T03567)

4.10 CM-3, OE 5194, Partial Loss of Feedwater Heating

4.11 CM-4, INPO SER 4-88 (T00462)

4.12 CM-5, GE Letter 11-7-88, Recirc Pump Trip Guidelines (T000157)

4.11 INPO SOER 94-01 (T03905)

PECO Energy Company
Peach Bottom Units 2 and 3

OT-112 - UNEXPECTED/UNEXPLAINED CHANGE IN CORE FLOW - PROCEDURE

(This revision is a complete rewrite)

1.0 ENTRY CONDITIONS

Unexpected/unexplained change in core flow in Mode 1 OR 2.

2.0 IMMEDIATE OPERATOR ACTIONS

2.1 IF NO Recirc Pumps are operating, THEN **SCRAM** AND **ENTER** T-100, "Scram", AND **EXIT** this procedure.

2.2 **DETERMINE** position on Exhibit GP-5-1, "PBAPS Power Flow Operation Map" (Power to Flow Map).

2.3 IF IN Region 1 of the Power to Flow Map, THEN **SCRAM** AND **ENTER** T-100, "Scram", AND **EXIT** this procedure.

2.4 IF a Recirc Pump has tripped, THEN **INSERT** ALL GP-9-2(3) Appendix 1, Table 1 rods.

2.5 **MONITOR** for the following indications of Thermal Hydraulic Instability (THI):

- Any LPRM OR APRM noise level grows by two OR more times its initial noise level, OR
- APRM noise level of greater than OR equal to 10 percent (peak to peak), OR
- LPRM OR APRM oscillations change from random to regular (with approximately 1 to 2 second oscillation period).

2.6 IF THI is present, THEN **SCRAM** AND **ENTER** T-100, "Scram", AND **EXIT** this procedure.

3.0 FOLLOW-UP ACTIONS

3.1 IF IN Region 2 of the Power to Flow Map, THEN **PERFORM** the following:

3.1.1 Immediately **EXIT** Region 2 by performing any of the following:

1. **INSERT** GP-9-2(3) Appendix 1, Table 1 rods.
2. IF ALL GP-9-2(3) Appendix 1, Table 1 rods have been inserted, THEN **INSERT** GP-3-2(3) Appendix A1/A2 Table 2 rods.
3. **RAISE** Recirc Pump speed(s) without exceeding 56 Mlbm/hr actual core flow.

3.1.2 IF Region 2 cannot be exited within one hour, THEN **SCRAM** AND **ENTER** T-100, "Scram", AND **EXIT** this procedure.

3.1.3 WHEN an acceptable operating point outside of Region 2 has been established, THEN power ascension should be suspended until a Reactor Engineer is contacted.

3.2 IF Recirc Pump speed is inexplicably changing, THEN:

3.2.1 **PLACE** the associated SCOOP TUBE switch to "LOCK" at Panel 2(3)0C004A for the affected Recirc Pump.

3.2.2 IF Recirc Pump speed was rising AND continues to rise, THEN **TRIP** the affected Recirc Pump AND **RETURN** to step 2.0 of this procedure.

3.2.3 IF pump speed was rising, THEN **LOWER** unaffected Recirc Pump speed to reduce total core flow to just below the pre-transient value.

3.2.4 **REFER** to SO 2D.7.B-2(3), "Recirculation MG Set Scoop Tube Lockup and Reset" for the affected Recirc Pump.

> **NOTE**
>
> In single loop operation, the Wide Range RPV level instruments associated with the idle loop may oscillate and read up to 10 inches higher than the active loop instruments due to reverse flow through the idle Jet Pumps. This may cause the "FEEDWATER FIELD INSTRUMENT TROUBLE" alarm, 2(3)01 H-1.

3.3 IF a Recirc Pump has tripped, THEN:

3.3.1 **CLOSE** MO-2(3)-02-053A(B), "DISCH" valve OR MO-2(3)-02-043A(B), "SUCTION" valve associated with the tripped Recirc Pump at Panel 2(3)0C004A.

3.3.2 IF the tripped Recirc Pump is NOT required to be isolated, THEN after 5 minutes **REOPEN** the valve closed in step 3.3.1.

3.3.3 **VERIFY** operating Recirc Pump speed is less than 1485 rpm.

3.3.4 **PERFORM** AO 2A.1-2(3), "Recirculation System Single Loop Operation" within 12 hours from the time the Recirc Pump tripped (reference Tech Spec 3.4.1).

3.3.5 **PERFORM** SO 2A.2.A-2(3), "Recirculation System Shutdown" on the inactive loop.

3.4 IF BOTH Recirc Pumps are operating, THEN:

3.4.1 **VERIFY** recirculation jet pump loop flows are within the following limits (reference Tech Spec SR 3.4.1.1):

- 10.25 Mlbm/hr if core flow is less than 71.75 Mlbm/hr.
- 5.125 Mlbm/hr if core flow is greater than OR equal to 71.75 Mlbm/hr.

3.4.2 IF recirculation jet pump loop flow limits are NOT met, THEN:

1. **DECLARE** the pump in the low flow loop inoperable (single loop operation).
2. **START** a 12 hour time clock per Tech Spec 3.4.1.

NOTES

1. Core flow can be maintained fairly constant by alternately lowering speed of the high flow pump and raising speed of the low flow pump.

2. IF the mismatch is restored in the next step, THEN the 12 hour time clock started in the previous step is no longer required.

3. Within ONE hour, **RESTORE** the mismatch to within Tech Spec limits by performing any of the following:

- **LOWERING** the speed of the high flow loop
- **RAISING** the speed of the low flow loop

NOTE

The next step will secure a Recirc Pump. This may be either the high flow or low flow pump depending on the situation. Shift Management will determine which pump will remain in service.

4. IF recirculation jet pump loop flow limits can NOT be restored within one hour, THEN:

- **INSERT** ALL GP-9-2(3) Appendix 1, Table 1 rods.
- IF ALL Table 1 rods are inserted AND operation is above the 66.7% Rod Line, THEN **REDUCE** power to below the 66.7% Rod Line in accordance with GP-3-2(3) Appendix A1/A2 Table 2 rods.
- **LOWER** Recirc Pump speed for the pump to remain in service to less than 1485 rpm.
- **TRIP** the other Recirc Pump AND **RETURN** to step 2.0 of this procedure.

3.5 <u>IF</u> core thermal power is greater than 30% <u>AND</u> actual core flow is less than 50 Mlbm/hr, <u>THEN</u> frequently **MONITOR** for THI until the plant is stable as follows:

3.5.1 **SELECT** each of the control rods listed below on the Rod Select Matrix:

14-47	30-47	46-47
14-31	30-31	46-31
14-15	30-15	46-15

3.6 Obtain an OFFICIAL 3D P1 from PMS <u>OR</u> 3D MONICORE <u>AND</u> monitor thermal limits/FLLLP.

4.0 <u>VERIFICATION OF AUTOMATIC ACTIONS</u>

None

PECO NUCLEAR
PEACH BOTTOM ATOMIC POWER STATION
JOB PERFORMANCE MEASURE

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2590060101 / PLOR-155C K/A: 259001A402
URO: 3.9 SRO: 3.7

TASK DESCRIPTION: TRANSFER RFPs TO MASTER LEVEL CONTROL

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

SO 6C.1.D-2, Rev. 4, Reactor Feedwater Automatic Level Control

D. TASK STANDARD

1. Satisfactory task completion is indicated when the all three RFPs are operating in AUTO on the Master Level controller.

2. Estimated time to complete: 15 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to transfer RFP control from the M/A stations to the Master Level Controller using the appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. The plant is at 100% power with all three RFPs being controlled in manual from their M/A Stations due to troubleshooting of the Master Level Controller.

2. Troubleshooting activities are complete.

3. All procedure prerequisites are complete.

G. INITIATING CUE

The Control Room Supervisor directs you to transfer RFP control to the Master Level Controller from RFP M/A Station IAW SO 6C.1.D-2 steps 4.2.1-4.2.7.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure SO 6C.1.D-2.	P	A copy of SO-6C.1.D-2 is obtained.
2	Verify "M/A SELECT" is lit for each operating RFP at Panel 20C005A. (Cue: "M/A SELECT" is lit for all three RFPs.)	P	Verify "M/A SELECT" is lit for each operating RFP at Panel 20C005A.
3	Verify RFP M/A Station, "RFP A(B)(C)", in "MANUAL" for each operating RFP. (Cue: The M/A Stations are in "MANUAL" for all three RFPs.)	P	Verify the RFP M/A Stations are in "MANUAL" for all three RFPs at Panel 20C005A.
4	Verify a Balanced flow condition exists on FR-2565, "Feed Water F (flow)". (Cue: A balanced flow condition exists on FR-2565.)	P	Verify a balanced flow condition exists on FR-2565, "Feed Water F (flow)" for all three RFPs at Panel 20C005A.
5	Verify the Master Level Controller (MLC) is in "Manual".) (Cue: The Master Level Controller (MLC) is in "MANUAL".)	P	Verify the Master Level Controller (MLC) is in "MANUAL" at Panel 20C005A.
6	Verify the "MLC" setpoint ("S" readout) and process ("P" readout-reactor water level) are matched. (Cue: The "MLC" setpoint ("S" readout and process ("P" readout-readout water level) are matched.)	P	Verify that the "MLC" setpoint ("S" readout) and process ("P" readout-readout water level) values are matched at Panel 20C005A.
7	Verify the "V" readout (Output) is displayed on the A(B)(C) RFP M/A Station (first RFP to be placed in AUTO). (Cue: The "V" readout (Output) is displayed on the A(B)(C) RFP M/A Station.)	P	Verify the "V" readout (output) is displayed on the A(B)(C) RFP M/A Station at Panel 20C005A.
8	Verify the "V" readout (output) is displayed on the "MLC".)	P	Verify the "V" readout (output) is displayed on the "MLC" at Panel 20C005A.

STEP NO	STEP	ACT	STANDARD
*9	Adjust the "MLC" control knob to match the "V" readout to the A(B)(C) RFP M/A Station "V" readout. (Cue: The "MLC" "V" readout is matched to the RFP M/A Station "V" readout.)	P	Adjust the "MLC" control knob as required to match the "V" readout to the A(B((C) RFP M/A Station "V" readout at Panel 20C005A.
*10	Place the "A (B)(C) RFP M/A Station in "AUTO". (Cue: The "A(B)(C) RFP M/A Station green light "ON" red light is "OFF".	P	The "A(B)(C)" RFP M/A button is depressed, the green "AUTO" light is lit, the red "MANUAL" light is out at Panel 20C005A.
*11	Place the Master Level Controller in "AUTO". (Cue: The Master Level Controller is in "AUTO".)	P	The operator depresses the Master Level Controller M/A pushbutton, the green "AUTO" light is lit, the red "MANUAL" light is out at Panel 20C005A.
12	Select the "V" readout (output) display on (one of the remaining RFPs) the A(B)(C) RFP M/A Station. (Cue: The "V" readout (output) is displayed on the A(B)(C) RFP M/A Station.)	P	Select the "V" readout (output) display on the A(B)(C) RFP M/A Station at Panel 20C005A.
13	Select the "V" readout (output) on the "MLC". (Cue: The "V" readout (output) is displayed on the "MLC".)	P	Select the "V" readout (output) display on the "MLC" at Panel 20C005A.
*14	Adjust the output ("V" display) on the A(B)(C) RFP M/A Station to match the output ("V" display) on the "MLC" (Cue: The "MLC" "V" readout is matched to the A(B)(C) RFP M/A Station "V" readout.)	P	Adjust the output ("V" display) on the A(B)(C) RFP M/A Station to match the output ("V" display) on the "MLC" by rotating the control knob as necessary at Panel 20C005A.
*15	Place A(B)(C) RFP M/A Station in "AUTO". (Cue: The A(B)(C) RFP M/A Station green light is "ON", red light is "OFF".	P	The A(B)(C) RFP M/A button is depressed, the green "AUTO" light is lit, the red "MANUAL" light is out at Panel 20C005A.

STEP NO	STEP	ACT	STANDARD
16	Select the "V" readout (output) display on the A(B)(C) RFP M/A Station (final RFP). (Cue: The "V" readout (output) is displayed on the A(B)(C) RFP M/A Station.)	P	Select the "V" readout (output) display on the A(B)(C) RFP M/A Station at Panel 20C005A.
17	Select the "V" readout (output) display on the "MLC". (Cue: The "V" readout (output) is displayed on the "MLC".)	P	Select the "V" readout (output) display on the "MLC" at Panel 20C005A.
*18	Adjust the output ("V" display) on the A(B)(C) RFP M/A Station to match the output ("V" display) on the "MLC". (Cue: The "MLC" "V" readout is matched to the A(B)(C) RFP M/A Station "V" readout.)	P	Adjust the output ("V" display) on the A(B)(C) RFP M/A Station to match the output ("V" display) on the "MLC" by rotating the control knob is necessary at Panel 20C005A.
*19	Place the A(B)(C) RFP M/A Station in "AUTO". (Cue: The A(B)(C) RFP M/A green light is "ON", red light is "OFF".	P	The A(B)(C) RFP M/A button is depressed, the green "AUTO" light is lit, the red "MANUAL" light is out at Panel 20C005A.
20	Inform Control Room Supervisor of task completion. (Cue: The Control Room Supervisor acknowledges the report).	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When all three RFPs have been transferred to Auto and are being controlled by the Master Level Controller, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. The plant is at 100% power with all three RFPs being controlled in manual from their M/A Stations due to troubleshooting of the Master Level Controller.

2. Troubleshooting activities are complete.

3. All procedure prerequisites are complete.

INITIATING CUE

The Control Room Supervisor directs you to transfer RFP control to the Master Level Controller from RFP M/A Station IAW SO 6C.1.D-2 steps 4.2.1-4.2.7.

PECO Energy Company
Peach Bottom Unit 2

SO 6C.1.D-2 REACTOR FEEDWATER AUTOMATIC LEVEL CONTROL

1.0 PURPOSE

This procedure provides the instructions necessary to operate the Reactor Feedwater Automatic Level Control System.

2.0 PREREQUISITES

2.1 One OR more Reactor Feedwater Pumps (RFP) running.

2.4 "STARTUP LEVEL CONTROL" and "BYPASS LEVEL CONTROL" stations are in "MANUAL".

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

3.2 IF annunciator 201 H-1, "FEEDWATER FIELD INSTRUMENT TROUBLE" is in ALARM, THEN verify that the alarm condition(s) will not adversely impact the successful performance of this procedure.

4.0 PERFORMANCE STEPS

> NOTE
>
> Communications shall be available between the Control Room AND Personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation OR alarms.

4.1 IF the RFP is being controlled manually from the MSC AND operation from the RFP M/A Station is desired, THEN perform steps 4.1.1 through 4.1.4.

4.1.1 Verify the RFP M/A Station is in "Manual".

4.1.2 Select the "Y" readout (MSC and M/A Station deviation) on the M/A Station.

NOTE

The RFPT M/A Station "Y" readout indicates the difference between the MSC speed setpoint and the RFP M/A Station speed setpoint.

For the next step:

IF "M/A PERMISSIVE" is NOT lit AND the "Y" readout is negative, THEN the MSC speed setpoint must be raised OR the M/A Station speed set point must be lowered.

IF "M/A PERMISSIVE" is NOT lit AND the "Y" readout is positive, THEN the MSC speed setpoint must be lowered OR the M/A Station speed set point must be raised.

4.1.3 Adjust turbine speed OR M/A Station output as required until "M/A PERMISSIVE" is lit.

NOTE

WHEN "M/A SELECT" is lit, THEN that RFPT is controlled from the associated RFP M/A Station.

4.1.4 Press "M/A SELECT" to transfer control to associated RFP M/A Station.

4.2 IF the operating RFP(s) is(are) being controlled manually from the RFP M/A Station(s) AND automatic operation from the Master Level Controller is desired, THEN perform steps 4.2.1 through 4.2.9.4.

4.2.1 Verify "M/A SELECT" lit for each operating RFP at Panel 20C005A.

4.2.2 Verify RFP M/A Station, "RFP A(B)(C)", in "MANUAL", for each operating RFP .

4.2.3 IF more than one RFP is operating, THEN verify a balanced flow condition exists on FR-2565, "Feed Water F (flow)".

4.2.4 Verify the Master Level Controller (MLC) in "MANUAL".

4.2.5 Verify "MLC" setpoint ("S" readout) AND process ("P" readout - reactor water level) are matched.

4.2.6 Place the first RFP in automatic as follows:

4.2.6.1 Verify the "V" readout (output) is displayed on the RFP M/A Station.

4.2.6.2 Verify the "V" readout (output) is displayed on the "MLC".

<u>NOTES</u>

1. The vertical bar displays on the RFP M/A Station will line up when the "MLC" is adjusted. The left bar display is the input from the "MLC". The right side is the output to the RFPT.

2. To allow transfer, the "MLC" output ("V" display) must be matched to within 5% of the RFP M/A Station output ("V" display).

4.2.6.3 Adjust the "MLC" control knob to match the "V" readout to the RFP M/A Station "V" readout.

<u>NOTE</u>

<u>WHEN</u> the RFP M/A control station is placed in "AUTO", <u>THEN</u> that RFPT is being controlled from the Master Level Controller.

4.2.6.4 Place the RFP M/A Station in "AUTO".

<u>NOTE</u>

Placing the Master Level Controller in "AUTO" with the selected RFP M/A Station in "AUTO", lines up the selected RFP to automatically control reactor water level.

4.2.6.5 Place the Master Level Controller in "AUTO".

4.2.7 Place the remaining RFP(s) in automatic as follows:

<u>NOTE</u>

The remaining RFPs will be placed in automatic one at a time.

4.2.7.1 Select the "V" readout (output) display on the RFP M/A Station for the selected RFP.

4.2.7.2 Select the "V" readout (output) display on the "MLC".

NOTE

To allow transfer, the RFP M/A Station output ("V" display) must be matched to within 5% of the Master Level Controller output ("V" display).

4.2.7.3 Adjust the output ("V" display) on the selected RFP M/A Station to match the output ("V" display) on the "MLC".

4.2.7.4 Place the RFP M/A Station in "AUTO".

4.2.7.5 Repeat steps 4.2.7.1 through 4.2.7.4 of this procedure for the remaining RFP, if applicable.

4.2.8 IF reactor water level setpoint adjustment is necessary, THEN perform steps 4.2.8.1 thru 4.2.8.3 of this procedure. Otherwise, go to step 4.2.9 of this procedure.

NOTE

RFP speed and flow should be carefully monitored while adjusting the Master Level Controller Level Setpoint.

4.2.8.1 Set the Master Level Controller to the desired reactor water level by selecting the "S" readout on the Digital Display and adjusting the control knob.

4.2.8.2 Monitor the following parameters on Panel 20C005A, while reactor water level is changing:

- SPI-2621A(B)(C), "Feed Pump Speed"
- FR-2565, "Feed Water F (flow)"
- LI-2-06-094A, B, & C, "Reactor Level L(NR)"

4.2.8.3 Verify reactor water level responds to the change in desired level.

4.2.9 Balance the feedwater flow output from each RFP, such that each RFP is carrying equal load, as follows:

4.2.9.1 Check feedwater flow from each RFP on FR-2565, "Feed Water F (flow)", located on Panel 20C005A.

NOTES

1. To balance feedwater flow for each RFP, the selected M/A Station must be in "AUTO" AND the "X" readout selected.

2. To decrease RFP flow (decrease RFPT speed), the control knob must be turned counterclockwise, inducing a negative bias. To increase RFP flow (increase RFPT speed), the control knob must be turned clockwise, inducing a positive bias.

4.2.9.2 Adjust the selected RFPT speed by selecting the "X" readout (bias) on the Digital Display and adjusting the control knob.

4.2.9.3 Once desired flow is achieved, THEN return the Digital Display to "V".

4.2.9.4 Repeat steps 4.2.9.1 through 4.2.9.3 for the other RFP(s), until all flows are balanced.

4.3 IF the operating RFP(s) is(are) being controlled automatically from the Master Level Controller AND manual operation from the Master Level Controller is desired, THEN perform steps 4.3.1 through 4.3.3

4.3.1 Verify the following on Panel 20C005A:

- o RFP Master Level Controller is in "AUTO".
- o RFP M/A Station is in "AUTO".

NOTE

WHEN the Master Level Controller is placed in "MANUAL", THEN the RFPT(s) is(are) being controlled manually from the control knob on the Master Level Controller.

CAUTION

Reactor water level must be closely monitored while operating in manual to ensure proper water level is maintained.

4.3.2 Verify reactor level is stable AND steam flow/feed flow are matched.

4.3.3 Place the Master Level Controller in "MANUAL".

4.4 IF the operating RFP(s) is(are) being controlled manually from the Master Level Controller AND automatic operation from the Master Level Controller is desired, THEN perform steps 4.4.1 through 4.4.5

4.4.1 Verify "MLC" setpoint ("S" readout) and process ("P" readout - reactor water level) are matched.

> NOTE
>
> RFP speed AND flow should be carefully monitored while adjusting the Master Level Controller Level Setpoint.

4.4.2 Place the Master Level Controller in "AUTO".

4.4.3 IF necessary, THEN adjust the "S" readout on the "MLC" to 23 inches or the desired water level.

4.4.4 Monitor the following parameters on Panel 20C005A, while reactor water level is changing:

- o SPI-2621A(B)(C), "Feed Pump Speed"
- o FR-2565, "Feed Water F (flow)"
- o LI-2-06-094A, B, & C, "Reactor Level L(NR)"

4.4.5 Verify reactor water level responds to the change in desired level.

4.5 IF a RFP is being controlled automatically from the Master Level Controller, AND manual operation from it's M/A Station is desired, THEN perform steps 4.5.1 through 4.5.4

> NOTE
>
> WHEN the RFP M/A Station is placed in "MANUAL", THEN the RFP is being controlled from the RFP M/A Station control knob.

> CAUTION
>
> Reactor water level must be closely monitored while operating in manual to ensure proper water level is maintained.

4.5.1 Place the RFP M/A Station for the selected RFP in "MANUAL".

4.5.2 To change the RFP discharge flow with the RFP M/A Station in "MANUAL" perform the following:

4.5.2.1 Select the "V" display on the associated RFP M/A Station.

4.5.2.2 Slowly adjust the RFP M/A Station Control Knob to achieve the desired flow.

4.5.3 Monitor the following parameters on Panel 20C005A, while RFP discharge flow is changing:

- o SPI-2621A,B AND C "Feed Pump Speed"
- o FR-2565 "Feed Water F"
- o LI-2-06-094A,B AND C "Reactor Level L(NR), steady
- o FR-2-06-098 "Total Steam Total F/W F/F", steady

4.5.4 Repeat step 4.5.1 through 4.5.3 for the remaining RFPs, if applicable.

4.6 IF a RFP is being controlled by the M/A Station AND MSC control is desired, THEN perform steps 4.6.1 through 4.6.2.

NOTE

In order to perform a "bumpless transfer" the MSC setpoint tracks the M/A setpoint when "M/A SELECT" is lit.

4.6.1 Press "MSC SELECT".

4.6.2 Place the RFP M/A Station in MANUAL AND adjust output ("V" setpoint) to 0%.

4.7 IF the mode of control of the Feedwater Level Control System is to be changed, THEN perform steps 4.7.1 through 4.7.3.

4.7.1 Verify the following on Panel 20C005A:

- o Feedwater Master Level Controller is in "AUTO".
- o RFP M/A Station is in "AUTO" for each RFP being used to provide feedwater to the reactor.
- o Reactor water level LI-2-06-094A, B, AND C, "Reactor Level L(NR)", steady.

- Reactor Steam flow AND Feed flow FR-2-06-098, "Total Steam Total F/W F/F", steady.

- Reactor Power at 30% OR greater, if going to three element control.

NOTES

1. The Digital feedwater system will automatically select single element OR three element control.

   - single element control approximately < 30% power.

   - three element control approximately > 30% power.

2. IF a failure of a steam flow OR feed flow signal has occurred, THEN the computer will NOT allow three element control to be selected AND will default to single element control.

4.7.2 Push the button corresponding to the desired condition: L (single element), LSF (three element) OR Auto L/LSF (auto selection).

NOTES

1. The selected button will flash.

2. IF the computer disagrees with the new selection, THEN the:

   - Disagree light will be solid - override is permissible.

   - Disagree light will be flashing - override is NOT permissible.

3. During the selection of a new mode, the system will resume the current configuration IF the "X" (execute) button is NOT pushed before the timer runs out (5 to 7 seconds).

4.7.3 Push the "X" (Execute) button to assume the selected condition.

4.8 IF it is desired to transfer "LEVEL SELECT" to an unselected channel, THEN perform steps 4.8.1 through 4.8.2.

4.8.1 Push the button corresponding to the desired level transmitter "A", "B", "C" OR "AUTO ABC".

NOTES

1. The selected button will flash.
2. IF the computer disagrees with the new selection, THEN the:
   - o Disagree light will be solid - override is permissible.
   - o Disagree light will be flashing - override is NOT permissible.

4.8.2 Push the "X" (Execute) button to assume the selected condition.

5.0 CONTROL STATIONS

5.1 20C005A

6.0 REFERENCES

6.1 P&ID M-308, "Feedwater & Feed Pumps"

6.2 P&ID M-321, "Turbine Lube Oil System"

6.3 M-1-S-25

6.4 E-126, "RFPT Lube Oil Pump 480V Starter"

6.5 E-128, "RFPT EMER Oil Pp 250V DC Starter"

6.6 E-129, "Reactor Feed Pump Control Scheme"

6.7 E-130, "RFPT Lube Oil Reservoir Vapor Extractor 480V Starter"

6.8 M-6-43-7, General Electric Steam Turbine, Boiler Feed Pump Drive

6.9 M-5, Byron Jackson Reactor Feed Pump Instruction Book

6.10 General Electric Level Diagram 509E 252 CX

6.11 General Electric Wiring Diagram 509E 254 BE

6.12 LER 2-89-12

7.0 TECHNICAL SPECIFICATIONS

None

8.0 INTERFACING PROCEDURES

None

PECO NUCLEAR
PEACH BOTTOM ATOMIC POWER STATION
JOB PERFORMANCE MEASURE

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2060050101 / NEW-HPCI   K/A: 206000
URO: 3.9   SRO: 4.3

TASK DESCRIPTION: Shutdown HPCI with an Initiation Signal Present

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

Procedure SO 23.2.A-2 Rev. 11, "HPCI System Shutdown"

D. TASK STANDARD

1. Satisfactory task completion is indicated when HPCI is shutdown and the HPCI "Aux Oil Pump" has been placed in "Pull to Lock".

2. Estimated time to complete: 8 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to manually perform a Short Term shutdown of the HPCI system while an injection signal is present using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. HPCI System spuriously initiated on failed -48" HPCI relays.

2. The -48" signal to HPCI is still present.

3. HPCI operation is not required.

G. INITIATING CUE

The Control Room Supervisor directs you to perform a Short Term shutdown of HPCI using SO 23.2.A-2, "HPCI System Shutdown".

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure SO 23.2.A-2, "HPCI SYSTEM SHUTDOWN".	P	A copy of procedure SO 23.2.A-2 is obtained.
2	Verify the " Aux Oil Pump", 20P026, control switch in "START".	P	The " Aux Oil Pump", 20P026, control switch is verified in "START".
3	Verify "HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on panel 221 A-2 is clear. (Cue: Annunciator 221 A-2 is not lit.)	P	"HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on panel 221 A-2 is verified clear.
4	Verify "HPCI DC MOTOR POWER LOSS" alarm on panel 221 A-1 is clear. (Cue: Annunciator 221 A-1 is not lit.)	P	"HPCI DC MOTOR POWER LOSS" alarm on panel 221 A-1 is verified clear.
5	Place the gland seal condenser "Vac Pump" control switch, in "START". (Cue: Acknowledge switch operation. The "Vac Pump" switch is in the "START" position.)	P	The gland seal condenser "Vac Pump" control switch, is placed in "START".
*6	Depress <u>AND</u> hold the HPCI System "Remote Trip" pushbutton. (Cue: Acknowledge switch operation. The HPCI System "Remote Trip" pushbutton is depressed and being held.)	P	The HPCI System "Remote Trip" pushbutton is being depressed and held.
*7	<u>WHEN</u> the "Remote Trip" pushbutton has been held for at least 90 seconds, <u>THEN</u> place the HPCI "Aux Oil Pump" control switch in "Pull to Lock". (Cue: Acknowledge control switch operation. The HPCI "Aux Oil Pump" control switch is in the "Pull to Lock" position.)	P	<u>WHEN</u> the "Remote Trip" pushbutton has been held for at least 90 seconds, <u>THEN</u> the HPCI "Aux Oil Pump" control switch is placed in "Pull to Lock".
8	Release the "Remote Trip" pushbutton. (Cue: Acknowledge pushbutton operation. The "Remote Trip" pushbutton has been released.)	P	The "Remote Trip" pushbutton has been released.
9	Inform Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report.)	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

TERMINATING CUE

When HPCI is shutdown and the "Aux Oil Pump" is in "Pull to Lock", the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. **HPCI System spuriously initiated on failed -48" HPCI relays.**

2. **The -48" signal to HPCI is still present.**

3. **HPCI operation is not required.**

INITIATING CUE

The Control Room Supervisor directs you to perform a Short Term shutdown of HPCI using SO 23.2.A-2, "HPCI System Shutdown".

PECO Energy Company
Peach Bottom Unit 2

SO 23.2.A-2 HPCI SYSTEM SHUTDOWN

1.0 PURPOSE

This procedure provides instructions to shutdown the HPCI System when system operation is no longer required. Sections are provided for HPCI shutdown with OR without an initiation condition present.

2.0 PREREQUISITES

2.1 HPCI System operation is no longer required OR as directed by TRIP procedures.

2.2 Concurrence of the Senior Licensed Operator (SLO) to secure the system.

2.3 HPCI System in operation.

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

3.2 Monitor Reactor water level AND pressure, AND primary containment temperatures AND pressure from multiple indications.

3.3 IF the Aux Oil Pump, 20P026, is left running after the turbine is shutdown AND the HPCI System subsequently initiates, THEN a high steam flow isolation may occur. **CM-1**

3.4 Do NOT secure OR place an ECCS in MANUAL Mode unless, by at least two independent indications, (1) misoperation in AUTOMATIC Mode is confirmed, OR (2) adequate core cooling is assured. IF an ECCS is placed in MANUAL Mode, THEN it will NOT initiate automatically. Make frequent checks of the initiating OR controlling parameter. WHEN manual operation is no longer required, THEN restore the system to AUTOMATIC/STANDBY Mode if possible.

3.5 Do NOT throttle the HPCI Turbine below 2200 rpm. A certain minimum speed is required to maintain the stop valve in its open position. Operation at excessively low speeds also positions the governor valve very close to its seat, causing intermittent exhaust flow AND water hammer in the exhaust line. During extended low speed operation, the resulting forces could damage the turbine exhaust line check valves.

4.0 PERFORMANCE STEPS

NOTES

1. Communications shall be available between the control room AND personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects control room instrumentation OR alarms.
2. Section 4.1 provides for HPCI shutdown when an initiation condition is NOT present.
3. Section 4.2 provides for short term HPCI shutdown when an initiation condition IS present. This method should be used when subsequent operation is anticipated.
4. Section 4.3 provides for long term HPCI shutdown when an initiation condition IS present. This method will quickly remove HPCI from service, but results in a system isolation making recovery more difficult. Long term shutdown should only be used when subsequent operation is NOT anticipated.

4.1 HPCI System Shutdown when an Initiation Condition is NOT present. **CM-3**

4.1.1 Verify 23A-S105, "HPCI Manual Initiation" collar in "DISARM".

CAUTION

During HPCI System shutdown, the Aux Oil Pump, 20P026, will NOT automatically start on lowering bearing oil pressure unless an initiation signal is present OR sealed-in. The HPCI "Aux Oil control switch shall be in "START" prior to tripping the turbine.

4.1.2 Verify the "Aux Oil Pump", 20P026, control switch in "START". **CM-2**

4.1.3 Verify "HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on Panel 221 A-2 is clear.

4.1.4 Verify "HPCI DC MOTOR POWER LOSS" alarm on Panel 221 A-1 is clear.

4.1.5 Verify gland seal condenser "Vac Pump", 20K002, control switch in "START". **CM-2**

4.1.6 Depress AND hold the HPCI System "Remote Trip" pushbutton.

4.1.7 Verify "Aux Oil Pump" starts as turbine slows down (1200 - 1500 rpm).

4.1.8 Fully close MO-2-23-14, "Supply."

4.1.9 Close MO-2-23-019, "To Feed Line".

4.1.10 WHEN MO-2-23-14 is fully closed, THEN release the HPCI System "Remote Trip" pushbutton.

4.1.11 IF HPCI is in CST to CST mode, THEN perform the following. Otherwise, proceed to step 4.1.12.

4.1.11.1 Close MO-2-23-021, "Full Flow Test".

4.1.11.2 IF RCIC is NOT in service to the CST, THEN close MO-2-23-024, "Cond Tank Return".

4.1.12 IF HPCI is in the Torus to Torus mode, THEN perform the following:

4.1.12.1 Close MO-2-23-021

4.1.12.2 Close MO-2-23-057

4.1.12.3 Close MO-2-23-058

4.1.12.4 Open MO-2-23-017

CAUTION

The following steps flush the HPCI pump piping to the torus. Do not exceed 14.9' Torus Level.

4.1.12.5 Throttle Open MO-2-23-021 AND Flush 1 ft of CST Water to the Torus.

4.1.12.6 Close MO-2-23-021

4.1.12.7 Close MO-2-23-031

4.1.13 IF a HPCI initiation condition had existed, THEN depress the "HPCI Initiation Signal" reset pushbutton, 23A-S21.

4.1.14 Verify "HPCI RELAYS NOT RESET" alarm on Panel 228 C-5 clear.

4.1.15 Verify open AO-2-23-042 AND AO-2-23-043, "Drain Isol to Mn Cndr".

4.1.16 Locally verify HPCI turbine shaft stopped.

4.1.17 Momentarily place the HPCI "Aux Oil Pump" control switch to "STOP" AND verify the control switch returns to "AUTO".

4.1.18 Shutdown the turbine vibration instrumentation, VBI and VBR 4506, AND mark the recorder chart with the date and time of the HPCI turbine run.

4.1.19 Verify HPCI flow controller in "AUTO" AND set for 5000 gpm.

4.1.20 WHEN torus water temperature is less than 95°F AND Torus Cooling is NOT required to support other plant operations, THEN remove Torus Cooling from service in accordance with SO 10.1.D-2, "RHR System Torus Cooling" AND return to step 4.1.21 of this procedure.

4.1.21 WHEN the HPCI gland seal condenser "Vac Pump" has run for 15 minutes, THEN place the HPCI gland seal condenser "Vac Pump" control switch in "STOP".

4.1.22 IF the Standby Gas Treatment System is NOT operating in support of other plant conditions, THEN Shutdown the Standby Gas Treatment System in accordance with SO 9A.2.A-2, "Standby Gas Treatment System Shutdown Following automatic Initiation" AND return to step 4.1.23 of this procedure.

4.1.23 Verify HPCI System aligned in accordance with SO 23.1.A-2, "HPCI System Alignment for Automatic or Manual Operation".

4.2 Short Term HPCI System Shutdown when an Initiation Condition IS Present. **CM-3**

CAUTION

During HPCI System shutdown, the Aux Oil Pump, 20P026, will NOT automatically start on lowering bearing oil pressure unless an initiation signal is present OR sealed-in. The HPCI "Aux Oil control switch shall be in "START" prior to tripping the turbine.

4.2.1 Verify the "Aux Oil Pump", 20P026, control switch in "START". **CM-2**

4.2.2 Verify "HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on Panel 221 A-2 is clear.

4.2.3 Verify "HPCI DC MOTOR POWER LOSS" alarm on Panel 221 A-1 is clear.

4.2.4 Place the gland seal condenser "Vac Pump" control switch, in "START". **CM-2**

CAUTION

MO-2-23-25, "Min Flow", opens with an initiation signal present AND the HPCI turbine shutdown. This will result in gravity drain of the CST to the Torus if HPCI suction is aligned to the CST.

4.2.5 Depress AND hold the HPCI System "Remote Trip" pushbutton.

4.2.6 WHEN the "Remote Trip" pushbutton has been held for at least 90 seconds, THEN place the HPCI "Aux Oil Pump" control switch in "Pull To Lock".

4.2.7 Release the "Remote Trip" pushbutton.

4.2.8 IF subsequent HPCI injection is desired, THEN perform the following substeps. Otherwise, proceed to step 4.2.9.

4.2.8.1 Place HPCI "Aux Oil Pump" in "AUTO".

4.2.8.2 Verify HPCI flowrate of 5000 gpm on FI-2-23-108.

4.2.8.3 WHEN HPCI operation is no longer required, THEN perform section 4.2 or 4.3 of this procedure as directed by Shift Management.

4.2.9 WHEN the HPCI Initiation condition(s) have cleared AND as directed by Shift Management, THEN perform SO 23.1.A-2, "High Pressure Coolant Injection System Setup for Automatic or Manual Operation".

4.3 Long Term HPCI System Shutdown when an Initiation Condition IS Present. **CM-3**

CAUTION

During HPCI System shutdown, the Aux Oil Pump, 20P026, will NOT automatically start on lowering bearing oil pressure unless an initiation signal is present OR sealed-in. The HPCI "Aux Oil control switch shall be in "START" prior to lowering turbine speed.

4.3.1 Verify the "Aux Oil Pump", 20P026, control switch in "START". **CM-2**

4.3.2 Verify "HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on Panel 221 A-2 clear.

4.3.3 Verify "HPCI DC MOTOR POWER LOSS" alarm on Panel 221 A-1 clear.

4.3.4 Verify gland seal condenser "Vac Pump", 20K002, control switch in "START". **CM-2**

> NOTE
>
> Step 4.3.5 will cause a HPCI System isolation.

4.3.5 Depress the "HPCI Isolation" pushbutton (23A-S27) AND verify the following valves close:

4.3.5.1 MO-2-23-015, "HPCI Steam Isol".

4.3.5.2 MO-2-23-016, "HPCI Steam Isol".

4.3.5.3 AO-4807, "Heatup Bypass".

4.3.5.4 HPCI turbine tripped AND HPCI stop valve closed.

4.3.5.5 AO-2-23-138, "Exh Line Drain Isol".

4.3.5.6 MO-2-23-025, "Min Flow".

4.3.5.7 MO-2-23-057, "Torus Suct Outboard".

4.3.5.8 MO-2-23-058, "Torus Suct Inboard".

> NOTE
>
> HPCI System is now isolated AND will NOT auto initiate.

4.3.6 Locally verify the HPCI turbine shaft has completely stopped.

4.3.7 Place the HPCI "Aux Oil Pump" control switch in "PULL TO LOCK".

4.3.8 IF subsequent HPCI operation is required, THEN perform SO 23.7.C-2, "HPCI System Recovery from System Isolation or Turbine Trip". Do NOT return to this procedure.

4.3.9 IF long term isolation of the HPCI System is necessary, AND sufficient time has passed to allow cooling of the turbine steam exhaust lines, THEN close MO-4245, "Vac Breaker".

4.3.10 Shutdown the turbine vibration instrumentation, VBI and VBR 4506, AND mark the recorder chart with the date and time of the HPCI turbine run.

4.3.11 Verify HPCI Flow controller in "AUTO" AND set for 5000 gpm.

4.3.12 WHEN torus water temperature is less than 95°F AND Torus Cooling is NOT required to support other plant operations, THEN remove Torus Cooling from service in accordance with SO 10.1.D-2, "RHR System Torus Cooling" AND return to step 4.3.13 of this procedure.

4.3.13 WHEN the HPCI gland seal condenser "Vac Pump" has run for 15 minutes, THEN stop the pump by placing it's control switch in "PULL TO LOCK".

4.3.14 IF the Standby Gas Treatment System is NOT operating in support of other plant conditions, THEN Shutdown the Standby Gas Treatment System in accordance with SO 9A.2.A-2, "Standby Gas Treatment System Shutdown Following automatic Initiation" AND return to step 4.3.15 of this procedure.

4.3.15 WHEN the HPCI initiation condition(s) have cleared AND as directed by Shift Management, THEN perform SO 23.7.C-2, "HPCI System Recovery From System Isolation or Turbine Trip".

5.0 CONTROL STATIONS

5.1 Panel 20C004B.

5.2 HPCI Pump Room.

6.0 REFERENCES

6.1 P&ID 6280-M-365 and 6280-M-366

6.2 6280-M-1-S-36 sheets 1 through 16

6.3 GE Drawing M-1-CC-14 through 16

6.4 GEK 9684 Volume IX, Part 1
GEK 9684 Volume V

6.5 CM-1, INPO SER 26-87 (CT T00414)

6.6 CM-2, IE Bulletin 80-06, "Engineered Safety Feature Reset Controls" (CT T00825)

6.7 CM-3, ISEG ER-34, (CT T00014)

6.8 TRMS 3.11

7.0 TECHNICAL SPECIFICATIONS

7.1 Section 3.3.5.1

7.2 Table 3.3.5.1.1

7.3 Section 3.5.1

7.4 Section 3.6.2.1

7.5 Section 3.6.2.2

7.6 Section 3.6.4.3

8.0 INTERFACING PROCEDURES

8.1 SO 9A.2.A-2 "Standby Gas Treatment System Shutdown Following Automatic Initiation"

8.2 SO 10.1.D-2 "RHR System Torus Cooling"

8.3 SO 23.1.A-2 "High Pressure Coolant Injection System Setup for Automatic or Manual Operations"

8.4 SO 23.7.C-2 "HPCI System Recovery from System Isolation or Turbine Trip"

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2230020101 / NEW-DWVENT K/A: 223001

URO: 4.2 SRO: 4.3

TASK DESCRIPTION: Drywell Venting via the 2" Vent

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

Procedure SO 7B.3.A-2, Rev. 9, "CONTAINMENT ATMOSPHERE PRESSURE CONTROL AND NITROGEN MAKEUP"

D. TASK STANDARD

1. Satisfactory task completion is indicated when drywell venting has been initiated.

2. Estimated time to complete: 10 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to initiate drywell venting via the 2" vent using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. Drywell pressure is 1 psig and going up slowly.

2. OT-101 has directed that the drywell be vented in accordance with SO 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup".

3. The primary containment has been inerted in accordance with SO 7B.1.A-2, "Containment Atmosphere Inerting".

4. Drywell and Torus Hydrogen/ Oxygen Sampling system is in operation in accordance with SO 7J.1.A-2, "Drywell and Torus H2/O2 Sampling System Startup and Normal Operation CAC Mode".

5. Drywell Ventilation System is in operation in accordance with SO 40C.1.A-2, "Drywell Ventilation System Startup and Normal Operations".

6. SBGT is currently operating on the 'A' Fan and the 'A' Train.

7. The Drywell Radiation Monitors are in service and being monitored by the STA.

8. The Main Stack Radiation Monitors are in service and being monitored by the STA.

9. Stack Dilution fans are in operation in accordance with SO 8.7.A, "Off-Gas Dilution Fan Operation".

10. Primary Containment Isolation System is reset in accordance with GP-8B, "PCIS Isolation - Group II & III".

11. Management has determined that COL 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup", is not required.

G. INITIATING CUE

The Control Room Supervisor directs you to maximize venting the drywell via the 2" vents in accordance with SO 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup" to lower drywell pressure.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure SO 7B.3.A-2.	P	A copy of procedure SO 7B.3.A-2 is obtained.
*2	Verify PR/RR-2-02-3-404B, "Reactor Pressure/Drywell Rad Gas Recorder" is <3.45 E-3 uCi/cc. (Cue: PR/RR-2-02-3-404B is reading 2 E-3 uCi/cc)	P	The candidate verifies that PR/RR-2-02-3-404B, "Reactor Pressure/Drywell Rad Gas Recorder" on panel 20C003 is indicating <3.45 E-3 uCi/cc.
2	Check open AO-2509, "Drywell Vent Inbd 2" Vent". (Cue: AO-2509 red light is lit, green light is out.)	P	AO-2509 red light is verified on.
*3	Open AO-2510, "Drywell Vent Outbd 2" Vent". (Cue: Acknowledge switch operation.)	P	AO-2510 switch is taken to open.
4	Verify AO-2510 is open. (Cue: AO-2510 red light is lit, green light is out.)		The AO-2510 red light is verified ON.
*5	Open CV-4957, "Drywell Bleed Flow", using manual control HCS-4957 to set the desired flowrate. (Cue: Acknowledge controller operation. HCS-4957 is indicating full open)	P	HCS-4957 is used to fully open CV-4957 to maximize venting via the 2" vents.
6	Inform Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report.)	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When drywell venting via the 2" vents has been established, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. Drywell pressure is 1 psig and going up slowly.

2. OT-101 has directed that the drywell be vented in accordance with SO 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup".

3. The primary containment has been inerted in accordance with SO 7B.1.A-2, "Containment Atmosphere Inerting".

4. Drywell and Torus Hydrogen/ Oxygen Sampling system is in operation in accordance with SO 7J.1.A-2, "Drywell and Torus H2/O2 Sampling System Startup and Normal Operation CAC Mode".

5. Drywell Ventilation System is in operation in accordance with SO 40C.1.A-2, "Drywell Ventilation System Startup and Normal Operations".

6. SBGT is currently operating on the 'A' Fan and the 'A' Train.

7. The Drywell Radiation Monitors are in service and being monitored by the STA.

8. The Main Stack Radiation Monitors are in service and being monitored by the STA.

9. Stack Dilution fans are in operation in accordance with SO 8.7.A, "Off-Gas Dilution Fan Operation".

10. Primary Containment Isolation System is reset in accordance with GP-8B, "PCIS Isolation - Group II & III".

11. Management has determined that COL 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup", is not required.

INITIATING CUE

The Control Room Supervisor directs you to maximize venting the drywell via the 2" vents in accordance with SO 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup" to lower drywell pressure.

PECO Energy Company
Peach Bottom Unit 2

SO 7B.3.A-2 CONTAINMENT ATMOSPHERE PRESSURE CONTROL AND NITROGEN MAKEUP

1.0 PURPOSE

This procedure provides the instructions necessary to vent and to makeup to the primary containment to maintain drywell pressure between 0.25 to 0.75 psig, and O_2 concentration less than 3% in the drywell, and less than 1% in the torus.

2.0 PREREQUISITES

2.1 Primary containment inerted in accordance with SO 7B.1.A-2, "Containment Atmosphere Inerting".

2.2 Drywell and Torus Hydrogen/Oxygen Sampling system in operation in accordance with SO 7J.1.A-2, "Drywell and Torus H_2/O_2 Sampling System Startup and Normal Operation CAC Mode".

2.3 Drywell Ventilation System in operation in accordance with SO 40C.1.A-2, "Drywell Ventilation System Startup and Normal Operations".

2.4 IF venting of the containment is required, THEN:

2.4.1 SBGT System available in accordance with SO 9A.1.A, "Standby Gas Treatment System Lineup for Automatic Operation".

2.4.2 Drywell Radiation Monitors in operation.

2.4.3 Main Stack Radiation Monitors in operation.

2.4.4 Stack Dilution fans in operation in accordance with SO 8.7.A, "Off-Gas Dilution Fan Operation".

2.4.5 Primary Containment Isolation System reset in accordance with GP-8B, "PCIS Isolation - Group II & III".

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

3.2 Monitor drywell radiation levels and Main Stack radiation levels while venting the primary containment. IF any rise in radiation levels is observed, THEN stop venting AND notify Chemistry, unless directed by OT-101, "High Drywell Pressure".

3.3 Pressure at DPI-8143, Drywell/Torus Diff "P", should be maintained between 0 to 0.25 psid.

4.0 PERFORMANCE STEPS

NOTE
Communications shall be available between the Control Room AND Personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation OR alarms.

4.1 Perform COL 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup", as directed by Shift Management.

4.2 IF venting the drywell is required, THEN perform the following:

4.2.1 Verify PR/RR-2-02-3-404B, "Reactor Pressure/ Drywell Rad Gas Recorder", < 3.45 X 10^{-3} µCi/cc on Panel 20C003. (Refer to ST-C-095-819-2, "Drywell Atmosphere Radiation Monitor Operational And Surveillance Log").

4.2.2 Startup the Standby Gas Treatment (SBGT) system in accordance with SO 9A.1.B, "Standby Gas Treatment System Manual Startup", AND return to step 4.2.3 of this procedure.

4.2.3 Check open AO-2509, "Drywell Vent Inbd 2" Vent" on Panel 20C484B, "CAD".

4.2.4 Open AO-2510, "Drywell Vent Outbd 2" Vent" on Panel 20C484B, "CAD".

4.2.5 Open CV-4957, "Drywell Bleed Flow", using manual control HCS-4957 to set desired flow on Panel 20C484B.

4.2.6 WHEN pressure at PR-2508, Drywell "P", on Panel 20C003-03 is between 0.25 to 0.75 psig, THEN close AO-2510 on Panel 20C484B.

4.2.7 Close CV-4957 using HCS-4957 on Panel 20C484B.

4.2.8 Return SBGT System to standby operation in accordance with SO 9A.2.B, "Standby Gas Treatment System Shutdown Following Manual Start", AND return to step 4.3 of this procedure.

4.3 <u>IF</u> nitrogen addition to containment is required due to low containment pressure, <u>THEN</u> perform the following:

4.3.1 Verify Containment Atmosphere Control (CAC) System operating in accordance with SO 7B.1.B, "CAC Nitrogen Storage System Startup/Operation High Flow Mode", <u>OR</u> SO 7B.1.C, "CAC Nitrogen Storage System Startup/Operation Low Flow Mode".

<u>NOTE</u>

1. Maximum flowrate for Water Bath Vaporizer 00S216 is 3200 scfm.
2. Maximum flowrate for Ambient Vaporizers 00S492 & 00S493 is 100 scfm

4.3.2 Open AO-2523, "D/W & Torus N2 Make-up Inlet", on Panel 20C003-03.

4.3.3 <u>WHEN</u> flow is started, <u>THEN</u> perform SO 7B.8.B, "CAC Nitrogen Storage System Routine Inspection", concurrently with this procedure.

4.3.4 Verify makeup flow on FR-2522, N2 Makeup "F" on Panel 20C003-03.

4.3.5 <u>WHEN</u> pressure at PR-2508, Drywell "P", is between 0.25 to 0.75 psig, <u>THEN</u> close AO-2523 on Panel 20C003-03.

4.4 <u>IF</u> nitrogen addition to containment is required to reduce drywell O_2 concentration to less than 3%, <u>THEN</u> perform the following:

4.4.1 Verify the Containment Atmosphere Control (CAC) System operating in accordance with SO 7B.1.B, "CAC Nitrogen Storage System Startup/Operation High Flow Mode", <u>OR</u> SO 7B.1.C, "CAC Nitrogen Storage System Startup/Operation Low Flow Mode".

<u>NOTE</u>

Both Primary Containment H_2/O_2 Analyzer are placed in operation to maximize sampling capability during O_2 concentration reduction.

4.4.2 Place standby analyzer XIC-80411A(B), "A(B) CAC/CAD Analyzer" in operation in accordance with SO 7J.7.C-2, "Placing Drywell and Torus H_2/O_2 Sampling System in Standby Mode and Removing From Standby Mode" <u>AND</u> return to step 4.4.3 of this procedure.

4.4.3 Verify PR/RR-2-02-3-404B, "Reactor Pressure/ Drywell Rad Gas Recorder", < 3.45 X 10^{-3} µCi/cc on Panel 20C003. (Refer to ST-C-095-819-2 , "Drywell Atmosphere Radiation Monitor Operational And Surveillance Log").

4.4.4 Startup the SBGT System in accordance with SO 9A.1.B, "Standby Gas Treatment System Manual Startup", <u>AND</u> return to step 4.4.5 of this procedure.

4.4.5 Direct an operator to close HV-2-7B-40123B, "N2 Makeup Isolation to Torus Purge Valve".

4.4.6 Monitor Drywell sample points on Panels 20C484A <u>AND</u> 20C484B using the "7" key on XIC-80411A(B) to advance sample points as required.

POINT	SAMPLE LOCATION	ANALYZER
SV 3	Drywell Exhaust	XIC-80411A
SV 4	Upper Drywell	XIC-80411A
SV 5	Lower Drywell	XIC-80411A
SV 3	Middle Drywell	XIC-80411B

4.4.7 Verify open AO-2509, "Drywell Vent Inbd 2" Vent", on Panel 20C484B.

NOTE

1. Maximum flowrate for Water Bath Vaporizer 00S216 is 3200 scfm.
2. Maximum flowrate for Ambient Vaporizers 00S492 & 00S493 is 100 scfm.

4.4.8 Open AO-2523, "D/W & Torus N2 Makeup Inlet", on Panel 20C003-03.

4.4.9 <u>WHEN</u> flow is started, <u>THEN</u> perform SO 7B.8.B, "CAC Nitrogen Storage System Routine Inspection", concurrently with this procedure.

4.4.10 Verify makeup flow on FR-2522, N2 Makeup "F", on Panel 20C003-03.

4.4.11 Open AO-2510, "Drywell Vent Outbd 2" Vent" on Panel 20C484B.

4.4.12 Open CV-4957, "Drywell Bleed Flow", using manual control HCS-4957 on Panel 20C484B to maintain pressure at PR-2508, Drywell "P", between 0.25 to 0.75 psig on Panel 20C003-03.

4.4.13 WHEN drywell O_2 concentration at XIC-80411A AND B are between 1.5% to 3.0%, THEN close AO-2523 on Panel 20C003-03.

4.4.14 Close AO-2510 on Panel 20C484B.

4.4.15 Close CV-4957 using HCS-4957 on Panel 20C484B.

4.4.16 Direct an operator to open HV-2-7B-40123B, "N_2 Makeup Isolation To Torus Purge Valve".

4.4.17 Return the SBGT system to standby operation in accordance with SO 9A.2.B, "Standby Gas Treatment System Shutdown Following Manual Start", AND return to step 4.4.18 of this procedure.

NOTES

1. Either Primary Containment H_2/O_2 Analyzer may be left in operation at the discretion of Shift Management. Redundant analyzer should be placed in standby. XIC-80411A is the preferred in service analyzer due to better sampling flexibility.

2. IF nitrogen addition to containment is required in section 4.5 to reduce Torus O_2 concentration, THEN both analyzers may be left in operation until completion of section 4.5.

4.4.18 IF XIC-80411A(B) is to be placed in standby, THEN perform SO 7J.7.C-2, "Placing Drywell and torus H_2/O_2 Sampling System in Standby Mode and Removing From Standby Mode", AND return to step 4.5 of this procedure.

4.5 **IF nitrogen addition to containment is required to reduce torus O_2 concentration to less than 1%, THEN perform the following.**

4.5.1 Verify Containment Atmosphere Control (CAC) System operations in accordance with SO 7B.1.B, "CAC Nitrogen Storage System Startup/Operation High Flow Mode", OR SO 7B.1.C, "CAC Nitrogen Storage System Startup/Operation Low Flow Mode".

NOTE

Both Primary Containment H_2/O_2 Analyzers are placed in operation to maximize sampling capability during O_2 concentration reduction.

4.5.2 IF NOT already in operation, THEN place standby analyzer XIC-80411A(B), "A(B) CAC/CAD Analyzer" in operation in accordance with SO 7J.7.C-2, "Placing Drywell and Torus H_2/O_2 Sampling System in Standby Mode and Removing From Standby Mode", AND return to step 4.5.3 of this procedure.

4.5.3 Direct an operator to verify RIS-4132, "D/W Leak Detec Rad Gas", < 3.45 X 10^{-3} µCi/cc on Panel 20C200, "D/W Radioactive Gas Sampler". (Refer to ST-C-095-819-2)

4.5.4 Startup the SBGT System in accordance with SO 9A.1.B,"Standby Gas Treatment System Manual Startup" AND return to step 4.5.5 of this procedure.

4.5.5 Direct an operator to close HV-2-7B-40123A, "N_2 Makeup Isolation to Drywell Purge Valve".

4.5.6 Monitor Torus sample points on Panels 20C484A AND 20C484B using the "7" key on XIC-80411A(B) to advance sample points as required.

POINT	SAMPLE LOCATION	ANALYZER
SV 10	Middle Torus	XIC-80411A
SV 4	Upper Torus	XIC-80411B
SV 5	Torus Exhaust	XIC-80411B

NOTE

1. Maximum flowrate for Water Bath Vaporizer 00S216 is 3200 scfm.
2. Maximum flowrate for Ambient Vaporizers 00S492 & 00S493 is 100 scfm.

4.5.7 Open AO-2523, "D/W & Torus N2 Makeup Inlet", on Panel 20C003-03.

4.5.8 WHEN flow is started, THEN perform SO 7B.8.B, "CAC Nitrogen Storage System Routine Inspection", concurrently with this procedure.

4.5.9 Verify makeup flow on FR-2522, N_2 Makeup "F", on Panel 20C003-03.

4.5.10 Open AO-2513, "Torus Vent Inbd 2" Vent", AND AO-2514, "Torus Vent Outbd 2" Vent".

4.5.11 Open CV-4954, "Torus Bleed Flow", using manual control HCS-4954 on Panel 20C484A to maintain pressure at PR-2508, Drywell "P", between 0.25 to 0.75 psig on Panel 20C003-03.

4.5.12 WHEN torus O_2 concentration at XIC-80411A AND B are less than 1%, THEN close AO-2523 on Panel 20C003-03.

4.5.13 Close AO-2513 AND AO-2514 on Panel 20C484A.

4.5.14 Close CV-4954 using HCS-4954 on Panel 20C484A.

4.5.15 Direct an operator to open HV-2-7B-40123A, "N_2 Makeup Isolation To Drywell Purge Valve".

4.5.16 Return the SBGT system to standby operation in accordance with SO 9A.2.B, "Standby Gas Treatment System Shutdown Following Manual Start".

NOTE

Either Primary Containment H_2/O_2 Analyzer may be left in operation at the discretion of Shift Management. Redundant analyzer should be placed in standby. XIC-80411A is the preferred in service analyzer due to better sampling flexibility.

4.5.17 IF XIC-80411A(B) is to be placed in standby, THEN perform SO 7J.7.C-2, "Placing Drywell and Torus H_2/O_2 Sampling System in Standby Mode and Removing From Standby Mode".

5.0 CONTROL STATIONS

5.1 MCR 20C003-03, Containment Atmosphere panel

5.2 MCR 20C484A, CAD panel

5.3 MCR 20C484B, CAD panel

5.4 MCR 20C012, Plant Services panel

6.0 REFERENCES

6.1 P&ID M-367, Containment Atmosphere Control System

6.2 P&ID M-391, Primary & Secondary Containment Isolation Control Diagram

6.3 P&ID M-397, Standby Gas Treatment Control Diagram

6.4 P&ID M-372, Containment Atmosphere Dilution System

6.5 M-1-S-23, Primary Containment Isolation System

6.6 E-28, Instrumentation & Uninterruptible AC Unit 3

6.7 ST-C-095-819-2, "Drywell Atmosphere Radiation Monitor Operational and Surveillance Log"

6.8 Letter to MJC from ECK dated 8/27/76, "Torus Corrosion Protection"

6.9 Offsite Dose Calculation Manual

7.0 TECHNICAL SPECIFICATIONS

7.1 Section 3.3.3.1

7.2 Section 3.6.3.1

7.3 Section 3.6.3.2

7.4 Section 3.6.4.3

8.0 INTERFACING PROCEDURES

8.1 COL 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup"

8.2 SO 7B.1.B, "CAC Nitrogen Storage System Startup/Operation High Flow Mode"

8.3 SO 9A.1.B, "Standby Gas Treatment System Manual Startup"

8.4 SO 9A.2.B, "Standby Gas Treatment System Shutdown Following Manual Start"

8.5 SO 7B.1.C, "CAC Nitrogen Storage System Startup/Operation Low Flow Mode"

8.6 ST-C-095-819-2, "Drywell Atmosphere Radiation Monitor Operational and Surveillance Log"

8.7 SO 7B.8.B, "CAC Nitrogen Storage System Routine Inspection"

8.8 SO 7J.7.C-3, "Placing Drywell and Torus H_2/O_2 Sampling System in Standby Mode and Removing From Standby Mode"

8.9 OT-101, "High Drywell Pressure"

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2640020101 / PLOR-318CA K/A: 264000A4.04
URO: 3.7 SRO: 3.7

TASK DESCRIPTION: Diesel Generator Fast Start from the Control Room – (Alternate Path ESW Pumps Fail to Start)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

Procedure SO 52A.1.B Rev. 20, "Diesel Generator Operations"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the diesel is running and ESW has been manually started.

2. Estimated time to complete: 17 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to Fast Start the E-4 Diesel Generator using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. E-4 Diesel Generator available for operation in accordance with SO 52A.1.A, "Diesel Generator Lineup for Automatic Start"

2. Equipment Operators are standing by in the E-4 D/G Room.

3. GP-23 "Diesel Generator Inoperable", has been reviewed.

G. INITIATING CUE

The Control Room Supervisor directs you to Fast Start the E-4 Diesel Generator in accordance with steps 4.3.1 through 4.3.11 of SO 52A.1.B, "Diesel Generator Operations".

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure SO 52A.1.B.	P	A copy of procedure SO 52A.1.B is obtained.
2	Direct Equipment Operator to perform pre-start inspection for fast start of E-4 D/G per SO 52A.1.B, step 4.3.1. (Cue: Report pre-start checks for E-4 D/G are complete per SO 52A.1.B, step 4.3.1.)	P	Equipment Operator is contacted to perform pre-start inspection for E-4 D/G per SO 52A.1.B, step 4.3.1.
*3	Start the E-4 diesel generator by momentarily taking the "START MODE" switch (143-DG12) to "MAN" and the "START-STOP" switch (101-DG12) to "START". (Cue: Acknowledge control switch operation.)	P	Turn and hold "Start Mode" switch (143-DG12) to "MAN" and "Start-Stop" switch (101-DG12) to "START" then release both switches at panel 00C026D.
4	Verify E-4 diesel start after 3 minute prelube. (Cue: 3 minutes for prelube then E-4 D/G volts 4.28 KV, E-4 D/G Frequency 60 Hz and annunciator 005 F-4 is alarming.)	P	Wait 3 minutes then verify E-4 Diesel Frequency 58.8 - 61.2 Hz, and E-1 Diesel volts 4.16 - 4.40 KV at panel 00C026D.
5	Acknowledge the "E-4 DIESEL RUNNING" annunciator. (Cue: Annunciator 005 F-4 is lit solid.)	P	The annunciator "ACKNOWLEDGE" pushbutton is depressed on panel 00C026B.
6	Verify `A' ESW pump start.  (Cue: `A' ESW pump red light <u>NOT</u> lit, green light on; discharge pressure is 0 psig on PI-0236A and motor amps are 0 amps on `A' pump ammeter and annunciator 002 A-5 is not alarming, "A" Emerg. Service Water Header Low Pressure 002D-5 is alarming.)	P	`A' ESW pump red light not lit, discharge pressure is 0 psig on PI-0236A and motor amps are 0 amps on the `A' pump ammeter are verified at panel 00C026B.

STEP NO	STEP	ACT	STANDARD
7	Verify `B' ESW pump start.  (Cue: `B' ESW pump red light NOT lit, green light on; discharge pressure is 0 psig on PI-0236B and motor amps are 0 amps on `B' pump ammeter, "B" Emerg. Service Water Header Low Pressure 004 D-5 is alarming.)	P	`B' ESW pump red light NOT lit, discharge pressure is 0 psig on PI-0236B and motor amps are 0 amps on the `B' pump ammeter are verified at panel 00C026C.
8	Verify ECW pump start. (Cue: ECW pump red light NOT lit, green light on; motor amps are 0 amps on the EM CLG WTR PP ammeter, and annunciator 212 B-2 is not alarming.)	P	ECW pump red light not lit and motor amps are 0 amps on the "EM CLG WTR PP" ammeter are verified at panel 00C026D.
9	Inform the Control Room Supervisor that "A" and "B" ESW pumps and the ECW pump failed to automatically start. (Cue: Control Room Supervisor acknowledges report.)	P	Control Room Supervisor informed of the ESW and ECW failure to start.
*10	Manually start either the "A" or "B" ESW pump. (Cue: Acknowledge control switch operation.)	P	The control switch for either the "A" or "B" ESW pump is rotated clockwise to the start position and allowed to spring return to the neutral position.
11	Verify "A" ("B") ESW pump start. (Cue: "A" ("B") EDW pump red light lit, green light off, discharge pressure is 64 psig on PI-0236 A(B) and motor amps are 28 amps on A(B) pump ammeter.	P	"A" ("B") ESW pump red light lit, and discharge pressure is 25 to 64 psig on PI-0236A(B) and motor amps are 22 to 32 amps on the "A" ("B") pump ammeter are verified at panel OOC026B(C).
	NOTE The ECW pump will not start if attempted.		
12	Inform the Control Room Supervisor that the "A" ("B") ESW pump has been started. (Cue: Control Room Supervisor acknowledges report.)	P	Control Room Supervisor informed that cooling water has been established to the E-4 Diesel Generator.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

After the E-4 D/G has been fast started in accordance with Steps 4.3.1 through 4.3.4 of SO 52A.1.B, "Diesel Generator Operations" and cooling water has been manually established using the A or B ESW pump, the evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. E-4 Diesel Generator available for operation in accordance with SO 52A.1.A, "Diesel Generator Lineup for Automatic Start"

2. Equipment Operators are standing by in the E-4 D/G Room.

3. GP-23 "Diesel Generator Inoperable", has been reviewed.

INITIATING CUE

The Control Room Supervisor directs you to Fast Start the E-4 Diesel Generator in accordance with steps 4.3.1 through 4.3.11 of SO 52A.1.B, "Diesel Generator Operations".

PECO Energy Company
Peach Bottom Units 2 and 3

SO 52A.1.B DIESEL GENERATOR OPERATIONS

1.0 PURPOSE

This procedure provides the instructions necessary to operate the emergency diesel generator in its most commonly used operating modes. It includes slow starting the diesel generator (the preferred method for non-emergency starts), synchronization and loading as for surveillance testing/routine testing, synchronization and transferring of 4KV breakers and shutting down.

This procedure is divided into sections which can be performed separate from the rest of the procedure according to demand and existing conditions.

2.0 PREREQUISITES

2.1 Emergency Diesel Generator System available for operation in accordance with SO 52A.1.A, "Diesel Generator Lineup for Automatic Start". **CM-1**

2.2 Equipment Operator stationed in the diesel generator building to perform operational steps as directed by the control room operators.

2.3 GP-23 "Diesel Generator Inoperable", has been reviewed. Use of this procedure makes the associated diesel generator inoperable.

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

3.2 Notify the main control room if the CARDOX System for the diesel generator building is to be disabled. Do NOT disable the CARDOX System for greater than 15 minutes, without the approval from Shift Management.

3.3 IF the activity for which the CARDOX System was defeated is still in progress 15 minutes after the defeat switch was placed in defeat, THEN immediate arrangements shall be made to provide a fire watch in accordance with the Technical Requirements Manual within one hour after the defeat switch was originally placed in defeat.

3.4 IF severe engine vibrations OR unusual noises occur, THEN the diesel should be immediately unloaded AND shutdown, until the cause can be determined AND corrected.

3.5 Limit the amount of time the engine is operated at no-load or low load conditions. Excessive operation at no-load or low load will cause oil to build up in the exhaust piping leading to smoke and possibly fire. The engine should be loaded within 10 minutes of EDG start to minimize the accumulation of oil in the manifolds.

3.6 IF an emergency condition exists (MCA or dead bus), THEN the following actions will occur automatically:

3.6.1 Both associated output breakers will trip.

3.6.2 The governor and voltage regulator will convert to isochronous mode (Unit). Speed will increase depending on initial load and the amount of droop in the governing system. Manual control of the governor and voltage regulator is lost when in isochronous mode.

3.6.3 The governor motor operated potentiometer (MOP) and the regulator motor operated controller (MOC) go to their center position.

3.7 IF a Dead Bus condition exists, THEN diesel generator output breaker will anti-pump lockout. To reset the breaker anti-pumping device, the breaker control switch must be placed in "TRIP" and back to "CLOSE" following verification of no over current condition.

3.8 IF an RHR pump breaker trips on anti-pumping, THEN to reset the breaker anti-pumping device, the breaker control switch must be placed in "TRIP" and back to "CLOSE" following verification of no over current condition.

3.9 A modified LPCI Pump start (immediate pump start instead of the pump start after 2 or 8 seconds) may occur following a LOCA signal, with offsite power available and the EDG output breaker closed.

3.10 The Cooling Tower Lift Pumps should NOT be started while an EDG is running. This precaution will eliminate the potential for tripping of the 4KV bus feeder breaker, thus isolating the EDG, leaving it to supply the 4KV bus alone.

3.11 IF system grid problems are anticipated by System Operations, diesel generator testing should not be performed.

3.12 IF electrical transients or grid problems occur with the EDG in Test, diesel generator output current shall be monitored closely. The 4KV bus feeder breaker shall be opened if the current output increases above specified test values.

4.0 PERFORMANCE STEPS

NOTES

1. Communication should be available between the control room AND personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects control room instrumentation OR alarms.

2. The following sections may be performed individually without performing the entire procedure:

   o Section 4.1, Diesel Generator Slow Start

   o Section 4.2, Diesel Generator Synchronization and Loading

   o Section 4.3, Diesel Generator Fast Start

   o Section 4.4, 4KV Switchgear Manual Transfer

   o Section 4.5, Diesel Generator Shutdown

4.1 Diesel Generator Slow Start

4.1.1 Direct the operator to perform the following as a pre-start inspection:

CAUTION

Improper governor oil level may cause erratic engine operation and damage to the governor

4.1.1.1 Verify governor oil level LG-7575A(B)(C)(D) above the black line AND below the top of the sightglass. **CM-7**

4.1.1.2 Check the engine crankcase oil level +3" to -2" on the upper scribe mark on the dipstick.

4.1.1.3 Verify proper generator bearing oil level at LG-7568A(B)(C)(D). **CM-7**

4.1.1.4 Verify coolant expansion tank level LG-0610A(B)(C)(D) between the green and yellow rings on the sightglass. Notify the system manager if coolant is added.

4.1.1.5 Verify control rod pin is engaged with adjuster collar, on each fuel injection pump. (See Figure 1).

****

CAUTION

The DG will NOT start unless at least 1 minute has passed since the last attempt to start the diesel, OR since the diesel was shutdown, due to the governor shutdown solenoid being energized to stop.

****

4.1.2 Direct the operator to place the Voltage Shutdown Reset Selector Switch located on the Engine Generator Panel 0A(B,C,D)C097 to "OFF".

4.1.3 Verify "E1(E2)(E3)(E4) DIESEL NOT IN AUTO" alarms.

4.1.4 Direct the operator to verify the AS FOUND setpoint of the governor actuator speed knob as indicated in the window marked "SPEED" combined with the governor actuator speed knob pointer agrees approximately with the values below:

- o E1 21.34
- o E2 21.24
- o E3 20.36
- o E4 20.68

4.1.5 Direct the operator to set the governor actuator speed knob to between 2 and 3 as indicated in the window marked "SPEED".

4.1.6 Start the diesel generator by performing the following:

4.1.6.1 Turn AND hold the "Start Mode" selector switch to "MAN" AND turn the "Start-Stop" switch to "START".

4.1.7 Release the "Start-Stop" AND "Start Mode" switches.

4.1.8 Direct the operator to verify the "E1(E2)(E3)(E4) D/G Lube Oil Pre-Lube Pump" 0AP173 (0BP173) (0CP173)(0DP173) starts.

4.1.9 Check the diesel generator starts approximately 3 minutes after the start of the pre-lube sequence. **CM-2**

NOTE

On a diesel generator start, the A ESW, B ESW AND ECW Pumps receive an auto start signal.

CAUTION

Cooling Water is required for diesel generator operation.

4.1.10 Verify ESW Pumps A AND B started.

4.1.10.1 Check pump discharge pressure PI-0236A AND B, "DISCH PRESS", 25 to 64 psig.

4.1.10.2 Check pump motor current "AMPS" 22 to 32 amps.

4.1.11 Red Flag the ESW Pump selected to remain in service.

4.1.12 Shutdown the remaining ESW Pump.

4.1.13 Verify ECW Pump automatically shuts down.

4.1.14 Direct an operator to slowly raise engine speed by continually rotating the governor actuator speed knob until it is at the AS FOUND setpoint specified in step 4.1.4 of this procedure.

4.1.15 Verify "E1(E2)(E3)(E4) DIESEL RUNNING" alarms.

NOTE

The "GENERATOR LOSS OF FIELD" alarm may come in at the local control panel AND can not be reset until the field is flashed.

4.1.16 Direct the operator to return the Voltage Shutdown Reset Selector Switch to "ON" to cause field flashing.

4.1.17 Verify "E1(E2)(E3)(E4) DIESEL NOT IN AUTO" clears.

4.1.18 Verify diesel generator running at rated frequency (58.8 to 61.2 Hz) and voltage (4.16 to 4.40KV).

4.1.19 Direct an operator to verify ESW flow to the diesel by verifying AO-0-33-0241A(B)(C)(D), "ESW Outlet Block Valve From Diesel Gen E1(2)(3)(4)" OPEN.

4.1.20 Direct an operator to rotate "T" handle on BS-0570A(B)(C)(D), "E1(E2)(E3)(E4) D/G Fuel Oil Pumps Suction Strnr".

4.1.21 Direct an operator to verify proper generator bearing oil level at LG-7568A(B)(C)(D). **CM-7**

4.1.22 Adjust engine speed AND generator output voltage as required, using the applicable control switch(es) below.

- o Engine speed - "GOVERNOR" control switch
- o Generator output voltage - "AUTO VOLT REG" control switch

4.2 Diesel Generator Synchronization and Loading

****

CAUTION

Limit the amount of time the engine is operated at no-load or low load conditions. The engine should be loaded within 10 minutes of EDG start to minimize the accumulation of oil in the manifolds.

****

4.2.1 Verify diesel generator is running in accordance with Section 4.1 of this procedure.

4.2.2 Verify diesel generator running at rated frequency (58.8 to 61.2 Hz) and voltage (4.16 to 4.40KV).

NOTES

1. It is good practice to alternate use of the D/G output breakers from test to test.
2. Preferred Off-site Source for 2SUE is 2SU XFMR 00X003 with 3SU XFMR 00X005 as alternate. Preferred Off-site Source for 3SUE is 343SU XFMR 00X011 with 3SU XFMR 00X005 as alternate.

4.2.3 Place the applicable "BKR SYNC" switch in "ON".

° E12	° E22	° E32	° E42
° E13	° E23	° E33	° E43

4.2.4 Verify speed and voltage control of diesel generator as follows:

4.2.4.1 Operate the "GOVERNOR" control switch to:

- "RAISE" frequency to 0.5 Hz above the initial value.
- "LOWER" frequency to 0.5 Hz below the initial value.
- "RAISE" frequency to return to initial value.

4.2.4.2 Operate the "AUTO VOLT REG" control switch to:

- "RAISE" voltage to 50 volts above the initial value.
- "LOWER" voltage to 50 volts below the initial value.
- "RAISE" voltage to return to initial value.

4.2.5 Check both synchronizing lights for proper operation as follows:

- Both lights "ON" when synchroscope is at "Bottom Dead Center"
- Both lights "OFF" when synchroscope is at "Top Dead Center"

4.2.6 Adjust diesel generator speed, using the "GOVERNOR" control switch, to make the synchroscope rotate slowly in the "FAST" direction.

CAUTION

Diesel generator voltage should be slightly higher, about 50 volts, but no more than 100 volts higher than bus voltage while synchronizing to avoid damage to the generator.

4.2.7 Adjust diesel generator "INCOMING" voltage so that it is slightly higher than "RUNNING" bus voltage by using the "AUTO VOLT REG" control switch.

4.2.8 Verify the synchroscope is still rotating slowly in the "FAST" direction.

> **NOTE**
>
> The diesel generator is considered synchronized, when the following conditions are met:
>
> - o Diesel generator "INCOMING" voltage slightly higher than "RUNNING" bus voltage. **CM-4**
> - o Synchroscope rotating slowly in the "FAST" direction.
> - o Synchroscope within 13 degrees of "Top Dead Center".

CAUTION

Perform step 4.2.10 immediately after completing step 4.2.9 to prevent "motoring" the diesel generator.

4.2.9 WHEN the diesel generator is synchronized with the 4KV emergency bus, THEN close breaker E12 (E13) (E22) (E23) (E32) (E33) (E42) (E43).

4.2.10 Pickup 200 to 300 KW of load on the diesel generator by turning the "GOVERNOR" control switch to "RAISE". Pickup 100 KVAR by turning the "AUTO VOLT REG" control switch to "RAISE".

4.2.11 Place the applicable "BKR SYNC" switch in "OFF".

o E12	o E22	o E32	o E42
o E13	o E23	o E33	o E43

> **NOTE**
>
> Loading the diesel generator shall proceed at a rate NOT to exceed 300 KW/min. **CM-3**

4.2.12 Check generator output voltage and generator amperage for all three phases.

4.2.13 Pickup the desired load to be carried by the diesel generator as follows:

4.2.13.1 Turn the "GOVERNOR" control switch to "RAISE".

CAUTION

Do NOT allow the KVAR value to exceed 75% of the KW value, to assure that the generator 0.8 power factor will NOT be exceeded.

4.2.13.2 Maintain the KW/KVAR ratio, by operating the "AUTO VOLT REG" control switch.

NOTES

1. IF the D/G is run above 2600 KW, THEN the Plant Reactor Operator shall log the load and duration of the run.

2. The maximum load to be carried by the diesel generator for continuous operations is 2600 KW. The diesel may be run at loads greater than 2600 KW, but less than 3250 KW in accordance with the following table: **CM-5, CM-6**

o 2600 KW	Continuous
o 2600 KW - 3000 KW	2000 hr/yr
o 3000 KW - 3100 KW	200 hr/yr
o 3100 KW - 3250 KW	30 min/yr

CAUTION

Any operation over 3250 KW will require an engine shutdown, declaration of inoperability AND performance of an internal inspection.

4.2.14 IF the diesel generator is operated at a load greater than 3250 KW, THEN do the following:

4.2.14.1 Immediately reduce the load to under 3000 KW.

4.2.14.2 Shutdown the diesel generator in accordance with Section 4.5 of this procedure.

4.2.14.3 Declare the diesel generator inoperable.

4.2.14.4 Notify Shift Management to have an internal inspection performed on the diesel generator because of the run in excess of 3250 KW.

4.2.15 For shutdown of the diesel generator, proceed to Section 4.5 of this procedure.

4.3 Diesel Generator Fast Start

4.3.1 Direct an operator to perform the following checks as a pre-start inspection:

CAUTION

Improper governor oil level may cause erratic engine operation and damage to the governor

4.3.1.1 Verify governor oil level LG-7575A(B)(C)(D) above the black line AND below the top of the sightglass. **CM-7**

4.3.1.2 Check the engine crankcase oil level +3" to -2" on the upper scribe mark on the dipstick.

4.3.1.3 Verify proper generator bearing oil level at LG-7568A(B)(C)(D). **CM-7**

4.3.1.4 Verify coolant expansion tank level LG-0610A(B)(C)(D) between the green and yellow rings on the sightglass.

4.3.1.5 Verify control rod pin is engaged with adjuster collar, on each fuel injection pump. (See Figure 1).

CAUTION

The DG will NOT start unless at least 1 minute has passed since the last attempt to start the diesel, OR since the diesel was shutdown, due to the governor shutdown solenoid being energized to stop.

4.3.2 Start the diesel generator by performing the following:

4.3.2.1 Turn AND hold the "Start Mode" selector switch to "MAN" AND turn the "Start-Stop" switch to "START".

4.3.3 Release the "Start-Stop" AND "Start Mode" switches.

4.3.4 Check the diesel generator starts after the 3 minute pre-lube sequence, <u>THEN</u> check the following: **CM-2**

- o Verify "E1(E2)(E3)(E4) DIESEL RUNNING" alarms.
- o Diesel generator running at rated frequency (58.8 to 61.2 Hz) and voltage (4.16 to 4.40KV).

<u>NOTE</u>

On a diesel generator start, the A ESW, B ESW <u>AND</u> ECW Pumps receive an auto start signal.

****

<u>CAUTION</u>

Cooling Water is required for diesel generator operation.

****

4.3.5 Verify ESW Pumps A <u>AND</u> B started.

4.3.5.1 Check pump discharge pressure PI-0236A <u>AND</u> B, "DISCH PRESS", 25 to 64 psig.

4.3.5.2 Check pump motor current "AMPS" 22 to 32 amps.

4.3.6 Red Flag the ESW Pump selected to remain in service.

4.3.7 Shutdown the remaining ESW Pump.

4.3.8 Verify ECW Pump automatically shuts down.

4.3.9 Verify diesel generator running at rated frequency (58.8 to 61.2 Hz) and voltage (4.16 to 4.40KV).

4.3.10 Direct an operator to verify ESW flow to the diesel by verifying AO-0-33-0241A(B)(C)(D), "ESW Outlet Block Valve From Diesel Gen E1(E2)(E3)(E4)" open.

4.3.11 Direct an operator to verify proper generator bearing oil level at LG-7568A(B)(C)(D). **CM-7**

4.3.12 Adjust engine speed <u>AND</u> generator output voltage as required, using the applicable control switch(es) below.

- o Engine speed - "GOVERNOR"
- o Generator output voltage - "AUTO VOLT REG"

NOTES

1. It is good practice to alternate use of the D/G output breakers from test to test.

2. Preferred Off-site Source for 2SUE is 2SU XFMR 00X003 with 3SU XFMR 00X005 as alternate. Preferred Off-site Source for 3SUE is 343SU XFMR 00X011 with 3SU XFMR 00X005 as alternate.

CAUTION

Limit the amount of time the engine is operated at no-load or low load conditions. The engine should be loaded within 10 minutes of EDG start to minimize the accumulation of oil in the manifolds.

4.3.13 Place the applicable "BKR SYNC" switch in "ON".

o E12	o E22	o E32	o E42
o E13	o E23	o E43	o E43

4.3.14 Verify speed and voltage control of diesel generator as follows:

4.3.14.1 Operate the "GOVERNOR" control switch to:

- o "RAISE" frequency to 0.5 Hz above the initial value.
- o "LOWER" frequency to 0.5 Hz below the initial value.
- o "RAISE" frequency to return to initial value.

4.3.14.2 Operate the "AUTO VOLT REG" control switch to:

- o "RAISE" voltage to 50 volts above the initial value.
- o "LOWER" voltage to 50 volts below the initial value.
- o "RAISE" voltage to return to initial value.

4.3.15 Check both synchronizing lights for proper operation as follows:

- o Both lights "ON" when synchroscope is at "Bottom Dead Center"
- o Both lights "OFF" when synchroscope is at "Top Dead Center"

4.3.16 Adjust diesel generator speed, using the "GOVERNOR" control switch, to make the synchroscope rotate slowly in the "FAST" direction.

CAUTION

Diesel generator voltage should be slightly higher, about 50 volts, but no more than 100 volts higher than bus voltage while synchronizing to avoid damage to the generator.

4.3.17 Adjust diesel generator "INCOMING" voltage so that it is slightly higher than "RUNNING" bus voltage by using the "AUTO VOLT REG" control switch.

4.3.18 Verify the synchroscope is still rotating slowly in the "FAST" direction.

NOTES

The diesel generator is considered synchronized, when the following conditions are met:

- o Diesel generator "INCOMING" voltage slightly higher than "RUNNING" bus voltage. **CM-4**
- o Synchroscope rotating slowly in the "FAST" direction.
- o Synchroscope within 13 degrees of "Top Dead Center".

CAUTION

Perform step 4.3.20 immediately after completing step 4.3.19 to prevent "motoring" the diesel generator.

4.3.19 WHEN the diesel generator is synchronized with the 4KV emergency bus, THEN close breaker E12 (E13) (E22) (E23) (E32) (E33) (E42) (E43).

4.3.20 Pickup 200 to 300 KW of load on the diesel generator by turning the "GOVERNOR" control switch to "RAISE". Pickup 100 KVAR by turning the "AUTO VOLT REG" control switch to "RAISE".

4.3.21 Place the applicable "BKR SYNC" switch in "OFF".

o E12	o E22	o E32	o E42
o E13	o E23	o E33	o E43

NOTE

Loading the diesel generator shall proceed at a rate NOT to exceed 300 KW/min. **CM-3**

4.3.22 Check generator output voltage and generator amperage for all three phases.

4.3.23 Pickup the desired load to be carried by the diesel generator as follows:

4.3.23.1 Turn the "GOVENOR" control switch to "RAISE".

CAUTION

Do NOT allow the KVAR value to exceed 75% of the KW value, to assure that the generator 0.8 power factor will NOT be exceeded.

4.3.23.2 Maintain the KW/KVAR ratio, by operating the "AUTO VOLT REG" control switch.

NOTES

1. IF the D/G is run above 2600 KW, THEN the Plant Reactor Operator shall log the load and duration of the run.

2. The maximum load to be carried by the diesel generator for continuous operations is 2600 KW. The diesel may be run at loads greater than 2600 KW, but less than 3250 KW in accordance with the following table: **CM-5, CM-6**

o 2600 KW	Continuous
o 2600 KW - 3000 KW	2000 hr/yr
o 3000 KW - 3100 KW	200 hr/yr
o 3100 KW - 3250 KW	30 min/yr

CAUTION

Any operation over 3250 KW will require an engine shutdown, declaration of inoperability AND performance of an internal inspection.

4.3.24 IF the diesel generator is operated at a load greater than 3250 KW, THEN do the following:

4.3.24.3 Immediately reduce the load to under 3000 KW.

4.3.24.4 Shutdown the diesel generator in accordance with Section 4.5 of this procedure.

4.3.24.5 Declare the diesel generator inoperable.

4.3.24.6 Notify Shift Management to have an internal inspection performed on the diesel generator because of the run in excess of 3250 KW.

4.3.25 For shutdown of the diesel generator, proceed to Section 4.5 of this procedure.

4.4 4KV Switchgear Manual Transfer

NOTES
1. 2 Emer Aux Xfmr normally supplies: o E12 Emergency Aux Switchgear o E32 Emergency Aux Switchgear o E23 Emergency Aux Switchgear o E43 Emergency Aux Switchgear
2. 3 Emer Aux Xfmr normally supplies: o E22 Emergency Aux Switchgear o E42 Emergency Aux Switchgear o E13 Emergency Aux Switchgear o E33 Emergency Aux Switchgear
3. E212 BKR & E312 BKR are interlocked preventing them from being closed at the same time. The other seven emergency buses are interlocked in a similar manner.
4. Cooling Towers should be the first loads shed during manual load shedding.

****

CAUTION

Manual load shedding should be initiated to restore 4 KV Bus Voltage to greater than 3.9 KV.

****

4.4.1 Verify the associated diesel for the bus that is to be transferred is running in accordance with Section 4.1 of this procedure.

NOTE

Preferred Off-site Source for 2SUE is 2SU XFMR 00X003 with 3SU XFMR 00X005 as alternate. Preferred Off-site Source for 3SUE is 343SU XFMR 00X011 with 3SU XFMR 00X005 as alternate.

CAUTION

Limit the amount of time the engine is operated at no-load or low load conditions. The engine should be loaded within 10 minutes of EDG start to minimize the accumulation of oil in the manifolds.

4.4.2 Place the applicable "BKR SYNC" switch in "ON".

o E12	o E22	o E32	o E42
o E13	o E23	o E33	o E43

4.4.3 Verify speed and voltage control of diesel generator as follows:

4.4.3.1 Operate the "GOVERNOR" control switch to:

- o "RAISE" frequency to 0.5 Hz above the initial value.
- o "LOWER" frequency to 0.5 Hz below the initial value.
- o "RAISE" frequency to return to initial value.

4.4.3.2 Operate the "AUTO VOLT REG" control switch to:

- o "RAISE" voltage to 50 volts above the initial value.
- o "LOWER" voltage to 50 volts below the initial value.
- o "RAISE" voltage to return to initial value.

4.4.4 Check both synchronizing lights for proper operation as follows:

- o Both lights "ON" when synchroscope is at "Bottom Dead Center"
- o Both lights "OFF" when synchroscope is at "Top Dead Center"

4.4.5 Adjust diesel generator speed, using the "GOVERNOR" control switch, to make the synchroscope rotate slowly in the "FAST" direction.

CAUTION

Diesel generator voltage should be slightly higher, about 50 volts, but no more than 100 volts higher than bus voltage while synchronizing to avoid damage to the generator.

4.4.6 Adjust diesel generator "INCOMING" voltage so that it is slightly higher than "RUNNING" bus voltage by using the "AUTO VOLT REG" control switch.

4.4.7 Verify the synchroscope is still rotating slowly in the "FAST" direction.

NOTE

The amount of load being carried on the 4KV emergency bus may be increased by placing equipment on the bus in service. Refer to Table 1 for equipment and associated current values.

4.4.8 Note the amount of load on the 4KV emergency bus, by one of the following methods:

- o Check how many amps are being supplied from "2(3) EM XFMR"
- o Sum load current values as indicated on individual load ammeters for loads being supplied by bus (e.g. RHR Pump, Core Spray Pump, Load Center, etc.)

NOTE

The diesel generator is considered synchronized, when the following conditions are met:

- o Diesel generator "INCOMING" voltage slightly higher than "RUNNING" bus voltage. **CM-4**
- o Synchroscope rotating slowly in the "FAST" direction.
- o Synchroscope within 13 degrees of "Top Dead Center".

CAUTION

Perform step 4.4.10 immediately after completing step 4.4.9 to prevent "motoring" the diesel generator.

4.4.9 WHEN the diesel generator is synchronized with the 4KV emergency bus, THEN close breaker E12 (E13) (E22) (E23) (E32) (E33) (E42) (E43).

4.4.10 Pickup load on the diesel generator by turning the "GOVERNOR" control switch to "RAISE". Pickup KVAR by turning the "AUTO VOLT REG" control switch to "RAISE".

4.4.11 Place the applicable "BKR SYNC" switch in "OFF".

o E12	o E22	o E32	o E42
o E13	o E23	o E33	o E43

NOTE

Loading the diesel generator shall proceed at a rate NOT to exceed 300 KW/min. **CM-3**

4.4.12 Check generator output voltage and generator amperage for all three phases.

4.4.13 Pickup all bus loads as follows:

> **NOTE**
>
> Determination of when the D/G has picked up all bus loads can be made by either of the following methods:
>
> - Diesel generator bus feed ammeter is near the value noted from step 4.4.8 and the emergency transformer bus feed ammeter has lowered to a minimum as close to 0 amps as can be achieved.
> - Using the PMS Computer, access the analog parameters for the bus being transferred via "4KV Emergency Power" in "Operations Graphics" and verify the diesel generator current is near the value noted from step 4.4.8 and the emergency transformer bus feed current has lowered to a minimum as close to 0 amps as can be achieved.

4.4.13.1 Turn the "GOVERNOR" control switch to "RAISE".

4.4.13.2 IF necessary, THEN adjust the "AUTO VOLT REG" control switch.

> **NOTE**
>
> The following step will make the Emergency Bus INOPERABLE and Tech Spec Action 3.8.7 shall be entered with a safety determination made for the supported functions on BOTH Units.

CAUTION

IF an Emergency Start Signal (MCA or Dead Bus) trips the D/G Breaker while the D/G is the sole source of Power to the Bus, THEN the D/G Breaker will have to be closed manually.

4.4.14 Open the applicable startup source bkr.

o E212	o E222	o E232	o E242
o E312	o E322	o E332	o E342
o E213	o E223	o E233	o E243
o E313	o E323	o E333	o E343

4.4.15 Place the applicable "BKR SYNC" switch in "ON", to parallel the diesel generator with the selected startup source.

Bus	Supplying Startup Source	Breaker
E12	Normal 2SUE Alternate 3SUE	E212 E312
E13	Normal 3SUE Alternate 2SUE	E313 E213
E22	Normal 3SUE Alternate 2SUE	E322 E222
E23	Normal 2SUE Alternate 3SUE	E223 E323
E32	Normal 2SUE Alternate 3SUE	E232 E332
E33	Normal 3SUE Alternate 2SUE	E333 E233
E42	Normal 3SUE Alternate 2SUE	E342 E242
E43	Normal 2SUE Alternate 3SUE	E243 E343

4.4.16 Check both synchronizing lights for proper operation as follows:

- o Both lights "ON" when synchroscope is at "Bottom Dead Center"
- o Both lights "OFF" when synchroscope is at "Top Dead Center"

4.4.17 Adjust diesel generator speed, using the "GOVERNOR" control switch, to make the synchroscope rotate slowly in the "SLOW" direction.

CAUTION

Diesel generator voltage should be slightly higher, about 50 volts, but no more than 100 volts higher than bus voltage while synchronizing to avoid damage to the generator.

4.4.18 Adjust diesel generator "RUNNING" voltage so that it is slightly higher than "INCOMING" bus voltage by using the "AUTO VOLT REG" control switch.

4.4.19 Verify the synchroscope is still rotating slowly in the "SLOW" direction.

NOTE

The diesel generator is considered synchronized, when the following conditions are met:

- o Diesel generator "RUNNING" voltage slightly higher than "INCOMING" bus voltage. **CM-4**
- o Synchroscope rotating slowly in the "SLOW" direction.
- o Synchroscope within 13 degrees of "Top Dead Center".

4.4.20 WHEN the diesel generator is synchronized with the startup source, THEN close the selected breaker.

4.4.21 Place the applicable "BKR SYNC" switch to "OFF".

4.4.22 IF it is desired to manually transfer back to the original S/U source breaker, THEN return to step 4.4.14.

4.4.23 For shut down of the diesel generator, proceed to Section 4.5 of this procedure.

4.5 Diesel Generator Shutdown

CAUTION

Limit the amount of time the engine is operated at no-load or low load conditions.

4.5.1 Reduce diesel generator load as follows:

4.5.1.1 IF the D/G was operating near full load, THEN cool down the D/G by operating at 1500 KW for 5 minutes as follows:

- o Turn the "GOVERNOR" control switch to "LOWER".

CAUTION

Do NOT allow the KVAR value to exceed 75% of the KW value, to assure that the generator 0.8 power factor will NOT be exceeded.

- o Maintain the KW/KVAR ratio by operating the "AUTO VOLT REG" control switch.

4.5.1.2 Reduce D/G load to 100 to 150 KW and VARS to 50 KVAR as follows:

- o Turn the "GOVERNOR" control switch to "LOWER".
- o Maintain the KW/KVAR ratio by operating the "AUTO VOLT REG" control switch until VARS are reduced to 50 KVAR.

4.5.2 WHEN D/G load is reduced to 100 to 150 KW and VARS are 50 KVAR, THEN trip the applicable diesel generator output breaker.

o E12	o E22	o E32	o E42
o E13	o E23	o E33	o E43

CAUTION

IF the diesel generator breaker does NOT indicate open, THEN do NOT proceed with diesel generator shutdown, until the breaker is verified open.

4.5.3 Verify the diesel generator output breaker opened as follows:

4.5.3.1 Check the breaker "GREEN" open light lit.

4.5.3.2 Check D/G "WATTS" at 0.

4.5.3.3 Check D/G "VAR" at 0.

4.5.4 IF it is required to operate the opposite output breaker, THEN perform step 4.5.8 and the applicable steps in Section 4.2 or 4.4 of this procedure.

4.5.5 Shutdown the diesel generator by turning its control switch to "STOP".

4.5.6 IF the Emergency Service Water (ESW) was used AND is NOT required for any other evolution, THEN shutdown the running ESW pump in accordance with SO 33.2.A, "Emergency Service Water System Shutdown", AND return to step 4.5.7 of this procedure.

4.5.7 IF the Emergency Cooling Water (ECW) System was used AND is NOT required for any other evolution, THEN it may be shutdown in accordance with SO 48.2.A, "Emergency Cooling Water System Shutdown". Return to step 4.5.8 of this procedure.

4.5.8 IF equipment that was started for the sole purpose of loading the diesel generator is no longer required, THEN they may be shutdown in accordance with their system procedures.

4.5.9 IF the diesel generator was run for one hour OR more, THEN direct an operator to perform the following steps for the diesel generator that has just been shut down. Return to step 4.5.10 of this procedure. **CM-9**

4.5.9.1 Remove cap from HV-0-52D-10007A (B)(C)(D), "D/G Fuel Oil Day Tank 0AT040 (0BT040)(0CT040)(0DT040) Drain Valve".

4.5.9.2 Crack open HV-0-52D-10007A(B)(C)(D) AND collect a 1 liter sample of fuel oil in a sample bottle.

4.5.9.3 Close HV-0-52D-10007A (B)(C)(D).

4.5.9.4 Allow the sample to settle for 15 minutes.

NOTE

IF water is present, THEN the water may settle to the bottom of the bottle or the sample may be all water.

4.5.9.5 Visually examine the sample for accumulated water.

4.5.9.6 IF water is observed, THEN repeat steps 4.5.9.2 through 4.5.9.5 until no water settles to the bottom of the sample bottle.

4.5.9.7 IF accumulator water was removed from the day tank, THEN verify the total amount of water removed was less than 2 liters.

4.5.9.8 Verify all accumulated water has been removed from the day tank.

4.5.9.9 Verify HV-0-52D-10007A(B)(C)(D) is closed.

4.5.9.10 Install cap on HV-0-52D-10007A (B)(C)(D).

NOTE

Step 4.5.10 may be omitted if Shift Management decides that it is undesirable to "air roll" the engine.

4.5.10 Direct an operator to perform the following steps 20 to 30 minutes after shutting down the diesel generator AND return to step 4.5.11 of this procedure:

NOTE

Steps 4.5.10.1 and 4.5.10.2 will bring up the following alarms on the Local Diesel Panel: "ENGINE OVERSPEED" and "CONTROL AT ENGINE" AND the Control Room alarms: "DIESEL GENERATOR TROUBLE", "DIESEL NOT IN AUTO" and "DIESEL GENERATOR NOT RESET".

4.5.10.1 Manually trip the fuel racks for the engine to be rolled, by pushing the large emergency stop button located on the engine control side.

4.5.10.2 Place the Diesel Generator Control Selector Switch RS4 located on the E1(E2)(E3)(E4) Diesel Gage Panel (DGP) to "AT ENGINE".

4.5.10.3 Unlock AND close HV-0-52C-10154A(B)(C)(D), "E1(E2)(E3)(E4) D/G Lube Oil Booster Block Valve".

4.5.10.4 Listen for abnormal noises during air roll. CM-8

4.5.10.5 Depress the manual start pushbutton located on the DGP for 2 to 3 seconds, allowing several revolutions of the crankshafts.

NOTE

Independent Verification of the following 3 steps is accomplished by A-C-8 "Control of Locked Valves and Devices" for the Locked Valve and by the absence of Control Room alarms for the fuel racks and RS4.

4.5.10.6 Open AND lock open HV-0-52C-10154A(B)(C)(D).

4.5.10.7 Reset the fuel racks.

4.5.10.8 Place the Diesel Generator Control Selector Switch RS4 located on the E1(E2)(E3)(E4) Diesel Gage Panel (DGP) to "NORMAL".

4.5.10.9 Verify all alarms are reset.

4.5.11 Perform SO 52A.1.A, "Diesel Generator Lineup for Automatic Start" to prepare the diesel generator for automatic operation.

4.5.12 IF outside air temperature is in excess of 70 degrees fahrenheit, place the 0AV091 (0BV091) (0CV091) (0DV091) in service until compartment air temperatures stabilize; THEN return the running fan to the "AUTO" position.

5.0 CONTROL STATIONS

5.1 Main Control Room Panel 00C029A(B)(C)(D)

5.2 Main Control Room Panel 00C026A(B)(C)(D)

5.3 Main Control Room Panel 00C024

5.4 E1(E2)(E3)(E4) D/G Local Control Panel 0AC097(0BC097)(0CC097)(0DC097)

5.5 E1(E2)(E3)(E4) Diesel Gauge Panel

6.0 REFERENCES

6.1 E-1, Single Line Diagram Station

6.2 E-8, Standby Diesel Gens. & 4160 Volt Emer. Power System, Unit No. 2

6.3 E-12, Standby Diesel Gens. & 4160 Volt Emer. Power System, Unit No. 3

6.4 E-5-166, Fairbanks-Morse Vendor Manual

6.5 E-5-7, Standby Diesel Engine Generators

6.6 M-377, Diesel Generator Auxiliary Systems

6.7 TRMS 3.14

6.8 Peach Bottom Improved Tech Specs Open Items A/R A0828140 Eval 23

6.9 CM-1, EIR 2-91-197 (T01669)

6.10 CM-2, INPO Significant Operating Experience Report 83-1 (T00658)

6.11 CM-3, PBAPS TSCR 88-08 (T02425)

6.12 CM-4, PBAPS LER 3-87-06 (T00279)

6.13 CM-5, INPO Significant Event Report 44-80 (T00422)

6.14 CM-6, PBAPS Diesel Generator Load Profiles and System Voltage Regulation Study

6.15 CM-7, Response to Report No. 86-25 dated 4-24-87 (T00293)

6.16 CM-8, NRC Inspection Report 91-13 (T01067)

6.17 CM-9, Letter to NRC from G.A.Hunger, Jr. dated Sept. 29, 1994 transmitting TSCR 93-16 (T03778, A0905549 E61)

7.0 TECHNICAL SPECIFICATION

7.1 3.8.1

7.2 3.8.2

8.0 INTERFACING PROCEDURES

8.1 SO 52A.1.A, "Diesel Generator Lineup for Automatic Startup"

8.2 SO 33.2.A, "Emergency Service Water System Shutdown"

8.3 SO 48.2.A, "Emergency Cooling Water System Shutdown"

8.4 ST-O-52D-601(2)(3)(4)-2, "E1(2)(3)(4) Diesel Generator Fuel Oil Day Tank Water Removal"

8.5 A-C-8, "Control of Locked Valves and Devices"

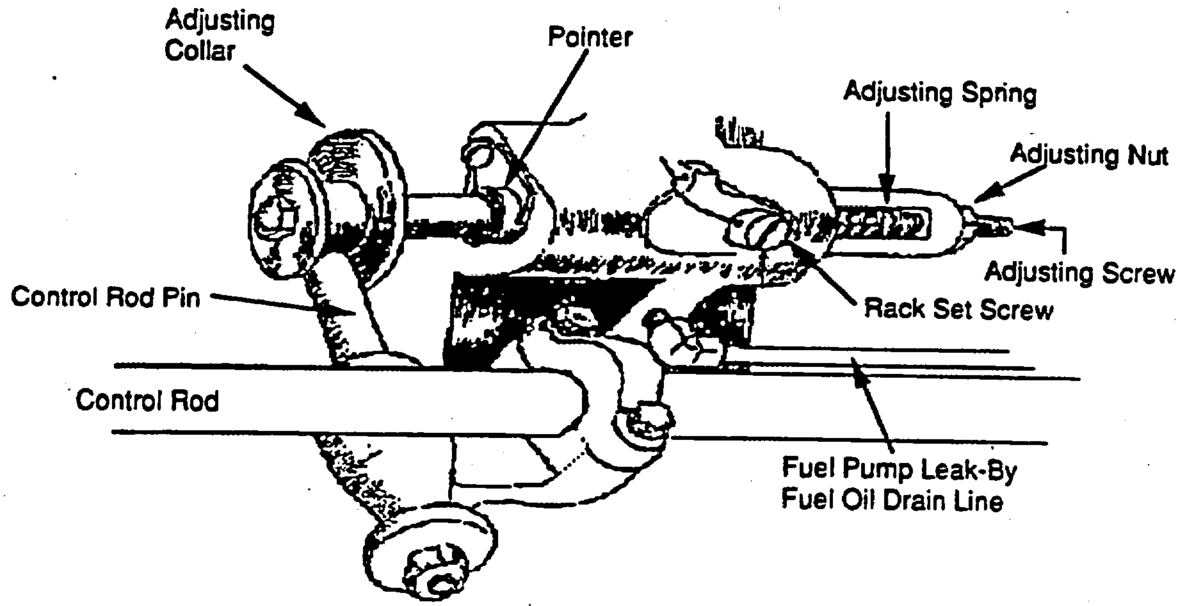
TABLE 1

AVAILABLE LOADS FOR THE DIESEL GENERATOR

Diesel	Bus	Equipment (In Preferred Loading Sequence)	Operating Mode	Approximate Current Draw in the Given Mode of Operation
E1	E12	2A RHR Pump 2A HPSW Pump 2A Core Spray Pump 2A CRD Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps
	E13	3A RHR Pump 3A HPSW Pump 3A Core Spray Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test	188 Amps 115 Amps 65 Amps
E2	E22	2B RHR Pump 2B HPSW Pump 2B Core Spray Pump A ESW Pump A ESW Booster Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps 24 Amps
	E23	3B RHR Pump 3B HPSW Pump 3B Core Spray Pump 3B CRD Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps
E3	E32	2C RHR Pump 2C HPSW Pump 2C Core Spray Pump B ESW Pump B ESW Booster Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps 24 Amps
	E33	3C RHR Pump 3C HPSW Pump 3C Core Spray Pump 3B CRD Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps
E4	E42	2D RHR Pump 2D HPSW Pump 2D Core Spray Pump 2B CRD Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps
	E43	3D RHR Pump 3D HPSW Pump 3D Core Spray Pump ECW Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation	188 Amps 115 Amps 65 Amps 21 Amps

FIGURE 1

CONTROL ASSEMBLY



POSITION TITLE: Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2000330501 / NEW-PRO SCRAM (ALT) K/A: 295006G10
RO: 4.1 SRO: 4.2

TASK DESCRIPTION: Plant Reactor Operator Response to Reactor Scram (Alternate Path – SDV Fails to Isolate)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Synchronizing Switch Key

C. REFERENCES

1. RRC 53.1-2, Rev. 0, "Unit 2 House Loads Transfer During a Plant Event"

2. RRC 94.2-2, Rev. 0, "Plant Reactor Operator Scram Actions"

3. RRC 94.2-2:1, Rev. 0, "PRO Scram Reports"

4. GP-8B, Rev. 15, "PCIS Isolation Groups II and III".

5. GP-8E, Rev. 7, "Primary Containment Isolation Bypass"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the trainee has performed all steps required by RRC 53.1-2, "Unit 2 House Loads Transfer During a Plant Event", RRC 94.2-2, "Plant Reactor Operator Scram Actions", and RRC 94.2-2:1, "PRO Scram Reports".

2. Estimated time to complete: 5 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform Plant Reactor Operator scram actions in accordance with the Operations Manual. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

The plant is in a full power, steady state condition.

G. INITIATING CUE

When reactor scram occurs, the Control Room Supervisor directs you to perform the Plant Reactor Operator scram actions in accordance with the Rapid Response Procedures.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*1	Insert handle and place 225-0105, 11 BKR Sync Switch in ON. (Cue: Synchroscope is at approximately 12 o'clock, Sync Lights are off and Incoming and Running Voltmeters indicate approximately 120 VAC.)	P	Sync Switch Handle is inserted into control switch 225-0105 and switch is placed in the ON position at panel 20C009.
2	Verify phase angle difference less than 12 degrees. (Cue: Synchroscope reading is approximately 12 o'clock and Sync Lights are off.)	P	Phase angle difference is verified to be less than 12 degrees on the Synchroscope at panel 20C009.
*3	Close 252-0105, 11 BKR. (Cue: Acknowledge control switch operation.)	P	11 BKR control switch is momentarily placed in the "CLOSE" position at panel 20C009.
4	Verify 252-0105, 11 BKR is closed. (Cue: 252-0105 red light is on, green light is off.)	P	11 BKR red light is verified ON and #1 13.2 KV Aux Bus from SU FDRS ammeter rises on panel 20C009.
5	Verify 252-0101, 1 BKR is tripped. (Cue: 252-0101 green light is on, red light is off.)	P	1 BKR green light is verified ON at panel 20C009.
6	Place 225-0105, 11 BKR Sync switch in OFF and remove handle. (Cue: Incoming and Running Voltmeters indicate 0 VAC.)	P	225-0105 is placed in the "OFF" position and Sync Switch Handle is removed at panel 20C009.
*7	Insert handle and place 225-0202, 22 BKR Sync Switch in ON. (Cue: Synchroscope is at approximately 12 o'clock, Sync Lights are off and Incoming and Running Voltmeters at approximately 120 VAC.)	P	Sync Switch Handle is inserted into Control Switch 225-0202 and switch is placed in the "ON" position at panel 20C009.
8	Verify phase angle difference less than 12 degrees. (Cue: Synchroscope reading is approximately 12 o'clock and Sync Lights are off.)	P	Phase angle difference is verified to be less than 12 degrees on the Synchroscope at panel 20C009.

STEP NO	STEP	ACT	STANDARD
*9	Close 252-0202, 22 BKR. (Cue: Acknowledge control switch operation.)	P	22 BKR Control Switch is momentarily placed in the "CLOSE" position at panel 20C009.
10	Verify 252-0202, 22 BKR is closed. (Cue: 252-0202 red light is on, green light is off.)	P	22 BKR red light is verified ON and #2 13.2 KV Aux Bus from SU FDRS ammeter rises on panel 20C009.
11	Verify 252-0214, 2 BKR tripped. (Cue: 252-0214 green light is on, red light is off.)	P	2 BKR green light is verified ON at panel 20C009.
12	Place 225-0202, 22 BKR Sync Switch in OFF and remove handle. (Cue: Incoming and Running Voltmeters indicate 0 VAC.)	P	225-0202 is placed in the "OFF" position and Sync Switch Handle is removed at panel 20C009.
13	Green flag 252-0101, 1 BKR control switch. (Cue: Acknowledge control switch operation, "1 BKR TRIP" annunciator clears.)	P	1 BKR control switch is momentarily placed in the "TRIP" position at panel 20C009.
14	Green flag 252-0214, 2 BKR Control Switch. (Cue: Acknowledge Control switch operation, #2 BKR TRIP annunciator clears.)	P	2 BKR Control Switch is momentarily placed in the "TRIP" position at panel 20C009.
15	Remove "21 BKR 252-0113" control switch from "Pull to Lock" position and place it in "NORMAL". (Cue: 225-0113 control switch shows a green flag.)	P	21 BKR control switch is removed from "PTL" and placed in the "NORMAL" position at panel 20C009.
16	Remove "12 BKR 252-0210" control switch from "Pull to Lock" and place it in "NORMAL". (Cue: 252-0210 control switch shows a green flag.)	P	12 BKR Control Switch is removed from "PTL" and placed in the "NORMAL" position at panel 20C009.

STEP NO	STEP	ACT	STANDARD
*17	Manually trip the Main Turbine when load drops to approximately 50 MWe. (Cue: Tripped light is on, Reset light is out; Master Trip Solenoid Test Lights A and B are out.)	P	Main Turbine Trip pushbutton is momentarily DEPRESSED at panel 20C008A after generator load drops below 200 MWe on JR-2157 on panel 20C008B and before the Main Generator locks out on reverse power.
*18	Verify Main Generator lockout. (Cue: Main Generator output breakers and Alt Exc Fld Bkr green lights are on, red lights are off. Annunciators 220 B-1 and 220 B-2 are lit.)	P	Main Generator output breakers and Alt Exc Fld Bkr green lights are verified ON at Panel 00C009.
*19	Verify Group I, II, and III isolations and verify SBGT initiation as appropriate. (Cue: If Reactor level dropped to 1", then all Group II and III isolation valves' green lights are on, red lights are off. SBGT system is running correctly.)	P	PCIS Group II and III isolation status is verified at panel 20C003-01, SBGT system status is verified at panel 20C012.
*20	Verify scram discharge volume vents and drains are closed. (Cue: SDV vent and drain red valve position lights are lit, green valve position lights are NOT lit.)	P	Recognize that SDV vents and drains remain open as indicated on Panel 20C005A or 20C003-01.
*21	Manually close the inboard and outboard SDV vent and drain valves. (Cue: Acknowledge control switch operation for inboard and outboard SDV vents and drain valves.)	P	Control switch for AO-2-03-032A, 023B and 033 and control switch for AO-203-032B, 035B and 036 are rotated counterclockwise to the close position.
*22	Verify scram discharge volume vent and drains are closed. (Cue: SDV vent and drain green valve position lights are lit, red valve position light are NOT lit.)	P	SDV vents and drains are verified closed and indicated on panel 20C005A or 20C003-01.
*23	Verify Hydrogen Water Chemistry is isolated. (Cue: FR-8629 flow is 0 scfm.)	P	Hydrogen flow is verified to be at 0 scfm on FR-8629 on panel 20C006A.

STEP NO	STEP	ACT	STANDARD
*24	Verify Recirc pump speed has runback to 30%. (Cue: A and B Recirc MG Set generator speed is 30% on SPI-2-02-184-016A and B.)	P	A and B Recirc MG Set generator speed is verified to be 30% on SPI-2-02-184-016A and B on panel 20C004A.
25	Monitor Instrument Air header pressure and Drywell pressure. (Cue: Drywell pressure is .3 psig, instrument air header pressure is 105 psig.)	P	Instrument Air header pressure on PI-2425A(B) on panel 20C012 is verified to be greater than Drywell pressure on PR-2508 on Panel 20C003-03 or computer point MØ26.
** NOTE ** IF the examinee does NOT report scram actions, THEN inform the examinee that you (the CRS) are ready for his/her scram action report.			
26	Report the following to the CRS: • House loads transferred. • Main Turbine is tripped. • Main Generator is locked out. • Group II and III isolations complete and SGTS is initiated. • SDV vent and drain valves did not initially close and had to be manually closed. • Hydrogen Water Chemistry is isolated. • Recirc pump speed is 30%. • Instrument Air header pressure is greater than Drywell pressure. (Cue: CRS is informed.)	P	CRS informed of that: • House loads transferred. • Main Turbine is tripped. • Main Generator is locked out. • Group II and III isolations complete with SGTS in service. • SDV vent and drain valves manually closed. • Hydrogen Water Chemistry is isolated. • Recirc pump speed is 30%. • Instrument Air header pressure is greater than Drywell pressure.
** NOTE ** IF requested by the examinee, THEN grant permission for the examinee to bypass and restore Drywell Instrument Nitrogen.			

STEP NO	STEP	ACT	STANDARD
*** NOTE *** t is procedurally permissible for a candidate to perform steps 33-35 prior to steps 27-30.			
*27	Place AO-2969A "Drywell Instrument N_2 Supply Valve" in "CLOSE". (Cue: Acknowledge control switch operation.)	P	AO-2969A control switch is placed in the "CLOSE" position at panel 20C003-03.
28	Verify AO-2969A, "Drywell Instrument N_2 Supply Valve is closed.	P	AO-2969A green light is verified on at panel 20C003-03.
*29	Place AO-2969B "Drywell Instrument N_2 Supply Valve" in "CLOSE". (Cue: Acknowledge control switch operation.)	P	AO-2969B control switch is placed in the "CLOSE" position at panel 20C003-03.
30	Verify AO-2969B, "Drywell Instrument N_2 Supply Valve is closed.	P	AO-2969B green light is verified on at panel 20C003-03.
*33	Place AO-2969A "Drywell Inst N_2 Bypass" Switch in "BYPASS". (Cue: Acknowledge Bypass switch operation.)	P	AO-2969A Bypass switch is placed in the "BYPASS" position at panel 20C005A.
*34	Place AO-2969B "Drywell Inst N_2 Bypass" switch in "BYPASS". (Cue: Acknowledge Bypass switch operation.)	P	AO-2969B Bypass switch is placed in the "BYPASS" position at panel 20C005A.
35	Acknowledge the "DRYWELL INST N_2 VALVES ISOLATION BYPASS" annunciator. (Cue: Annunciator 219 G-1 stops flashing and clears.)	P	The annunciator "ACKNOWLEDGE" pushbutton is depressed at panel 00C024.
*36	Open AO-2969A Drywell Instrument N_2 Supply valve. (Cue: Acknowledge control switch operation.)	P	AO-2969A control switch is placed in the "OPEN" position at panel 20C003-03.
37	Verify AO-2969A Drywell Instrument N_2 supply valve is open. (Cue: AO-2969A red light is ON, green light is OFF.	P	AO-2969A red light is verified ON at panel 20C003-03.

STEP NO	STEP	ACT	STANDARD
*38	Open AO-2969B "Drywell Instrument N_2 Supply" valve. (Cue: Acknowledge control switch operation.)	P	AO-2969B control switch is placed in the "OPEN" position at panel 20C003-03 panel.
39	Verify AO-2969B "Drywell Instrument N_2 Supply" valve is open. (Cue: AO-2969B red light is ON, green light is OFF.)	P	AO-2969B red light is verified ON at panel 20C003-03.
40	Report to the Control Room Supervisor the status of Drywell Instrument Nitrogen. reported that Drywell Instrument Nitrogen is restored. (Cue: Control Room Supervisor acknowledges report.)	P	It is reported that Drywell Instrument Nitrogen is restored.
41	Notify Health Physics of changing plant conditions. (Cue: Health Physics acknowledges report.)	P	Health Physics is notified of the plant scram.
42	Inform Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report.)	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When all required steps required by RRC 53.1-2, "Unit 2 House Loads Transfer During a Plant Event", RRC 94.2-2, "Plant Reactor Operator Scram Actions", and RRC 94.2-2:1, "PRO Scram Reports" are complete, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

The plant is in a full power, steady state condition.

INITIATING CUE

When reactor scram occurs, the Control Room Supervisor directs you to perform the Plant Reactor Operator scram actions in accordance with the Rapid Response Procedures.

PECO Energy Company
Peach Bottom Unit 2

RRC 53.1-2 UNIT 2 HOUSE LOADS TRANSFER DURING A PLANT EVENT

ENTRY

This RRC provides instructions to transfer house loads during a Plant Event.

PERFORMANCE STEPS

1. INSERT AND place SYNC switch, in "ON" for the selected breaker. [___]
2. VERIFY phase angle difference is < 12 degrees on "Synchroscope". [___]
3. CLOSE the selected breaker. [___]
4. VERIFY the associated generator BKR is tripped. [___]
5. Place "BKR SYNC" switch in "OFF" AND remove. [___]
6. INSERT AND PLACE "BKR SYNC" switch in "ON". [___]
7. VERIFY phase angle difference is < 12 degrees on "Synchroscope". [___]
8. CLOSE selected BKR. [___]
9. VERIFY associated generator BKR is tripped. [___]
10. PLACE "BKR SYNC" switch in "OFF" AND remove. [___]
11. FLAG BKR control switches to correspond to actual position. [___]
12. REMOVE associated bus breakers from "PULL TO LOCK". [___]

AS CONDITIONS PERMIT, REFER TO THE APPROPRIATE SYSTEM OPERATING PROCEDURE.

REFERENCES

Note: When revising this RRC, all changes should coincide with changes made to these referenced procedures.

1. TRIP Procedures
2. SO 53.2.A-2, "Transferring Unit 2 Aux Loads from Unit Auxiliary Transformer to Startup Feed Buses"

PECO Energy Company
Peach Bottom Unit 2

RRC 94.2-2 PLANT REACTOR OPERATOR SCRAM ACTIONS

ENTRY

This RRC provides instructions for plant reactor operator scram actions during a Plant Event as directed by TRIP procedures.

PERFORMANCE STEPS

1. TRANSFER 13KV house loads. [___]
2. TRIP Main Turbine when Generator load drops to approximately 50 MWE. [___]
3. VERIFY Main Generator Lockout. [___]
4. VERIFY Group I, II, III Isolations and SGTS initiation, as applicable. [___]
5. VERIFY scram discharge volume vents and drains are closed. [___]
6. VERIFY Hydrogen Water Chemistry is isolated. [___]
7. VERIFY both Recirc Pumps speed have runback to 30%. [___]
8. MONITOR Instrument Air header pressure and Drywell pressure. [___]
9. WHEN the CRS is ready, THEN REPORT Scram actions. [___]
10. BYPASS AND RESTORE Instrument N_2 to the Drywell when directed by the CRS. [___]
11. REPORT to the CRS, that Drywell Instrument Nitrogen is restored. [___]
12. NOTIFY Health Physics of changing plant conditions. [___]

AS CONDITIONS PERMIT, REFER TO THE APPROPRIATE SYSTEM OPERATING PROCEDURE.

REFERENCES

Note: When revising this RRC, all changes should coincide with changes made to these referenced procedures.

1. TRIP Procedures

PRO SCRAM REPORTS

When the CRS is ready, report the following:

1. "House loads transferred"
2. "Main Turbine is tripped"
3. "Main Generator is locked out"

1. "Group I, II and III isolations are complete and SGTS is initiated"
2. "Scram Discharge Volume vents and drains are closed"
3. "Hydrogen Water Chemistry is isolated"

1. "Recirc pump speed is 30%"
2. "Instrument Air Header pressure is greater than Drywell pressure"

PECO Energy Company
Peach Bottom Units 2 and 3

GP-8.E PRIMARY CONTAINMENT ISOLATION BYPASS

1.0 PURPOSE

This procedure provides instructions for bypassing PCIS isolation signals.

2.0 OPERATOR ACTIONS

2.1 Valve isolations shall NOT be bypassed without Shift Management permission.

> **NOTE**
>
> Following a full Group II Isolation, it may be desirable to restore instrument N_2 system pressure inside the drywell to provide pressure to:
>
> a. Open (maintain open) MSIVs.
> b. Operate target rock relief valves.
> c. Operate Drywell cooler chilled water valves.

2.2 Isolation Signals for the following valves can be bypassed.

VALVE	VALVE NAME
SV-2(3)969A	Instrument N_2 Supply A Drywell
SV-2(3)969B	Instrument N_2 Supply B Drywell
AO-8(9)098 A to D	RHR Sample Inboard
AO-8(9)099 A to D	RHR Sample Outboard
AO-2(3)509	Drywell Vent Inbd 2" Vent
AO-2(3)510	Drywell Vent Outbd 2" Vent
AO-2(3)513	Torus Vent Inbd 2" Vent
AO-2(3)514	Torus Vent Outbd 2" Vent
AO-2(3)523	D/W & Torus N_2 Makeup Inlet
SV-4(5)966 A to F	Sample Valves
SV-8(9)101	Rad Gas Sample
SV-2(3)671 A to G	O_2 Anal Inbd
SV-2(3)978 A to G	O_2 Anal Outbd
SV-2(3)980	O_2 Anal Outbd
AO-2(3)506	Drywell Ventilation Inbd 18" Vent
AO-2(3)507	Drywell Ventilation Outbd 18" Vent
AO-2(3)511	Torus Ventilation Inbd 18" Vent
AO-2(3)512	Torus Ventilation Outbd 18" Vent

NOTE

The instrument N_2 isolation should NOT be bypassed if drywell pressure is greater than N_2 pressure. This may be accomplished by comparing D/W pressure with Instrument Air Header pressure (PI-2(3)425A or B) since instrument air backs up instrument N_2. IF Instrument Air Header pressure is less than D/W pressure, THEN N_2 pressure SHALL be obtained locally (PI-4(5)466A or B) before instrument N_2 is bypassed.

3.0 INSTRUMENT N2 SUPPLY

3.1 Place the control switch for "A" DRYWELL (AO 2(3)969A) AND "B" DRYWELL (AO 2(3)969B) in the closed position on the Containment Atmosphere Panel 20(30)C003-03.

3.2 Place the D/W Inst. N_2 bypass switches A(16A-S100) and B(16A-S99) on Panel 20(30)C005A in the bypass position.

3.3 The valves may now be opened without affecting the reset logic.

4.0 RHR SAMPLE

4.1 Place the control switches for Inboard (AO-8(9)098A through D) and Outboard (AO-8(9)099A through D) on Panels 20(30)C003-02 and 20(30)C003-04 in the closed position.

4.2 Place the RHR Sample Inboard (16A-S108) and Outboard (16A-S107) bypass switches on Panel 20(30)C005A in the bypass position.

4.3 The valves may now be opened without affecting the reset logic.

5.0 DRYWELL AND TORUS VENT/N2 SUPPLY

5.1 Place the control switches for the following valves in the close position.

a. AO-2(3)509 Drywell Vent Inbd 2" Vent at Panel 20(30)C484B

b. AO-2(3)510 Drywell Vent Outbd 2" Vent at Panel 20(30)C484B

c. AO-2(3)513 Torus Vent Inbd 2" Vent at Panel 20(30)C484A

d. AO-2(3)514 Torus Vent Outbd 2" Vent at Panel 20(30)C484A

e. AO-2(3)523 D/W & Torus N_2 Makeup Inlet At Panel 20(30)C003-03

5.2 To open the Drywell Vent Valves place the Drywell Vent Inboard (16A-S103) and Outboard (16A-S104) Isolation bypass switches on Panel 20(30)C005A in the bypass position.

5.2.1 The Drywell 2" vent valves may now be opened without affecting reset logic.

5.3 To open the Torus Vent Valves place the Torus Vent Inboard (16A-S102) and Outboard (16A-S101) Isolation bypass switches on Panel 20(30)C005A in the bypass position.

5.3.1 The Torus 2" vent valves may now be opened without affecting reset logic.

6.0 <u>CAD GAS SAMPLE VALVES</u>

6.1 Place the control switch for SV-4(5)966A-F on Panel 20(30)C484A in the normal position.

6.2 Place the control switch for SV-8(9)101 on Panel 20(30)C484B in the closed position.

6.3 Place the RAD Gas Sample Inboard (16A-S109) and Outboard (16A-S111) Isolation bypass switches on Panel 20(30)C005A in the bypass position.

6.4 Place the control switch for SV-8(9)0391 on Panel 20(30)C484B in the bypass position.

6.5 The valves may now be opened without affecting reset logic.

7.0 <u>CAC ANALYZER VALVES</u>

7.1 Place the control switch for SV-2(3)671A-G on Panel 20(30)C003-03 in the closed position.

7.2 Place the control switch for SV-2(3)978A-G/SV-2(3)980 on Panel 20(30)C003-03 in the closed position.

7.3 Place the H_2/O_2 Analyzer Inboard SV-2(3)671A-G (69-ISO-1) and Outboard SV-2(3)978A-G,SV-2(3)980 (69-ISO-2) Isolation Bypass switches on Panel 20(30)C003-03 in the bypass position.

7.4 The valves may now be opened without affecting reset logic.

8.0 DRYWELL/TORUS 18" VENT VALVES

8.1 Place the control switches for the following valves, on Panel 20(30)C003-03 in the closed position.

a. AO-2(3)506 Drywell Ventilation Inbd 18" Vent

b. AO-2(3)507 Drywell Ventilation Outbd 18" Vent

c. AO-2(3)511 Torus Ventilation Inbd 18" Vent

d. AO-2(3)512 Torus Ventilation Outbd 18" Vent

8.2 Place the D/W Torus Purge Exh Inboard (16A-S114A) and Outboard (16A-S114B) Isolation bypass key switches on Panel 20(30)C005A in the appropriate bypass (D/W OR Torus) position.

8.3 The valves may now be opened without affecting reset logic.

9.0 RETURN TO NORMAL

9.1 For any isolation bypassed

a. Place the appropriate isolation bypass switch(es) to normal.

b. Verify the "Isolation Bypass" alarm resets.

10.0 REFERENCES

10.1 M-1-S-23, Primary Containment Isolation System

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2450050101 / PLOR-017C   K/A: 262001A4.04

RO: 3.6   SRO: 3.7

TASK DESCRIPTION: SYNCHRONIZE TURBINE GENERATOR OUTPUT WITH GRID AT MINIMUM LOAD

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

1. Synchroscope key for breaker operation (R)

2. Key for synchro-check relay bypass key switch (R)

C. REFERENCES

Procedure SO 50.1.A-2 Rev. 7, Main Generator Synchronizing and Loading (R)

D. TASK STANDARD

1. Satisfactory task completion is indicated when the generator is synchronized to the grid and initial load is placed on the generator.

2. Estimated time to complete: 12 minutes (A.5) Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to synchronize the main generator to the grid and pickup load using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. Plant startup in progress; reactor power approximately 18%.

2. Turbine generator at 1800 rpm and ready for electrical loading IAW SO 1B.1.A-2.

3. Main Generator disconnects are closed.

4. Main Generator output breakers are open.

5. Generator terminal voltage at 22 KV; voltage regulator in automatic.

6. Generator ready to be synchronized to grid.

7. Power System Director has been notified.

8. Main generator hydrogen pressure is at 75 psig IAW SO 50C.5.A-2

9. Generator and alterrex cooler vent valves are properly positioned IAW SO 30.1.A-2.

G. INITIATING CUE

The Control Room Supervisor directs you to continue with procedure SO 50.1.A-2 from step 4.11 to 4.24, and sync the generator to the grid and pick up load.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*1	Turn on synchroscope for breaker 215 or 225. (Cue: Synchroscope meter rotating and incoming voltmeters and sensing lights are activated.)	P	Synchroscope key obtained from panel 00C024 inserted into selected breaker sync switch and placed in the "ON" position at panel 00C024.
*2	Use turbine load selector pushbuttons to adjust generator speed. (Cue: Synchroscope is rotating slowly in clockwise direction.)	P	Load selector pushbuttons are momentarily depressed to get synchro-scope rotating slowly in the "FAST" direction at panel 00C024.
3	Check both synchronizing lights for proper operations. (Cue: Both lights lit at the "6 o'clock position", both lights out at the "12 o'clock position".)	P	Sync lights verified ON at "6 o'clock position" OFF at "12 o'clock position" at panel 00C024.
*4	Use the auto voltage regulator rheostat to adjust generator voltage so that incoming voltage is slightly higher than running voltage. (Cue: Incoming voltage meter is reading 121 volts, running voltage meter is reading 120 volts.)	P	Auto voltage regulator rheostat adjusted to set incoming voltage slightly higher than running voltage while maintaining gen-erator voltage between 20.9 and 23.1 KV at panel 00C024.
5	Verify the sync scope is rotating slowly in the "FAST" direction. (Cue: Sync scope is rotating slowly in the clockwise direction.)	P	Synchroscope verified for rotation - slowly in the "FAST" direction at panel 00C024.
*6	When the synchroscope is within five degrees (green lines) of the "12 o'clock" position then close the selected breaker. (Cue: Acknowledge control switch operation.)	P	215 (225) breaker control switch is taken to CLOSE when the synchroscope is within approximately 5 degrees of "12 o'clock" position at panel 00C024.
7	Verify selected breaker is closed. (Cue: Breaker closed - red light on/green light off, synchroscope steps rotating at the "12 o'clock" position.)	P	Selected breakers red indicating light is verified ON at panel 00C024.

STEP NO	STEP	ACT	STANDARD
8	Verify synchroscope pointer at "12 o'clock" position. (Cue: Synchroscope at "12 o'clock" position and lights off.)	P	Synchroscope pointer verified at "12 o'clock" position at panel 00C024.
9	Turn off synchroscope for breaker 215 or 225. (Cue: Acknowledge sync switch operation.)	P	Synchroscope placed in the "OFF" position for breaker 215 or 225 at panel 00C024.
*10	Pick up load on the generator until all nine bypass valves are closed. (Cue: All nine bypass valves red lights are off, green lights on, and generator kiloamps rising on all three phases.	P	The "RAISE" load selector pushbutton is depressed on panel 00C024 until all nine bypass valves red lights are OFF at panel 20C008B.
11	Place the remaining breakers sync switch to ON. (Cue: Synchroscope is at the 12 o'clock position and incoming and running voltage ≈120V.)	P	Synchroscope key obtained from panel 00C024 inserted into selected breaker sync switch and placed in the "ON" position at panel 00C024.
12	Place the SYNC CHK RELAY BYPASS KEY switch in BYPASS. (Cue: Acknowledge key switch operation.)	P	Key is obtained from SSV keybox, inserted into the SYNC CHK RELAY BYPASS switch and placed in the "BYPASS" position at panel 00C024.
13	Verify incoming and running voltage are matched. (Cue: Incoming and running voltage are both ≈ 120V.)	P	Incoming and running voltage are verified to be matched on the INCOMING and RUNNING voltage meters at panel 00C024.
14	Verify the synchroscope within five degrees (green lines) of the "12 o'clock position". (Cue: Synchroscope at "12 o'clock" positon.	P	The synchroscope is verified to be within 5 degrees of the "12 o'clock" position, inside the green lines on the meter face at panel 00C024.
15	Close the selected breaker. (Cue: Acknowledge breaker control switch operation.)	P	The selected breaker control switch is placed in the "CLOSED" position.

STEP NO	STEP	ACT	STANDARD
16	Verify breaker 225 or 215 is closed. (Cue: Breaker 225 or 215 red light on, green light off, the synchroscope needle is stopped at the 12 o'clock position and sync lights out.)	P	Breaker 225 or 215 red light on, sync scopes stopped at 12 o'clock position and sync lights "OFF" verified at panel 00C024.
17	Place the 225 or 215 breaker sync switch to OFF. (Cue: Breaker sync switch is placed in OFF and incoming and running voltage meters drop to 0 volts.)	P	Breaker 225 or 215 sync switch is placed in the OFF position at panel 00C024.
18	Place the SYNC CHK RELAY BYPASS KEYSWITCH in NORM. (Cue: Sync chk relay bypass keyswitch is in NORM.)	P	SYNC CHK RELAY BYPASS KEYSWITCH is placed in the NORMAL position at panel 00C024 and the key is returned to the SSV keybox.
19	Inform the Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report.)	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When steps 4.11 through 4.24 of procedure SO 50.1.A-2 have been completed, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. Plant startup in progress; reactor power approximately 18%.

2. Turbine generator at 1800 rpm and ready for electrical loading IAW SO 1B.1.A-2.

3. Main Generator disconnects are closed.

4. Main Generator output breakers are open.

5. Generator terminal voltage at 22 KV; voltage regulator in automatic.

6. Generator ready to be synchronized to grid.

7. Power System Director has been notified.

8. Main generator hydrogen pressure is at 75 psig IAW SO 50C.5.A-2

9. Generator and alterrex cooler vent valves are properly positioned IAW SO 30.1.A-2.

INITIATING CUE

The Control Room Supervisor directs you to continue with procedure SO 50.1.A-2 from step 4.11 to 4.24, and sync the generator to the grid and pick up load.

PECO Energy Company
Peach Bottom Unit 2

SO 50.1.A-2 MAIN GENERATOR SYNCHRONIZING AND LOADING

1.0 PURPOSE

This procedure provides the instructions necessary to electrically startup the main generator and synchronize to the grid.

2.0 PREREQUISITES

2.1 Main turbine at 1800 rpm and ready for electrical loading in accordance with SO 1B.1.A-2, "Main Turbine Startup And Normal Operations".

2.2 All permits and clearances removed on the main generator disconnects AND the main generator disconnects are closed.

2.3 Main generator output breakers open.

2.4 Main generator hydrogen pressure is greater than 60 psig in accordance with SO 50C.5.A-2, "Generator Purging-Air to CO_2 and CO_2 H_2".

2.5 Generator and alterrex cooler vent valves are properly positioned in accordance with SO 30.1.A-2, "Unit 2 Service Water System Startup and Normal Operations".

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

4.0 PERFORMANCE STEPS

4.1 Verify L-2, "GENERATOR INSULATION OVER HEATING" alarm on 206(20C208R) is clear.

4.2 Verify the "Load Selector" pushbutton selected to "REMOTE/AUTO" on Panel 20C008A, "Main Turbine".

4.3 Verify "Reg/Transfer" switch (43-0601) in "MAN" on Panel 20C009, "Plant Electrical Distribution".

4.4 Verify the DC Manual regulator set at minimum as indicated by the green and amber lights lit.

CAUTIONS

- o Main generator gas pressure will increase as the machine heats up.
- o Generator gas pressures in excess of 80 psig can lead to generator end bell damage and loss of pressure boundary.
- o Generator gas pressures of less than 60 psig can lead to stator water cooling intrusion into the main generator.

4.5 Perform the following during synchronization and power ascension:

4.5.1 Periodically monitor machine gas pressure at local indicator PI-4356.

4.5.2 Vent machine gas as required to maintain 72 to 78 psig as follows:

4.5.2.1 Verify HV-2-50C-47572 "CO_2 Purge or Fill Selector Valve for Main Gen (G-01)" in "H_2 Manifold" position (valve handle horizontal).

4.5.2.2 Slowly throttle open HV-2-50C-47574 "Outlet Block Valve for Gen H_2 & CO_2 Purge (G-03)" as required to maintain pressure at 72 to 78 psig.

4.5.2.3 <u>WHEN</u> pressure is reduced to the desired point, <u>THEN</u> close HV-2-50C-47574 (G-03).

4.5.3 <u>WHEN</u> generator H_2 cold gas temperature exceeds 30 degrees C as indicated on the indicator at Panel 20C008A <u>AND</u> machine gas pressure stabilizes at approximately 75 psig, <u>THEN</u> monitoring is no longer required.

4.6 Close the "Alt Exc Fld Bkr" and check the following:

- o "Field" voltage and amperage
- o "Gen" voltage
- o Red "De-Excitation Backup" light is lit

4.7 Adjust generator output voltage, "Gen" to obtain 21.5 - 22.5 KV, using the DC manual voltage regulator.

4.8 Transfer the voltage regulator to the automatic mode by performing the following:

4.8.1 Obtain a "Reg Man/Auto Deviation" voltage of 0 VDC by adjusting the "Auto Voltage Reg Rheostat".

4.8.2 Verify C-3, "GEN VOLT REG AUTO TO MAN UNBALANCED", alarm on 220(20C209R) is clear.

****
CAUTION

Monitor generator output voltage when transferring the voltage regulator from manual to automatic to prevent over excitation of the generator. An over excitation condition will cause a "VOLT/HERTZ TROUBLE" alarm and overheating in the generator core. Be prepared to reduce voltage immediately.
****

4.8.3 Place the "Reg/Transfer" switch in "AUTO", and verify the "Reg/Transfer" lights indicate auto regulation.

4.9 Verify generator speed and voltage control as follows:

4.9.1 Operate the "Load Selector" pushbuttons to:

4.9.1.1 "RAISE" frequency to 0.5 hz above the initial value.

4.9.1.2 "LOWER" frequency to 0.5 hz below the initial value.

4.9.1.3 "RAISE" frequency to return to initial value.

4.9.2 Operate the "Auto Voltage Reg Rheostat" to:

4.9.2.1 "RAISE" voltage to 0.5 KV above the initial value.

4.9.2.2 "LOWER" voltage to 0.5 KV below the initial value.

4.9.2.3 "RAISE" voltage to return to initial value.

4.10 Direct the Unit Control Room Operator to select point G029 on the computer console display to monitor generator megawatt load.

4.11 Place the "215 BKR Sync" ("225 BKR Sync") switch in "ON".

4.12 Adjust generator speed, using the "Load Selector" pushbuttons, to make the synchroscope rotate slowly in the "FAST" direction.

4.13 Check both synchronizing lights for proper operation as follows:

- o Both lights lit when the synchroscope is at the "6 o'clock position".
- o Both lights out when the synchroscope is at the "12 o'clock position".

CAUTION

Observe the following generator voltage limits:

- o minimum - 20.9 KV
- o maximum - 23.1 KV

4.14 Adjust generator voltage, "Incoming", so that it is slightly higher than grid voltage, "Running", using the "Auto Voltage Reg Rheostat".

4.15 Verify synchroscope is still rotating slowly in the "FAST" direction.

4.16 <u>WHEN</u> the synchroscope is within five degrees (green lines) of the "12 o'clock position", <u>THEN</u> close "215 Bkr 500 KV" ("225 Bkr 500 KV") <u>AND</u> verify synchroscope at the "12 o'clock position".

CAUTION

Picking up load two quickly may cause a turbine trip due to high moisture separator level.

4.17 Place the "215 Bkr Sync" ("225 Bkr Sync") switch in "OFF".

4.18 Immediately pick-up load using the "Load Selector" pushbutton until all nine By-pass valves are closed as indicated on Panel 20C008B, "T/G".

4.19 Place the "225 Bkr Sync" ("215 Bkr Sync") switch in "ON".

4.20 Place the "Sync Chk Relay By-pass" key switch in "BYPASS" to bypass the Sync Check Relay.

4.21 Verify "Incoming", and "Running" voltage are matched and the synchroscope within five degrees (green lines) of the "12 o'clock position".

4.22 Close the "225 Bkr 500 KV" ("215 Bkr 500 KV").

4.23 Place the "225 Bkr Sync" ("215 Bkr Sync") switch in "OFF".

4.24 Place the "Sync Chk Relay Bypass" keyswitch in "NORM".

4.25 Verify generator load is within limits specified on Figure 1.

4.26 Direct the Unit Control Room Operator to select the "Load Selector" pushbutton to "MANUAL" to return turbine control to 20C008A.

4.26.1 Increase load set to 105% by depressing the load selector "Raise" pushbutton.

4.27 Monitor alterrex exciter air temperatures in accordance with SO 50G.1.A-2, "Operation of Alterrex Exciter Air Coolers", data sheet until stable temperatures are maintained between 59 - 104 Degrees F (15 - 40 Degrees C). **CM-1**

4.28 Monitor generator H_2 cold gas temperature at the indicator on Panel 20C008A AND adjust HCS-2485 on Panel 20C009 as needed to maintain gas temperature between 30-45 degrees C.

4.29 WHEN turbine control has been returned to Panel 20C008A, THEN verify the following systems are operating properly:

- o Alterrex Exciter Air Coolers (50G) **CM-1**
- o Stator Cooling Water (50A)
- o Hydrogen Seal Oil (50B)
- o Hydrogen and Carbon Dioxide (50C)
- o Isophase Bus Cooling (50D)
- o Electrohydraulic Control, EHC (1D)
- o Turbine Lube Oil (1F)

****

CAUTION

To carry house loads the generator voltage should be maintained between 20.9KV - 22.5KV.

****

5.0 CONTROL STATIONS

5.1 MCR 20C009, Plant Electrical Distribution

6.0 REFERENCES

6.1 GEK 5595 Vol IIB, Generator

6.2 M-2-355-C, Alterrex Excitation System with SCR Regulator

6.3 E-1, Single Line Diagram Station

6.4 E-40, "Main Generator Unit 2

6.5 E-91, Generator Excitation and Regulation

6.6 E-98, Generator Bus Cooler

6.7 E-247, Annunciators, Main Turbine (Unit 2)

6.8 E-248, Annunciators, Generator Aux Bypass, & CH-II D.C. Unit 2

6.9 C-201754, D.C. Control & L&P 500KV BKR 215 & Disc. SW 213 & 217

6.10 C-201755, D.C. Control & L&P 500KV BKR 225 & Disc. SW 223 & 227

6.11 Voltage Study, 1988

6.12 Event Investigation Report No. 2-90-015

6.13 Alterrex Low Air Temperature Limit (A0922705)

7.0 TECHNICAL SPECIFICATIONS

None

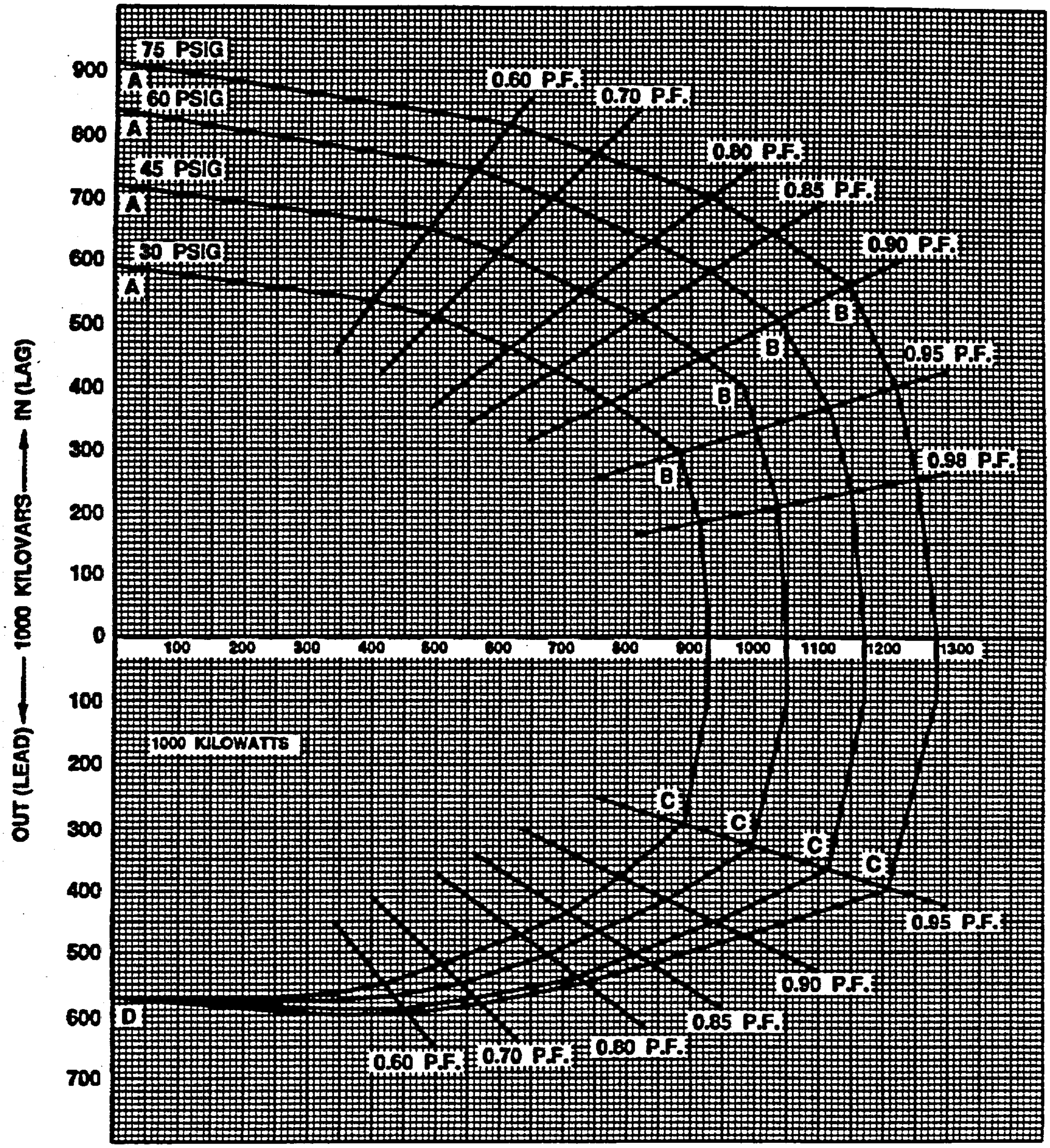
8.0 INTERFACING PROCEDURES

8.1 SO 1B.1.A-2, "Main Turbine Startup and Normal Operations"

8.2 SO 50G.1.A-2, "Operation of Alterrex Exciter Air Coolers"

FIGURE 1

ATB 4 POLE 1,280,000 KVA 1800 RPM 22,000 VOLTS
0.90 P.F. 0.60 SCR 75 PSIG HYDROGEN PRESSURE 500 VOLTS EXCITATION



CURVE AB LIMITED BY FIELD HEATING
CURVE BC LIMITED BY ARMATURE HEATING
CURVE CD LIMITED BY ARMATURE CORE END HEATING

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 0201710040/ PLOR-054P K/A: 218000A2.03

URO: 3.4 SRO: 3.6

TASK DESCRIPTION: Backup Instrument Nitrogen to ADS System Startup and Operation

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

Procedure SO 16A.1.A-2 Rev. 4, "Backup Instrument Nitrogen to ADS Startup and Operation".

D. TASK STANDARD

1. Satisfactory task completion is indicated when backup Instrument Nitrogen to ADS has been lined up locally.

2. Estimated time to complete: 23 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to line up Backup Instrument Nitrogen to the ADS relief valves using SO 16A.1.A-2, "Backup Instrument Nitrogen to ADS Startup and Operation". I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. The Prerequisites listed in SO 16A.1.A-2, "Backup Instrument Nitrogen to ADS Startup and Operation" are met.

2. COL 16A.1.A-2, "Backup Instrument Nitrogen to ADS System" has been performed.

G. INITIATING CUE

The Control Room Supervisor directs you, the Equipment Operator, to perform SO 16A.1.A-2, "Backup Instrument Nitrogen to ADS Startup and Operation" in order to lineup Backup Instrument Nitrogen to the Unit 2 ADS relief valves.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure SO 16A.1.A-2.	P	A copy of procedure SO 16A.1.A-2 is obtained.
****NOTE**** **Inform the examinee the individual bottle PCV outlet pressure indicators and header pressure indicator (PI-8130) read zero psig. Individual bottle pressures indicate 2200 psig.**			
*2	Slowly open the nitrogen bottle isolation valves for 2AS377, 2BS377 and 2CS377. (Cue: Acknowledge isolation valve operation.)	S	Nitrogen bottle isolation valves 16A-23331A, 16A-23331B and 16A-23331C are slowly turned in the counterclockwise direction.
*3	Adjust nitrogen bottle 2AS377 pressure control valve to obtain ≥ 85 psig. (Cue: Acknowledge PCV operation, pressure indicator for bottle 2AS377 indicates 85 psig.)	S	PCV-2-16A-8917A handle is turned clockwise until ≥ 85 psig is obtained on bottle 2AS377 pressure indicator.
*4	Adjust nitrogen bottle 2BS377 pressure control valve to obtain ≥ 85 psig. (Cue: Acknowledge PCV operation, pressure indicator for bottle 2BS377 indicates 85 psig.)	S	PCV-2-16A-8917B handle is turned clockwise until ≥ 85 psig is obtained on bottle 2BS377 pressure indicator.
*5	Adjust nitrogen bottle 2CS377 pressure control valve to obtain ≥ 85 psig. (Cue: Acknowledge PCV operation, pressure indicator for bottle 2CS377 indicates 85 psig.)	S	PCV-2-16A-8917B handle is turned clockwise until ≥ 85 psig is obtained on bottle 2CS377 pressure indicator.
6	Request URO to verify Backup Nitrogen is ≥ 85 psig on PI-8142. (Cue: Unit Reactor Operator acknowledges request and reports that PI-8142 indicates 85 psig.)	S	Control Room is requested via telephone, radio, or GAI-TRONICS page system to verify that backup nitrogen pressure is ≥ 85 psig on PI-8142.

STEP NO	STEP	ACT	STANDARD
7	Inform Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report.)	S	Task completion reported using telephone, hand held radio, or GAI-TRONICS page system.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the Backup Instrument Nitrogen to ADS System has been lined up locally and the URO verifies $\geq$ 85 psig Backup Instrument Nitrogen pressure indication, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. The Prerequisites listed in SO 16A.1.A-2, "Backup Instrument Nitrogen to ADS Startup and Operation" are met.

2. COL 16A.1.A-2, "Backup Instrument Nitrogen to ADS System" has been performed.

INITIATING CUE

The Control Room Supervisor directs you, the Equipment Operator, to perform SO 16A.1.A-2, "Backup Instrument Nitrogen to ADS Startup and Operation" in order to lineup Backup Instrument Nitrogen to the Unit 2 ADS relief valves.

PECO Energy Company
Peach Bottom Unit 2

SO 16A.1.A-2 BACKUP INSTRUMENT NITROGEN TO ADS STARTUP AND OPERATION

1.0 PURPOSE

This procedure provides the instructions necessary to align the Backup Instrument Nitrogen To ADS System to provide a backup supply of nitrogen for operation of the ADS relief valves.

2.0 PREREQUISITES

2.1 Vital 120 VAC System available in accordance with SO 58A.1.A-2, "Vital 120 VAC System Normal Operation".

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

3.2 Nitrogen bottle pressure shall be maintained greater than 1300 psig.

3.3 Opening a nitrogen bottle valve without its respective pressure control valve fully counterclockwise, could result in pressure control valve failure.

4.0 PERFORMANCE STEPS

NOTE

Communications shall be available between the Control Room AND Personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation OR alarms.

4.1 Perform COL 16A.1.A-2, "Backup Instrument Nitrogen to ADS System", as directed by Shift Management.

4.2 Slowly open the applicable nitrogen bottle 2A(B,C)S377 isolation valve.

4.3 Adjust the following nitrogen bottle pressure control valves to obtain $\geq$ 85 psig on the individual nitrogen bottle pressure indicators:

N2 Bottle	Pressure Control Valve
2AS377	PCV 2-16A-8917A, "Nitrogen Pressure Control Valve for Backup Supply to ADS"

2BS377 PCV 2-16A-8917B, "Nitrogen Pressure Control Valve for Backup Supply to ADS"

2CS377 PCV 2-16A-8917C, "Nitrogen Pressure Control Valve for Backup Supply to ADS"

4.4 Request the RO to verify ≥ 85 psig as indicated on PI-8142, "Backup N2", at Panel 20C003-03, "Containment Atmosphere".

> NOTE
>
> IF piping downstream of SV-8130A & B is depressurized, THEN SV-8130A & B will close on a high nitrogen flow isolation upon opening.

4.5 Place SV-8130A, "A Supply", AND SV-8130B, "B Supply", control switches on Panel 20C003-03 in "OPEN", AND verify the valves remain open.

4.6 IF SV-8130A & B do NOT remain open, THEN place SV-8130A & B control switches in "CLOSE" AND proceed to AO 16A.1-2, "Post Maintenance Filling of the Backup Instrument Nitrogen to ADS System".

4.7 Place SV-8130A & B control switches in "CLOSE".

5.0 CONTROL STATIONS

5.1 MCR 20C003-03, Containment Atmosphere panel

6.0 REFERENCES

6.1 P&ID M-333, Instrument Nitrogen

6.2 E-2357, Post Accident Monitoring System

6.3 M-1-S-23, Primary Containment Isolation System

6.4 E-28, Instrumentation & Uninterruptible AC System Unit 2 & Common

6.5 SO 58A.1.A-2, "Vital 120 VAC System Normal Operation"

7.0 TECHNICAL SPECIFICATIONS

7.1 Section 3.5.1

8.0 INTERFACING PROCEDURES

8.1 COL 16A.1.A-2, "Backup Instrument Nitrogen to ADS System"

8.2 AO 16A.1-2, "Post Maintenance Filling of the Backup Instrument Nitrogen to ADS System"

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2010010501 / PLOR-123P K/A: 295031EA1.10
URO: 3.6 SRO: 3.7

TASK DESCRIPTION: Maximize CRD Flow to Reactor Vessel – Unit 3

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

Procedure T-246-3, Rev. 2, "Maximizing CRD Flow to the Reactor Vessel"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the Unit 3 CRD System is lined up to deliver maximum flow to the reactor vessel with:

    a. Both CRD pumps are running.

    b. The CRD suction filter is bypassed.

    c. Both CRD drive water filters are in service.

2. Estimated time to complete: 24 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to maximize CRD flow to the Reactor Vessel using T-246, "Maximizing CRD Flow to the Reactor Vessel". I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. T-111, "Level Restoration" directs that CRD flow to the Reactor vessel be maximized.

2. Unit 3 has scrammed.

3. Scram is NOT reset.

4. The 3A CRD pump is operating.

5. The 3A Drive Water Filter is in service.

6. All prerequisites in Section 2.0 of T-246-3, "Maximizing CRD Flow to the Reactor Vessel" are met.

G. INITIATING CUE

The Control Room Supervisor directs you, the Equipment Operator, to perform steps 4.3 through 4.8 of T-246-3, "Maximizing CRD Flow to the Reactor Vessel" on Unit 3.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure T-246-3.	P	A copy of procedure T-246-3 is obtained.
*2	Open HV-3-3-129, CRDHS Bypass Valve for Pump Suction Filter 30F101. (Cue: Valve handwheel is turned [COUNTERCLOCKWISE] until stem length above valve yoke rises 4 inches then will not turn.)	S	HV-3-3-129 handwheel is turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
3	Verify HV-3-3-35B, Suction Block Valve to CRD Water Pump 3BP039, is open. (Cue: Valve handwheel turned [CLOCKWISE] until stem length above valve yoke begins to lower then handwheel turned [COUNTER-CLOCKWISE] to original position then will not turn further.)	S	HV-3-3-35B handwheel is turned CLOCKWISE until stem movement is observed, then COUNTERCLOCKWISE until resistance of valve backseat is felt.
4	Verify HV-3-3-36B, Inner Disch Block Vv from CRD Drive Water Pump 3BP039, is closed. (Cue: [CLOCKWISE] Valve handwheel does not move, stem length above valve yoke does not change.)	S	HV-3-3-36B handwheel movement is attempted in the CLOCKWISE direction.
5	Verify HV-3-3-37B, CRD Wtr. Pp 3BP039 Recirc to Cond Storage Tank Valve, is locked open. (Cue: Valve handwheel is turned [CLOCKWISE] 1/4 turn then is stopped by locking device then the handwheel turned [COUNTERCLOCKWISE] to original position and will not turn further.)	S	HV-3-3-37B locking device is verified installed, handwheel is turned CLOCKWISE to determine that the locking device will prevent the valve from being closed then turned COUNTERCLOCK-WISE until resistance of valve backseat is felt.
6	Verify oil level in Speed Increaser. (Cue: Oil level is 1 1/2 inches.)	P	Speed Increaser oil level verified $\geq$ 1 inch.
7	Verify oil level in motor bearing sightglass. (Cue: Oil level is 3/4 full.)	P	Motor bearing sightglass verified $\geq$ 1/2 full.

STEP NO	STEP	ACT	STANDARD
8	Verify proper oil level in pump bearing sightglasses. (Cue: Oil level in all sighglasses are 3/4 full.)	P	Sightglasses on pump bearings verified ≥ 1/2 full.
9	Verify TBCW flow from Gear Box and pump bearings oil cooler. (Cue: Flapper in flowglass is lifted up.)	P	TBCW flow verified from gearbox and pump bearing oil cooler by observing flowglass flapper.
10	Verify HV-3-3-39, CRD Pump 3AP039 Seal Flood Cross Connection Valve, is open. (Cue: Valve handwheel turned [CLOCKWISE] until stem length above valve yoke begins to lower then handwheel turned [COUNTER-CLOCKWISE] to original position then will not turn further.]	S	HV-3-3-39 handwheel is turned CLOCKWISE until stem movement is observed, then COUNTERCLOCKWISE until resistance of valve backseat is felt.
*11	Report to the Main Control Room that procedure steps 4.1 through 4.4 are complete. Request the Main Control Room start "3B" CRD pump. (Cue: MCR acknowledges report, CRD pump start announcement is heard over PA system, noise of motor start is heard from "3B" CRD pump.)	S	Procedure Step 4.1 to 4.4 completion reported to Main Control Room and request to start "3B" CRD pump using hand held radio or GAI-TRONICS page system.
	***** NOTE ***** **Direct examinee to complete Steps 4.6 through 4.8.**		
*12	Slowly open HV-3-3-36B, Inner Disch Block Vv from CRD Drive Water Pump 3BP039, after Control Room starts the "3B" CRD pump. (Cue: Valve handwheel turned [COUNTERCLOCKWISE] until stem length above valve yoke rises 4 inches then will not turn, flow noise can be heard as valve is opened.)	S	HV-3-3-36B handwheel is slowly turned COUNTERCLOCKWISE until resistance of valve backseat is felt.

STEP NO	STEP	ACT	STANDARD
*13	Fully open HV-3-3-170, Inlet Valve to Drive Water Filters. (Cue: Valve handwheel turned [COUNTERCLOCKWISE] until it will not turn.)	S	HV-3-3-170 handwheel is turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
14	Verify HV-3-3-45B, Drain Valve for Drive Water Filter 3BF013, is closed. (Cue: [CLOCKWISE] Valve handwheel does not move, stem length above valve yoke does not change.)	S	HV-3-3-45B handwheel movement is attempted in the CLOCKWISE direction.
15	Open HV-3-3-44B, Vent Valve for the Drive Water Filter 3BF013. (Cue: Valve handwheel turned [COUNTERCLOCKWISE] until stem length above valve yoke rises 2 inches then will not turn.)	S	HV-3-3-44B handwheel is turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
16	Crack open HV-3-3-42B, CRDHS Inlet Block Valve to Drive Water Filter 3BF013. (Cue: Valve handwheel turned [COUNTERCLOCKWISE], stem length above valve yoke rises, flow noise is heard, steady stream of water is seen in flow glass FG-9047B downstream of HV-3-3-44B.)	S	HV-3-3-42B handwheel is turned COUNTERCLOCKWISE until flow is heard or felt.
17	Close HV-3-3-44B, Vent Valve for the Drive Water Filter 3BF013. (Cue: Valve handwheel turned [CLOCKWISE], stem length above valve yoke lowers, flow noise stops, water stream in flow glass stops, then handwheel will not turn further.)	S	When a steady stream of water is seen in FG-9047B, HV-3-3-44B handwheel is turned CLOCKWISE until resistance of valve seat is felt.

STEP NO	STEP	ACT	STANDARD
*18	Fully open HV-3-3-42B, CRDHS Inlet Block Valve to Drive Water Filter 3BF013. (Cue: Valve handwheel turned [COUNTERCLOCKWISE] until stem length above valve yoke rises 4 inches then will not turn.)	S	HV-3-3-42B handwheel is turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
*19	Slowly open HV-3-3-43B, CRDHS Outlet Block Valve from Drive Water Filter 3BF013. (Cue: Valve handwheel is turned [COUNTERCLOCKWISE] until stem length above valve yoke rises 4 inches then will not turn, flow noise can be heard as valve is opened.)	S	HV-3-3-43B handwheel is turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
20	Inform Control Room of task completion. (Cue: Control Room acknowledges report.)	S	Task completion reported using hand held radio or GAI-TRONICS page system.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When CRD flow has been maximized to the Reactor vessel with both CRD pumps running, The CRD suction filter bypassed, and both drive water filter in service, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. T-111, "Level Restoration" directs that CRD flow to the Reactor vessel be maximized.
2. Unit 3 has scrammed.
3. Scram is <u>NOT</u> reset.
4. The 3A CRD pump is operating.
5. The 3A Drive Water Filter is in service.
6. All prerequisites in Section 2.0 of T-246-3, "Maximizing CRD Flow to the Reactor Vessel" are met.

INITIATING CUE

The Control Room Supervisor directs you, the Equipment Operator, to perform steps 4.3 through 4.8 of T-246-3, "Maximizing CRD Flow to the Reactor Vessel" on Unit 3.

PECO Energy Company
Peach Bottom Unit 3

T-246-3 MAXIMIZING CRD FLOW TO THE REACTOR VESSEL

1.0 PURPOSE

This procedure provides the instructions necessary to maximize CRD System flow. Maximizing CRD flow is performed for either of the following reasons:

- o Raising flow to the RPV serves as an alternate means of RPV injection.
- o Raising flow will raise the CRD cooling water differential pressure, and, especially at lower than normal RPV pressure, could cause any control rods not fully inserted to drift into the core.

This procedure CANNOT be performed concurrently with procedure T-220-3, "Driving Control Rods During Failure to Scram."

2.0 PREREQUISITES

2.1 Use of this procedure has been directed by the TRIP or SAMP procedures.

2.2 CRD pump(s) available.

2.3 Turbine Building Cooling Water or Reactor Building Cooling Water supplying the CRD Pump Lube Oil Coolers.

2.4 Instrument Air supplying the CRDH System.

2.5 CST level above 5 ft.

2.6 Shift Management has directed that this procedure is to be performed with higher priority than T-220-3, "Driving Control Rods During Failure to Scram."

3.0 AREA ACCESS/PERSONNEL REQUIREMENTS

3.1 Area Access

3.1.1 Main Control Room

3.1.2 Turbine Building 116'

3.1.3 Reactor Building 135'

3.2 Personnel Requirements

3.2.1 Required: 1 MCR Operator, 1 Equipment Operator

3.2.2 Preferred: 1 MCR Operator, 1 Equipment Operator

4.0 PERFORMANCE STEPS

4.1 Unless directed by a TRIP or SAMP procedure to reset the scram, verify the scram is NOT reset.

4.2 IF no CRD pump is operating,
THEN start a CRD pump by performing the following:

4.2.1 Direct an Operator to the CRD pump area to perform the following for the selected CRD pump:

4.2.1.1 Verify oil level in Speed Increaser 1 inch OR greater.

4.2.1.2 Verify oil level in motor bearings sight glass at least 1/2 full.

4.2.1.3 Verify proper oil level in pump bearing sight glasses.

4.2.1.4 Verify TBCCW flow from gear box and pump bearing oil cooler visible in flow glass.

4.2.1.5 Verify HV-3-3-36A(B), "Inner Disch Block Valve from CRD Drive Water Pump 3AP039 (3BP039)" is closed.

4.2.1.6 Verify open HV-3-3-35A(B), "Suction Block Valve to CRD Water Pump 3AP039 (3BP039)."

4.2.2 In the MCR, perform the following at Panel 30C005A:

4.2.2.1 Verify CRD flow valve controller FIC-3-03-301 in "MAN".

4.2.2.2 Verify AO-3-3-19A(B), "Flow Control" is closed.

4.2.2.3 Verify MO-3-03-020, "Drive Wtr Press" fully open.

4.2.3 Start the selected CRD pump AND observe the running current on the ammeter is below 34 amps and remains below 34 amps during initial system flow changes.

4.2.4 Direct the operator to slowly open HV-3-3-36A(B), "Inner Disch Block VV from CRD Drive Water Pump 3AP039 (3BP039)" for the running pump.

NOTE

An orifice in the charging header limits charging flow to below 180 gpm at 0 psig RPV pressure.

4.3 Direct an operator to open HV-3-3-129, "CRDHS Bypass Valve for Pump Suction Filter 30F101."

4.4 Direct an operator to check the standby CRD pump for starting as follows:

4.4.1 Verify open HV-3-3-35A(B) "Suction Block Valve to CRD Water Pump 3AP039 (3BP039)."

4.4.2 Verify closed HV-3-3-36A(B), "Inner Disch Block Vv from CRD Drive Water Pump 3AP039 (3BP039)."

4.4.3 Verify locked open HV-3-3-37A(B), "CRD Wtr Pp 3AP039(3BP039) Recirc to Cond Storage Tank Valve."

4.4.4 Verify oil level in Speed Increaser 1 in. or greater.

4.4.5 Verify oil level in motor bearing sight glass at least 1/2 full.

4.4.6 Verify proper oil level in pump bearing sight glasses.

4.4.7 Verify TBCCW flow from Gear Box and pump bearings oil cooler visible in flow glass.

4.4.8 Verify open HV-3-3-39, "CRD Pp 3AP039 Seal Flood Cross Connection Valve."

4.5 In the MCR, start the standby CRD pump and observe the running current for the CRD pumps do <u>NOT</u> exceed 34 amps following pump start.

4.6 Direct the Operator to slowly open HV-3-3-36A(B), "Inner Disch Block Vv from CRD Drive Water Pump 3AP039 (3BP039)."

4.7 Direct an operator to the Reactor Building 135' CRD Valve Nest to fully open HV-3-3-170, "Inlet Valve to Drive Water Filters."

4.8 Direct an operator to place the Standby Drive Water Filter in service by performing the following:

4.8.1 Verify HV-3-3-45A(B), "Drain Valve for Drive Water Filter 3AF013 (3BF013)", is closed for the out of service filter.

4.8.2 Open HV-3-3-44A(B), "Vent Valve For Drive Water Filter 3AF013 (3BF013)", for the out of service filter.

4.8.3 Slowly crack open HV-3-3-42A(B), "CRDHS Inlet Block Valve to Drive Water Filter 3AF013 (3BF013)", for the out of service filter.

4.8.4 WHEN a steady flow of water is observed through the vent,
THEN close HV-3-3-44A(B).

4.8.5 Fully open HV-3-3-42A(B) for the out of service filter.

4.8.6 Slowly open HV-3-3-43A(B), "CRDHS Outlet Block Valve from Drive Water Filter 3AF013 (3BF013)", for the out of service filter.

4.9 In the MCR, verify MO-3-03-020, "Drive Wtr Press" fully open.

4.10 Close the following valves at Panel 30C004A to isolate the Reactor Recirc pumps seal purge:
- o MO-3-2A-9029A, "Seal Purge"
- o MO-3-2A-9029B, "Seal Purge"

4.11 Verify the CRD flow valve controller FIC-3-03-301 in "MAN."

CAUTION

Operating a CRD pump with motor current above 41 amps may cause damage.

4.12 While monitoring CRD pump amps, open AO-3-3-19A(B), "Flow Control" using FIC-3-03-301.

CAUTION

Closing HV-3-3-56, which is done to maximize CRD Cooling Water Header dP during an ATWS, prevents recharging HCU accumulators. IF the accumulators are NOT charged, THEN control rod insertion using T-216-3, "Control Rod Insertion by Manual Scram or Individual Scram Test Switches" may be limited.

4.13 IF an ATWS is in progress,
THEN direct an operator to close HV-3-3-56, "Charging Wtr Hdr Blk Vv to Hydraulic Control Units", located at Reactor Building 135'.

NOTES

1. The CRD System is now delivering maximum flow to the RPV. The expected flow is:

   - o 212 gpm at 1000 psig RPV pressure
   - o 300 gpm at 0 psig RPV pressure

2. With high flow through the CRD system, all CRDs may be driven to the insert overtravel position. Therefore, a green double dash (--) indication on the Full Core Display should be considered normal during execution of this procedure.

3. Any rods not fully inserted may drift into the core.

5.0 RETURN TO NORMAL

5.1 IF HV-3-3-56 was closed in Step 4.13
AND
HV-3-3-56 is not required to be closed by a TRIP or SAMP procedure,
THEN direct a floor operator to open HV-3-3-56, located at Reactor Building 135'.
Otherwise, mark this step N/A.

Performer Initials/Date   I.V. Initials/Date

5.2 IF BOTH CRD pumps are operating,
THEN shut down one CRD pump and close HV-3-3-36A(B), "Inner Disch Block Vv from CRD Drive Water Pump 3AP039 (3BP039)".

Performer Initials/Date   I.V. Initials/Date

5.3 Adjust the CRD flow valve controller FIC-3-03-301 to obtain 55 - 65 gpm CRD System Flow on FI-3-03-310 or as required to maintain the desired RPV level.

Performer Initials/Date   I.V. Initials/Date

5.4 Direct an operator to remove one Drive Water Filter from service by performing the following:

5.4.1 Close HV-3-3-43A(B), "CRDHS Outlet Block Valve from Drive Water Filter 3AF013 (3BF013)."

Performer Initials/Date   I.V. Initials/Date

5.4.2 Close HV-3-3-42A(B), "CRDHS Inlet Block Valve to Drive Water Filter 3AF013 (3BF013)."

Performer Initials/Date   I.V. Initials/Date

5.5 Direct an operator to close HV-3-3-129, "CRDHS Bypass Valve for Pump Suction Filter."

Performer Initials/Date   I.V. Initials/Date

5.6 In the MCR, adjust the CRD flow controller to a null deviation and transfer to "AUTO."

Performer Initials/Date   I.V. Initials/Date

5.7 Throttle MO-3-03-020, "Drive Wtr Press" to obtain 260 - 280 psid on DPI-3-03-303.

Performer Initials/Date   I.V. Initials/Date

5.8 Check Cooling Water Header dP is 15 - 25 psid on DPI-3-03-304, or as required to maintain the desired RPV level.

Performer Initials/Date   I.V. Initials/Date

5.9 Throttle HV-3-3-170, "Inlet Valve to Drive Water Filters" as necessary to reduce Charging Water pressure to below 1510 psig on PI-3-03-302.

Performer Initials/Date   I.V. Initials/Date

5.10 Check drive water flow is 0 gpm on FI-3-03-305.

Performer Initials/Date   I.V. Initials/Date

5.11 Check that Cooling Water Flow is 55 - 65 gpm on FI-3-03-306 or as required to maintain the desired RPV level.

Performer Initials/Date   I.V. Initials/Date

5.12 IF desired,
THEN restore Reactor Recirc Pumps seal purge using SO 2A.1.C-3, "Operation of the Recirculation Pump Seal Purge System".

Performer Initials/Date   I.V. Initials/Date

5.13 Inform Shift Management upon completion of this procedure.

Performer Initials/Date	I.V. Initials/Date

6.0 REFERENCES

6.1 P&ID M-356, "Control Rod Drive Hydraulic System - Part A".

6.2 P&ID M-357, "Control Rod Drive Hydraulic System - Part B"

6.3 P&ID M-309, "Condensate & Refueling Water Storage & Transfer Systems"

6.4 E-186, "Control Rod Drive Wtr Pp 4.16KV Ckt Bkr"

6.5 GEK-9684, "Control Rod Drive System"

6.6 SIL-200, "Increasing CRD System Flow to the RPV After Shutdown During Emergency Situations"

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2390110401 / PLOR-313PA K/A: 239001G.09

RO: SRO:

TASK DESCRIPTION: CLOSING A STUCK OPEN MSIV - ALTERNATE PATH (UNIT 3)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Fuse Pullers

C. REFERENCES

AO 1A.2-3, Rev. 4, "Closing a Stuck Open Outboard Main Steam Isolation Valve"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the Unit 3 Reactor Building 135' Elevation Instrument Air headers have been vented.

2. Estimated time to complete: 22 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to close the stuck open outboard MSIVs using AO 1A.2-3, "Closing a Stuck Open Outboard Main Steam Isolation Valve". I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. Unit 3 has just been manually scrammed.

2. RPV level is -175 inches.

3. All outboard MSIVs failed to isolate.

4. Proper operation of SGIG system has been verified in accordance with SO 16B.8.A-3, "Backup Seismic Instrument Nitrogen System Routine Inspection".

5. Radiological conditions do NOT allow entry into the Outboard MSIV Room.

G. INITIATING CUE

The Control Room Supervisor directs you to close the Unit 3 outboard MSIVs in accordance with AO 1A.2-3, "Closing a Stuck Open Outboard Main Steam Isolation Valve."

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure AO 1A.2-3.	P	A copy of procedure AO 1A.2-3 is obtained.
	**** NOTE **** Examinee should utilize sections 4.1 AND 4.3 of AO 1A.2-3.		
2	Open panel 30C042 front panel doors. (Cue: Panel 30C042 doors are open.)	P	Door handle turned, doors pulled outward to gain access to the outboard MSIV AC and DC solenoid valve fuses at the front of panel 30C042 in the Cable Spreading Room.
3	Pull the outboard MSIV AC solenoid valve fuse 16A-F12B. (Cue: Fuse is removed.)	S	Fuse puller is attached to outboard MSIV AC solenoid valve fuse 16A-F12B fuse if pulled outward until fuse is free of fuse holder.
4	Direct the Unit Reactor Operator to monitor outboard MSIV position indication. (Cue: Outboard MSIVs are open.)	S	Unit Reactor Operator is contacted to monitor outboard MSIV position indication.
5	Pull the outboard MSIV DC solenoid valve fuse 16A-F11B. (Cue: Fuse is removed.)	S	Fuse puller is attached to outboard MSIV DC solenoid valve fuse 16A-F11B. Fuse is pulled outward until fuse is free of fuse holder.
6	Direct the Unit Reactor Operator to monitor Main Steam line flow using FI-3-06-088A,B,C,D on panel 30C008A. (Cue: Main Steam line FI-3-06-088A,B,C,D are NOT reading downscale. Position indication for all outboard MSIVs has been lost.)	S	Unit Reactor Operator is contacted to monitor Main Steam line flow on FI-3-06-088A,B,C,D at panel 30C008A.
7	Install fuse 16A-F11B. (Cue: Fuse is installed.)	S	Fuse puller is attached to outboard MSIV DC solenoid valve fuse 16A-F11B. Fuse is inserted until fuse is installed in fuse holder.
8	Close panel 30C042 front panel doors. (Cue: Panel 30C042 doors are closed.)	P	Door closed and relatched using handle.
9	Direct the Unit Reactor Operator to verify RWCU isolation. (Cue: RWCU is isolated.)	S	Unit Reactor Operator is contacted to verify RWCU isolation.

STEP NO	STEP	ACT	STANDARD
10	Direct the Unit Reactor Operator to open Backup N_2 to ADS valves SV-9130A(B) in accordance with SO 16A.7.A-3. (Cue: SV-9130A(B) are open.)	S	Unit Reactor Operator is contacted to verify Backup N_2 to ADS valves SV-9130A(B) in accordance with SO 16A.7.A-3.
*11	Close Instrument Air A(B) Header Isolation valves HV-3-36B-56981A AND HV-3-36B-56981B. (Cue: The valve handwheels have been turned clockwise until they will turn no further.)	S	HV-3-36B-56981A and HV-3-36B-56981B handwheels turned clockwise until the resistance of the valve seats are felt at the 3B Recirc MG Set area.
12	Verify open Instrument Air Supply to DT-5695 Inlet Block valve HV-3-36B-54642. (Cue: The valve handwheel is turned slightly in the clockwise direction and then turned counterclockwise to the original position.	S	An attempt is made to turn HV-3-36B-54642 handwheel is turned slightly in the clockwise direction and then turned counterclockwise to the original position at the 3B Recirc MG Set area.
13	Verify open Instrument Air Supply to DT-5696 inlet block valve HV-3-36B-54643. (Cue: The valve handwheel is turned slightly in the clockwise direction and then turned counterclockwise to the original position.	S	An attempt is made to turn HV-3-363-54643 handwheel is turned slightly in the clockwise direction and then turned counterclockwise to the original position at the 3B Recirc MG Set area.
14	Notify the Control Room that venting is commencing and to perform more frequent monitoring of MSIV position. (Cue: Control Room acknowledges notification.)	S	Unit Reactor Operator is contacted and notified of venting and MSIV position monitoring.
*15	Simultaneously press and hold Drain Trap Bypass switches HS-3-36B-5695 AND HS-3-36B-5696. (Cue: HS-3-36B-5695 AND HS-3-36B-5696 are simultaneously depressed and held.)	S	Drain Trap Bypass pushbuttons HS-3-36B-5695 AND HS-3-36B-5696 are simultaneously depressed and held at the 3B Recirc MG Set area.
18	Inform Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknow-ledges report. Outboard MSIVs are closed.)	S	Task completion reported using telephone, hand held radio or GAI-TRONICS page system.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the Unit 3 outboard MSIVs are closed, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. Unit 3 has just been manually scrammed.

2. RPV level is -175 inches.

3. All outboard MSIVs failed to isolate.

4. Proper operation of SGIG system has been verified in accordance with SO 16B.8.A-3, "Backup Seismic Instrument Nitrogen System Routine Inspection".

5. Radiological conditions do <u>NOT</u> allow entry into the Outboard MSIV Room.

INITIATING CUE

The Control Room Supervisor directs you to close the Unit 3 outboard MSIVs in accordance with AO 1A.2-3, "Closing a Stuck Open Outboard Main Steam Isolation Valve."

PECO Energy Company
Peach Bottom Unit 3

AO 1A.2-3 CLOSING A STUCK OPEN OUTBOARD MAIN STEAM ISOLATION VALVE

1.0 PURPOSE

This procedure provides the instructions necessary for closing a stuck open outboard Main Steam Isolation Valve (MSIV) following a Group I isolation.

2.0 PREREQUISITES

2.1 Shift Management's permission to perform this procedure.

2.2 Group I isolation signal OR plant conditions warranting isolation of the main steam lines present.

2.3 Mode switch in shutdown.

3.0 PRECAUTIONS

3.1 During performance of this procedure, the Instrument Air Header for Unit 3 Reactor Building elevation 135' may be vented. Attachment 1 provides a list of equipment that will be effected. Reference ON-119, "Loss of Instrument Air for effect on plant and operator response.

3.2 IF stuck open MSIV CLOSES during performance of this procedure, THEN place equipment in a safe condition AND inform Shift Management.

4.0 PERFORMANCE STEPS

NOTES

1. Communication should be established between the Control Room AND personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation OR alarms.
2. Section 4.1: Attempts to close the stuck open MSIV by removing power to the control logic. This section is preferred to section 4.2 or 4.3.
3. Section 4.2: Attempts to close the stuck open MSIV by removing air to the Outboard MSIV header. This section is only used as radiological conditions permit.
4. Section 4.3: Attempts to close the stuck open MSIV by removing air to the 135' Rx Bldg header.

4.1 Perform steps 4.1.1 through 4.1.5 to remove power to the outboard MSIV (AO-3-01A-086A(B,C,D) AC and DC solenoid valves.

4.1.1 Direct an operator to remove power to the outboard MSIV AC solenoid valves by removing fuse 16A-F12B in panel 30C042.

4.1.2 Monitor outboard MSIV position indication to determine if stuck open MSIV has closed.

NOTE

Removing DC power from the MSIV control logic will result in loss of position indication for all outboard MSIVs. MSIV closure shall be verified by observing main steam line flow.

4.1.3 Direct an operator to remove power to the outboard MSIV DC solenoid valves by removing fuse 16A-F11B in panel 30C042.

4.1.4 Monitor main steam line flow using FI-3-06-088A(B,C,D) on 30C008A to determine if stuck open MSIV has closed.

4.1.5 IF MSIV does not indicate closed THEN direct an operator to restore power to the outboard MSIV DC solenoid valves and valve indication lights by installing fuse 16A-F11B in panel 30C042.

NOTE

Section 4.2 shall only be used if radiological conditions permit access to the Unit 3 OBMSIV room.

4.2 IF radiological conditions permit access to the Unit 3 OBMSIV room, THEN perform steps 4.2.1 through 4.2.4 to remove instrument air to the Outboard MSIV header, otherwise go to section 4.3.

<AT R3-81, RX BLDG NE GEN AREA - 135' ELEV>

4.2.1 Close HV-3-36B-56913A, "Instr Air A Hdr Isol Valve for Outboard MSIV Room".

4.2.2 Close HV-3-36B-56913B, "Instr Air B Hdr Isol Valve for Outboard MSIV Room".

<AT R3-30, OUTBOARD MSIV ROOM>

4.2.3 Uncap and Open HV-3-36B-56919A, "Instr Air A Hdr Isol Valve for Future Header Extension".

4.2.4 Uncap and Open HV-3-36B-56919B, "Instr Air B Hdr Isol Valve for Future Header Extension".

****
*   CAUTION   *
*   *
*   Venting the MSIV headers will impact the ability to   *
*   reset the Scram per T-216-3.   *
****

4.3 Perform steps 4.3.1 through 4.3.6 to remove instrument air to the Unit 3 Reactor Building elevation 135' header.

NOTE
The following major equipment will be lost due to isolation and venting of the Instrument Air Header for Unit 3 Reactor Building elevation 135': o Instrument Air Backup to Instrument Nitrogen o Drywell Instrument Nitrogen supply header o RBCCW to RWCU Non-Regen Hx and Pump Seal Coolers o Instrument Air supply to the large Primary Containment Ventilation Isolation Valves o Control Rod Drive Hydraulic System Flow Attachment 1 contains more detail on effected equipment

4.3.1 Isolate/Verify Isolation of Reactor Water Cleanup System.

4.3.2 Open SV-3-16A-9130A(B), "Backup Nitrogen to ADS A(B) Supply" in accordance with SO 16A.7.A-3, "Backup Instrument Nitrogen to ADS System Manual Actuation".

4.3.3 Verify proper operation of SGIG system in accordance with SO 16B.8.A-3, "Backup Seismic Instrument Nitrogen System Routine Inspection".

4.3.4 Direct an operator to vent the Instrument Air Header to Unit 3 Reactor Building elevation 135.

<AT T3-68, B RECIRC PUMP MG SET>

4.3.4.1 Close HV-3-36B-56981A, "Instr Air A Hdr Isol Valve for U/3 Rx Bldg El 135".

4.3.4.2 Close HV-3-36B-56981B, "Instr Air B Hdr Isol Valve for U/3 Rx Bldg El 135".

4.3.4.3 Verify open HV-3-36B-54642, "I/A Supply to Rx Bldg 135 DT-5695 Inlet Block Valve".

4.3.4.4 Verify open HV-3-36B-54643, "I/A Supply to Rx Bldg 135 DT-5696 Inlet Block Valve".

4.3.4.5 Notify Control Room that venting is commencing <u>AND</u> to perform more frequent monitoring of MSIV position.

CAUTION

Venting the MSIV headers will take a considerable amount of time due to check valves downstream of the vent path being used.

4.3.4.6 Simultaneously Press and Hold HS-3-36B-5695, "By-Pass Hand Switch for Drain Trap DT-5695" and HS-3-36B-5696, "By-Pass Hand Switch for Drain Trap DT-5696".

4.3.5 Monitor outboard MSIV position indication and Main Steam Line Flow to determine if stuck open MSIV has closed.

4.3.6 <u>WHEN</u> all outboard MSIVs indicate closed, <u>THEN</u> direct operator to release HS-3-36B-5695 and HS-3-36B-5696.

NOTE

All restoration steps require Double/Independent Verification. Signoffs for restoration steps are in Attachment 2.

4.4 <u>WHEN</u> restoration is desired, <u>THEN</u> perform the following in conjunction with Attachment 2:

4.4.1 Obtain Shift Management permission to perform restoration.

4.4.2 Obtain Unit 3 Reactor Operator permission to perform restoration.

4.4.3 <u>IF</u> Section 4.3 was performed, <u>THEN</u> perform steps 4.4.3.1 through 4.4.3.4 to restore instrument air to the Unit 3 Reactor Building elevation 135' header, <u>OTHERWISE</u> proceed to step 4.4.4.

<AT T3-68, B RECIRC PUMP MG SET>

4.4.3.1 Open HV-3-36B-56981A, "Inst Air A Hdr Isol Valve for U/3 Rx Bldg El 135".

4.4.3.2 Open HV-3-36B-56981B, "Inst Air B Hdr Isol Valve for U/3 Rx Bldg El 135".

4.4.3.3 Restore the Instrument Nitrogen system in accordance with SO 16.7.A-3 as directed by Shift Management.

4.4.3.4 Place Reactor Water Cleanup System in service in accordance with SO 12.1.A-3 as directed by Shift Management.

4.4.4 IF Section 4.2 was performed, THEN perform steps 4.4.4.1 through 4.4.4.4 to restore instrument air to the Outboard MSIV header, OTHERWISE proceed to step 4.4.5.

<AT R3-30, OUTBOARD MSIV ROOM>

4.4.4.1 Close AND Cap HV-3-36B-56919A, "Instr Air A Hdr Isol Valve for Future Header Extension".

4.4.4.2 Close AND Cap HV-3-36B-56919B, "Instr Air B Hdr Isol Valve for Future Header Extension".

<AT R3-81, RX BLDG NE GEN AREA - 135' ELEV>

4.4.4.3 Open HV-3-36B-56913A, "Instr Air A Hdr Isol Valve for Outboard MSIV Room".

4.4.4.4 Open HV-3-36B-56913B, "Instr Air B Hdr Isol Valve for Outboard MSIV Room ".

4.4.5 IF Section 4.1 was performed, THEN perform steps 4.4.5.1 AND 4.4.5.2 to restore power to the Outboard MSIV (AO-3-01A-086A(B,C,D) AC and DC solenoid valves.

4.4.5.1 Install (OR Verify installed) fuse 16A-F11B in panel 30C042.

4.4.5.2 Install fuse 16A-F12B in panel 30C042.

5.0 CONTROL STATIONS

5.1 30C003-01

5.2 30C005A

5.3 30C008

6.0 REFERENCES

6.1 M-351, Sheet 3 and 4

6.2 M-320, Sheet 35

6.3 M-1-S-23, Sheet 45

7.0 TECHNICAL SPECIFICATION

7.1 Section 3.6.1.3, 3.6.1.5, 3.6.3.1

8.0 INTERFACING PROCEDURES

8.1 ON-119, "Loss of Instrument Air"

8.2 SO 12.1.A-3, "Reactor Water Cleanup System Startup For Normal Operations Or Reactor Vessel Level Control"

8.3 SO 16.7.A-3, "Instrument Nitrogen System Restoration Following Primary Containment Isolation"

8.4 SO 16A.7.A-3, "Backup Instrument Nitrogen to ADS System Manual Actuation"

8.5 SO 16B.8.A-3, "Backup Seismic Instrument Nitrogen System Routine Inspection"

ATTACHMENT 1

EQUIPMENT EFFECTED BY LOSS OF INSTRUMENT AIR HEADER 135 RX BLDG

VALVE	DESCRIPTION	NORMAL POSITION	FAILURE MODE
AO-3-01A-086A	A Main Steam Line Outboard Isolation Valve	OPEN	CLOSED
AO-3-01A-086B	B Main Steam Line Outboard Isolation Valve	OPEN	CLOSED
AO-3-01A-086C	C Main Steam Line Outboard Isolation Valve	OPEN	CLOSED
AO-3-01A-086D	D Main Steam Line Outboard Isolation Valve	OPEN	CLOSED
TIC-3535A(B)	M/G Lube Oil Cooler Outlet Temp	THROTTLED	OPEN
AO-3-03-019A	Control Rod Drive Hydraulic System Flow Control A	OPEN	CLOSED
AO-3-03-019B	Control Rod Drive Hydraulic System Flow Control B	OPEN	CLOSED
CV-3-07B-3515	N2 Purge to Drywell and Torus	CLOSED	CLOSED
AO-3-07B-3519	Drywell and Torus Inlet N2 Purge Isol Valve	CLOSED	CLOSED
AO-3-07B-3523	Drywell + Torus N2 Make-up Inlet Isol Valve	CLOSED	CLOSED
AO-3-07B-3521A	Torus Air Purge Outboard Isolation Valve	CLOSED	CLOSED
AO-3-07B-3521B	Torus Air and N2 Purge Outboard Isol Valve	CLOSED	CLOSED
AO-3-07B-3520	Drywell Air and Nitrogen Purge Isol Valve	CLOSED	CLOSED
AO-3-07B-3505	Drywell Air Purge Inlet Isolation Valve	CLOSED	CLOSED
AO-3-13-022	RCIC Discharge Check Valve	N/A	N/A
AO-3-16-3969A(B)	A(B) DW Inst N2 Hdr Isol Valve to A(B) Hdr	OPEN	CLOSED
AO-3-23-018	HPCI Discharge Check Valve	N/A	N/A
AO-3-35-9154A	RBCW Backup to DWCW Clrs Inlet Vv B Loop	CLOSED	OPEN
AO-3-35-9154B	RBCW Backup from DWCW Clrs Outlet Vv B Loop	CLOSED	OPEN
AO-3-35-9155A	RBCW Backup to DWCW Clrs Inlet Vv A Loop	CLOSED	OPEN
AO-3-35-9155B	RBCW Backup from DWCW Clrs Outlet Vv A Loop	CLOSED	OPEN
AO-3-35-3253	RBCW Isol to Non Regen Hx + Pp Seal Clrs	OPEN	CLOSED
AO-3-36B-5230A(B)	Instrument Air Backup to A(B) Inst N2 Hdr	CLOSED	CLOSED
	Backup Inst Air to DW Inst N2 Hdr A(B)	N/A	N/A
	TIP Drive Mechanisms	N/A	N/A

ATTACHMENT 2

RESTORATION VERIFICATION

This attachment provides signoffs of procedure steps AND shall be forwarded to Nuclear Records Management System at the completion of this procedure.

4.4.1 Shift Management permission to perform restoration.

____
Shift Management/Date/Time

4.4.2 Unit 2 Reactor Operator permission to perform restoration.

____
Unit 2 Reactor Operator/Date/Time

4.4.3.1 Open HV-3-36B-56981A. ________

________ IV

4.4.3.2 Open HV-3-36B-56981B. ________

________ IV

4.4.3.3 Instrument Nitrogen system restored in accordance with SO 16.7.A-3 as directed by Shift Management (N/A if NOT performed). ________

________ IV

4.4.3.4 Reactor Water Cleanup system restored in accordance with SO 12.1.A-3 as directed by Shift Management (N/A if NOT performed). ________

________ IV

4.4.4.1 Close AND Cap HV-3-36B-56919A. ________

________ IV

4.4.4.2 Close AND Cap HV-3-36B-56919B. ________

________ IV

4.4.4.3 Open HV-3-36B-56913A. ________

________ IV

ATTACHMENT 2 (Continued)

4.4.4.4	Open HV-3-36B-56913B.	________ ________ IV
4.4.5.1	Install (OR Verify installed) fuse 16A-F11B in panel 30C042.	________ ________ IV
4.4.5.2	Install fuse 16A-F12B in panel 30C042.	________ ________ IV

12/31/99

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
Sep 13, 14-16, 1999, AT Peach Bottom Units 2 + 3
DOCKET NO. 50-277, 278

ON ______________ 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 & Written EXAMINATION, DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE A070. including outlines

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

As Given

PECO NUCLEAR

A Unit of PECO Energy

WRITTEN EXAM

Senior Reactor Operator

Reactor Operator

Peach Bottom Atomic Power Station

Initial License Examination

September 1999

A010

Facility: Peach Bottom Atomic Power Station Form ES-401-1

Exam Date: 09/13/1999 **Exam Level:** SRO

Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	3	5	3				5	3			7	26
	2	3	2	3				2	4			3	17
	Tier Totals	6	7	6				7	7			10	43
2. Plant Systems	1	2	1	2	2	2	3	1	3	3	2	2	23
	2	1	2	1	1	1	0	1	1	1	0	4	13
	3	0	0	0	1	0	1	1	0	1	0	0	4
	Tier Totals	3	3	3	4	3	4	3	4	5	2	6	40

3. Generic Knowledge And Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	4	4	4	5	17

Note:

1. Attempt to distribute topics among all K/A Categories; select at least one topic from every K/A category within each tier.
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category tier.

Facility: Pe[illegible] Bottom Atomic Power Stat

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295003	Partial or Complete Loss of A.C. Power / 6						X	2.1.32 - Ability to explain and apply system limits and precautions.	3.8	1
295003	Partial or Complete Loss of A.C. Power / 6		X					AK2.04 - A.C. electrical loads	3.5	1
295006	SCRAM / 1					X		AA2.02 - Control rod position	4.4*	1
295007	High Reactor Pressure / 3		X					AK2.01 - Reactor/turbine pressure regulating system	3.7	1
295009	Low Reactor Water Level / 2				X			AA1.01 - Reactor feedwater	3.9	1
295010	High Drywell Pressure / 5			X				AK3.04 - Leak investigation	3.8	1
295010	High Drywell Pressure / 5						X	2.4.11 - Knowledge of abnormal condition procedures.	3.6	1
295014	Inadvertent Reactivity Addition / 1					X		AA2.03 - Cause of reactivity addition	4.3	1
295015	Incomplete SCRAM / 1						X	2.4.6 - Knowledge symptom based EOP mitigation strategies.	4.0	1
295016	Control Room Abandonment / 7						X	2.4.11 - Knowledge of abnormal condition procedures.	3.6	1
295016	Control Room Abandonment / 7.				X			AA1.06 - Reactor water level	4.1	1
295017	High Off-Site Release Rate / 9				X			AA1.07 - Process radiation monitoring system	3.6	1
295024	High Drywell Pressure / 5					X		EA2.01 - Drywell pressure	4.4*	1
295024	High Drywell Pressure / 5				X			EA1.14 - Drywell ventilation system	3.5	1

BWR SR[illegible]xamination Outline

Facility: Pe[illegible] Bottom Atomic Power Stat

Printed: 06/[illegible]9

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295025	High Reactor Pressure / 3				X			EA1.03 - Safety/relief valves: Plant-Specific	4.4*	1
295025	High Reactor Pressure / 3						X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	4.0	1
295026	Suppression Pool High Water Temperature / 5	X						EK1.01 - Pump NPSH	3.4	1
295026	Suppression Pool High Water Temperature / 5						X	2.1.25 - Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	3.1	1
295030	Low Suppression Pool Water Level / 5			X				EK3.03 - RCIC operation: Plant-Specific	3.7	1
295031	Reactor Low Water Level / 2	X						EK1.01 - Adequate core cooling.	4.7*	1
295031	Reactor Low Water Level / 2		X					EK2.01 - Reactor water level indication	4.4*	1
295037	SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1			X				EK3.07 - Various alternate methods of control rod insertion: Plant-Specific	4.3*	1
295037	SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1		X					EK2.09 - Reactor water level	4.2	1
295038	High Off-Site Release Rate / 9		X					EK2.03 - Plant ventilation systems	3.8	1
500000	High Containment Hydrogen Concentration / 5	X						EK1.01 - Containment integrity	3.9	1
500000	High Containment Hydrogen Concentration / 5						X	2.1.20 - Ability to execute procedure steps.	4.2	1

K/A Category Totals: 3 5 3 5 3 7

Group Point Total: 26

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295002	Loss of Main Condenser Vacuum / 3				X			AA1.05 - Main turbine	3.2	1
295002	Loss of Main Condenser Vacuum / 3			X				AK3.01 - Reactor SCRAM: Plant-Specific	3.8	1
295008	High Reactor Water Level / 2					X		AA2.01 - Reactor water level	3.9	1
295018	Partial or Complete Loss of Component Cooling Water / 8			X				AK3.02 - Reactor power reduction	3.4	1
295018	Partial or Complete Loss of Component Cooling Water / 8						X	2.4.35 - Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.	3.5	1
295019	Partial or Complete Loss of Instrument Air / 8						X	2.4.11 - Knowledge of abnormal condition procedures.	3.6	1
295019	Partial or Complete Loss of Instrument Air / 8		X					AK2.01 - CRD hydraulics	3.9	1
295021	Loss of Shutdown Cooling / 4	X						AK1.01 - Decay heat	3.8	1
295022	Loss of CRD Pumps / 1	X						AK1.01 - Reactor pressure vs. rod insertion capability	3.4	1
295028	High Drywell Temperature / 5					X		EA2.03 - Reactor water level	3.9	1
295029	High Suppression Pool Water Level / 5	X						EK1.01 - Containment integrity	3.7	1
295029	High Suppression Pool Water Level / 5		X					EK2.05 - Containment/drywell vacuum breakers	3.3	1
295032	High Secondary Containment Area Temperature / 5					X		EA2.02 - Equipment operability	3.5	1
295034	Secondary Containment Ventilation High Radiation / 9				X			EA1.03 - Secondary containment ventilation	3.9	1

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295036	Secondary Containment High Sump/Area Water Level / 5						X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	4.0	1
600000	Plant Fire On Site / 8					X		AA2.17 - Systems that may be affected by the fire	3.6	1
600000	Plant Fire On Site / 8			X				AK3.04 - Actions contained in the abnormal procedure for plant fire on site	3.4	1
	K/A Category Totals:	3	2	3	2	4	3	Group Point Total:		17

Facility: Peach Bottom Atomic Power Stat

ES - 401 **Plant Systems - Tier 2 / Group 1** **Form ES-401-1**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
202002	Recirculation Flow Control System / 1	X											K1.09 - Reactor water level	3.2	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2				X								K4.10 - Dedicated injection system during automatic system initiation (injection valve interlocks)	4.1	1
206000	High Pressure Coolant Injection System / 2					X							K5.05 - Turbine speed control: BWR-2, 3, 4	3.3	1
209001	Low Pressure Core Spray System / 2			X									K3.02 - ADS logic	3.9	1
211000	Standby Liquid Control System / 1							X					A1.03 - Pump discharge pressure	3.6	1
212000	Reactor Protection System / 7											X	2.1.12 - Ability to apply technical specifications for a system.	4.0	1
216000	Nuclear Boiler Instrumentation / 7									X			A3.01 - Relationship between meter/recorder readings and actual parameter values: Plant-Specific	3.4	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2		X										K2.01 - Motor operated valves	2.8*	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2								X				A2.15 - Steam line break	3.8	1
218000	Automatic Depressurization System / 3										X		A4.02 - ADS logic initiation	4.2*	1
223001	Primary Containment System and Auxiliaries / 5										X		A4.12 - Drywell coolers/chillers	3.6	1

BWR SRO Examination Outline

Printed: 06 [illegible]999

Facility: Peach Bottom Atomic Power Stat

ES - 401

Plant Systems - Tier 2 / Group 1

Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5									X			A3.02 - Valve closures	3.5	1
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5								X				A2.06 - Containment instrumentation failures	3.2	1
239002	Relief/Safety Valves / 3				X								K4.07 - Minimum steam pressure required to keep SRV open or to open SRV	3.2	1
241000	Reactor/Turbine Pressure Regulating System / 3						X						K6.01 - A.C. electrical power	2.9	1
241000	Reactor/Turbine Pressure Regulating System / 3					X							K5.04 - Turbine inlet pressure vs. reactor pressure	3.3	1
259002	Reactor Water Level Control System / 2						X						K6.05 - Reactor water level input	3.5	1
259002	Reactor Water Level Control System / 2									X			A3.01 - Runout flow control: Plant-Specific	3.0*	1
261000	Standby Gas Treatment System / 9											X	2.2.23 - Ability to track limiting conditions for operations.	3.8	1
261000	Standby Gas Treatment System / 9						X						K6.01 - A.C. electrical distribution	3.0	1
262001	A.C. Electrical Distribution / 6								X				A2.06 - Deenergizing a plant bus	2.9	1
262001	A.C. Electrical Distribution / 6			X									K3.06 - Reactor protection system	4.1*	1

Facility: Peach Bottom Atomic Power Stat

ES - 401

Plant Systems - Tier 2 / Group 1

Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
264000	Emergency Generators (Diesel/Jet) / 6	X											K1.01 - A.C. electrical distribution	4.1	1
	K/A Category Totals:	2	1	2	2	2	3	1	3	3	2	2	**Group Point Total:**		23

Facility: Peach Bottom Atomic Power Stat

ES - 401 Plant Systems - Tier 2 / Group 2 Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201001	Control Rod Drive Hydraulic System / 1		X										K2.03 - Backup SCRAM valve solenoids	3.6*	1
201001	Control Rod Drive Hydraulic System / 1											X	2.1.32 - Ability to explain and apply system limits and precautions.	3.8	1
204000	Reactor Water Cleanup System / 2							X					A1.04 - System flow	2.8	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4		X										K2.02 - Motor operated valves	2.7*	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4								X				A2.05 - System isolation	3.7	1
214000	Rod Position Information System / 7					X							K5.01 - Reed switches	2.8	1
215003	Intermediate Range Monitor (IRM) System / 7											X	2.2.34 - Knowledge of the process for determining the internal and external effects on core reactivity.	3.2*	1
234000	Fuel Handling Equipment / 8											X	2.2.27 - Knowledge of the refueling process.	3.5	1
245000	Main Turbine Generator and Auxiliary Systems / 4											X	2.1.25 - Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.	3.1	1
245000	Main Turbine Generator and Auxiliary Systems / 4	X											K1.06 - Component cooling water systems	2.6	1
259001	Reactor Feedwater System / 2				X								K4.11 - Recirculation runbacks: Plant-Specific	3.5	1

Facility: Peach Bottom Atomic Power Stat

ES - 401 | Plant Systems - Tier 2 / Group 2 | Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
290003	Control Room HVAC / 9									X			A3.01 - Initiation/reconfiguration	3.5	1
300000	Instrument Air System (IAS) / 8			X									K3.01 - Containment air system	2.9	1
	K/A Category Totals:	1	2	1	1	1	0	1	1	1	0	4	Group Point Total:		13

Facility: Peach Bottom Atomic Power Stat

ES - 401 Plant Systems - Tier 2 / Group 3 Form ES-401-1

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
215001	Traversing In-Core Probe / 7				X								K4.01 - Primary containment isolation: Mark-I&II(Not-BWR1)	3.5	1
233000	Fuel Pool Cooling and Clean-up / 9									X			A3.02 - Pump trip(s)	2.6	1
256000	Reactor Condensate System / 2							X					A1.01 - System flow	2.9	1
288000	Plant Ventilation Systems / 9						X						K6.03 - Plant air systems	2.7	1
	K/A Category Totals:	0	0	0	1	0	1	1	0	1	0	0	Group Point Total:		4

Generic Knowledge and Abilities Outline (Tier 3)

Printed: 06/24/19>

BWR SRO Examination Outline

Form ES-401-5

Facility: Peach Bottom Atomic Power Stat

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.6	Ability to supervise and assume a management role during plant transients and upset conditions.	4.3	1
	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	4.0	1
	2.1.3	Knowledge of shift turnover practices.	3.4	1
	2.1.12	Ability to apply technical specifications for a system.	4.0	1
			Category Total:	4
Equipment Control	2.2.11	Knowledge of the process for controlling temporary changes.	3.4*	1
	2.2.13	Knowledge of tagging and clearance procedures.	3.8	1
	2.2.29	Knowledge of SRO fuel handling responsibilities.	3.8	1
	2.2.20	Knowledge of the process for managing troubleshooting activities.	3.3	1
			Category Total:	4
Radiation Control	2.3.2	Knowledge of facility ALARA program.	2.9	1
	2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	3.1	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1
	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements.	3.0	1
			Category Total:	4

Generic Knowledge and Abilities Outline (Tier 3)

Printed: 06/24/19.

BWR SRO Examination Outline

Form ES-401-5

Facility: Peach Bottom Atomic Power Stat

Generic Category	KA	KA Topic	Imp.	Points
Emergency Plan	2.4.4	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
	2.4.41	Knowledge of the emergency action level thresholds and classifications.	4.1	1
	2.4.27	Knowledge of fire in the plant procedure.	3.5	1
	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions including: 1.Reactivity control 2.Core cooling and heat removal 3.Reactor coolant system integrity 4.Containment conditions 5.Radioactivity release control.	4.3	1
	2.4.38	Ability to take actions called for in the facility emergency plan, including (if required)supporting or acting as emergency coordinator.	4.0	1

Category Total: 5

Generic Total: 17

FORM NO 90010-PECO

PART 1 — KEY

Question	Marked answer
1	A (T)
2	B
3	B
4	D
5	D
6	D
7	C
8	B
9	A
10	D
11	D
12	B
13	B
14	B
15	C
16	B
17	B
18	D
19	C
20	D
21	C
22	B
23	B
24	C
25	A
26	B
27	B
28	A
29	B
30	C
31	A
32	C
33	C
34	C
35	C
36	A
37	D
38	B
39	C
40	D
41	A
42	D
43	C
44	D
45	D
46	A
47	D
48	C
49	B
50	C

PECO NUCLEAR

STATION PB / LGS

COURSE TITLE 1999 Peach Bottom SRO Exam

FORM SRO

NAME (PRINT) Examination (last) Key (first) (mi)

SOCIAL SECURITY NUMBER

COMPANY / PECO PAYROLL #

DATE 13 Sept 99

I HAVE REVIEWED AND UNDERSTAND THE CORRECTED QUIZ; ALL WORK ON THIS EXAMINATION IS MY OWN, I HAVE NEITHER GIVEN NOR RECEIVED ASSISTANCE

signature

IMPORTANT

- USE #2 PENCIL
- EXAMPLE: A B ● D E
- ERASE *COMPLETELY* TO CHANGE

PART 2 — KEY

Question	Marked answer
51	B
52	D
53	A
54	A
55	A
56	D
57	B
58	C
59	C
60	D
61	A
62	D
63	B
64	B
65	D
66	A
67	C
68	B
69	A
70	C
71	A
72	D
73	C
74	D
75	C
76	D
77	B
78	C
79	D
80	A
81	C
82	A
83	A
84	A
85	D
86	B
87	A
88	A
89	D
90	A
91	B
92	D
93	B
94	B
95	A
96	B
97	C
98	A
99	C
100	B

FEED THIS DIRECTION

SCANTRON® FORM NO 90010-PECO

FEED THIS DIRECTION

PART 1

KEY

PECO NUCLEAR

STATION PB / LGS

COURSE TITLE 1999 Peach Bottom SRO Exam

FORM SRO

NAME (PRINT) Examination Key
last / first / mi

SOCIAL SECURITY NUMBER ___ - ___ - ___

COMPANY / PECO PAYROLL # ______

DATE 13 Sept 99

I HAVE REVIEWED AND UNDERSTAND THE CORRECTED QUIZ; ALL WORK ON THIS EXAMINATION IS MY OWN, I HAVE NEITHER GIVEN NOR RECEIVED ASSISTANCE ______
signature

IMPORTANT

- USE #2 PENCIL
- EXAMPLE: A B C D E
- ERASE *COMPLETELY* TO CHANGE

PART 2

Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	26	B	51	B	76	D
2	B	27	B	52	D	77	B
3	B	28	A	53	A	78	C
4	D	29	B	54	A	79	D
5	D	30	C	55	A	80	A
6	D	31	A	56	D	81	C
7	C	32	C	57	B	82	A
8	B	33	C	58	C	83	A
9	A	34	C	59	C	84	A
10	D	35	C	60	D	85	D
11	D	36	A	61	A	86	B
12	B	37	D	62	D	87	A
13	B	38	B	63	B	88	A
14	B	39	C	64	B	89	D
15	C	40	D	65	D	90	A
16	B	41	A	66	A	91	B
17	B	42	D	67	C	92	D
18	D	43	C	68	B	93	B
19	C	44	D	69	A	94	B
20	D	45	D	70	C	95	A
21	C	46	A	71	A	96	B
22	B	47	D	72	D	97	C
23	B	48	C	73	C	98	A
24	C	49	B	74	D	99	C
25	A	50	C	75	C	100	B

FEED THIS DIRECTION

2696-165-5 4 3 2 1

NRC Report

Question Data for Test: 1999 SRO

Question: 1

Given the following conditions:
- The Control Room Supervisor (CRS) has delegated completion of GP-3, "Normal Plant Shutdown" for Unit 3 to a fully qualified Senior Reactor Operator (SRO)
- This has been logged in the Unified Control Room Log
- During the Unit 3 shutdown a problem requires entry into T-103, "Secondary Containment Control"
- Unit 2 is operating at 75% power during this time

Which of the following delineates the responsibility for command and control authority on each of the two Units for these conditions?

✔ A	The CRS shall retain command and control over both Units at all times
B	The Unit 3 SRO retains command and control over Unit 3 until an emergency no longer exists. The CRS retains command and control over Unit 2.
C	The Senior Manager - Operations shall assume command and control over both Units upon his arrival.
D	The Unit 3 SRO immediately transfers Unit 3 command and control to the Shift Manager and provides support and backup to the CRS on both Units.

Explanation of Answer:

Exam Level	Cognitive Level	Facility	Materials
SRO	Memory	PBAPS	None

KA Information

Tier: PWGs | RO Grp: 1 | SRO Grp: 1 | RO Val: 2.1 | SRO Val: 4.3 | 55.43 ✔

System:	Generic	
KA Group Num:	2.1	Conduct of Operations
KA Detail Num:	2.1.6	Ability to supervise and assume a management role during plant transients and upset conditions

Question Source Information

Ques Source: 1997 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
OM - Senior Licensed Operators	OM-P-3.2	4.1.10	12	11	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
LP OM Chapters 0-5	LOT-0006			0	3

Question Data for Test: 1999 SRO

Question: 5

A Reactor Operator has just begun night work following his long break (seven days).

- Day 1 he works 1845 - 0645
- Day 2 he works 1845 - 0645
- Day 3 he works 2245 - 0645 (4 hours vacation)
- Day 4 he works 1845 - 0945 (to cover for a sick RO)

At 1200, the RO gets a call at home from the Shift Operations Assistant (SOA) requesting that he return to work as soon as possible to fill a vacancy. To stay within the bounds of A-40, without deviations, the RO may:

A. Return to work immediately, but can only work 8 hours.

✓ B. Return to work at 1745, but can only work 9 hours.

C. Return to work at 1845, and work a regular 12 hour shift.

D. Return to work at 2145, and work up to 16 hours.

Explanation of Answer

A. Should not return to work until after 8 hour rest period.
B. Correct answer, 8 hour rest then 9 hours maximum 24/48.
C. Could return to work at 1845 but 12 hours exceeds 24/48.
D. Don't need to wait 12 hour to return to work, still limited by 24/48.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	None

KA Information

Tier: PWGs RO Grp: 1 SRO Grp: 1 RO Val: 3.0 SRO Val: 4.0 55.43

System: Generic

KA Group Num: 2.1 Conduct of Operations

KA Detail Num: 2.1.2 Knowledge of operator responsibilities during all modes of plant operations.

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Unit 2 Tech Specs		5.2.2.c	-3 & 5.0		

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Working Hour Limitations	AC-40	3.1.2 & 5.2	1 & 3		

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Administrative Practices Lesson Pl	PLOT-1570			12	1.j

Question Data for Test: 1999 SRO

Question: 8

Both units are operating in MODE 1 at full power with no Surveillance Testing or other evolutions in progress. The Shift Manger receives a call indicating that one of the licensed operators has been selected for a random substance screening. The selected operator is currently the Unit 2 Reactor Operator (URO). The testing would require the operator to leave the main control room for approximately 45 minutes. Determine the MINIMUM shift response to this condition.

A	A temporary relief of the URO by the on-shift Plant Reactor Operator (PRO).
✓ B	A temporary relief of the URO by the fourth Reactor Operator (4th RO).
C	A complete turnover of the URO position to the Plant Reactor Operator (PRO).
D	No relief is required since licensed operators are exempt from random substance testing while holding a licensed position.

Explanation of Answer

A. The PRO can not relieve the URO to leave the main control room. Must have a CRS and 3 Ros in the Control Room.
B. Correct answer.
C. A complete turnover is not required since it will be less than 1 hour. Also, the PRO cannot formally hold two shift positons.
D. Licensed operators may be excused from random substance exams only on a case by case basis if the CRS determine that conditions do not support the operator leaving.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: PWGs | RO Grp: 1 | SRO Grp: 1 | RO Val: 3.0 | SRO Val: 3.4 | 55.43

System:	Generic	
KA Group Num:	2.1	Conduct of Operations
KA Detail Num:	2.1.3	Knowledge of Shift Turnover Practices

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Temporary Relief	OM-C-6.2		2-3	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operations Manual Chapters 6-9	PLOT-0007	II.A.2	5	0	1

Question Data for Test: 1999 SRO

Question: 9

Unit 3 is in MODE 1 at 80% power.

- An applicable Tech Spec Surveillance with a 24 hour frequency was last performed satisfactorily at 0900 on 1/1/99.
- The LCO Required Actions direct that the equipment be restored to OPERABLE status in 4 hours, or be in MODE 3 in 12 hours AND MODE 4 in 36 hours.

If equipment problems prevent the surveillance from being performed, when is the unit required to be in MODE 4?

A	By 2100 on 1/3/99.
B	By 0100 on 1/4/99.
C	By 0300 on 1/4/99.
✔ D	By 0700 on 1/4/99.

Explanation of Answer

A. Incorrect, 1/1/99 at 0900 + 24 hr frequency + 36 hours to MODE 4.
B. Incorrect, 1/1/99 at 0900 + 24 hr frequency + 6 hour grace + 36 hours to MODE 4.
C. Incorrect, 1/1/99 at 0900 + 24 hr frequency + 4 hrs restoration + 36 hrs to MODE 4.
D. Correct, 1/1/99 at 0900 + 24 hr frequency + 6 hour grace + 4 hour restoration + 36 hours to MODE 4.

Exam Level	Cognitive Level	Facility	Materials
SRO	Application	PBAPS	

KA Information

Tier: PWGs   RO Grp: 1   SRO Grp: 1   RO Val: 2.9   SRO Val: 4.0   55.43 ✔

System:	Generic	
KA Group Num:	2.1	Conduct of Operations
KA Detail Num:	2.1.12	Ability to apply technical specifications for a system.

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Tech Specs	TS	3.0	.0-1, 4	210	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Tech Specs	TS	1.3-1	1.3-3	210	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Introduction to Improved Tech Spe	PLOT-1800	III	7	6	2

Question Data for Test: 1999 SRO

Question: 12

A Post Maintenance Test (PMT) requires the performance of a portion of a ST to stroke time a valve following maintenance to prove OPERABILITY. The CRS notes that the acceptance criteria for valve stroke time needs to be changed due to a recent Tech Spec revision.

Which of the following is the MINIMUM required to use the ST to complete this PMT.

A	A "Partial Procedure Use Change".
B	A "Permanent Revision Temporary Change".
C	A "Single Use Temporary Change".
✓ D	A "Procedure Revision".

Explanation of Answer: Temporary changes, partial procedure changes may not be made for changes to ST acceptance criteria because they change the intent of the procedure, the ST would have to be revised.

Exam Level	Cognitive Level	Facility	Materials
SRO	Comprehension	PBAPS	

KA Information

Tier: PWGs RO Grp: 2 SRO Grp: 2 RO Val: 2.5 SRO Val: 3.4 55.43 ✓

System:	Generic	
KA Group Num:	2.2	Equipment Control
KA Detail Num:	2.2.11	Knowledge of the process of controlling temporary changes.

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Temporary Procedure Change	A-3	Exhibit A-3-1	1	0	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Administrative Procedures	PLOT-1570	II.B.1.e.1	7	13	1

Question Data for Test: 1999 SRO

Question: 13

Which of the following combinations of tags may be applied to the same component at the same time in accordance with the Clearance and Tagging Manual?

A. A Special Condition Tag (SCT) and a tagged component bearing a green suspension label.

B. Two Special Condition Tags (SCTs).

C. A Danger Tag and Special Condition Tag (SCT).

✔ D. An Information Tag and a Danger Tag.

Explanation of Answer

A. Incorrect,, a SCT SHALL NOT be applied to any tagged component bearing a green suspension label. (C&T 4.3.7)
B. Incorrect, only one SCT shall be applied to a component (C&T 4.3.4).
C. Incorrect, a Danger Tag SHALL NOT be applied to a component bearing a SCT (C&T 4.4.3).
D. Correct, the component position specified on an Information Tag SHOULD NOT conflict with any other tags applied to that component (ex: Danger, other Info Tag) (C&T 4.2.10).

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 2 SRO Grp: 2 RO Val: 3.6 SRO Val: 3.8 55.43

System:	Generic	
KA Group Num:	2.2	Equipment Control
KA Detail Num:	2.2.13	Knowledge of Clearance and Tagging Procedures

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Clearance & Tagging Manual	CTM	4.2.10		4	

Question Data for Test: 1999 SRO

Question: 14

You are the responsible SRO supervising the beginning of core reload as the refuel platform main hoist lowers the third fuel bundle around the "A" Wide Range Neutron Monitoring detector.

Which of the following conditions would require suspension of core alterations?

A	The Unit Reactor Operator reports that the white rod withdraw permissive light on panel C05 is NOT lit.
B	"A" Wide Range Neutron Monitor count rate doubles as the bundle is seated in the fuel support piece.
✔ C	The Refuel Platform Operator reports that the "Rod Block Interlock #1" light on the refuel platform is NOT lit.
D	The Unit Reactor Operator reports that the inservice RHR shutdown cooling pump has just been removed from service.

Explanation of Answer

A. Incorrect, FH6C - 10.2.7, Light should NOT be lit when over the core with hoist loaded.
B. Incorrect, FH6C - 10.2.9 doubling of count rate does not apply to 1st, 2nd, 3rd, or 4th, adjacent to a WRNM.
C. Correct, FH6C - 10.2.8 Light should be list under stated conditions.
D. Incorrect, SDC may be removed from service without requiring a suspension of core alterations.

Exam Level	Cognitive Level	Facility	Materials
SRO	Comprehension	PBAPS	N/A

KA Information

Tier: PWGs   RO Grp: 2   SRO Grp: 2   RO Val: 1.6   SRO Val: 3.8   55.43 ✔

System:	Generic	
KA Group Num:	2.2	Equipment Control
KA Detail Num:	2.2.29	Knowledge of SRO Fuel Handling Responsibilities

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Core Component Movement - Core	FH6C	10.2.8	31	49	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Peach Bottom Refueling Procedure	NLSRO-0763	III.A	10	3	6

Question Data for Test: 1999 SRO

Question: 15

During a HPCI system maintenance window, the HPCI System Manger wishes to perform a diagnostic activity on the HPCI High Steam Flow Isolation Logic. The activity will involve lifting leads, checking electrical continuity and potentially cleaning and tightening of electrical connections. The activity is expected to take 1 hour. HPCI is considered to be Tech Spec INOP due to being isolated with the Aux Oil pump in "Pull to Lock". A 50.59 review has determined there is no un-reviewed safety question.

Which of the following procedures is required to control this activity?

A	A-C-023 "Plant Evolution/Special Test (PEST) Program".
✔ B	A-C-041 "Troubleshooting, Rework and Testing (TRT) Control Process".
C	A-C-025 "Fix it Now (FIN) Process".
D	MOD-C-7 "Temporary Plant Alteration (TPA)".

Explanation of Answer

A. Incorrect, activity is NOT an infrequently performed complex test or evolution which may place the plant equipment and operation outside bound of normal procedures.
B. Correct, A-C-41 and AG-CG-41, 4.4.1 addresses all listed activities.
C. Incorrect, FIN process does not include troubleshooting.
D. Incorrect, this activity does not involve a temporary alteration to the plant.

Exam Level	Cognitive Level	Facility	Materials
SRO	Comprehension	PBAPS	None

KA Information

Tier: PWGs RO Grp: 2 SRO Grp: 2 RO Val: 2.2 SRO Val: 3.3 55.43 ✔

System:	Generic	
KA Group Num:	2.2	Equipment Control
KA Detail Num:	2.2.20	Knowledge of the process for managing troubleshooting activities.

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Troubleshooting, Rework and Testi	AG-CG-41	4.4.1	4	1	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Administrative Procedures	PLOT-1570	II.B.1.e.6	9	13	16

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.

Question Data for Test: 1999 SRO

Question: 18

Given the following conditions:

- A scheduled Unit 2 surveillance is required to be performed on a system in a radiation area.
- All radiological precautions have been taken and a pre-evolution brief has been completed.

Using the As Low As Reasonably Achievable (ALARA) guidelines, which of the following is the PREFERRED method for completing this surveillance? (Consider only the personnel aspects of this surveillance.)

✓ A. One individual installing shielding in a 90 mR/hr area for 30 minutes then performing the surveillance in a 9 mR/hr area for 60 minutes.

B. Two individuals performing the surveillance in a 90 mR/hr area for 35 minutes.

C. One individual performing the surveillance in a 90 mR/hr area for 60 minutes.

D. Two individuals installing shielding in a 90 mR/hr area for 15 minutes then performing the surveillance in a 9 mR/hr for 35 minutes.

Explanation of Answer

A. 54 mR total exposure, correct answer
B. 105 mR total exposure
C. 90 mR total exposure
D. 55.5 mR total exposure

Exam Level	Cognitive Level	Facility	Materials
SRO	Application	PBAPS	Calculator

KA Information

Tier: PWGs | RO Grp: 3 | SRO Grp: 3 | RO Val: 2.5 | SRO Val: 2.9 | 55.43 ✓

System:	Generic	
KA Group Num:	2.3	Radiological Controls
KA Detail Num:	2.3.2	Knowledge of facility ALARA program

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
ALARA Program	PLOT-1770	1.B	5 & 6	10	1

Question Data for Test: 1999 SRO

Question: 19

During a declared emergency, it is necessary to raise the PECO Administrative Dose Control Levels to the NRC annual exposure limits.

Which of the following describes how this extension is authorized?

A. During a declared emergency, all Peach Bottom qualified Radiation Workers are automatically extended to the NRC TEDE limit.

B. The Radiation Protection Manager provides the Emergency Director with verbal case-by-case extension authorizations to the NRC limit.

C. The Control Room Supervisor provides immediate verbal extension authorization for Operations personnel.

✓ D. The Emergency Director approves a "Dose Extension Form".

Explanation of Answer

A. Not true at Peach Bottom
B. Radiation Protection Manager does not approve any extensions verbally
C. The CRS does not approve extension
D. Correct answer

Exam Level	Cognitive Level	Facility	Materials
SRO	Memory	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 3 SRO Grp: 3 RO Val: 2.5 SRO Val: 3.1 55.43 ✓

System: Generic

KA Group Num: 2.3 — Radiological Control

KA Detail Num: 2.3.4 — Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Emergency Radiation Exposure Gu	ERP-670	2.1.3	1	4	
Emergency Preparedness Training	PEPP-0010			0	

Question Data for Test: 1999 SRO

Question: 20

Which of the following is the REQUIRED immediate action if a Locked High Radiation Area door is found open with no control of area access?

A. Inform Security and establish Positive Access Control.

B. Inform the on-shift Health Physics Technician and lock the area after checking for unauthorized personnel.

C. Inform Security, lock the area and have Health Physics check for exposures in excess of those expected.

✔ D. Inform the Health Physics Supervisor and establish Positive Access Control

Explanation of Answer: D correct as directed by HP-C-202.

Exam Level	Cognitive Level	Facility	Materials
SRO	Memory	PBAPS	N/A

KA Information

Tier: PWGs | RO Grp: 3 | SRO Grp: 3 | RO Val: 2.9 | SRO Val: 3.3 | 55.43 ✔

System:	Generic	
KA Group Num:	2.3	Radiation Control
KA Detail Num:	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure

Question Source Information

Ques Source: 1997 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Locked High Radiation Area Contro	HP-C-202	7.13.1	9	6	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Radiation Protection for PAAT Wor	GETCM-10308			0A	10

Question Data for Test: 1999 SRO

Question: 21

To return the plant to a stable condition following a transient, Operations personnel need to enter a High Radiation Area that does not have an existing Radiation Permit (RWP).

Which of the following will meet the MINIMUM requirements for an Equipment Operator to enter the area.

A. Must be accompanied by an Advanced Rad Worker (ARW) qualified individual.

✔ B. Must be accompanied by a Level II Radiation Protection Technician qualified individual.

C. Entry into the area is not permitted without the Radiation Protectection Manger (RPM) permission.

D. Entry into the area is not permitted until activation of the Emergency Plan.

Explanation of Answer: HP-C-310 in a effort to return the plant to a stable condition a Level II (ANSI 3.1) RP Technician may act in lieu of a formal RWP to assist workers

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: PWGs | RO Grp: 3 | SRO Grp: 3 | RO Val: 2.6 | SRO Val: 3.0 | 55.43

System:	Generic	
KA Group Num:	2.3	Radiation Control
KA Detail Num:	2.3.1	Knowledge of 10CFR20 and related facility limits

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Radiation Work Permits	PLOT-1760	II.C	6	14	4
Radiation Work Permit Program	HP-C-310	7.12		3	

Question Data for Test: 1999 SRO

Question: 23

Given the following conditions:

- A plant transient occurred on Unit 3 at 1415 resulting in an Unusual Event declaration at 1425.
- While completing the Unusual Event Notification Form an Alert was declared at 1435 for an unrelated event.

The State and Local Agencies shall be notified of the Alert no later than:

A	1440.
✔ B	1450.
C	1515.
D	1535.

Explanation of Answer

Multiple events occurring together/sequentially.
A. 15 minutes from UE declaration, time limit for notifying the State and Local Agencies of UE.
B. 15 minutes from Alert declaration, correct answer
C. 1 hour from event occurrence.
D. 1 hour from Alert declaration.

Exam Level	Cognitive Level	Facility	Materials
SRO	Comprehension	PBAPS	N/A

KA Information

Tier: PWGs | RO Grp: 4 | SRO Grp: 4 | RO Val: 2.2 | SRO Val: 4.0 | 55.43 ✔

System:	Generic	
KA Group Num:	2.4	Emergency Procedures and Plan
KA Detail Num:	2.4.38	Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as the Emergency Director

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Emergency Notification Phone List -	ERP-110, App. 1		1	51	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Emergency Director	ERP-200	1.3	1	15	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Emergency Director Training	PEPP-6010			2	2.a

Question Data for Test: 1999 SRO

Question: 24

Unit 3 was operating in MODE 1 at 50% power when a plant transient required the crew to scram the unit. The following conditions exist:

- All rods are inserted
- Reactor pressure dropped to 940 psig and has stabilized at approximately 1000 psig
- Reactor level dropped to -20", then quickly recovered to its present value of +20" and going up
- HPCI auto started and is injecting into the reactor vessel
- A Main Stack High Radiation Alarm is present
- An Area Radiation Monitor is alarming (HPCI reading 12 mR/hr)

Select which of the following TRIP procedures should be entered and executed under these conditions.

	A	Scram Condition (T-100)
✓	B	Primary Containment Control (T-102)
	C	Secondary Containment Control (T-103)
	D	Radioactive Release (T-104)

Explanation of Answer

A. T-100 should be exited due to the T-101 entry condition on 2# DW pressure.
B. Correct answer due to Drywell pressure as evidenced by the HPCI auto start.
C. HPCI rad alarm is expected due to HPCI run do not enter T-103.
D. T-104 is not entered until a High High Main Stack Radiation alarm exists.

Exam Level	Cognitive Level	Facility	Materials
SRO	Comprehension	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 4 SRO Grp: 4 RO Val: 4.0 SRO Val: 4.3 55.43 ✓

System: Generic

KA Group Num: 2.4 — Emergency Procedures / Plan

KA Detail Num: 2.4.4 — Ability to recognize abnormal indications for system operating parameter which are entry level condition

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control	T-102		1	12	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
TRIP Procedures	PLOT-1560			8	1

Question Data for Test: 1999 SRO

Question: 25

Peach Bottom Units 2 and 3 are operating in MODE 1 at full power when the following timeline commences:

- At 1600, the Power System Director (PSD) notifies the Control Room that a hurricane is forecast to hit the station with sustained winds of 100 miles per hour.
- At 1630, with Plant Manager and PSD concurrence both Units are shutdown using GP-4, Manual Reactor Scram. Unit 2's shutdown was uneventful but Unit 3 has 6 control rods with unknown position after the scram.
- At 1700, the hurricane hits Peach Bottom and causes a complete loss of off-site power. All four Diesel Generators failed to start. The crew was successful at manually starting the E-3 Diesel Generator but have been unable to close either of its output breakers.

It is currently 1718, using the attached ERP-101, Classification of Emergencies Tables, classify these conditions to determine the appropriate current Emergency Action Level (EAL) to be declared.

A. Unusual Event

B. Alert

✓ C. Site Area Emergency

D. General Emergency

Explanation of Answer: A Site Area Emergency must be declared based on Table 8, since a loss of power has existed for > 15 minutes and NO diesel generators have energized their associated busses for > 15 minutes.

Exam Level	Cognitive Level	Facility	Materials
SRO	Application	PBAPS	ERP-101 Tables

KA Information

Tier: PWGs RO Grp: 4 SRO Grp: 4 RO Val: 2.3 SRO Val: 4.1 55.43 ✓

System: Generic

KA Group Num: 2.4 — Emergency Procedures/Plan

KA Detail Num: 2.4.41 — Knowledge of the emergency action level thresholds and classifications

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Classification of Emergencies	ERP-101	Table 8	15	20	

Question Data for Test: 1999 SRO

Question: 26

ON-114 is designed to mitigate actual fires reported in selected areas at Peach Bottom. An actual fire reported in which of the following areas would require entry into this procedure.

A	The Low Level Radwaste Storage Facility.
✔ B	The Inner Screen Structure.
C	The SU-25 Start-Up House.
D	The Water Treatment Plant.

Explanation of Answer: While important, the areas in distracters A, C, and D are not covered by ON-114. Answer B is specifically listed as an entry symptom into ON-114.

Exam Level	Cognitive Level	Facility	Materials
SRO	Memory	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 4 SRO Grp: 4 RO Val: 3.0 SRO Val: 3.5 55.43 ✔

System:	Generic	
KA Group Num:	2.4	Emergency Procedures/Plan
KA Detail Num:	2.4.27	Knowledge of fire in the plant procedure

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Actual Fire Reported in . . .	ON-114	Entry Symptoms	1	6	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550	II.B.1	6	7	1

Question Data for Test: 1999 SRO

Question: 27

Unit 2 is experiencing a Hydraulic Anticipated Transient Without Scram (ATWS). Currently the Reactor Operator is manually inserting control rods using T-220, also the "A" Standby Liquid Control (SBLC) pump is injecting boron into the reactor vessel. Reactor Engineering has been directed to complete a calculation to determine the reactor's shutdown condition.

Select from the following conditions the one that describes when the ATWS will be considered to be terminated by T-101, RPV Control.

A. 1 Control Rod is at position 08, 10 Control Rods are at position 02, all other rods are at position 00, 28% of the SBLC tank has been injected.

✔ B. 1 Control Rod is at position 44, all other rods are at position 00, 2% of the SBLC tank has been injected.

C. 3 Control Rods are at position 06, all other Control Rods are at position 00, 45% of the SBLC tank has been injected.

D. 12 Control Rods positions are unknown, the SBLC tank has been fully injected into the vessel.

Explanation of Answer: TRIP Note #24 clearly defines what terminates an ATWS condition as: - All rods inserted to or beyond the Maximum Subcritical Banked Rod Withdrawal Position (MSBRWP). OR See note 24

Exam Level	Cognitive Level	Facility	Materials
SRO	Application	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 4 SRO Grp: 4 RO Val: 3.7 SRO Val: 4.3 55.43 ✔

System: Generic

KA Group Num: 2.4 Emergency Procedures/Plan

KA Detail Num: 2.4.21 Knowledge of the parameters and logic used to assess the status of safety functions including Reactivity Control

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RPV Control	T-101	Note #24	1	17	

Question Data for Test: 1999 SRO

Question: 33

Which of the following conditions will result in Recirc flow controller output being limited to 30%?

A	Total feedwater flow greater than 85% and any condensate pump trip.
B	Individual feedpump flow less than 20% and Reactor level less than 17".
C	Total feedwater flow greater than 20% and Reactor level less than 17".
✔ D	Reactor scram and Reactor level less than 17".

Explanation of Answer

A. Incorrect - results in 45% limiter
B. Incorrect - results in 45% limiter
C. Incorrect - no action
D. Correct

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS | RO Grp: 1 | SRO Grp: 1 | RO Val: 3.1 | SRO Val: 3.2 | 55.43

System: 202002 — Recirculation Flow Control System

KA Group Num: K1 — Knowledge of the physical connections and/or cause effect relationship between recirc flow control system and the following

KA Detail Num: K1.09 — Reactor water level

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Low Level	OT-101	4.0	2	9	
Recirc Flow Control	PLOT-0040	IV.B	15	8	5b

Question Data for Test: 1999 SRO

Question: 34

The following conditions exist on Unit 2 after a LOCA.

- Drywell pressure 7 psig, rising slowly
- Reactor pressure 400 psig, dropping slowly
- Reactor level -75"
- All low pressure ECCS pumps were manually secured
- Level is being maintained with condensate injection.
- "D" RHR pump was placed in Torus Sprays at 1000 gpm and Drywell sprays at 1000 gpm

If level were to drop to -200" what would be the response of the LPCI system with no additional operator actions?

A. A, B, C RHR pumps would start, "D" RHR would continue to run, LPCI outboard injection valve (MO-154) would auto open, spray valves would auto close.

B. A, B, C RHR pumps would start, "D" RHR would continue to run, LPCI outboard injection valve (MO-154) would auto open, spray valves would remain open.

✔ C. A, B, C RHR pumps would NOT start, "D" RHR would continue to run, LPCI outboard injection valve (MO-154) would remain closed, spray valves would remain open.

D. A, B, C RHR pumps would NOT start, "D" RHR would continue to run, LPCI outboard injection valve (MO-154) would remain closed, spray valves would auto close.

Explanation of Answer

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier	RO Grp	SRO Grp	RO Val	SRO Val	
SYS	1	1	3.9	4.1	55.43

System:	203000	RHR/LPCI Injection Mode
KA Group Num:	K4	Knowledge of RHR/LPCI Injection mode design features and/or interlocks which provide for the following
KA Detail Num:	K4.10	Dedicated injection system during automatic system initiation (injection valve interlocks)

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Initiation of Drywell Sprays Using R	T-204			1	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Residual Heat Removal	PLOT-0370	H-PLOT-0370-2	2	10	5a

Question Data for Test: 1999 SRO

Question: 35

Following a valid HPCI initiation due to high Drywell pressure on Unit 3, HPCI was secured using the "Short Term HPCI System Shutdown When an Initiation Condition IS Present" method of SO-23.2.2A-3, "HPCI System Shutdown". The PRO has been directed to initiate HPCI injection into the Reactor Vessel from this condition.

Under these conditions, HPCI Turbine speed during startup is controlled by:

A. The ramp generator initiated by the opening of HPCI steam supply valve, MO-3-23-014.

B. The slow opening of the HPCI Turbine Stop Valve, HO-3-23-4513.

C. The ramp generator initiated by opening of the HPCI Turbine Control Valve, HO-3-23-4512.

✔ D. The ramp generator initiated by opening of the HPCI Turbine Stop Valve, HO-3-23-4513.

Explanation of Answer

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS | RO Grp: 1 | SRO Grp: 1 | RO Val: 3.3 | SRO Val: 3.3 | 55.43

System:	206000	High Pressure Coolant Injection (HPCI)
KA Group Num:	K5	Knowledge of the operational implications of the following concepts as they apply to HPCI
KA Detail Num:	K5.05	Turbine Speed Control

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
High Pressure Coolant Injection	PLOT-5023	II.C.3.d	14	0	5.d

Question Data for Test: 1999 SRO

Question: 36

An ADS blowdown has occurred following a LOCA. The ADS valve control switches remain in "Auto". Pressure is 200 psig and lowering slowly. All Core Spray and RHR pumps were initially injecting. "D" Core Spray pump has tripped. All RHR pumps were secured when level recovered above -100". Level is being restored using A, B, and C Core Spray pumps.

An additional Core Spray pump needs to be shutdown to control level recovery.

Which of the following statements accurately describe the response of the ADS system to pump shutdown?

A. ADS blowdown will stop when the "A" Core Spray pump is shutdown.

B. ADS blowdown will stop when the "B" Core Spray pump is shutdown.

✓ C. ADS blowdown will stop when the "C" Core Spray pump is shutdown.

D. An ADS seal in prevents inadvertent blowdown termination by pump shutdown.

Explanation of Answer: A or B AND C or D Core Spray pumps are required for the ADS blowdown to continue.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS | RO Grp: 1 | SRO Grp: 1 | RO Val: 3.8 | SRO Val: 3.9 | 55.43

System:	209001	Low Pressure Core Spray Subsystem
KA Group Num:	K3	Knowledge of the effect that a loss or malfunction of the low pressure core spray system will have on
KA Detail Num:	K3.02	ADS logic

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
ADS and Relief Valve Alignment fo	SO 1.G.1.A	3.1	1	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Automatic Depressurization Syste	PLOT-5001G	11.E.1.r.3	19	0	5

Question Data for Test: 1999 SRO

Question: 37

An ATWS condition has occurred on Unit 3. Reactor level is 23 inches and pressure is 1000 psig with the turbine still running. The CRS has directed the URO to inject Standby Liquid Control (SBLC). The URO positions the SLBC switch to "PUMP 'A' RUN". Identify the expected SBLC System response.

A	Squib continuity light are lit, pump discharge pressure is 1450 psig.
✔ B	Squib continuity lights are lit, pump discharge pressure is 1100 psig.
C	Squib continuity lights are out, pump discharge pressure is 1450 psig.
D	Squib continuity lights are out, pump discharge pressure is 1100 psig.

Explanation of Answer: SBLC is expected to inject at approximately 100 psig greater than reactor pressure the continuity lights will stay lit as long as the pump is energized.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.6 SRO Val: 3.6 55.43

System:	211000	Standby Liquid Control System
KA Group Num:	A1	Ability to predict and/or monitor changes in parameters associated with SBLC including
KA Detail Num:	A1.03	Pump discharge pressure

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Standby Liquid Control System	PLOT-5011	II.D.3, II.F.2	14, 19	0	4h

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
SBLC Initiation	SO 11.1.B	4.0 Note	1	3	

Question Data for Test: 1999 SRO

Question: 38

A Unit 2 start up is in progress with the plant in MODE 1 at 25% RTP. Main condenser pressure switches PS-5-11A and PS-5-11B were discovered to be out of calibration and INOP. Use the copy of Tech Specs provided to determine the actions required (if any) for this inoperability.

A	Restore RPS trip capability within 1 hour.
✓ B	Place one trip system in trip within 6 hours.
C	Be in MODE 2 within 6 hours.
D	Required number of channels met, no action required.

Explanation of Answer

Answer A - incorrect, RPS trip capability IS maintained by PS-5-11C and PS-5-11D.
Answer B - correct, PS-5-11A inputs to RPS A, PS-5-11B inputs to RPS B, TS 3.3.1.1 condition B applies: One ore more functions with one or more required channels inop in both trips systems.
Answer C - incorrect, "Be in MODE 2" is not required other required actions could not be performed.
Answer D - incorrect, Required number of channels are two per trip system.

Exam Level	Cognitive Level	Facility	Materials
SRO	Application	PBAPS	TS 3.3.1.1

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 2.9 SRO Val: 4.0 55.43 ✓

System:	212000	Reactor Protection System
KA Group Num:	2.1	Conduct of Operations
KA Detail Num:	2.1.12	Ability to apply technical specifications for a system.

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Tech Specs	TS	3.3.1.1 Cond. B		210	

Question Data for Test: 1999 SRO

Question: 39

Unit 2 was operating at 100% power when the "A" Recirc pump tripped. The pump was isolated in accordance with the procedure.

Which of the following statements describes the relationship between INDICATED total core flow and ACTUAL total core flow?

Total core flow indicated on DPFR-2-3-095 dP/F will be:

A	Less than actual by an amount TWICE idle loop flow.
B	Less than actual by an amount EQUAL to idle loop flow.
✓ C	Greater than actual by an amount TWICE idle loop flow.
D	Greater than actual by an amount EQUAL to idle loop flow.

Explanation of Answer

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.4 55.43

System:	216000	Nuclear Boiler Instrumentation
KA Group Num:	A3	Ability to monitor automatic operations of the Nuclear Boiler Instrumentation
KA Detail Num:	A3.01	Relationship between meter/recorder readings and actual parameter values

Question Source Information

Ques Source: New Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Vessel Instrumentation	PSYS-5002B	III.J.k	29	0	4d

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS Power Flow Operation Ma	Exhibit GP-5-1		2	0	

Question Data for Test: 1999 SRO

Question: 40

The RCIC system was being restored to its normal alignment following maintenance, when a high steam flow isolation occurred due to stroking open the valves too quickly. A few minutes later, a feedwater transient results in a scram and the need for RCIC system operation. Current level is -50 inches and dropping slowly. The SRO has directed that RCIC be recovered and injection initiated into the vessel at 600 gpm.

After depressing the isolation reset pushbutton, which of the following actions will be necessary to inject with RCIC?

✓	A	The RCIC turbine trip throttle valve will need to be reset from the control room.
	B	The RCIC turbine trip throttle valve will need to be reset locally.
	C	The MO-131, steam admission valve, must be stroked open manually.
	D	RCIC will automatically align and inject when the isolation reset pushbutton is depressed.

Explanation of Answer: A RCIC turbine trip is received with an isolation signal. RCIC turbine trips must be manually reset. Only an overspeed trip must be reset locally.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.8 SRO Val: 3.8 55.43

System:	217000	Reactor Core Isolation Cooling (RCIC)
KA Group Num:	A2	Ability to predict the impact of the following on RCIC and based on those . . .
KA Detail Num:	A2.15	Steam Line Break

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recovery from RCIC System Isolat	SO 13.7.A	4.1	3	10	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RCIC	PLOT-5013	11.D.4	18019	0	4f

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recovery from a RCIC System Isol	SO 13.7.A	4.1	2-3	10	

Question Data for Test: 1999 SRO

Question: 41

Given the following conditions:

- Unit 2 has experienced a loss of all AC power (station blackout).
- The Reactor Core Isolation Cooling (RCIC) system automatically initiated.
- Reactor water level is now -52 inches and rising.
- The Control Room Supervisor directs the Unit Reactor Operator to isolate RCIC.

What will be the expected RCIC system response when the operator depresses the Manual Isolation Pushbutton?

A	A normal RCIC system isolation and turbine trip will occur.
✔ B	A RCIC turbine trip and system isolation will occur except the Inboard Steam Isolation Valve (MO-15) will not close.
C	No RCIC isolation actions or turbine trip will occur.
D	A RCIC turbine trip and system isolation will occur except the Outboard Steam Isolation Valve (MO-16) will not close.

Explanation of Answer

A. MO-15 has no power.
B. Correct answer, MO-15 is only AC RCIC valve
C. This would be true if level was back above -48 inches, initiation auto reset point
D. MO-16 is a DC valve, should close.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 2.8 SRO Val: 2.8 55.43

System:	217000	Reactor Core Isolation Cooling System (RCIC)
KA Group Num:	K2	Knowledge of electrical power supplies to the following:
KA Detail Num:	K2.01	Motor Operated valves

Question Source Information

Ques Source: 1998 PBAPS NRC Exam Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Core Isolation Cooling	PLOT-5013	II.E.6	34	0	2a

Question Data for Test: 1999 SRO

Question: 42

A small Main Steam Line leak has occurred in the Turbine Building on Unit 2. The following plant conditions exist:

- The Reactor is scrammed.
- The "A" Main Steam Line has failed to isolate.
- Reactor Pressure is 800 psig.
- The PRO shutdown all low pressure ECCS pumps immediately after they started on LO-LO-LO level since no injection or minimum flow path was available.
- HPCI is blocked.
- RCIC has been maintaining reactor level steady at -165" for 12 minutes.

Starting the "A" RHR pump will:

A	Result in an ADS blowdown after a 9 minute time delay.
✓ B	Result in an immediate ADS blowdown.
C	Result in an ADS blowdown after a 105 second time delay.
D	NOT result in an ADS blowdown.

Explanation of Answer: The 9 minute timer and 105 second timer have both timed out. When the RHR pump is started, the blowdown will occur immediately.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 4.2 SRO Val: 4.2 55.43

System:	218000	Automatic Depressurization System (ADS)
KA Group Num:	A4	Ability to manually operate and/or monitor in the control room
KA Detail Num:	A4.02	ADS logic initiation

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Automatic Depressurization Syste	PLOT-5001G	II.E	16-18	0	4c

Question Data for Test: 1999 SRO

Question: 43

A small recirc leak has resulted in 8 psig drywell pressure and -170" reactor level on Unit 2. After the Drywell Cooling Fans tripped, the CRS directed them to be restored using T-223. The trip was bypassed and the fans were restored in fast speed. 15 minutes later, the STA reports that the amber bypass light over the Drywell Cooler Fan bypass switch (43-5-0165) has gone out.

Describe the effect this will have on Drywell Cooler Fan operation and why.

- ✓ A. Fans will continue to run, light goes out when both trip signals clear.
- B. Fans will continue to run, light goes out if either trip signal clears.
- C. Fans will trip, light goes out when both trip signals clear.
- D. Fans will trip, light goes out when either trip signal clears.

Explanation of Answer: Light going out indicates that the bypass logic has dropped out. For the bypass to be active, an isolation signal must be present. If light clears, the isolation signals have cleared and the fans would have no trip signal.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 1   SRO Grp: 1   RO Val: 3.5   SRO Val: 3.6   55.43

System:	223001	Primary Containment and Auxiliaries
KA Group Num:	A4	Ability to manually operate and/or monitor in the control room.
KA Detail Num:	A4.12	Drywell Cooler/Chillers

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Drywell Cooler Fan Bypass	T-223-2	4.4 Note	3	3	

Question Data for Test: 1999 SRO

Question: 44

Unit 2 is operating in MODE 1 at full power. The 2B RPS MG set output breakers trip on underfrequency.

Under these conditions, which of the following PCIS isolations will occur and result in isolation valves repositioning?

A. A Group II Outboard half isolation.

✔ B. A Group III Outboard half isolation.

C. An Outboard MSIV auto isolation.

D. A full RWCU isolation.

Explanation of Answer: Loss of power to "B" RPS results in a half Group III outboard isolation. A half Group I is received but no valves move. Group 2 is not impacted.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS | RO Grp: 1 | SRO Grp: 1 | RO Val: 3.5 | SRO Val: 3.5 | 55.43

System:	223002	Primary Containment Isolation System (PCIS)
KA Group Num:	A3	Ability to Monitor Automatic Operation of PCIS including:
KA Detail Num:	A3.02	Valve Closures

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Group I, II, and III Outboard Half Is	GP-8D	Notes	2	12	
PCIS	PLOT-5007G	II.C.7.a.4	33	0	5h

Question Data for Test: 1999 SRO

Question: 45

Unit 2 is operating in MODE 1 at full power when PISH-2-5-12A the drywell pressure input to RPS and PCIS fails high resulting in an "A" channel RPS half scram and associated annunciators.

Determine the expected Primary Containment Isolation System (PCIS) response to this condition.

The "GROUP II/III INBOARD ISOL RELAYS NOT RESET" annunciator will:

A	Alarm, but NO valves will reposition.
B	Alarm, and the inboard isolation valves will reposition.
✔ C	NOT alarm, and NO valves will reposition.
D	NOT alarm, but the inboard isolation valves will reposition.

Explanation of Answer: This condition will result in only half of the A channel logic picking up and will not result in any alarms or isolation.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.0 SRO Val: 3.2 55.43

System:	223002	Primary Containment Isolation System (PCIS)
KA Group Num:	A2	Ability to predict the impact of the following on PCIS
KA Detail Num:	A2.06	Containment Instrument Failures

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PCIS Groups II and III Channel A	GP-25 App. 5	4.0	2	4	

Question Data for Test: 1999 SRO

Question: 46

A T-112 BLOWDOWN is in progress with reactor pressure at 75 psig above Torus pressure. The URO notes that, although the ADS valve switches are in "OPEN", the SRV's are indicating closed. The green and white lights are lit for each of the ADS valves. All other SRV's have only green lights lit. The "SAFETY RELIEF VALVE OPEN" annunciator is NOT lit.

Given the above conditions, determine the current expected position of the ADS valves.

✔ A. Fully open.

B. Partially open, but not far enough for proper indication.

C. Failed closed.

D. Fully closed, due to low steam pressure.

Explanation of Answer: Although acoustic valve indication is lost in this pressure range, SRVs are designed to stay open until 50 psig and have actually stayed open to lower values during testing.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.1 SRO Val: 3.2 55.43

System: 239002 Relief/Safety Valves

KA Group Num: K4 Knowledge of Relief/Safety Valve design features and/or interlocks which provide for:

KA Detail Num: K4.07 Minimum steam pressure to keep an SRV open.

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Main Steam and Pressure Relief	PLOT-0120	5.B.8	27	14	5K

Question Data for Test: 1999 SRO

Question: 47

Given the following conditions:

- Unit 2 was operating at 100% power.
- Annunciator 220 F-5, "Inverter Trouble", was received indicating a loss of 20Y050.
- The reactor was later scrammed and the turbine tripped.

Which of the following is the reason why this failure requires reactor pressure control via the Safety Relief Valves?

The static inverter loss will:

A	Cause a full Group I Main Steam Isolation Valve closure.
B	Cause a "full open" signal to the Turbine Bypass Valves requiring the EHC Pumps to be tripped to prevent a rapid depressurization.
✔ C	Result in a loss of Turbine Bypass Valve opening capability.
D.	Result in a closure of the Inboard Main Steam Isolation Valves.

Explanation of Answer

A. MSIVs are not affected.
B. TBV close on this loss.
C. Correct answer, power loss to EHC logic when it swaps to PMG, TBVs close
D. MSIVs not affected.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 2.8 SRO Val: 2.9 55.43

System:	241000	Reactor/Turbine Pressure Regulating System
KA Group Num:	K.6	Knowledge of the effect that a loss or malfunction of the following will have on the Reactor/Turbine
KA Detail Num:	K6.01	AC Electrical power

Question Source Information

Ques Source: 1997 PBAPS NRC Exam Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
ON-112-2 Loss of Uninterruptible A	ON-112-2 Bases	2.0 Notes	2	5	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 SRO

Question: 48

Unit 3 is performing a GP-2 Plant Startup. Power is being raised from 50% to 100%. The Plant Reactor Operator is monitoring Electrohydraulic Control (EHC) system performance.

Pressure averaging manifold pressure is initially:

A. Equal to reactor pressure with an increasing dP as turbine load is raised.

B. Equal to reactor pressure with a constant dP as turbine load is raised.

✔ C. Less than reactor pressure with an increasing dP as turbine load is raised.

D. Less than reactor pressure with a lowering dP as turbine load is raised.

Explanation of Answer: Answer C - PAM pressure remains less than reactor pressure with dP increasing as steam flow increases due to flow induced pressure drop through the steam lines.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.3 SRO Val: 3.3 55.43

System:	241000	Reactor/Turbine Pressure Regulating System
KA Group Num:	K5	Knowledge of the operational implications of the following concepts as they apply to reactor/turbine
KA Detail Num:	K5.04	Turbine inlet pressure vs. reactor pressure.

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
EHC	PLOT-5001DL	Transp. 3	1	0	1b

Question Data for Test: 1999 SRO

Question: 49

Unit 2 is operating at 100% power, with the Digital Feedwater Control System (DFCS) in three-element control with the "B" Narrow Range Level automatically selected. A fault in the level detector causes it to fail downscale. Which of the following will occur?

A	DFCS will sense a low level and increase RFPT speed, thereby causing Reactor Vessel level to increase.
B	The "B" Narrow Range Level Detector will be automatically de-selected and the HIGHEST remaining narrow range level signal will be automatically selected.
✔ C	The "B" Narrow Range Level Detector will be automatically de-selected, and the LOWEST remaining narrow range level signal will be automatically selected.
D	A default valve of +23" will be automatically selected by the master level controller.

Explanation of Answer: The DFCS system automatically selects the middle narrow range for control.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.5 SRO Val: 3.5 55.43

System: 259002 — Reactor Water Level Control System

KA Group Num: K6 — Knowledge of the effect that a loss or malfunction of the following will have on the reactor water level control system

KA Detail Num: K6.05 — Reactor water level input

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Feedwater Field Instrument Troubl	ARC 201 H1		1	3	
Reactor Feedwater Automatic Leve	SO 6C.1.D-2			4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Feedwater Control System	PLOT-0550	IV.B.9.d.1	19	7	5d

Question Data for Test: 1999 SRO

Question: 50

Following a reactor scram from a power condition, Reactor Feedwater Pump (RFP) speed automatically goes up to compensate for the shrink experienced as the voids in the reactor collapse.

To protect the pumps from overspeed under these conditions, RFPs are limited to 85% following a scram:

A. With all three condensate pump running.

B. With less than three condensate pumps running.

✔ C. With individual feedwater flows greater than 20%.

D. With individual feedwater flows less than 20%.

Explanation of Answer: Self explanatory.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 1   SRO Grp: 1   RO Val: 3.0   SRO Val: 3.0   55.43

System:	259002	Reactor Water Level Control System
KA Group Num:	A3	Ability to monitor automatic operations of the reactor water level control system including:
KA Detail Num:	A3.01	Runout flow control

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Feedwater Control Ssstem	PLOT-0550	V.D	28	7	4c

Question Data for Test: 1999 SRO

Question: 51

Unit 2 and Unit 3 are both in MODE 1 at 100% power. During an attempt to start the Standby Gas Treatment (SGT) system, the "A" SGT fan (OAV020) failed to start and the "Standby Gas Treatment B Filter Inlet" 00476-1 failed to open.

Using the Tech Specs provided, determine the required actions for Unit 2 AND Unit 3.

✔ A	Unit 2 - Restore SGT within 7 days. Unit 3 - Restore SGT within 7 days.
B	Unit 2 - Enter LCO 3.0.3 immediately. Unit 3 - No action required.
C	Unit 2 - Restore SGT within 7 days. Unit 3 - No action required.
D	Unit 2 - Enter LCO 3.0.3 immediately. Unit 3 - Restore SGT within 7 days.

Explanation of Answer: Two SGT subsystems are required for each Unit. Unit 2 has one subsystem operable consisting of the B fan and the A filter train, one subsystem is INOP due to EITHER the A fan or B filter inlet. Unit 3 has one subsystem operable consisting of either B or C fan and the A filter train, one subsystem is inop due to the B filter inlet.

Exam Level	Cognitive Level	Facility	Materials
SRO	Application	PBAPS	Unit 2 and Unit 3 Tech Specs Section 3.6.4.3

KA Information

Tier: SYS   RO Grp: 1   SRO Grp: 1   RO Val: 2.6   SRO Val: 3.8   55.43 ✔

System:	261000	Standby Gas Treatment
KA Group Num:	2.2	Equipment Control
KA Detail Num:	2.2.23	Ability to Track Limiting Conditions for Operations

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Tech Specs	3.6.43	3.6	3.6-4.0	210	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Standby Gas Treatment	PSYS-5009A	7	28	1	10a

Question Data for Test: 1999 SRO

Question: 52

Both Units were operating in MODE 1 at full power when the "3A" RPS bus was manually transferred to its alternate feed. Determine the expected condition of the Standby Gas Treatment (SBGT) system as a result of this transient.

A "B" SBGT fan has started, SBGT "A" filter inlet and outlet dampers have opened.

B "C" SBGT has started, SBGT "B" filter inlet and outlet dampers have opened.

C "B" SBGT fan has started, SBGT "B" filter inlet and outlet dampers have opened.

✔ D "C" SBGT fan has started, SBGT "A" filter inlet and outlet dampers have opened.

Explanation of Answer:

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 2.9 SRO Val: 3.0 55.43

System: 261000 — Standby Gas Treatment (SBGT)

KA Group Num: K6 — Knowledge of the effect that a loss or malfunction of the following will have on SBGT

KA Detail Num: K6.01 — AC Electrical Distribution

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Group I, II, and III Inboard Half Isol	GP-8C	Notes	2	17	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
COL GP-8.C Groups II and III Inbo	GP-8.C COL		4	15	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Standby Gas Treatment	PSYS-5009A	V.L.3.a	23	1	8e

Question Data for Test: 1999 SRO

Question: 53

Peach Bottom 4KV is aligned as follows:

- The #2 Emergency Auxiliary Transformer (OAX04) is out of service.
- All eight 4KV busses are being supplied by the #3 Emergency Auxiliary Transformer (OBX04).
- The 2A RHR and 2A HPSW pumps are running in Torus Cooling.

Determine the expected plant response to an automatic trip of the E-312 breaker.

A	The E-1 Diesel Generator will start after .25 seconds.
✔ B	The E-1 Diesel Generator will start after .5 seconds.
C	The 2A RHR and HPSW pumps will trip and restart on power restoration.
D	The E-124 Load Center will trip and lockout.

Explanation of Answer: Diesel Generator start will be required after .5 seconds since the alternate off-site source is not available.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 1 RO Val: 2.7 SRO Val: 2.9 55.43

System:	262001	AC Electrical Distribution
KA Group Num:	A2	Ability to predict the impact of the following on AC electrical distribution
KA Detail Num:	A2.06	De-energizing a Plant Bus

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Diesel Generators and Auxiliary	PLOT-0670	II.D.2	11	6	3c

Question Data for Test: 1999 SRO

Question: 54

Unit 3 is in MODE 1 at full power with "B" RPS on its normal alternate feed. All other equipment is in its normal alignment. Both of the inservice off-site start up feeds trip simultaneously. All diesel generators start and close in on their buses as designed.

Determine the response of Unit 3 to this loss of AC power event. Unit 3 will:

A. Scram immediately due to the loss of power to the RPS system.

B. Scram immediately due to turbine stop and control valve closure.

✔ C. NOT scram immediately due to "B" RPS being powered by its alternate source.

D. NOT scram immediately due to the RPS MG Sets maintaining power until the diesel generators load their buses.

Explanation of Answer: With "B" RPS on its alternate feed, RPS will not entirely lose power during a loss of off-site power.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 1 RO Val: 3.8 SRO Val: 4.1 55.43

System: 262001 AC Electrical Distribution

KA Group Num: K3 Knowledge of the effect that a loss or malfunction of AC will have on:

KA Detail Num: K3.06 Reactor Protection System

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Protection System	PLOT-5060F	II.C.2.b		0	6a

Question Data for Test: 1999 SRO

Question: 55

Peach Bottom has experienced a complete loss of off-site power. The E-1 and E-2 Diesel Generators started and loaded their busses normally but the "A" ESW pump did not start. The E-3 and E-4 Diesels did not start. The E-1 and E-2 were then shutdown due to not having cooling water. The Power System Director (PSD) has been requested to configure Conowingo Station for Peach Bottom Station Blackout. The CRS has directed a backfeed in accordance with SE-11 Attachment D, "Backfeeding Safe Shutdown Loads with E-1 & E-2 Diesel Generators Available".

Given that both the 2SUE and 3SUE busses are available for backfeeding, the PRO should select:

A	The 2SUE bus because it is the normal power source for the bus that feeds the "B" ESW pump.
B	The 2SUE bus because this will allow use of the SBO line to power 4KV buses.
C	The 3SUE bus because it is the normal power source for the bus that feeds the "B" ESW pump.
✔ D	The 3SUE bus because this will allow use of the SBO line to power 4KV buses.

Explanation of Answer: Note from SE-11 Attachment "D" states that if the 2SUE bus is used for backfeeding, THEN the SBO line CANNOT be used to power 4KV buses.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.8 SRO Val: 4.1 55.43

System:	264000	Emergency Generators
KA Group Num:	K1	Knowledge of the physical connection and/or cause-effect relationship between emergency generators a
KA Detail Num:	K1.01	AC Electrical Distribution

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Station Blackout	SE-11 Att. D	Note 2	2	5	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Special Event Procedures	PLOT-1555			4	11d

Question Data for Test: 1999 SRO

Question: 56

Which of the following statements describe the power supply to the Backup Scram Solenoid valves and their expected condition upon receipt of a full scram.

✔ A	Station batteries, energize on a Full Scram.
B	Station batteries, de-energize on a Full Scram.
C	Reactor Protection Bus, energize on a Full Scram.
D	Reactor Protection Bus, de-energize on a Full Scram.

Explanation of Answer

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.6 55.43

System:	201001	Control Rod Drive Hydraulics System
KA Group Num:	K2	Knowledge of Electrical Power Supplies to the following
KA Detail Num:	K2.03	Backup Scram Valve Solenoids

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Rod Drive Hydraulic Syste	PLOT-5003A	I.4.d	17	0	4d

Question Data for Test: 1999 SRO

Question: 57

Given the following conditions:

- Unit 2 is making preparations for a reactor startup from a refueling outage.
- Reactor Building ambient temperature is 74 degrees F.
- The Reactor Building Equipment Operator is charging the hydraulic control unit accumulators with nitrogen to a pressure of 590 psig.
- Several days later with the Unit at 100% power, Reactor Building temperatures have stabilized at 92 degrees F.

Which of the following describes the expected impact on the Control Rod Drive Hydraulic system operations for these conditions? (Refer to attached figure.)

The individual control rod:

A. Normal insertion speeds will be slower and may result in control rod drift alarms.

B. Scram speeds will be slower and will result in reduced reactivity addition rates.

C. Normal insertion speeds will be faster and may result in "double notching".

✔ D. Scram speeds will be faster and may result in mechanism damage.

Explanation of Answer:

D. Excessive pressure at low RB temps results in even higher pressure as temps increase resulting in excessive scram speeds and possible damage to mechanisms.
B. Scram speeds are faster, not slower.
A & C Does not affect normal insert/withdraw functions.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	Accumulator Precharge Nitrogen Pressure vs. Ambient Temperature Graph

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 2 RO Val: 3.4 SRO Val: 3.8 55.43

System:	201001	Control Rod Drive Hydraulic System
KA Group Num:	2.1	Conduct of Operations
KA Detail Num:	2.1.32	Ability to explain and apply system limits and precautions

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Rod Drive Hydraulic Syste	PLOT-5003A	I.1.b	15	0	4e

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Rod Drive Hydraulic Syste	SO 3.7.A-2	Figure 1		7	

Question Data for Test: 1999 SRO

Question: 58

Unit 2 is in MODE 2 with a heat up in progress. Vessel level is being maintained by the Control Rod Drive Hydraulic system and the Reactor Water Cleanup system in dump mode to the main condenser through the "RWCU Filter Bypass Valve", MO-74, which is full open.

What is the basis for the caution in procedure SO 12.1.A-2, "Reactor Water Cleanup System Start" which prohibits opening the "RWCU Outlet Valve" MO-68 in this system lineup?

A. Excessive heat load on the Non-Regenerative Heat Exchanger.

B. Group II isolation on greater than 125% system flow.

✔ C. Excessive RWCU pump flows without control room indication.

D. Auto closure of CV-55 "Dump Flow Control Valve".

Explanation of Answer

A. Incorrect opening MO-68 would reduce heat load on the NRHX.
B. Incorrect, opening MO-68 would not result in flow in excess of 125% of design.
C. Correct, with the demins bypassed through MO-74 the only system flow indication is dump flow, opening MO-68 will allow potential excessive unmonitored flows.
D. Incorrect, auto closure of CV-55 occurs on specific pressures in the dump flow line.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.5 55.43

System:	204000	Reactor Water Cleanup System
KA Group Num:	A1	Ability to predict and/or monitor changes in parameters associated with RWCU control including:
KA Detail Num:	A1.04	System Flow

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Water Cleanup System St	SO 12.1.A-2	Table 1		24	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Water Cleanup	PLOT-5012		0	4.g	

Question Data for Test: 1999 SRO

Question: 59

Given the following conditions:

- Unit 3 has had a complete loss of the E13 4160VAC Bus.
- This results in a loss of power to the "A" Residual Heat Removal (RHR) Pump and to the "A" Loop Inboard LPCI Injection Valve (MO-25A).
- A valid LOCA signal occurs.

What must occur to result in a final, design RHR injection flowrate for these conditions of 30,000 gpm.

A	The RHR Loop Cross-Tie Valve (MO-20) must be unlocked and opened by an operator.
B	An operator must manually transfer the Inboard LPCI Injection Valve (MO-25A) to the alternate power supply.
C	The Outboard LPCI Injection Valve (MO-154A) must automatically open to inject through the normally open MO-25A.
✔ D	The Inboard LPCI Injection Valve (MO-25A) must automatically transfer to the alternate power supply.

Explanation of Answer

A. No procedural guidance for this step.
B. Power transfer is automatic.
C. MO-154A is normally open, MO-25A is normally closed.
D. Correct answer, power transfer automatically, 30K flowrate with no operator action.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 2   SRO Grp: 2   RO Val: 2.5   SRO Val: 2.7   55.43

System:	205000	Shutdown Cooling System (RHR Shutdown Cooling Mode)
KA Group Num:	K2	Knowledge of electrical power supplies to the following.
KA Detail Num:	K2.02	Motor Operated Valves

Question Source Information

Ques Source:	1998 PBAPS NRC Exam	Question Source	
Ques Mod Met			

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Residual Heat Removal System	PLOT-0370	III.D	18	10	3b

Question Data for Test: 1999 SRO

Question: 60

Unit 2 is in MODE 4 with "A" RHR pump in Shutdown Cooling (SDC) returning to the vessel through the MO-25A, "Inboard Disch". Loss of inventory causes level to drop to -20". SDC isolates and the "A" RHR pump trips.

Which of the following statements describes the response of LPCI should level continue to drop to
< -160" with no additional operator actions.

A. "A" RHR restarts, "B", "C", and "D" start and inject.

B. "A" RHR restarts, "B", "C", and "D" start and run on min. flow.

C. RHR "B", "C", and "D" start and inject.

✔ D. RHR "B", "C", and "D" start and run on min flow.

Explanation of Answer: 1" Reactor level will cause a PCIS Group IIb isolation. MO-17, 18, 25A and 25B will receive a close signal. At < -160" B, C, and D RHR pumps will start but not inject due to the MO-25 closure. "A" RHR will not start due to no suction flow path (17 and 18 closed MO-13A Torus Suction, closed).

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.7 55.43

System:	205000	Shutdown Cooling System
KA Group Num:	A2	Ability to Predict the Impacts of the following on the SDC System
KA Detail Num:	A2.05	System Isolation

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
System I RHR Relays Not Reset	ARC 227 D-3		1	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Groups II and III Isolations	GP-8B COL	Table Notes	4, 8	17	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Residual Heat Removal	PLOT-0370	Handout 3	2	10	5.b

Question Data for Test: 1999 SRO

Question: 61

Following a reactor scram and scram reset, the Unit Reactor Operator notes that the full core display for rod 02-23 is blank with no position indicated and no green back light. All other rods indicate 00 with a green back light.

If the blank display is due to a rod 02-23 Position Indicating Probe (PIP) problem, the operational impact will be the inability to select and move:

✔ A. Other rods in REFUEL due to a lack of "REFUEL MODE SELECT PERMISSIVE".

B. Other rods due to "RPIS INOPERATIVE".

C. Rod 02-23 due to lack of position indication and backlight.

D. Rod 02-23 due to "ROD SELECT BLOCK TIMER MALFUNCTION".

Explanation of Answer

A. Correct, position of all rods full in from the green backlight PIP reed switch is required for the REFUEL MODE SELECT PERMISSIVE white light.
B. Incorrect, loss of position indication does not cause RPIS INOP (ARC 211 D-5).
C. Incorrect, see correct answer A.
D. Incorrect, loss of position indication is not a cause of ROD SELECT BLOCK TIMER MALFUNCTION (ARC 211 E-3).

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 2.7 SRO Val: 2.8 55.43

System: 214000 — Rod Position Information System

KA Group Num: K5 — Knowledge of the operational implications of the following concepts as they apply to Rod Position Information System

KA Detail Num: K5.01 — Reed Switches

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Manual Control System	PSYS-5062	IV.C.6	18	0	2g

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Rod Drive Mechanism	PLOT-5003	II.B.3	20	0	8c

Question Data for Test: 1999 SRO

Question: 62

At what point during a Unit 3 reactor startup can the Unit Reactor Operator expect a significant increase in Wide Range Neutron Monitoring (WRNM) nuclear instrumentation response during control rod withdrawals?

A	Control rod withdrawals made after steam is being drawn from the reactor.
B	Control rod withdrawals made as reactor power passes 1.00E0% on WRNMs.
C	Withdrawal of a center control rod during a fast recovery startup.
✔ D	Initial rod withdrawals from 50% rod density in the startup.

Explanation of Answer

A. Past the POAH, rod withdrawals are less responsive.
B. This is the point of adding heat, power response should be less responsive.
C. No real difference between before and after critical.
D. Correct answer per GP-2, 50% rod density is "black and white".

Exam Level	Cognitive Level	Facility	Materials
SRO	Application	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 2 RO Val: 2.8 SRO Val: 3.2 55.43 ✔

System:	215003	Intermediate Range Monitor (IRM) System
KA Group Num:	2.2	Equipment Control
KA Detail Num:	2.2.34	Knowledge of the process for determining the internal and external effects on core reactivity.

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Normal Plant Start-up	GP-2	6.2 Caution 1	88	91	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
General Plant Procedures	PLOT-1530	V.A2.f	13	10	4

Question Data for Test: 1999 SRO

Question: 63

Given the following conditions:

- Unit 2 is in Mode 5
- The Mode Selector Switch is in "Refuel"
- The Refueling Platform is over the spent fuel pool
- A fuel bundle has been loaded on the Main Hoist and raised out of the fuel pool storage rack

Which of the following actions would result in a rod block?

A. The Refueling Platform operator raises the Main Hoist to the "full up" position.

B. The Unit Reactor Operator places the Mode Selector Switch in "Startup/Hot Standby".

✔ C. The Refueling Platform operator moves the platform over the reactor vessel.

D. The Unit Reactor Operator selects, but does NOT withdraw, a single control rod.

Explanation of Answer

A. Would clear the rod block.
B. No change in conditions for rod block for this condition alone.
C. Correct answer
D. Input for fuel hoist interlock

Exam Level	Cognitive Level	Facility	Materials
SRO	Application	PBAPS	N/A

KA Information

Tier: SYS — RO Grp: 3 — SRO Grp: 2 — RO Val: 2.6 — SRO Val: 3.5 — 55.43 ✔

System:	234000	Fuel Handling Equipment
KA Group Num:	2.2	Equipment Control
KA Detail Num:	2.2.27	Knowledge of the refueling process

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met: Minor editorial changes made as recommended by the NRC for 1999 PBAPS NRC Exam. Question phrasing changed and distractor tense changed to be consistent.

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Receipt of Rod Blocks	SO 62.7.A-2	Attachment 1	5	16	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Refueling Bridge And Platform	NLSRO-0762		36	3	13

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Manual Control System	PSYS-5062			0	2g

Question Data for Test: 1999 SRO

Question: 64

Unit 3 is in MODE 1 at full power with the following conditions:

- Main Generator Load is 1050 MWe.
- Power factor is .95 lagging.
- Generator hydrogen pressure is 60 psig.

The Power System Director contacts you and directs you to raise reactive loading to 400 MVARs. What is the maximum real load permitted by the attached generator capability curve for the new value of reactive loading?

A 1040 megawatts

✔ B 1090 megawatts

C 1190 megawatts

D 1220 megawatts

Explanation of Answer

A. Used leading limitations vs. lagging.
B. Correct answer.
C. Junction of .95 power factor with 400 MVARs.
D. Junction of 75 psig hydrogen line with 400 MVARs

Exam Level	Cognitive Level	Facility	Materials
SRO	Application	PBAPS	Main Generator Estimated Capability Curve

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 2.8 SRO Val: 3.1 55.43 ✔

System:	245000	Main Turbine Generator and Auxiliary Systems
KA Group Num:	2.1	Conduct of Operations
KA Detail Num:	2.1.25	Ability to Interpret Station reference materials such as graphs/nonographs/and tables which continue

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Main Generator Synchronizing and	SO 50.1.A	Figure 1	Last	7	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Main Generator and Auxiliaries	PLOT-5050	II.N.5.a	61	0	10

Question Data for Test: 1999 SRO

Question: 65

Unit 2 is operating at 100% power when a leak develops in the TBCCW system. Shortly thereafter TBCCW Head Tank level drops out of sight low. The operating TBCCW pump starts cavitating and discharge pressure drops to 0 psig.

Assuming no operator actions are taken, which of the following statements describe the operational impact of this event?

A "ISO-PHASE BUS TROUBLE" alarm is received immediately, "ISO-PHASE BUS LOSS OF COOLING" is received 10 minutes later, and an automatic turbine runback is initiated.

B "ISO-PHASE BUS TROUBLE" and ISO-PHASE BUS LOSS OF COOLING" alarms are received immediately, and an automatic turbine runback is initiated.

✔ C "ISO-PHASE BUS TROUBLE" alarm is received immediately, followed by "ISO-PHASE BUS LOSS OF COOLING" alarm 10 minutes later. No automatic turbine runback will occur in this condition.

D "ISO-PHASE BUS TROUBLE" and "ISO-PHASE BUS LOSS OF COOLING" alarms are received immediately. No automatic turbine runback will occur in this condition.

Explanation of Answer: Isophase bus trouble alarm is caused immediately by low water flow and other parameters.
Isophase bus loss of cooling is caused by either low cooling water flow or low air flow for 10 minutes.
There is no automatic load runback on loss of isophase bus cooling.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS · RO Grp: 2 SRO Grp: 2 RO Val: 2.6 SRO Val: 2.6 55.43

System: 245000 — Main Turbine Generator and Auxiliary Systems

KA Group Num: K1 — Knowledge of the Physical Connection and/or cause and effect relationship between main turbine general

KA Detail Num: K1.06 — Component Cooling Water Systems

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Isophase Bus Trouble	ARC 206 F-5			5	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of TBCCW	ON-118	2	2	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Iso-phase Bus Loss of Cooling	ARC 206 F-4			3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
TBCCW	PLOT-5034	II.E	11	0	3.b

Question Data for Test: 1999 SRO

Question: 66

Unit 2 is operating at 95% power with all condensate pumps and all feedpumps running. The "A" CONDENSATE PUMP trips on motor overload. The RO verified that vessel level was maintained in the normal band.

Which of the following statements describe the plant response to this trip?

A	A Reactor Recirculation pump runback to 30% occurred due to the "A" condensate pump trip.
✔ B	A Reactor Recirculation pump runback to 45% occurred due to the "A" condensate pump trip.
C	A Reactor Recirculation runback did NOT occur since vessel level was maintained in the normal band.
D	A Reactor Recirculation runback did NOT occur since total feed flow is > 85%.

Explanation of Answer

B. Correct, A condensate pump trip with feed flow greater than 85% results in a recirc runback to 45%.
A. Incorrect, Interlocks not met for 30% runback.
C. Incorrect, No level input to 45% runback.
D. Incorrect, Feed flow is limited to 85% on a condensate pump trip.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 1   SRO Grp: 2   RO Val: 3.5   SRO Val: 3.5   55.43

System:	259001	Reactor Feedwater System
KA Group Num:	K4	Knowledge of Reactor Feedwater System design features and/or interlocks which provide for the following:
KA Detail Num:	K4.11	Recirculation Runbacks

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
A Condensate Pump Brk Trip	ARC 203 E-2			3	

Question Data for Test: 1999 SRO

Question: 67

Both Units were operating at full power when the following alarm and indications were received:
- "CONTROL ROOM RAD MONITOR DIV. II INITIATED" (003 A-3)
- MCR Radiation Monitors RI-0760B and RI-0760D were reading approximately 14,000 cpm with their red high lights lit.

Thirty seconds later, the following alarms and indication were received:
- "CONTROL ROOM VENT SUPPLY FAN HI-LO" (003 A-1)
- "CONTROL ROOM VENT SUPPLY LO FLOW CREV START" (003 A-5)
- FR-0765 is reading 200 scfm and dropping.

The Control Room Emergency Ventilation System:

A. Has NOT realigned since the complete initiation logic has not been satisfied.

B. Has NOT realigned as indicated by the low flow condition.

C. Has realigned due to a low flow condition.

✔ D. Has realigned due to a high radiation condition.

Explanation of Answer: CREV initiated due to high radiation condition on B and D radiation monitors. After the CREV initiation, a low flow to the Fresh Air Supply Fans resulted in a second CREV initiation signal.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 2   SRO Grp: 2   RO Val: 3.3   SRO Val: 3.5   55.43

System:	290003	Control Room HVAC
KA Group Num:	A3	Ability to Monitor Automatic Operations of the Control Room HVAC including
KA Detail Num:	A3.01	Initiation/Re-Configuration

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Room Vent Supply Flow Hi	ARC 003 A-1		1	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Room Rad Monitor Div I Ini	ARC 003 A-2		1	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Room Ventilation Startup a	SO 40D.1.A			9	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Room Ventilation	PLOT-0450	V	12-13	10	4

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Room Vent Supply Lo Flow	ARC 003 A-5		1	4	

Question Data for Test: 1999 SRO

Question: 68

Unit 2 has experienced a total loss of instrument air with the Instrument Air headers reading 0 psig.

Which of the following statements describe the pneumatic sources available to operate ALL of the Safety Relief Valves (SRVs).

✔ A. Seismic Grade Instrument Gas (via T-261).

B. Instrument Nitrogen (via GP-8E).

C. Backup N2 bottles (via SV 8130 A &B).

D. Relief Valve accumulators.

Explanation of Answer: AO-2969A and B, drywell instrument N2 supply valves to the drywell fail closed on loss of instrument air. N2 supply from SGIG taps into the B header downstream of AO-2969B and is therefore available. Backup N2 bottles via SU 8130 A, B have a separate supply line to the ADS valves. Only the ADS valves are equipped with accumulators.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 2.7 SRO Val: 2.9 55.43

System:	300000	Instrument Air System (IAS)
KA Group Num:	K3	Knowledge of the effect that a loss or malfunction of the Instrument Air System will have on:
KA Detail Num:	K3.01	Containment Air System

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Instrument Nitrogen Ssytem	PSYS-5016	II	9, 12	0	4a

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
P&ID Instrument Nitrogen	M-333			53	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Placing the Backup Instrument Nitr	T-261			1	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Backup Instrument Nitrogen to AD	SO 16A.1.A			4	

Question Data for Test: 1999 SRO

Question: 71

The Traversing In-core Probe (TIP) system is in use with a probe in the core when the reactor scrams on low level following a loss of feedwater. HPCI automatically starts and recovers level, containment parameters are normal.

Which of the following statements describe the expected response of the TIP system to this transient?

✔ A. TIP automatically retracts from the core, TIP Ball valves close, TIP Nitrogen Purge valves close.

B. TIP automatically retracts from the core, TIP Ball valves close, TIP Nitrogen purge valves remain open.

C. TIP automatically retracts from the core, TIP Ball valves and TIP Nitrogen purge valves remain open.

D. NO TIP system response to a reactor low level condition.

Explanation of Answer: A. Correct, Tip automatically retracts, ball valves and purge valve close on 1" Group II isolation.
D. Incorrect, Plausible since some GP II isolations such as RWCU do not occur on Rx lo level condition.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 3 SRO Grp: 3 RO Val: 3.4 SRO Val: 3.5 55.43

System: 215001 Traversing In-Core Probe

KA Group Num: K4 Knowledge of Traversing In-Core Probe Design Features and/or interlockes which provide for the following:

KA Detail Num: K4.01 Primary Containment Isolation

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Group II and III	GP-8B	2.1	1	15	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Groups II and III Isolations	GP-8B COL	1	3,8	17	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Tip System	PSYS-5007F	IV.E	15, 16	0	4.a

Question Data for Test: 1999 SRO

Question: 72

The following conditions exist on Unit 3:

- A leak on the "3A" RWCU pump discharge has resulted in Reactor Building Ventilation Stack Radiation Levels rising.
- The Reactor Building Equipment Cell Exhaust had just been aligned to Standby Gas Treatment (SBGT) in accordance with SO 9 when a loss of instrument air occurred.
- The "3A" and "3B" instrument air headers and the Unit 3 service air header are fully depressurized.
- ON-119 has been entered.

Under these conditions, Standby Gas Treatment:

✔ A Will remain in service. Reactor Building Ventilation will isolate.

B Will remain in service. Reactor Building Ventilation will NOT isolate.

C Will NOT remain in service. Reactor Building Ventilation will isolate.

D Will NOT remain in service. Reactor Building Ventilation will NOT isolate.

Explanation of Answer: SBGT will remain in service and Reactor Building will isolate because these systems fail to their isolation condition positions on a loss of instrument air.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 3 SRO Grp: 3 RO Val: 2.7 SRO Val: 2.7 55.43

System:	288000	Plant Ventilation Systems
KA Group Num:	K6	Knowledge of the effect that a loss or malfunction of the following will have on the plant ventilation system
KA Detail Num:	K6.03	Plant Air Systems

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Instrument Air	ON-119	Attachment 1	17, 18	14	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Building HVAC	PSYS-5040	V.F.2	28	1	5.c

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Building HVAC	PSYS-5040	III.B.7.c	16	1	

Question Data for Test: 1999 SRO

Question: 73

Unit 2 is operating at 100% power with all 10 Condensate Filter Demineralizers are in service in the AUTOMATIC mode. Condensate filter demin system dP momentarily spikes high and returns to normal. The Reactor Operator acknowledges receipt of the "CONDENSATE FILTER-DEMIN TROUBLE" alarm (20C207L A-2) and notes that the Condensate Filter Demineralizer Bypass Valve (MO-2114) is full open.

After the dP spike returns to normal, Feedpump suction pressure:

A. Will drop, due to Condensate Demin "E" Valve closure.

B. Will drop, due to Condensate Demin "E" Valve opening.

C. Will NOT drop, due to Condensate Demin "E" Valve closure.

✔ D. Will NOT drop, due to Condensate Demin "E" Valve opening.

Explanation of Answer

The Condensate Filter Demin Bypass Valve, MO-2114, opens on high dP of 60 psi.
The Condensate Filter Demin"E" Valves open on high dP of 50 psi.
If MO-2114 is open on high dP, the "E" valves will be open.
The "E" valves and the MO-2114 open to maintain Condensate pressure to the Feedpump suctions.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 2   SRO Grp: 3   RO Val: 2.9   SRO Val: 2.9   55.43

System:	256000	Reactor Condensate System
KA Group Num:	A1	Ability to predict and/or monitor changes in parameters associated with condensate system conditions
KA Detail Num:	A1.01	System Flow

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
System Diff Press High	RC 20C089R D-5		1	5	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Condensate	PLOT-0520	III.F	14-16	6	1b

Question Data for Test: 1999 SRO

Question: 74

A refueling outage is in progress on Unit 2, with the reactor cavity flooded and the Fuel Pool gates removed. CRDH is in service and RWCU is rejecting inventory to maintain fuel pool level. A trip of the in-service CRD pump occurs. With no operator action, which of the following will occur as a result of the CRD pump trip?

Fuel pool cooling pumps (FCP) will trip on:

A. Low skimmer surge tank level to prevent Fuel Pool pump down.

✔ B. Low skimmer surge tank level to provide FPC pump protection.

C. Low Fuel Pool level to prevent Fuel Pool pump down.

D. Low booster pump suction pressure to provide FPC pump protection.

Explanation of Answer

A. Incorrect, FPC pumps trip on skimmer surge tank to 40" but will not pump down Fuel Pool due to physical arrangement of skimmer surge tanks and fuel pool.
B. Correct, FPC pumps trip on skimmer surge tank level of 40".
C. Incorrect, there are no automatic actions, other than alarms, off fuel pool level.
D. Incorrect, low booster pump suction pressure causes booster pump trip, low FPC pump suction causes FPC pump trip.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS | RO Grp: 3 | SRO Grp: 3 | RO Val: 2.6 | SRO Val: 2.6 | 55.43

System:	233000	Fuel Cooling and Cleanup
KA Group Num:	A3	Ability to monitor automatic operation of fuel pool cooling and cleanup
KA Detail Num:	A3.02	Pump Trip

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Fuel StoragePool High/Low Level	ARC C075 B-1		1	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Skimmer Surge Tank Low Level	ARC C075 B-3		1	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Fuel Pool Cooling	PLOT-0750	IV	9	7	3b

Question Data for Test: 1999 SRO

Question: 86

Unit 3 was operating at 50% power when it experienced a loss of vacuum transient. Currently power is 20% and condenser vacuum is 24.5" and steady. A circ water problem has been discovered to be the cause of the vacuum loss. Maintenance estimates that it will be 4 hours until the circ water problem will be corrected. Under these conditions, the next operator action is to:

A	Continue to reduce power.
B	Hold power constant.
✔ C	Trip the main turbine.
D	Scram and enter T-100.

Explanation of Answer: OT-106 Step 3.2 directs that if vacuum is > 25" and generator Mwe are < 325 Mwe, then if within bypass capability trip the main turbine.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.2 SRO Val: 3.2 55.43

System:	295002	Loss of Main Condenser Vacuum
KA Group Num:	AA1	Ability to operate and/or monitor the following as they apply to the loss of main condenser vacuum
KA Detail Num:	AA1.05	Main Turbine

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Condenser Low Vacuum	OT-106	3.2	1	18	
Operational Transient Procedures	PLOT-1540			6	4

Question Data for Test: 1999 SRO

Question: 87

Unit 2 is experiencing a low condenser vacuum transient and has entered OT-106, Condenser Low Vacuum. Vacuum is currently 24.5" Hg and dropping. The "C CONDENSER LO VAC" annunciator (203 D-2) is lit.

During a brief the CRS states that a full reactor scram will not be received until the "A" or "B" low vacuum alarms come in.

The CRS statement is:

A	Correct, since the "C" condenser provides only a "A" Channel RPS input.
B	Correct, since the scram setpoint cannot be achieved without all three condenser losing vacuum.
✔ C	Incorrect, since the "C" condenser inputs into both RPS channels.
D	Incorrect, since low vacuum in any condenser (A, B, C) can result in a full scram.

Explanation of Answer: Note in OT-106 for low condenser vacuum explains that the "C" condenser has two low vacuum RPS inputs for RPS channels A and B and can cause a full scram by itself.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.7 SRO Val: 3.8 55.43

System:	295002	Loss of Main Condenser Vacuum
KA Group Num:	AK3	Knowledge of the reasons for the following responses as they apply to loss of Main Condenser Vacuum
KA Detail Num:	AK3.01	Reactor Scram

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Condenser Low Vacuum - Bases	OT-106	Note	1	18	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RPS	PLOT-5060F			0	1.j

Question Data for Test: 1999 SRO

Question: 88

Unit 2 has experienced a high drywell pressure transient. The reactor has been scrammed and the URO is controlling level manually. Due to overfeeding with HPCI, reactor level has exceeded the band of +5" to +35", HPCI was then secured.

Current conditions are:

- Reactor Pressure 1000 psig.
- Narrow range level indicators are upscale.
- Wide Range Level indicators reads +45" to +50" and steady.
- LI-2-2-3-86 is reading +75" and steady (figure 1 is attached).

Actual level should be verified using:

A	LI-2-2-3-86 and is currently ABOVE the Main Steam Lines.
B	LI-2-2-3-86 and is currently BELOW the Main Steam Lines.
C	Wide Range indication and is currently ABOVE the Main Steam Lines.
✔ D	Wide Range indication and is currently BELOW the Main Steam Lines.

Explanation of Answer: Step 3.2 of OT-110 directs that LI-2-2-3-86 should not be used if other level indicators are available. Wide Range Level is significantly below the steam lines.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	Figure 1 OT-110

KA Information

Tier: E/APE   RO Grp: 2   SRO Grp: 2   RO Val: 3.9   SRO Val: 3.9   55.43

System:	295008	High Reactor Water Level
KA Group Num:	AA2	Ability to determine and/or interpret the following as they apply to high reactor water level
KA Detail Num:	AA2.01	Reactor Water Level

Question Source Information

Ques Source:	New	Question Source	
Ques Mod Met			

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor High Level	OT-110 Bases	Step 3.2	2	6	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operational Transient Procedures	PLOT-1540			6	4

Question Data for Test: 1999 SRO

Question: 89

ON-118, loss of Turbine Building Closed Cooling Water (TBCCW), directs that if TBCCW cannot be restored, Main Turbine Generator load should be reduced to less than 18,000 amps in accordance with GP-9-2.

The basis for this ON-118 step is to:

✔ A. Permit heat generated by the isophase bus bars to be absorbed by the environment.

B. Reduce the heat load so that RBCCW is not overloaded when it backs up TBCCW.

C. Permit condensate pumps to be alternated to prevent condensate pump overheating.

D. Reduce the heat load on TBCCW so that the station air compressors will NOT trip on high temperature.

Explanation of Answer

A. Correct, at < 18,000 amps heat generated by the bus bars can be absorbed by the environment without bus duct cooling.
B. Incorrect, Isophase bus cooling is not a TBCCW load that is backed up by RBCCW.
C. Incorrect, the basis for lowering to 18,000 amps is not to alternate Condensate pumps.
D. Incorrect, Station air compressors are backed up by RBCCW on a loss of TBCCW.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.3 SRO Val: 3.4 55.43

System:	295018	Partial or Complete loss of component cooling water
KA Group Num:	AK3	Knowledge of the reasons for the following responses as they apply to partial or complete loss of component cooling water
KA Detail Num:	AK3.02	Reactor Power Reduction

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Turbine Building Closed Co	ON-118	2	2	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 SRO

Question: 90

ON-113, Loss of Reactor Building Closed Cooling Water (RBCCW), directs that the RCCW Head Tank Level be verified. When sent to verify RBCCW Head Tank Level, an Equipment Operator must:

A	Go to Turbine Building 165' elevation and check the level in the head tank sightglass.
B	Go to Turbine Building 165 elevation and check make-up valve position.
C	Go to the Refuel Floor and check the level in the head tank sightglass level.
✔ D	Go to the Refuel Floor and check make-up valve position.

Explanation of Answer: Head tanks for TBCCW and DWCW are located on Turbine Building 165' El. RBCCW head tank is actually located above the Refuel Floor so operators are directed to check make-up valve position.

Exam Level	Cognitive Level	Facility	Materials
SRO	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.3 SRO Val: 3.5 55.43 ✔

System:	295018	Partial or complete loss of component cooling water.
KA Group Num:	2.4	Emergency Procedure/Plan
KA Detail Num:	2.4.35	Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of RBCCW - Bases	ON-113	2.3.4	2	11	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RBCCW Head Tank Hi Lo Level	ARC 217 G-5			4	

Question Data for Test: 1999 SRO

Question: 91

ON-119, Loss of Instrument Air, directs that the reactor be scrammed if any rod begins to drift in due to lowering scram pilot air header pressure.

What is the bases for this direction?

A. To ensure that the scram discharge volume is fully isolated during the scram.

✔ B. To ensure that various scram valve opening pressures do not result in a random rod pattern.

C. To ensure that the individual control rod scram inlet valves do not open before the scram outlet valves.

D. To ensure that sufficient volume exists in the scram discharge volume to complete a full scram.

Explanation of Answer

A. Incorrect, Loss of air will result in SDV isolation.
B. Correct, To avoid random rod insertion due to varying scram valve opening pressures.
C. Incorrect, scram outlet valves open prior to scram inlet valves due to greater spring preload.
D. Incorrect, an automatic scram would be initiated off SDV high level PRIOR to there being insufficient volume in the SDV.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.4 SRO Val: 3.6 55.43

System:	295019	Partial or Complete Loss of Instrument Air
KA Group Num:	2.4	Emergency Procedure/Plan
KA Detail Num:	2.4.11	Knowledge of abnormal condition procedures

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Instrument Air - Bases	ON-119	Step 2.1 Bases	2		

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 SRO

Question: 92

A loose fitting has resulted in the loss of instrument air to the in-service Control Rod Drive (CRD) Flow Control Valve (AO-19).

Determine which of the following conditions could result from this instrument air loss.

A	Control Rod Drive accumulator alarms due to low pressure.
✔ B	Control Rod Drive alarms due to high temperatures.
C	Control Rods begin to drift due to excessive flow.
D	High rod speeds during control rod withdrawal.

Explanation of Answer

A. Incorrect, CRD accumulator pressure is not affected by loss of air.
B. Correct, loss of instrument air will cause AO-19 to fail closed resulting in reduced cooling water flow to CRDMs.
C. Incorrect, Cooling water flow and dP is reduced due to AO-19 closure.
D. Incorrect, Drive water flow and dP is reduced due to AO-19 closure.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.8 SRO Val: 3.9 55.43

System: 295019 — Partial or complete loss of instrument air

KA Group Num: AK2 — Knowledge of the interrelationship between loss of instrument air and the following

KA Detail Num: AK2.01 — CRD Hydraulics

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Instrument Air	ON-119	Attachment 1	12	13	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 SRO

Question: 93

Unit 2 has experienced a loss of shutdown cooling, ON-125, Loss of Shutdown Cooling, directs you to determine the expected decay heat load using Operator Aid 95-04 located on the back of Panel 20C005A.

The information necessary to determine expected heat load using this Operator Aid is:

A	Current heat up rate.
B	Current WRNM indicated power.
C	Power history before shutdown.
✔ D	Elapsed time since shutdown.

Explanation of Answer: The operator aid relates time since shutdown to decay heat load in megawatts.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 3 SRO Grp: 2 RO Val: 3.6 SRO Val: 3.8 55.43

System:	295021	Loss of Shutdown Cooling
KA Group Num:	AK1	Knowledge of the operational implications of the following concepts as they relate to a loss of shutdown cooling
KA Detail Num:	AK1.01	Decay Heat

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Shutdown Cooling - Bases	ON-125	Step 2.8.7	11	1	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Expected Decay Heat Operator Aid	OP Aid 95-04				

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 SRO

Question: 94

A Unit 3 reactor startup was in progress with reactor pressure at 500 psig and reactor power at 1% when the running "A" Control Rod Drive (CRD) pump tripped. A start of the "B" CRD pump is in progress. CRD charging header pressure was 920 psig and dropping when 3 accumulator trouble alarms were received on withdrawn control rods.

Under these conditions, ON-107, Loss of CRD Regulation Function, directs that a full reactor scram be inserted. The basis for this direction is that:

✔ A	At this reactor pressure, operable HCU accumulators are required to ensure proper scram force.
B	At this reactor pressure the CRDM ball check valves will NOT reposition to permit reactor pressure to insert the control rods.
C	This condition may result in unanalyzed rod patterns due to rods inserting randomly on low accumulator pressure.
D	This condition exceeds the Tech Spec Limit for the number of withdrawn control rods that can be declared "slow".

Explanation of Answer: INOP accumulators could lead to a potentially severe degradation of scram performance. At reactor pressures less than 900 psig accumulators become very important in providing the scram force especially during a depressurization event or at low reactor pressures.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.3 SRO Val: 3.4 55.43

System:	295022	Loss of CRD Pumps
KA Group Num:	AK1	Knowledge of operational implications of the following concepts as they apply to loss of CRD pumps
KA Detail Num:	AK1.01	Reactor pressure vs. rod insertion capability

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of CRD Regulating Function	ON-107 Bases	7.2	2	7	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 SRO

Question: 95

Unit 2 has experienced a drywell steam leak with an ATWS. Current conditions are as follows:

- Reactor pressure being maintained 950-1050 psig.
- TI-2501 point 126 is not available.
- TI-2501 point 127 indicates 520 degrees F.
- Narrow range RPV level indicates +5 inches.
- Wide range RPV level indicates -115 inches.
- Fuel Zone RPV level range indicates -125 inches.
- Refuel range RPV level (Shutdown Range Instrument LI-2-2-3-86) indicates -21 inches.

Evaluate the above conditions and then use Table DW/T-1 from T-102 (attached), "Primary Containment Control" to determine which RPV level indication ranges may be used.

A. Narrow Range and Refuel Range

B. Narrow Range and Wide Range

✔ C. Wide Range and Fuel Zone Range

D. Fuel Zone Range and Refuel Range

Explanation of Answer:

With point 126 unavailable, point 127 must plot on the "safe" side.
Point 127 of 520 degrees F. and 950 to 1050 psig plots on the "safe" side of the RPV saturation curve.
Wide Range level at -115 inches is ABOVE the minimum indicated run level of -120".
Refuel Range at -21 inches plots to the unsafe side.
Narrow Range is BELOW the minimum indicated run level of 10 inches and point 127 at 520 degrees F. is above the max run temperature of 450 degrees F.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	T-102 Table DW/T-1

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.7 SRO Val: 3.9 55.43

System:	295028	High Drywell Temperature
KA Group Num:	EA2	Ability to determine and/or interpret the following as they apply to High Drywell Temperature
KA Detail Num:	EA2.03	Reactor Water Level

Question Source Information

Ques Source:	New	Question Source	
Ques Mod Met			

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1650			8	9

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control	T-102 Bases	DW/T-4	19	14	

Question Data for Test: 1999 SRO

Question: 96

T-102, Primary Containment Control, provides direction to maintain Torus level in the band of 14.5 ft. to 14.9 ft. In accordance with the TRIP Bases what is the first concern during a rising torus level transient?

A	Submerging the Reactor Building to Torus Vacuum Breaker Line.
✔ B	Excessive stress on SRV tail pipes.
C	Submergence of the Torus Spray Header.
D	Excessive stress on ECCS suction piping.

Explanation of Answer: T/L-18 Basis - Increased submergence of SRV tailpipes can cause excessive stress on SRV pipes, quenchers, and associated supports.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.4 SRO Val: 3.7 55.43

System:	295029	High Suppression Pool Water Level
KA Group Num:	EK1	Knowledge of the operational implications of the following as they apply to high suppression pool level
KA Detail Num:	EK1.01	Containment Integrity

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control - Bas	T-102 Bases	T/L-18	8	14	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 SRO

Question: 97

T-102 step PC/P-6 directs use of Torus Sprays before Torus pressure reaches 9 psig if Torus level is below 21 ft.

What are the bases for the 9 psig and 21 feet limitations?

✔ A. Threshold for downcomer chugging and Torus Spray header becomes submerged.

B. Threshold for downcomer chugging and Torus to drywell vacuum breakers become submerged.

C. Threshold for evaporative cooling and Torus to drywell vacuum breakers become submerged.

D. Threshold for evaporative cooling and Torus Spray header becomes submerged.

Explanation of Answer

A. Correct
B. Incorrect, Torus to drywell vacuum breaker becomes submerged at 18 ft.
C. Incorrect, See B and no maximum dP.
D. Incorrect, Evaporative cooling is part of D/W spray initiation limit curve bases.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.1 SRO Val: 3.3 55.43

System:	295029	High Suppression Pool Water Level
KA Group Num:	EK2	Knowledge of the interrelationship between high suppression pool water level and the following
KA Detail Num:	EK2.05	Containment/Drywell vacuum breakers

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control - Bas	T-102 Bases	PC/P-6	13	14	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 SRO

Question: 98

Plant conditions on Unit 3 are as follows:

- A steam leak exists in the Unit 3 Reactor Building.
- The Reactor has been shutdown and depressurized to a steady value of 30 psig.
- TR-3-13-139 point 22 indicates 325 degrees F.
- Wide Range RPV level indicates -150 inches.
- Fuel Zone RPV level indicates -172 inches.

Evaluate the above conditions and then use Table SC/T-4 from T-103, "Secondary Containment Control" (attached) to determine which RPV level range may be used.

A. Wide Range may be used, Vigilant Monitoring required.

B. Wide Range may be used, Vigilant Monitoring NOT required.

✔ C. Fuel Zone may be used, Vigilant Monitoring required.

D. Fuel Zone may be used, Vigilant Monitoring NOT required.

Explanation of Answer: TR-139 pt. 22 at 325 degrees F. and 30 psig reactor pressure plots to the "vigilant" monitoring side of the RPV saturation curve.
Wide Range level at -150 inches is below the minimum indicated level and 325 degrees F. is above the max run temp and is therefore not available.
Fuel Zone level at-172 inches is above the minimum indicated level and is available for use.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	T-103 Table SC/T-4

KA Information

Tier: E/APE RO Grp: 3 SRO Grp: 2 RO Val: 3.3 SRO Val: 3.5 55.43

System: 295032 High Secondary Containment Area Temperature

KA Group Num: EA2 Ability to determine and/or interpret the following as they apply to high secondary containment area temperature:

KA Detail Num: EA2.02 Equipment Operability

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Secondary Containment Control -	T-103 Bases	SC/T-3	5	12	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 SRO

Question: 99

A Designated Alternate (DA) is moving an old jet pump in the Unit 2 fuel pool when it falls off the auxiliary hoist. It is reported to the Control Room that a jet pump fell on an irradiated fuel bundle and damaged some fuel pins.

The Control Room also receives the following alarms and indications

- Refueling Floor Vent Exhaust Hi Radiation (218 A-1)
- Reac. Bldg. Zone Vent Exhaust Hi Radiation (218 B-1)
- Reac. Bldg. Or Refueling Floor Vent Exh. Hi Rad Trip (218 D-4)
- Refueling Floor Radiation Trip Units A and D High lights are lit.

Evaluate these conditions and determine the expected ventilation lineup.

✔ A
Reactor Building Ventilation trips.
Refuel Floor Ventilation trips.
SBGT initiates and aligns to the entire Reactor Building/Refuel Floor.

B
Reactor Building Ventilation continues to run.
Refuel Floor Ventilation trips.
SBGT initiates and aligns to the Refuel Floor.

C
Reactor Building Ventilation continues to run.
Refuel Floor Ventilation continues to run.
SBGT initiates and aligns to the Refuel Floor.

D
Reactor Building Ventilation continues to run.
Refuel Floor Ventilation continues to run.
SBGT remains in standby.

Explanation of Answer
A trip of "A" and "D" Refuel Floor rad will result in a Group III isolation.
A Group III isolation will trip Reactor Bldg. And Refuel Floor vent, SBGT will align to the entire Reactor Building and Refuel Floor.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE   RO Grp: 2   SRO Grp: 2   RO Val: 4.0   SRO Val: 3.9   55.43

System:	295034	Secondary Containment Ventilation High Radiation
KA Group Num:	EA1	Ability to operate and/or monitor the following as they apply to secondary containment ventilation high radiation
KA Detail Num:	EA1.03	Secondary Containment Ventilation

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Refueling Floor Vent Exhaust Hi R	ARC 218 A-1			2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reac. Bldg. Zone Vent Exhaust Hi	ARC 218 B-1			2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reac. Bldg. Or Refueling Floor Ven	ARC 218 D-4			3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PCIS	PLOT-5007G	II.B.4.h	18	0	1.c

Question Data for Test: 1999 SRO

Question: 100

Unit 2 is in T-103, "Secondary Containment Control", due to high water level condition in Secondary Containment. The Reactor has been conservatively scrammed and the Group II/III isolations (from the level shrink) are complete.

The CRS is currently attempting to determine whether a Primary System is discharging into the Reactor Building. Given the above conditions, evaluate the following and determine which constitutes a primary system discharging into the Reactor Building.

A. Leakage from a pipe flange on the discharge of the Reactor Water Cleanup Non-regenerative Heat Exchanger.

B. Steam leakage from a rupture on the piping of the #2 Main Steam stop valve inlet.

C. Leakage from a weld crack on the "A" RHR suction piping penetration to the Torus.

✔ D. Steam leakage from the Standby Liquid Control Injection line just outboard of the drywell penetration.

Explanation of Answer

A. Incorrect, RWCU is isolated on a complete Group II isolation.
B. Incorrect, #2 MSV is not in the Reactor Building and not a T-103 issue.
C. Incorrect, RHR suction is not a primary system.
D. Correct

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.3 SRO Val: 4.0 55.43

System:	295036	Secondary Containment High Jump/Area Water Level
KA Group Num:	2.4	Emergency Procedure/Plan
KA Detail Num:	2.4.20	Knowledge of operational implications of EOP Warnings/Cautions/and Notes

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Secondary Containmnet Control -	T-103	Note 25.1	11	12	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 SRO

Question: 101

Unit 3 was operating in MODE 1 at 75% power when a fire was reported in the Reactor Building 135' elevation. The Crew has entered ON-114, the procedure for an "actual fire", and the CRS has directed that the Equipment Operator isolate the RPV Condensing Chamber Backfill System.

The basis for isolation of this system under these conditions is to prevent inaccurate level indication and unreliable automatic initiations due to:

A. Lowering Instrumentation Variable Leg density.

B. Raising Instrumentation Variable Leg density.

✔ C. Lowering Instrumentation Reference Leg density.

D. Rising Instrumentation Reference Leg density.

Explanation of Answer: Localized heating of the 3B reference leg backfill system could eventually raise reference leg temperature. With the rise in reference leg temperature, the density of the reference leg will go down resulting in unreliable indications and unreliable automatic initiations.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE   RO Grp: 2   SRO Grp: 2   RO Val: 3.1   SRO Val: 3.6   55.43

System:	600000	Plant Fire on Site
KA Group Num:	AA2	Ability to determine and interpret the following as they apply to a plant fire on site
KA Detail Num:	AA2.17	Systems that may be affected by the fire

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Actual Fire Reported - Bases	ON-114	Note 1	1	6	

Question Data for Test: 1999 SRO

Question: 102

ON-114, for an Actual Reported Fire, has a note to inform the Operator that a loss of power to the Motor Driven Fire Pump for more than 8 seconds will defeat that pumps automatic start capability.

The basis for this feature is to prevent:

A	A simultaneous start with the Diesel Driven Fire Pump and resultant water hammer.
B	A spurious start due to loss of power to the fire header pressure instrumentation.
C	The pump from automatically starting with reduced bus voltage.
✔ D	Overloading the diesel generators on a loss of off-site power.

Explanation of Answer: Defeat of the auto start feature occurs after 8 sec. Loss of power to prevent an auto start during a Loop event which could cause an Emergency Diesel Generator to exceed its 200 hour rating.

Exam Level	Cognitive Level	Facility	Materials
SRO	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 2.8 SRO Val: 3.4 55.43

System:	600000	Plant Fire on Site
KA Group Num:	AK3	Knowledge of the reasons for the following responses as they apply to a plant fire on site
KA Detail Num:	AK3.04	Actions contained in the abnormal procedure for plant fire on site

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Actual Fire Reported In - Bases	ON-114		3	6	
Fire Protection System	PLOT-0685	V.A	17	7	5.h

Question Data for Test: 1999 SRO

Question: 103

Given the following conditions:

- A loss of off-site power has occurred.
- The E-1 and E-4 Diesel Generators (DG) are running.
- The E-43 4KV bus has an overcurrent lockout.
- No DG cooling water is available.
- Drywell pressure is 3.6 psig and slowly rising.

Why are jumpers, installed in the Control Room, the PREFERRED method for shutting down the two diesel generators?

A	This bypasses the 10 minute timer on the MCA signal enabling the DG Control Switch "Pull-To-Lock" position.
B	Local methods of DG shutdown are disabled for these conditions.
✔ C	The DG shutdown actions need to be completed as quickly as possible.
D	Use of the DG Control Switch "Pull-To-Lock" position will not allow a restart should cooling be restored.

Explanation of Answer

A. Jumpers insert a DG differential overcurrent signal.
B. All local stops remain available, just can't be done in 3 minutes.
C. Correct answer, need to shutdown the DG in 3 minutes.
D. Switch will not shutdown the DG.

Exam Level	Cognitive Level	Facility	Materials
SRO	Memory	PBAPS	N/A

KA Information

Tier: E/APE. RO Grp: 2 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.8 55.43 ✔

System:	295003	Partial or Complete Loss of AC Power
KA Group Num:	2.1	Conduct of Operations
KA Detail Num:	2.1.32	Ability to explain and apply system limits and precautions

Question Source Information

Ques Source:	1998 PBAPS NRC Exam	Question Source	
Ques Mod Met			

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Off-Site Power - Bases	SE-11 Bases	LP-9	6	7	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Special Events	PLOT-1555			4	12b

Question Data for Test: 1999 SRO

Question: 104

Unit 2 was operating in MODE 1 at 40% power when it experienced a loss of 20Y050. All required control room actions have been completed.

Under these conditions, operator actions will be impacted by a loss of power to:

A. The RBCCW backup of DWCW which will require manual transfer.

B. The lighting in vital areas which will require the use of flashlights.

C. The Fire Alarm Panel which will require continuous roving fire watches.

✔ D. The Control Room radios which will require the use of alternate communications.

Explanation of Answer

A. Incorrect, RBCCW backup of TBCCW is impacted (NOT DWCW).
B. Incorrect, SE-11 directs use of flashlights.
C. Incorrect, Plausible wrong answer.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.5 55.43

System:	295003	Partial or Complete loss of AC Power
KA Group Num:	AK2	Knowledge of the interrelations between partial or complete loss of AC power and
KA Detail Num:	AK2.04	AC Electrical Loads

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Uninterrutable AC Power -	ON-112-2	Note 4	2	6	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550	II	6	7	2

Question Data for Test: 1999 SRO

Question: 105

Following a reactor scram, the Unit Reactor Operator reported that all APRMs are downscale. Later, the Control Room Supervisor (CRS) directed all control rods be verified to be inserted to or beyond Notch "02".

Which of the following describes why the CRS needs this information?

The CRS:

A	Will direct boron injection (Standby Liquid Control) it this is not true.
✔ B	Is assured the reactor is shutdown and will remain shutdown during the ensuing cooldown.
C	Will exit T-101, "RPV Control" and enter T-117, "Level/Power Control", if this is not true.
D	Is assured the Heat Capacity Temperature Limit will not be exceeded.

Explanation of Answer

A. SBLC is injected if power > 3% or unknown and the reactor is not shutdown.
B. Correct answer, Maximum Subcritical Banked Withdrawal Position.
C. T-117 entry required but T-101 is continued.
D. Not a concern with these conditions.

Exam Level	Cognitive Level	Facility	Materials
SRO	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.3 SRO Val: 4.4 55.43 ✔

System:	295006	SCRAM
KA Group Num:	AA2	Ability to determine and/or interpret the following as they apply to SCRAM:
KA Detail Num:	AA2.02	Control Rod Position

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Trip Curves, Tables & Limits - Bas		4	3	2	

Question Data for Test: 1999 SRO

Question: 106

Unit 2 is operating in MODE 1 at 100% power when the following occurs:

- "REACTOR HI PRESS" alarm 210 G-2 annunciates.
- Reactor Pressure indicates 1075 psig and rising slowly.

In accordance with OT-102 "Reactor High Pressure" which of the following is an appropriate immediate operator action?

A. Control reactor pressure by raising the Bypass Jack setting.

B. Control reactor pressure by lowering the Max Combined Flow Limit Pot.

✔ C. Control reactor pressure by lowering reactor power.

D. Control reactor pressure by raising the Max Combined Flow Limit Pot.

Explanation of Answer

A. Incorrect, EHC pressure set is lowered if reactor pressure has stabilized (OT-102 step 2.2)
B. Incorrect, Max combined flow limit put is lowered for reactor low pressure (OT-111 step 1)
C. Correct, Per OT-102 Step 2.1.1.
D. Incorrect, Raising Max Combined Flow Limit Pot would have no effect.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.5 SRO Val: 3.7 55.43

System:	295007	Reactor High Pressure
KA Group Num:	AK2	Knowledge of the interrelations between high reactor pressure and the following
KA Detail Num:	AK201	Reactor/Turbine Pressure Regulating System

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor High Pressure	OT-102	2	1	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Low Pressure	OT-111	1	1	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operational Transient Procedures	PLOT-1540			6	3

Question Data for Test: 1999 SRO

Question: 107

Unit 2 is operating at 87% power when the "A" Condensate pump shaft coupling shears. The Condensate pump continues to run at low motor amps.

Given that all three Reactor Feedpumps (RFPs) remain in service and no Operator action is taken, what is the expected plant response to this event?

A. A Recirc runback to 45% speed will occur immediately.

B. A Recirc runback to 45% speed will occur when level is less than +17".

C. A Recirc runback to 30% speed will occur immediately.

✔ D. A Reactor scram will occur when level is less than +1".

Explanation of Answer

A. Incorrect, All condensate pumps continue to run, condensate pump "tripped" is from breaker position which is still closed, runback requirements will not be met and will not occur.
B. Incorrect, Feed pump flow will rise on the loss of level and remain > 20%, no runback.
C. Incorrect, Total feed flow will remain > 20% no runback.
D. Correct, Level will slowly be lost due to reduced condensate flow and power remaining at 87%.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.9 SRO Val: 3.9 55.43

System:	295009	Low Reactor Water Level
KA Group Num:	AA1	Ability to operate and/or monitor the following as they apply to low reactor water level
KA Detail Num:	AA1.01	Reactor Feedwater

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Low Level	OT-100	4.0	2	9	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operational Transient Procedures	PLOT-1540			6	3

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recirculation Flow Control	PLOT-0040	IV	15	8	2k

Question Data for Test: 1999 SRO

Question: 108

Unit 2 is at 100% power when Drywell pressure begins to rise.

In accordance with OT-101 "HIGH DRYWELL PRESSURE" follow up actions the following parameters and alarms are noted.

- "A RECIRC PUMP SEAL STAGE 2 HI FLOW" alarm 214 A-1
- PI-2-02-2-033A "Seal 1 Inner" 1056 psig
- PI-2-02-2-032A "Seal 2 Outer" 1043 psig

Evaluate these indications, using the attached drawing, and select the appropriate statement below.

✔ A. The 1st stage seal has failed but it is NOT the source of high drywell pressure.

B. The 2nd stage seal has failed but it is NOT the source of high drywell pressure.

C. The 1st stage seal has failed and is the source of high drywell pressure.

D. The 2nd stage seal has failed and is the source of high drywell pressure.

Explanation of Answer

A. Correct - High flow alarm is due to a high second stage seal pressure caused by a failure of the recirc pump first stage seal. PI-032A is typically half of the first stage pressure, high second stage seal pressure indicates failure of first stage seal (ARC 214 A-1). With the 2nd stage seal intact, this would not be a source of high drywell pressure. A 2nd stage seal failure would cause PI-32A to indicate near 0 psig.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	T-PLOT-0030-3 Recirculation Pump Seal Piping

KA Information

Tier: E/APE   RO Grp: 1   SRO Grp: 1   RO Val: 3.5   SRO Val: 3.8   55.43

System:	295010	High Drywell Pressure
KA Group Num:	AK3	Knowledge of the reasons for the following responses as they apply to high drywell pressure
KA Detail Num:	AK3.04	Leak investigation

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
High Drywell Pressure	OT-101	3.5	2	10	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
A Recirc Pump Seal Stage 2 Hi Flo	ARC 214 A-1		1	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Recirculation System	PLOT-0030	III.A.3	17, 18	9	2cc

Question Data for Test: 1999 SRO

Question: 109

Unit 3 was operating at 70% power when it experienced a rising drywell pressure. Using OT-101, High Drywell Pressure, the source of the leak has been determined to be the "A" Recirculation pump seals. The CRS has directed you to trip and isolate the "A" Recirculation pump.

Given these conditions, what is the proper sequence for isolating the recirculation pump and why?

	A	Shut the suction valve first since it can close against a higher dP.
	B	Shut the discharge valve first since it can close against a higher dP.
✔	C	Shut the suction valve first since it is limited to closing against a lower dP.
	D	Shut the discharge valve first since it is limited to closing against a lower dP.

Explanation of Answer: OT-101 Bases

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.6 55.43

System:	295010	High Drywell Pressure
KA Group Num:	2.4	Emergency Procedure/Plan
KA Detail Num:	2.4.11	Knowledge of abnormal condition procedures

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
High Drywell Pressure - Bases	OT-101	Note	4	10	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operational Transient Procedures	PLOT-1540			6	4

Question Data for Test: 1999 SRO

Question: 110

Unit 2 is at 100% power.

Which of the following events would require power to be reduced or maintained in accordance with OT-104, "Positive Reactivity Insertion"?

✔ A. "A" Reactor Feedpump min flow valve fails open.

B. EHC pressure set setpoint drops 10 psi.

C. Condensate pump trip.

D. Loss of RBCCW to RWCU Non-regen Heat Exchanger.

Explanation of Answer

A. Correct, flow through min flow valves causes additional flow through feedwater heaters resulting in a reduction in feed water heating, a positive reactivity insertion.
B. Incorrect, a reduction in pressure set setpoint will cause reactor pressure to drop, causing additional voiding a negative reactivity addition.
C. Incorrect,, A condensate pump trip at 100% power will cause a 45% recirc runback, a negative reactivity addition.
D. Incorrect, a loss of RBCCW will result in a RWCU isolation. RWCU returns cooler water to the reactor, a loss of RWCU will result in a higher core inlet temperature.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.0 SRO Val: 4.3 . 55.43

System:	295014	Inadvertent Reactivity Addition
KA Group Num:	AA2	Ability to determine and/or interpret the following as they apply to inadvertent reactivity addition.
KA Detail Num:	AA2.03	Cause of reactivity addition

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Positive Reactivity Insertion	OT-104 Bases	3	1	14	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operational Transient Procedures	PLOT-1540			6	4

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Feedwater System	PLOT-0540			6	4.j

Question Data for Test: 1999 SRO

Question: 111

The following conditions exist following the receipt of an automatic scram signal:

- Reactor power: < 1.00 E 0%
- RPV pressure: 950 psig AND dropping
- RPV level: +25 inches AND steady
- Drywell pressure: .5 psig AND steady
- Scram Air Header pressure: 0 psig
- Control Rod 34-27 is at position 48
- All other Control Rods are fully inserted.
- Boron has NOT been injected to the RPV

Which one of the following procedures will provide direction for the successful insertion of Control Rod 34-27 in this situation?

✔ A. GP-3, "Normal Plant Shutdown"

B. T-100, "Scram"

C. T-101, "RPV Control"

D. T-117, "Level/Power Control"

Explanation of Answer

A. Correct, GP-3 in step 6.69 directs all rods to be inserted.
B. Incorrect, T-100 does not provide direction for control rod insertion.
C. Incorrect, T-101 does not provide for the successful insertion of Control Rod 34-27 because an ATWS is NOT inprogress.
D. Incorrect, T-117 would not apply since it is entered for ATWS only.

Exam Level	Cognitive Level	Facility	Materials
SRO	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.1 SRO Val: 4.0 55.43 ✔

System:	295015	Incomplete Scram
KA Group Num:	2.4	Emergency Procedures/Plans
KA Detail Num:	2.4.6	Knowledge symptom based EOP mitigation strategy

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
General Plant Procedures	PLOT-1530			10	3

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	7

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Normal Plant Shutdown	GP-3	6.69	41	80	

Question Data for Test: 1999 SRO

Question: 112

Which of the following is the reason why the Main Steam Isolation Valves (MSIV) are closed prior to evacuating the Main Control Room in accordance with SE-1, "Plant Shutdown from the Remote Shutdown Panel"?

✔ A With MSIVs closed, all reactor inventory and pressure control may take place at the Remote Shutdown Panel.

B Since plant release points cannot be monitored at the Remote Shutdown Panel, closing the MSIVs precludes any concern for off-site releases.

C The MSIV closure outside the Main Control Room requires access to plant areas that may not be accessible during an evacuation.

D If the MSIVs are closed from outside the Main Control Room, there is no method for verification of complete closure.

Explanation of Answer:

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.6 55.43

System:	295016	Control Room Abandonment
KA Group Num:	2.4	Emergency Procedures/Plans
KA Detail Num:	2.4.11	Knowledge of abnormal condition procedures

Question Source Information

Ques Source: 1997 PBAPS NRC Exam Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Plant Shutdown from the Remote S	SE-1	Immeidate Actio	5 1	16	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Special Events	PLOT-1555			4	1c

Question Data for Test: 1999 SRO

Question: 113

Unit 2 Reactor Operator is controlling reactor level using HPCI at the Unit 2 Alternate Shutdown Panel following Control Room Abandonment. Indicated reactor level on LI-2-2-3-112 is currently 20" and reactor pressure is 500 psig. Using SE-10 Attachment 9, provided, determine the current reactor level and the expected HPCI response if an actual high level condition occurs.

A. Actual level is > 40", HPCI will automatically trip on high level condition.

B. Actual level is > 40", HPCI must be manually tripped on high level condition.

C. Actual level is between 0" and 40", HPCI will automatically trip on a high level condition.

✔ D. Actual level is between 0" and 40", HPCI must be manually tripped on a high level condition.

Explanation of Answer: SE-10 Bases, Caution #100 "HPCI Operation is Manual. All Trips, Isolations, and Auto Starts are Bypassed".

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	SE-10 ATT. 9

KA Information

Tier: E/APE   RO Grp: 2   SRO Grp: 1   RO Val: 4.0   SRO Val: 4.1   55.43

System:	295016	Control Room Abandonment
KA Group Num:	AA1	Ability to operator and/or monitor the following as they apply to control room abandonment
KA Detail Num:	AA1.06	Reactor Water Level

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Special Events	PLOT-1555			4	2.e
Reactor Water Level Determination	SE-10	Att. 9 Fig. 1		0	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Plant Shutdown from the Alternativ	SE-10 Bases	Caution #100	7	10	

Question Data for Test: 1999 SRO

Question: 114

Unit 2 was operating at full power in MODE 1 when a positive reactivity event occurred due to a control rod drifting out. The CRS has directed you to monitor for evidence of fuel damage.

Which of the following indications would be the first indication of a small fuel pin leak from this transient?

A	Main Steam Line Radiation Recorders.
✔ B	Air Ejector Discharge Log Monitor Recorders.
C	Off-Gas Adsorber Outlet Radiation Indication.
D	Main Stack Gas Recorder.

Explanation of Answer

A. Incorrect, Fission gasses from a small fuel leak would be diluted in the background rad level from N-16 and steam flow.
B. Correct, Air Ejector discharge radiation levels is primarily due to fission product gasses since N-16 would have decayed away at this point. The low volume of process flow makes this a sensitive indication of fission product gasses (ARC 218 E-1).
C. Incorrect, Off-gas adsorber outlet radiation indication is at the discharge of the hold up pipe and would not be the first indication of fuel damage.
D. Incorrect, Main stack is at the end of the off-gas process flow and although it will go up due to gland seal exhaust, it would not be the first indication of fuel failure.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N./A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.6 55.43

System:	295017	High Off-Site Release Rate
KA Group Num:	AA1	Ability to operator and/or monitor the following as they apply to high off-site release rate
KA Detail Num:	AA1.07	Process radiation monitoring system

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Main Condenser Air Removal	PSYS-5008A			0	6d

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Air Ejector Discharge Radiation Hig	ARC 218 E-1			3	

Question Data for Test: 1999 SRO

Question: 115

Given the following conditions:

- Unit 2 has experienced a loss of coolant accident with confirmed fuel failures.
- Drywell and Torus pressures reached 29 psig and sprays were initiated.
- Sprays were NOT manually secured when pressure reached 2.0 psig.
- Sprays did NOT automatically isolate at 1 psig.

Which of the following is the expected impact on the plant for these conditions?

✔ A. The drywell oxygen concentration may rise.

B. Torus water level indication will be unavailable.

C. The running Residual Heat Removal Pumps may cavitate.

D. Failure of the Reactor Building - Torus Vacuum Breakers will make the Reactor Building a High Radiation Area.

Explanation of Answer

A. Correct answer, Negative pressure results in de-inerting the drywell.
B. Not a concern for these conditions.
C. RHR Pump NPSH not affected for small negative pressures.
D. Flow is into the Torus during the event.

Exam Level	Cognitive Level	Facility	Materials
SRO	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.2 SRO Val: 4.4 55.43 ✔

System: 295024 High Drywell Pressure

KA Group Num: EA2 Ability to determine and/or interpret the following as they apply to High Drywell Pressure

KA Detail Num: EA2.01 Drywell Pressure

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
T-102 Primary Containment Contro	T-102 Bases	PC/P-5 & 9	3 & 14	14	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Transient Response Implementatio	PLOT-1560			7	3

Question Data for Test: 1999 SRO

Question: 116

Following a LOCA on Unit 2 the CRS directs restoration of Drywell Cooling, using T-223, "Drywell Cooler Fan Bypass" for Drywell pressure control. The Unit Reactor Operator reports that the Drywell Cooler fans cannot be placed inservice without an engineering evaluation due to plant conditions falling on the UNSAFE side of T-223 Figure 1, "Drywell Chilled Water (DWCW) Saturation Curve.

Which of the following describes the basis for restricting Drywell Fan restoration when on the UNSAFE side of the curve?

✔ A. Water hammer and rupture of piping inboard of DWCW Isolation valves when flow is restored.

B. Inadvertent lifting of overpressure relief valves inboard of the DWCW Isolation valves when flow is restored.

C. Overcurrent trips of the Drywell Cooler Fans if restarted with a LOCA condition.

D. Overpressurization and rupture of piping inboard of the closed DWCW Isolation valves with a LOCA condition.

Explanation of Answer:

A. Correct, Drywell temperatures above saturation may cause boiling within the piping resulting in water hammer when flow is re-established.
B. Incorrect, setpoint of DWCW relief valves should prevent spurious actuation during flow restoration.
C. Incorrect, fan trip concerns are due to moisture present and starting fans in FAST speed.
D. Incorrect, basis for relief valves installed on DWCW piping.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.5 55.43

System: 295024

KA Group Num: EA1 — Ability to operate and/or monitor the following as they apply to High Drywell Pressure

KA Detail Num: EA1.14 — Drywell Ventilation System

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
	NRC GL 96-06				

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
	MOD P00802				

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Drywell Cooler Fan Bypass	T-223	2	1	3	

Question Data for Test: 1999 SRO

Question: 117

Unit 2 was operating at 100% power when a total loss of Instrument Air occurred resulting in a plant scram. T-101, "RPV Control" was entered on high reactor pressure at the time of the scram. Normal scram actions have been completed, no other actions have been performed.

In accordance with T-101, RPV pressure control leg, which of the following is the correct method for pressure control under these conditions?

A	Manual operation of SRVs between 950 psig and 1050 psig.
B	Automatic operation of the EHC system at 920 psig.
C	Manual operation of ADS SRVs to stabilize pressure below 1050 psig.
✔ D	Automatic operation of SRVs at their setpoint.

Explanation of Answer

A. Incorrect, opening and closing of SRV following a GPI is NOT cycling per T-101 RC/P-5 bases.
B. Incorrect, EHC controlled bypass valves are not available due to MSIV closure on loss of instrument air.
C. Incorrect, use of ADS valves with only their accumulators available is not permitted per RC/P-13 bases due to loss of instrument air and inability to bypass and restore instrument nitrogen.
D. Correct, SRV will be permitted to operate automatically at their setpoint, which is not cycling due to ADS accumulators being the only pneumatic supply.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.4 SRO Val: 4.4 55.43

System:	295025	High Reactor Pressure
KA Group Num:	EA1	Ability to operate and/or monitor the following as they apply to high reactor pressure
KA Detail Num:	EA1.03	Safety/Relief Valves

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RPV Control - Bases	T-101 Bases	Step RC/P-13	24, 25	21	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 SRO

Question: 118

Unit 3 has experienced a reactor scram following a steam leak in the Drywell. The CRS directs restoration of Drywell Instrument Nitrogen from T-101, RPV Control, to permit manual reactor pressure control. Restoring Instrument Nitrogen to the Drywell in accordance with GP-8E, "Primary Containment Isolation Bypass":

✔ A. May contribute to a flammable environment in the Drywell.

B. Will only supply nitrogen to the "B" Instrument Nitrogen Header.

C. May deplete CAD nitrogen tank inventory.

D. Will only be permitted if Instrument Air Header pressure is greater than Drywell pressure.

Explanation of Answer

A. With the N2 compressors isolated by a Group II/III, instrument air will back up instrument nitrogen and may release air into the drywell during pneumatic valve operation.
B. Using SGIG only supplies B header, restoring supplies both.
C. Using SGIG will deplete the CAD tank inventory, restoration will not.
D. May be bypassed as long as instrument nitrogen pressure is greater than drywell pressure.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.3 SRO Val: 4.0 55.43

System:	295025	High Reactor Pressure
KA Group Num:	2.4	Emergency Procedures/Plans
KA Detail Num:	2.4.20	Knowledge of operational implications of EOP warnings/cautions/and notes

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RPV Control - Bases	T-101	Caution #7	20	21	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	11

Question Data for Test: 1999 SRO

Question: 119

Unit 3 has experienced a transient and the following is observed:

- Torus pressure: 9 psig
- Torus temperature: 200 degrees F
- Torus level: 14 feet
- Reactor pressure: 1000 psig
- RHR "A" Loop Flow: 23,000 gpm
- Core Spray "B" Loop Flow: 7500 gpm
- All other low pressure ECCS pump are NOT in service.

Use the attached T-102 Sheet 3 curves to determine if Net Positive Suction Head (NPSH) requirements are being met.

A — There is sufficient NPSH for the "A" Loop of the RHR ONLY.

✔ B — There is sufficient NPSH for the "B" Loop of Core Spray ONLY.

C — There is sufficient NPSH for both the "A" Loop of RHR and the "B" Loop of Core Spray.

D — There is NOT sufficient NPSH for either the "A" Loop of RHR or the "B" Loop of Core Spray.

Explanation of Answer: Using the T-102 curves, only the B loop of Core Spray is operating in the safe region.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	T-102 Sh. 3

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 3.0 SRO Val: 3.4 55.43

System:	295026	Suppression Pool High Water Temperature
KA Group Num:	EK1	Knowledge of the operational implications of the following concepts as they apply to Suppression Pool High Water Temperature
KA Detail Num:	EK1.01	Pump NPSH

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	11

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
TRIP/SAMP Curves Tables, and Li			17	3	

Question Data for Test: 1999 SRO

Question: 120

A full power ATWS occurred on Unit 2 which caused excessive heat input to the Torus and a Torus leak. The following conditions currently exist:

- Main Condenser is available.
- Six rods are stuck full out, all other rods are fully inserted.
- Reactor pressure: 950 psig
- Torus temperature: 175 degrees F. and steady
- Torus level 14 ft. and dropping

Use the attached portion of T-102 to determine which of the following actions are required as Torus level drops from 14 ft. to 12 ft.

A	Perform an Emergency Blowdown using T-112.
B	Perform an Emergency Blowdown using Bypass valves.
C	Depressurize to 900 psig.
✔ D	Depressurize to 750 psig.

Explanation of Answer: Direction is to maintain pressure below the curve or move towards a blowdown. Since torus temperature can not be lowered rapidly, reactor pressure must be dropped to stay on the safe side of the curve. Dropping pressure to < 900 psig will put you on an appropriate curve to keep you safe with torus level > or equal to 12 feet.

Exam Level	Cognitive Level	Facility	Materials
SRO	Application	PBAPS	Portion of T-102 containing steps T/T-8, 9, 10 and Curve T/T-1

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 2.8 SRO Val: 3.1 55.43 ✔

System:	295026	Suppression Pool High Water Temperature
KA Group Num:	2.1	Conduct of Operations
KA Detail Num:	2.1.25	Ability to obtain and interpret station reference materials such as graphs, monograph, and tables which contain performance data

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control	T-102	T/T-8, 9, 10	1	17	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 SRO

Question: 121

For a lowering suppression pool level T-102, "Torus Level", directs that if Torus level cannot be maintained above 9.5' secure HPCI. It does not direct that RCIC be secured until < 6'.

What is the basis for securing HPCI but not RCIC at 9.5'?

A. HPCI turbine exhaust becomes uncovered at 9.5', RCIC turbine exhaust becomes uncovered at 6'.

✔ B. HPCI turbine exhaust becomes uncovered at 9.5', RCIC turbine exhaust is an insignificant containment input.

C. HPCI NPSH becomes a concern at 9.5', RCIC turbine exhaust becomes uncovered at 6'.

D. HPCI NPSH becomes a concern at 9.5', RCIC turbine exhaust is a insignificant containment input.

Explanation of Answer: Self explanatory.
RCIC is secured at 6' if it is aligned to the Torus to prevent vortexing.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 3.6 SRO Val: 3.7 55.43

System: 295030 Low Suppression Pool Water Level

KA Group Num: EK3 Knowledge of the reasons for the following responses as they apply to low suppression pool water level

KA Detail Num: EK3.03 RCIC Operations

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control	T-102	/L-11 to T/L-16	3a7-8	14	
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 SRO

Question: 122

T-111, "Level Restoration" was entered on Unit 3 following a loss of all off-site power and a failure of all diesel generators to start. Current plant conditions are as follows:

- Reactor pressure is 800 psig.
- Reactor level -195" and dropping slowly.
- HPCI tripped on a loss of lube oil.
- RCIC is blocked out of service.

Evaluate these plant conditions and determine the status of Adequate Core Cooling (ACC).

A	ACC exists until level is below -200".
✔ B	ACC exists until level is below -210".
C	ACC does NOT exist, since level is below -172".
D	ACC does NOT exist, since injection is not present.

Explanation of Answer: ACC is provided by steam cooling with no RPV injection until -210".

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.6 SRO Val: 4.7 55.43

System: 295031 Reactor Low Water Level

KA Group Num: EK1.01 Knowledge of the operational/implications of the following concepts as they apply to reactor low water level

KA Detail Num: EK1.01 Adequate Core Cooling

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Introduction to TRIPS and SAMPS -	T-BAS (INTRO)	5.1	17	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	8

Question Data for Test: 1999 SRO

Question: 123

Level recorder LR-2-02-3-110A blue pen is fed by LT-2-02-3-072C "Wide Range" and LT-2-02-3-073C "Fuel Zone" level transmitters.

If level transmitter LT-73C failed upscale and then actual reactor level dropped to -172", what would be the impact on vessel level indications and ECCS initiation from reactor level?

✔ A. LR-110A blue pen input would swap at -100", low level ECCS initiations would NOT be impacted.

B. LR-110A blue pen input would swap at -100", low level ECCS initiations would be impacted.

C. LR-110A blue pen input would NOT swap at -100", low level ECCS initiations would NOT be impacted.

D. LR-110A blue pen input would NOT swap at -100" low level ECCS initiations would be impacted.

Explanation of Answer: Blue pen input swaps from LT-72 to LT-73 when LT-72 senses < -100", (indication would go high), ECCS -160" inputs continue to be taken from LT-72.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE   RO Grp: 1   SRO Grp: 1   RO Val: 4.4   SRO Val: 4.4   55.43

System:	295031	Reactor Low Water Level
KA Group Num:	EK2	Knowledge of interrelations between reactor low water low level and the following
KA Detail Num:	EK2.01	Reactor Water Level Indication

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactro Vessel Instrumentation an	PSYS-5002B	HO 4	1	0	2c

Question Data for Test: 1999 SRO

Question: 124

Following an ATWS and Group I Isolation on Unit 2, the following conditions exist:

- Reactor power: 30%
- Reactor level: -100"
- Torus temperature: 115 degrees F.
- SRV's A, B, C, G open

T-117 level power control directs RPV injection be terminated and prevented using T-240.

For the conditions listed above, which of the following concerns is the basis for performing T-240?

A. Uncontrolled injection of large amounts of cold water.

✔ B. Power generation which is a threat to primary containment.

C. Neutron flux oscillations which challenge fuel clad integrity.

D. Power excursions while establishing minimum alternative RPV flooding pressure.

Explanation of Answer:
A. Incorrect, basis for performing T-240 prior to blowdown, T-117 LQ-21
B. Correct, LQ-11
C. Incorrect, Basis for lowering level to -60", T-117 LQ-13
D. Incorrect, Basis for performing T-240 prior to establishing MARFP, T-116 RF-25

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.0 SRO Val: 4.2 55.43

System: 295037 — Scram Condition present and reactor power above APRM downscale or unknown

KA Group Num: EK2 — Knowledge of the interrelationship between scram condition present and reactor power above APRM downscale or unknown and the following

KA Detail Num: EK2.09 — Reactor Water Level

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Level/Power Control	T-117		1	12	

Question Data for Test: 1999 SRO

Question: 125

Unit 2 was operating at 100% power when a Reactor high pressure scram condition occurred due to a total loss of instrument air. Control rods failed to insert, reactor pressure peaked at 1180 psig.

The following plant conditions currently exist:

- Reactor power: 35%
- Reactor level: +23"
- Reactor pressure: 1140 psig
- Full core display blue lights lit
- A & B Air Header pressure: 0 psig

Determine which of the following TRIP procedures will insert the control rods.

A	T-213, "Scram Solenoid De-Energization"
B	T-214, "Isolating and Venting the Scram Air Header"
✔ C	T-215, "Control Rod Insertion by Withdraw Line Venting"
D	T-216 "Control Rod Insertion by Manual Scram or Individual Scram Test Switches"

Explanation of Answer

A. Incorrect, T-213 N/A due to scram valves open, evidenced by blue lights lit.
B. Incorrect, T-214 N/A ARI initiated at 1106 psig and blue lights lit.
C. Correct
D. Incorrect, No instrument air available for closing scram inlet and outlet and open SDV for accumulator charge and discharge volume draining.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.2 SRO Val: 4.3 55.43

System:	295037	Scram condition present and reactor power above APRM downscale or unknown
KA Group Num:	EK3	Knowledge of the reasons for the following responses as they apply to scram condition present and reactor power above APRM downscale or unknown
KA Detail Num:	EK3.07	Various alternate methods of control rod insertion

Question Source Information

Ques Source:	New	Question Source	
Ques Mod Met			

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RPV Control	T-101	RC/Q-19	12	21	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.

Question Data for Test: 1999 SRO

Question: 126

A steam leak exists in the Unit 3 Turbine Building. T-104, "Radioactivity Release", has been entered due to high ventilation stack radiation alarms. The Equipment Operator (EO) then reports that Turbine Building Ventilation is tripped.

Under these conditions, determine the appropriate response to the EO's report that Turbine Building Ventilation is tripped.

✔ A. Restart ventilation to monitor the release.

B. Restart ventilation to lower the radioactive release.

C. Maintain ventilation tripped to prevent an unmonitored release.

D. Maintain ventilation tripped to lower the radioactive release.

Explanation of Answer: T-104 Step RR-6 directs that ventilation be restored to maintain personal accessibility and prevent a ground level unmonitored release.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 3.6 SRO Val: 3.8 55.43

System: 295038 — High Off-Site Release Rate

KA Group Num: EK2 — Knowledge of the interrelationship between off-site release rates and the following:

KA Detail Num: EK2.03 — Plant Ventilation Systems

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Radioactivity Release - Bases	T-104	Step RR-6	3	10	
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 SRO

Question: 127

For which of the following conditions would direction be given to initiate Drywell Sprays regardless of whether Adequate Core Cooling is assured?

A	To prevent exceeding the Pressure Suppression Pressure Limit.
B	To maintain Drywell pressure below the Drywell Spray Initiation Limit.
✔ C	To mitigate the consequence of a H2 deflagration.
D	To mitigate the consequences of containment overpressurization.

Explanation of Answer

A. Incorrect - Sprays are not used to prevent exceeding this limit.
B. Incorrect - Sprays are utilized prior to exceeding this limit but not regardless of ACC.
C. Correct - See T-102 DW/G-3.9 Bases.
D. Incorrect - If ACC is assured sprays are secured to address containment overpressurization.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.3 SRO Val: 3.9 55.43

System:	500000	High Containment Hydrogen Concentrations
KA Group Num:	EK1	Knowledge of the operational implications of the following concepts as they apply to high containment hydrogen concentrations
KA Detail Num:	EK1.01	Containment Integrity

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control	T-102 - Bases	DW/G-3.9	3.6	14	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Facility: Peach Bottom Atomic Power Station Form ES-401-2

Exam Date: 09/13/1999 **Exam Level:** RO

Tier	Group	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Point Total
1. Emergency & Abnormal Plant Evolutions	1	2	3	2				3	1			2	13
	2	3	4	3				4	3			2	19
	3	1	0	0				0	1			2	4
	Totals Tier	6	7	5				7	5			6	36
2. Plant Systems	1	3	2	1	4	3	3	1	3	3	4	1	28
	2	1	2	2	2	2	2	2	2	2	1	1	19
	3	0	0	1	1	0	1	0	0	1	0	0	4
	Tier Totals	4	4	4	7	5	6	3	5	6	5	2	51

3. Generic Knowledge And Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	4	3	3	3	13

Note:

1. Attempt to distribute topics among all K/A Categories; select at least one topic from every K/A category within each tier.
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category tier.

Facility: Pe... Bottom Atomic Power Stat

BWR R... amination Outline

Printed: 06/... 9

ES - 401 Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1 Form ES-401-2

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295007	High Reactor Pressure / 3		X					AK2.01 - Reactor/turbine pressure regulating system	3.5	1
295009	Low Reactor Water Level / 2				X			AA1.01 - Reactor feedwater	3.9	1
295010	High Drywell Pressure / 5			X				AK3.04 - Leak investigation	3.5	1
295010	High Drywell Pressure / 5						X	2.4.11 - Knowledge of abnormal condition procedures.	3.4	1
295014	Inadvertent Reactivity Addition / 1					X		AA2.03 - Cause of reactivity addition	4.0	1
295024	High Drywell Pressure / 5				X			EA1.14 - Drywell ventilation system	3.4	1
295025	High Reactor Pressure / 3				X			EA1.03 - Safety/relief valves: Plant-Specific	4.4*	1
295025	High Reactor Pressure / 3						X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	3.3	1
295031	Reactor Low Water Level / 2	X						EK1.01 - Adequate core cooling.	4.6*	1
295031	Reactor Low Water Level / 2		X					EK2.01 - Reactor water level indication	4.4*	1
295037	SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1		X					EK2.09 - Reactor water level	4.0	1
295037	SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1			X				EK3.07 - Various alternate methods of control rod insertion: Plant-Specific	4.2	1
500000	High Containment Hydrogen Concentration / 5	X						EK1.01 - Containment integrity	3.3	1

K/A Category Totals: 2 3 2 3 1 2

Group Point Total: 13

BWR R[illegible]amination Outline

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Facility: Pe[illegible] Bottom Atomic Power Stat

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-2

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295002	Loss of Main Condenser Vacuum / 3				X			AA1.05 - Main turbine	3.2	1
295002	Loss of Main Condenser Vacuum / 3			X				AK3.01 - Reactor SCRAM: Plant-Specific	3.7	1
295003	Partial or Complete Loss of A.C. Power / 6		X					AK2.04 - A.C. electrical loads	3.4	1
295008	High Reactor Water Level / 2					X		AA2.01 - Reactor water level	3.9	1
295016	Control Room Abandonment / 7						X	2.4.11 - Knowledge of abnormal condition procedures.	3.4	1
295016	Control Room Abandonment / 7				X			AA1.06 - Reactor water level	4.0	1
295017	High Off-Site Release Rate / 9				X			AA1.07 - Process radiation monitoring system	3.4	1
295018	Partial or Complete Loss of Component Cooling Water / 8			X				AK3.02 - Reactor power reduction	3.3	1
295019	Partial or Complete Loss of Instrument Air / 8						X	2.4.11 - Knowledge of abnormal condition procedures.	3.4	1
295019	Partial or Complete Loss of Instrument Air / 8		X					AK2.01 - CRD hydraulics	3.8	1
295022	Loss of CRD Pumps / 1	X						AK1.01 - Reactor pressure vs. rod insertion capability	3.3	1
295026	Suppression Pool High Water Temperature / 5	X						EK1.01 - Pump NPSH	3.0	1
295028	High Drywell Temperature / 5					X		EA2.03 - Reactor water level	3.7	1
295029	High Suppression Pool Water Level / 5	X						EK1.01 - Containment integrity	3.4	1
295029	High Suppression Pool Water Level / 5		X					EK2.05 - Containment/drywell vacuum breakers	3.1	1
295030	Low Suppression Pool Water Level / 5			X				EK3.03 - RCIC operation: Plant-Specific	3.6	1

ES - 401

Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

Form ES-401-2

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295034	Secondary Containment Ventilation High Radiation / 9				X			EA1.03 - Secondary containment ventilation	4.0	1
295038	High Off-Site Release Rate / 9		X					EK2.03 - Plant ventilation systems	3.6	1
600000	Plant Fire On Site / 8					X		AA2.17 - Systems that may be affected by the fire	3.1	1

K/A Category Totals: 3 4 3 4 3 2

Group Point Total: 19

E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
295021	Loss of Shutdown Cooling / 4	X						AK1.01 - Decay heat	3.6	1
295023	Refueling Accidents / 8						X	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.0	1
295032	High Secondary Containment Area Temperature / 5					X		EA2.02 - Equipment operability	3.3	1
295036	Secondary Containment High Sump/Area Water Level / 5						X	2.4.20 - Knowledge of operational implications of EOP warnings, cautions, and notes.	3.3	1

K/A Category Totals: 1 0 0 0 1 2

Group Point Total: 4

BWR RO [illegible]nination Outline — Printed: 0[illegible] 999

Facility: Peach Bottom Atomic Power Stat

ES - 401 — Plant Systems - Tier 2 / Group 1 — Form ES-401-2

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201001	Control Rod Drive Hydraulic System / 1		X										K2.03 - Backup SCRAM valve solenoids	3.5*	1
201001	Control Rod Drive Hydraulic System / 1											X	2.1.32 - Ability to explain and apply system limits and precautions.	3.4	1
201002	Reactor Manual Control System / 1	X											K1.05 - Rod worth minimizer: Plant-Specific	3.4	1
202002	Recirculation Flow Control System / 1	X											K1.09 - Reactor water level	3.1	1
202002	Recirculation Flow Control System / 1				X								K4.01 - Scoop tube break: Plant-Specific	3.1	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2				X								K4.10 - Dedicated injection system during automatic system initiation (injection valve interlocks)	3.9	1
203000	RHR/LPCI: Injection Mode (Plant Specific) / 2								X				A2.11 - Motor operated valve failures	3.4	1
206000	High Pressure Coolant Injection System / 2					X							K5.05 - Turbine speed control: BWR-2, 3, 4	3.3	1
209001	Low Pressure Core Spray System / 2			X									K3.02 - ADS logic	3.8	1
209001	Low Pressure Core Spray System / 2										X		A4.05 - Manual initiation controls	3.8	1
211000	Standby Liquid Control System / 1							X					A1.03 - Pump discharge pressure	3.6	1
216000	Nuclear Boiler Instrumentation / 7					X							K5.09 - Recirculation flow effects on level indications: Design-Specific	2.9	1

Facility: Peach Bottom Atomic Power Stat

ES - 401 Plant Systems - Tier 2 / Group 1 Form ES-401-2

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
216000	Nuclear Boiler Instrumentation / 7									X			A3.01 - Relationship between meter/recorder readings and actual parameter values: Plant-Specific	3.4	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2		X										K2.01 - Motor operated valves	2.8*	1
217000	Reactor Core Isolation Cooling System (RCIC) / 2								X				A2.15 - Steam line break	3.8	1
218000	Automatic Depressurization System / 3										X		A4.02 - ADS logic initiation	4.2*	1
223001	Primary Containment System and Auxiliaries / 5										X		A4.12 - Drywell coolers/chillers	3.5	1
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5									X			A3.02 - Valve closures	3.5	1
223002	Primary Containment Isolation System/Nuclear Steam Supply Shut-Off / 5								X				A2.06 - Containment instrumentation failures	3.0	1
239002	Relief/Safety Valves / 3				X								K4.07 - Minimum steam pressure required to keep SRV open or to open SRV	3.1	1
241000	Reactor/Turbine Pressure Regulating System / 3						X						K6.01 - A.C. electrical power	2.8	1
241000	Reactor/Turbine Pressure Regulating System / 3					X							K5.04 - Turbine inlet pressure vs. reactor pressure	3.3	1

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ES - 401 | **Plant Systems - Tier 2 / Group 1** | **Form ES-401-2**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
259001	Reactor Feedwater System / 2				X								K4.11 - Recirculation runbacks: Plant-Specific	3.5	1
259002	Reactor Water Level Control System / 2						X						K6.05 - Reactor water level input	3.5	1
259002	Reactor Water Level Control System / 2									X			A3.01 - Runout flow control: Plant-Specific	3.0*	1
261000	Standby Gas Treatment System / 9						X						K6.01 - A.C. electrical distribution	2.9	1
264000	Emergency Generators (Diesel/Jet) / 6										X		A4.04 - Manual start, loading, and stopping of emergency generator: Plant-Specific	3.7	1
264000	Emergency Generators (Diesel/Jet) / 6	X											K1.01 - A.C. electrical distribution	3.8	1
	K/A Category Totals:	3	2	1	4	3	3	1	3	3	4	1	**Group Point Total:**		28

Facility: Peach Bottom Atomic Power Stat

ES - 401 **Plant Systems - Tier 2 / Group 2** **Form ES-401-2**

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201003	Control Rod and Drive Mechanism / 1											X	2.4.48 - Ability to interpret control room indications to verify the status and operation of system, and understand how operator action s and directives affect plant and system conditions.	3.5	1
201006	Rod Worth Minimizer System (RWM) (Plant Specific) / 7					X							K5.13 - Insert block: P-Spec(Not-BWR6)	3.5	1
202001	Recirculation System / 1				X								K4.02 - Adequate recirculation pump NPSH	3.1	1
202001	Recirculation System / 1						X						K6.03 - A.C. power: Plant-Specific	2.9	1
204000	Reactor Water Cleanup System / 2							X					A1.04 - System flow	2.8	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4		X										K2.02 - Motor operated valves	2.5*	1
205000	Shutdown Cooling System (RHR Shutdown Cooling Mode) / 4								X				A2.05 - System isolation	3.5	1
214000	Rod Position Information System / 7					X							K5.01 - Reed switches	2.7	1
245000	Main Turbine Generator and Auxiliary Systems / 4	X											K1.06 - Component cooling water systems	2.6	1
245000	Main Turbine Generator and Auxiliary Systems / 4										X		A4.14 - Generator megavar output	2.5	1
256000	Reactor Condensate System / 2							X					A1.01 - System flow	2.9	1

Facility: Peach Bottom Atomic Power Stat

ES - 401

Plant Systems - Tier 2 / Group 2

Form ES-401-2

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
262001	A.C. Electrical Distribution / 6								X				A2.06 - Deenergizing a plant bus	2.7	1
262001	A.C. Electrical Distribution / 6			X									K3.06 - Reactor protection system	3.8	1
271000	Offgas System / 9									X			A3.01 - Automatic system isolations	3.3	1
272000	Radiation Monitoring System / 7				X								K4.02 - Automatic actions to contain the radioactive release in the event that the predetermined release rates are exceeded	3.7	1
290003	Control Room HVAC / 9									X			A3.01 - Initiation/reconfiguration	3.3	1
300000	Instrument Air System (IAS) / 8			X									K3.01 - Containment air system	2.7	1
400000	Component Cooling Water System (CCWS) / 8		X										K2.01 - CCW pumps	2.9	1
400000	Component Cooling Water System (CCWS) / 8						X						K6.06 - Heat exchangers and condensers	2.9	1
	K/A Category Totals:	1	2	2	2	2	2	2	2	2	1	1	Group Point Total:		19

Facility: Peach Bottom Atomic Power Stat

ES - 401 | Plant Systems - Tier 2 / Group 3 | Form ES-401-2

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
215001	Traversing In-Core Probe / 7				X								K4.01 - Primary containment isolation: Mark-I&II(Not-BWR1)	3.4	1
233000	Fuel Pool Cooling and Clean-up / 9									X			A3.02 - Pump trip(s)	2.6	1
288000	Plant Ventilation Systems / 9						X						K6.03 - Plant air systems	2.7	1
290002	Reactor Vessel Internals / 5			X									K3.07 - Nuclear boiler instrumentation	3.1	1
	K/A Category Totals:	0	0	1	1	0	1	0	0	1	0	0	Group Point Total:		4

Generic Knowledge and Abilities Outline (Tier 3)

Printed: 06/24/199

BWR RO Examination Outline

Form ES-401-5

Facility: Peach Bottom Atomic Power Stat

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.30	Ability to locate and operate components, including local controls.	3.9	1
	2.1.29	Knowledge of how to conduct and verify valve lineups.	3.4	1
	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	3.0	1
	2.1.3	Knowledge of shift turnover practices.	3.0	1
			Category Total:	4
Equipment Control	2.2.13	Knowledge of tagging and clearance procedures.	3.6	1
	2.2.30	Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area / communication with fuel storage facility / systems operated from the control room in support of fueling operations / and supporting instrumentation.	3.5	1
	2.2.13	Knowledge of tagging and clearance procedures.	3.6	1
			Category Total:	3
Radiation Control	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9	1
	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements.	2.6	1
	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements.	2.6	1
			Category Total:	3
Emergency Plan	2.4.25	Knowledge of fire protection procedures.	2.9	1
	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	3.3	1
	2.4.39	Knowledge of the RO's responsibilities in emergency plan implementation.	3.3	1
			Category Total:	3

Generic Total: 13

PART 1

PECO NUCLEAR

STATION PB / LGS

COURSE TITLE 1999 Peach Bottom RO Exam

FORM RO

NAME (PRINT) Examination Key
last first mi

SOCIAL SECURITY NUMBER

COMPANY / PECO PAYROLL #

DATE 13 SEPT 99

I HAVE REVIEWED AND UNDERSTAND THE CORRECTED QUIZ; ALL WORK ON THIS EXAMINATION IS MY OWN, I HAVE NEITHER GIVEN NOR RECEIVED ASSISTANCE ____________ signature

IMPORTANT

- USE #2 PENCIL
- EXAMPLE: A B C D E
- ERASE *COMPLETELY* TO CHANGE

PART 2

KEY 1 (T) A 2 (F) B 3 C D E

Question	Answer
1	B
2	C
3	A
4	B
5	A
6	C
7	D
8	B
9	B
10	B
11	D
12	D
13	A
14	D
15	D
16	D
17	D
18	C
19	D
20	C
21	B
22	C
23	A
24	B
25	B
26	A
27	B
28	C
29	A
30	C
31	C
32	C
33	C
34	D
35	B
36	C
37	D
38	A
39	D
40	C
41	D
42	D
43	A
44	C
45	B
46	D
47	A
48	D
49	A
50	A
51	D
52	B
53	C
54	A
55	B
56	B
57	D
58	B
59	B
60	B
61	A
62	D
63	D
64	C
65	B
66	C
67	C
68	D
69	A
70	B
71	B
72	D
73	A
74	C
75	B
76	A
77	C
78	A
79	D
80	C
81	D
82	C
83	D
84	A
85	C
86	A
87	A
88	D
89	B
90	A
91	D
92	A
93	B
94	B
95	B
96	A
97	B
98	C
99	A
100	C

50

51

FEED THIS DIRECTION

PART 1

KEY

PECO NUCLEAR

COURSE TITLE 1999 Peach Bottom RO Exam

STATION PB / LGS

FORM RO

NAME (PRINT) Examination Key
last first mi

SOCIAL SECURITY NUMBER

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signature

IMPORTANT

- USE #2 PENCIL
- EXAMPLE: A B C D E
- ERASE *COMPLETELY* TO CHANGE

PART 2

KEY

FEED THIS DIRECTION

NRC Report

Question Data for Test: 1999 RO

Question: 5

A Reactor Operator has just begun night work following his long break (seven days).

- Day 1 he works 1845 - 0645
- Day 2 he works 1845 - 0645
- Day 3 he works 2245 - 0645 (4 hours vacation)
- Day 4 he works 1845 - 0945 (to cover for a sick RO)

At 1200, the RO gets a call at home from the Shift Operations Assistant (SOA) requesting that he return to work as soon as possible to fill a vacancy. To stay within the bounds of A-40, without deviations, the RO may:

A Return to work immediately, but can only work 8 hours.

✔ B Return to work at 1745, but can only work 9 hours.

C Return to work at 1845, and work a regular 12 hour shift.

D Return to work at 2145, and work up to 16 hours.

Explanation of Answer

A. Should not return to work until after 8 hour rest period.
B. Correct answer, 8 hour rest then 9 hours maximum 24/48.
C. Could return to work at 1845 but 12 hours exceeds 24/48.
D. Don't need to wait 12 hour to return to work, still limited by 24/48.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	None

KA Information

Tier: PWGs RO Grp: 1 SRO Grp: 1 RO Val: 3.0 SRO Val: 4.0 55.43

System: Generic

KA Group Num: 2.1 Conduct of Operations

KA Detail Num: 2.1.2 Knowledge of operator responsibilities during all modes of plant operations.

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Unit 2 Tech Specs		5.2.2.c	-3 & 5.0		

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Working Hour Limitations	AC-40	3.1.2 & 5.2	1 & 3		

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Administrative Practices Lesson Pl	PLOT-1570			12	1.j

Question Data for Test: 1999 RO

Question: 6

Given the following conditions:

- With Unit 2 operating at 50% power, a packing leak is discovered on an accessible motor operated valve in a safety-related system.
- The leak is not severe and it has been decided to backseat the valve during the next shift.
- All plant systems are operating as designed.

In accordance with OM-C-7.5, "Valves", which of the following describes how this valve should be backseated?

A	The appropriate System Manager should manually backseat the valve using TMT.
B	The Operator in the Main Control Room should electrically backseat the valve.
✔ C	Maintenance personnel should manually backseat the valve.
D	An Equipment operator at the motor control center should electrically backseat the valve.

Explanation of Answer

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	

KA Information

Tier: PWGs RO Grp: 1 SRO Grp: 1 RO Val: 3.9 SRO Val: 3.4 55.43

System: Generic

KA Group Num: 2.1 Conduct of Operations

KA Detail Num: 2.1.30 Ability to locate and operate components, including local controls.

Question Source Information

Ques Source: 1997 PBAPS NRC Exam Question Source:

Ques Mod Met: Added procedure reference to question stem at NRC recommendation.

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Valves	OM-C-7.5	2.4	2	6	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
OM Chapters 6 - 9	PLOT-0007	II.A.5.a	6	0	

Question Data for Test: 1999 RO

Question: 7

An operator, performing an Independent Verification of a check-off list (COL), discovers that a manually operated valve is danger tagged in the "open" position? The COL required position for the valve is "closed".

In accordance with OM-C-11.1, "Independent Verification", which of the following describes the required action(s)?

✔ A	The COL step should NOT be initialed, the clearance number and valve position should be noted on the COL.
B	The COL position should be changed to the actual valve position, then the step should be initialed and dated.
C	The COL step should be marked "N/A" and the remainder of the COL should be completed.
D	The COL should NOT be completed until a temporary change noting the discrepancy is prepared in accordance with A-3.

Explanation of Answer

A. Correct answer.
B. Independent Verifier not authorized to modify COL steps.
C. Independent Verifier not authorized to "N/A" COL steps.
D. COL is correct, valve position is the problem. A-3 is not required here.

Exam Level	Cognitive Level	Facility	Materials
RO	Memory	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 1 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.3 55.43

System:	Generic	
KA Group Num:	2.1	Conduct of Operations
KA Detail Num:	2.1.29	Knowledge of how to conduct and verify valve lineups

Question Source Information

Ques Source: 1998 PBAPS NRC Exam Question Source:

Ques Mod Met: Added procedure reference to question stem at NRC recommendation.

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Independent Verification	OM-C-11.1	6.3.e	7 & 8	1	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operations Manual Chapters 10 thr	PLOT-0008				1

Question Data for Test: 1999 RO

Question: 8

Both units are operating in MODE 1 at full power with no Surveillance Testing or other evolutions in progress. The Shift Manger receives a call indicating that one of the licensed operators has been selected for a random substance screening. The selected operator is currently the Unit 2 Reactor Operator (URO). The testing would require the operator to leave the main control room for approximately 45 minutes. Determine the MINIMUM shift response to this condition.

A. A temporary relief of the URO by the on-shift Plant Reactor Operator (PRO).

✔ B. A temporary relief of the URO by the fourth Reactor Operator (4th RO).

C. A complete turnover of the URO position to the Plant Reactor Operator (PRO).

D. No relief is required since licensed operators are exempt from random substance testing while holding a licensed position.

Explanation of Answer

A. The PRO can not relieve the URO to leave the main control room. Must have a CRS and 3 Ros in the Control Room.
B. Correct answer.
C. A complete turnover is not required since it will be less than 1 hour. Also, the PRO cannot formally hold two shift positons.
D. Licensed operators may be excused from random substance exams only on a case by case basis if the CRS determine that conditions do not support the operator leaving.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: PWGs | RO Grp: 1 | SRO Grp: 1 | RO Val: 3.0 | SRO Val: 3.4 | 55.43

System:	Generic	
KA Group Num:	2.1	Conduct of Operations
KA Detail Num:	2.1.3	Knowledge of Shift Turnover Practices

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Temporary Relief	OM-C-6.2		2-3	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operations Manual Chapters 6-9	PLOT-0007	II.A.2	5	0	1

Question Data for Test: 1999 RO

Question: 10

In accordance with OM-C-11.2, "Double Verification", which of the following would REQUIRE a second individual to actually witness the activity while it is occurring?

✔ A. Restoration of a throttled valve to its required locked position.

B. Fuse removal as directed by the T-200 procedures.

C. Restoration of a clearance on an ECCS system.

D. A routine surveillance test being performed in a Radiation Area.

Explanation of Answer

A. Correct Answer.
B. DV is required for fuse removal but not required during T-200 ops.
C. System restorations require IV.
D. Surveillances require IV, a radiation area may allow waiving IV and DV.

Exam Level	Cognitive Level	Facility	Materials
RO	Memory	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 2 SRO Grp: 2 RO Val: 3.6 SRO Val: 3.8 55.43

System:	Generic	
KA Group Num:	2.2	Equipment Control
KA Detail Num:	2.2.13	Knowledge of tagging and clearance procedures.

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met: Added procedure reference to question stem at NRC recommendation.

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Double Verification	OM-C-11.2	2.1	2	1	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Administrative Procedures	PLOT-1570			12	1.b

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control of Locked Valves and Devi	A-C-8	7.3.2	4	0	

Question Data for Test: 1999 RO

Question: 11

Unit 3 is in MODE 5 with refueling activities in progress.

Which of the following conditions would require the Reactor Operator to notify the Fuel Floor Supervisor to suspend core alterations in accordance with FH-6C, "Core Component Movement - Core Transfers".

A. A control rod in a defueled cell is withdrawn.

B. The white rod permissive light on the C05 panel is NOT lit when the refuel platform is over the core with fuel loaded on the main hoist.

✔ C. Wide Range Neutron Count Rate doubles when a fifth fuel bundle is seated around the "A" WRNM detector.

D. Receipt of the "A Fuel Pool Serv Water Booster Pump Overcurrent" alarm.

Explanation of Answer

A. Incorrect, withdraw of a control rod in a defueled cell is not a core alteration.
B. Incorrect, White light should extinguish under these conditions FH6C - 10.2.7.
C. Correct, FH6C - 10.2.9 required notification component movement if any WRNM count rate doubles (after the 4th placed around a detector).
D. Incorrect, Loss of Fuel Pool Cooling Service Water Booster pump has no impact on core alterations.

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 2 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.3 55.43

System: Generic

KA Group Num: 2.2 Equipment Control

KA Detail Num: 2.2.30 Knowledge of RO duties in the Control Room during fuel handling

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met: Added procedure reference to question stem at NRC recommendation.

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Core Component Movement - Core	FH-6C	10.2.9	31-32	49	

Reference Title	Facility Ref. No.	Section.	Pg #	Rev.	L.O.
Peach Bottom Refueling Procedure	NLSRO-0763			3	6

Question Data for Test: 1999 RO

Question: 13

Which of the following combinations of tags may be applied to the same component at the same time in accordance with the Clearance and Tagging Manual?

A. A Special Condition Tag (SCT) and a tagged component bearing a green suspension label.

B. Two Special Condition Tags (SCTs).

C. A Danger Tag and Special Condition Tag (SCT).

✔ D. An Information Tag and a Danger Tag.

Explanation of Answer:

A. Incorrect,, a SCT SHALL NOT be applied to any tagged component bearing a green suspension label. (C&T 4.3.7)
B. Incorrect, only one SCT shall be applied to a component (C&T 4.3.4).
C. Incorrect, a Danger Tag SHALL NOT be applied to a component bearing a SCT (C&T 4.4.3).
D. Correct, the component position specified on an Information Tag SHOULD NOT conflict with any other tags applied to that component (ex: Danger, other Info Tag) (C&T 4.2.10).

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 2 SRO Grp: 2 RO Val: 3.6 SRO Val: 3.8 55.43

System: Generic

KA Group Num: 2.2 — Equipment Control

KA Detail Num: 2.2.13 — Knowledge of Clearance and Tagging Procedures

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Clearance & Tagging Manual	CTM	4.2.10		4	

Question Data for Test: 1999 RO

Question: 16

A check-off list (COL) Independent Verification (IV) is required to be completed on 8 system valves located in an area with dose rates of 120 mR/hr.

What is the maximum time available to complete the verification before exceeding the guidelines for Shift Management to consider waiving the IV?

A	2 minutes.
✔ B	5 minutes.
C	10 minutes
D	12 minutes

Explanation of Answer

OM-C-11.1 provides 10 mR as the guideline for waiving an IV.
A. 4 mR
B. 10 mR correct answer
C. 20 mR
D. 24 mR
All based upon 120 mR/hr divided by 60 minutes = 2 mR/minute

Exam Level	Cognitive Level	Facility	Materials
RO	Application	PBAPS	Calculator

KA Information

Tier: PWGs RO Grp: 3 SRO Grp: 3 RO Val: 2.9 SRO Val: 3.3 55.43

System:	Generic	
KA Group Num:	2.3	Radiological Controls
KA Detail Num:	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure

Question Source Information

Ques Source: 1998 PBAPS NRC Exam Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Independent Verification	OM-C-11.1	1.2.1	2	1	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Basic Radiation Worker Training	GETCM-10400			3	17

Question Data for Test: 1999 RO

Question: 17

Given the following conditions:

- A male, fully qualified radiation worker at Peach Bottom has just returned from 4 weeks of outage support at Limerick.
- Total Effective Dose Equivalent (TEDE) received at Limerick was 250 mrem.
- This workers' current TEDE from Peach Bottom for 1999 is 225 mrem.

What is the MAXIMUM annual non-emergency Total Effective Dose Equivalent (TEDE) that can be received at Peach Bottom for the remainder of 1999 WITHOUT exceeding the Federal Exposure Limits.

A 4475 mrem

✔ B 4525 mrem

C 4750 mrem

D 4775 mrem

Explanation of Answer: Federal Exposure Limit is 5000 mrem. 5000 mrem - 250 mrem (Limerick) -225 mrem (PBAPS) = 4525 mrem

Exam Level	Cognitive Level	Facility	Materials
RO	Application	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 3 SRO Grp: 3 RO Val: 2.5 SRO Val: 3.1 55.43

System: Generic

KA Group Num: 2.3 Radiation Control

KA Detail Num: 2.3.1 Knowledge of 10CFR20 and related facility radiation control requirements

Question Source Information

Ques Source: 1997 PBAPS NRC Exam Question Source:

Ques Mod Met: Dates changed to reflect current year.

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Dosimetry Program	HP-C-106	7.1.1	3	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Occupational Dose Limits for Adult	10CFR20.1201				

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Radiation Exposure Limits	PLOT-1730			12	2

Question Data for Test: 1999 RO

Question: 21

To return the plant to a stable condition following a transient, Operations personnel need to enter a High Radiation Area that does not have an existing Radiation Permit (RWP).

Which of the following will meet the MINIMUM requirements for an Equipment Operator to enter the area.

A. Must be accompanied by an Advanced Rad Worker (ARW) qualified individual.

✔ B. Must be accompanied by a Level II Radiation Protection Technician qualified individual.

C. Entry into the area is not permitted without the Radiation Protectection Manger (RPM) permission.

D. Entry into the area is not permitted until activation of the Emergency Plan.

Explanation of Answer: HP-C-310 in a effort to return the plant to a stable condition a Level II (ANSI 3.1) RP Technician may act in lieu of a formal RWP to assist workers

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: PWGs   RO Grp: 3   SRO Grp: 3   RO Val: 2.6   SRO Val: 3.0   55.43

System: Generic

KA Group Num: 2.3 — Radiation Control

KA Detail Num: 2.3.1 — Knowledge of 10CFR20 and related facility limits

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Radiation Work Permits	PLOT-1760	II.C	6	14	4
Radiation Work Permit Program	HP-C-310	7.12		3	

Question Data for Test: 1999 RO

Question: 22

The Plant Reactor Operator (PRO) has just received a fire alarm from the Turbine Building.

The PRO is REQUIRED to make a call for off-site fire fighting support:

A. After 10 minutes if an actual fire is confirmed.

B. Immediately if equipment for safe shutdown is jeopardized.

C. When 2 or more fire alarms are received in the same area.

✔ D. After 20 minutes if the Incident Commander reports the fire is NOT controlled.

Explanation of Answer

A. UE classification time.
B. Not IAW FF-01
C. Not IAW FF-01
D. Correct answer

Exam Level	Cognitive Level	Facility	Materials
RO	Memory	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 4 SRO Grp: 4 RO Val: 2.9 SRO Val: 3.4 55.43

System:	Generic	
KA Group Num:	2.4	Emergency Procedures and Plan
KA Detail Num:	2.4.25	Knowledge of fire protection procedures.

Question Source Information

Ques Source: 1998 PBAPS NRC Exam Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Fire Brigade	FF-01	6.1.1 Note	3	6	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Fire Protection System	PLOT-0685	VI.B	24	7	

Question Data for Test: 1999 RO

Question: 28

You were working as the fourth Reactor Operator on your crew during the night shift when an emergency occurred on Unit 3. The Shift Manager, acting as the Emergency Director, has assigned you the responsibility of being the NRC Communicator. From the following, select one responsibility of this position.

A. Establish communications with the TSC to report Trip Table status.

B. Establish communications with the PBAPS NRC Resident Inspector.

C. Initiating the Emergency Response Organization call out.

✔ D. Initiating the Emergency Response Data System.

Explanation of Answer

A. Trip Table Communicator responsibility
B. Not a valid responsibility
C. ED Communicator responsibility
D. Correct Answer

Exam Level	Cognitive Level	Facility	Materials
RO	Memory	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 4 SRO Grp: 4 RO Val: 3.3 SRO Val: 3.1 55.43

System: Generic

KA Group Num: 2.4 Emergency Procedures/Plan

KA Detail Num: 2.4.39 Knowledge of the RO's responsibilities in emergency plan implementation

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Emergency Notifications	ERP-110	2.2.20	5	12	

Question Data for Test: 1999 RO

Question: 29

A Main Control Room annunciator has a "blue" dot on its window.

Which of the following describes the status of the equipment monitored by that annunciator?

The monitored equipment has a deficiency that:

✔ A. Affects the performance of the Transient Response Implementation Plan (TRIP) procedures.

B. Is NOT considered a Main Control Room deficiency.

C. Affects the performance of the Emergency Response Procedures (ERP).

D. Does not impact any safety related plant equipment.

Explanation of Answer:

A. Correct answer, blue dot is critical deficiency which is anything that affects performance of EOPs (TRIPS).
B. Blue tinted window.
C. ERPs not referred to in this procedure.
D. Yellow for non-MCR deficiencies.

Exam Level	Cognitive Level	Facility	Materials
RO	Memory	PBAPS	N/A

KA Information

Tier: PWGs RO Grp: 4 SRO Grp: 4 RO Val: 3.0 SRO Val: 3.1 55.43

System: Generic

KA Group Num: 2.4 Emergency Procedures/ Plan

KA Detail Num: 2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Equipment Status List/Tagging of D	OM-P-10.3	5.3.2 & 6.1.1.3	6 & 7	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operations Manual Chapters 10 thr	PLOT-0008			0	1

Question Data for Test: 1999 RO

Question: 30

Given the following conditions:

- A Unit 2 reactor startup is in progress with control rod withdrawals occurring.
- Rod Worth Minimizer (RWM) Group 1 contains 12 control rods that are to be withdrawn from Notch "00" to Notch "48".
- 11 rods from this group are withdrawn to Notch "48" and the remaining rod to Notch "42".
- A control rod in Group 2 is then selected but not withdrawn.

Which of the following is the expected response of the RWM?

The RWM will display:

A. One withdraw error and further rod withdrawals will be blocked except for the rod with the withdraw error.

B. One withdraw error and if a second withdraw error is made further rod withdrawals will be blocked except for the two rods with the withdraw errors.

C. One insert error and further rod withdrawals will be blocked except for the rod with the insert error.

✔ D. One insert error and if a second insert error is made, further rod withdrawals will be blocked except for the two rods with the insert errors.

Explanation of Answer:

Exam Level	Cognitive Level	Facility	Materials
RO	Application	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.5 55.43

System:	201006	Rod Worth Minimizer
KA Group Num:	K5	Knowledge of the operational implication of the following as they apply to the RWM
KA Detail Num:	K5.13	Insert Block

Question Source Information

Ques Source: 1997 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Rod Worth Minimizer	PLOT-0090	III.A 7-9 & IV.B	1 & 22	10	5a

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Receipt of Rod Blocks	SO 62.7.A-2			16	

Question Data for Test: 1999 RO

Question: 31

During steady power reduction from 100% to 65% power on Unit 3 the Unit Reactor Operator notes Wide Range reactor water level indications, which had been reading about 10 inches less than Narrow Range, are slowly rising. Actual reactor water level remains unchanged.

Which of the following describes what is occurring?

A. The density compensation signal (reactor pressure) has failed full "downscale".

B. The density compensation signal (reactor pressure) is lowering as power is reduced resulting in a lowering d/p on the level instrument, therefore an indicated level rise.

C. The Digital Feedwater redundant feedback signals have failed full "upscale".

✔ D. The reduction in recirculation flow is raising the pressure at the variable leg tap resulting in a lowering d/p on the level instrument, therefore an indicated level rise.

Explanation of Answer

A. This failure results in a -30" level on wide range.
B. Possibly true but not of this magnitude
C. DFCS feedback signals do not exist
D. Correct answer from the reference

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 1   SRO Grp: 1   RO Val: 2.9   SRO Val: 2.9   55.43

System:	216000	Nuclear Boiler Instrumentation
KA Group Num:	K5	Knowledge of the operational implications of the following concepts as they apply to Nuclear Boiler
KA Detail Num:	K5.09	Recirculation flow effects on level indications: Design-Specific

Question Source Information

Ques Source: 1998 PBAPS NRC Exam   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Vessel Instrumentation	PSYS-5002B	III.E.8	6 & 17	0	2e

Question Data for Test: 1999 RO

Question: 32

Given the following conditions:

- The E-42 4KV Bus has lost power.
- The fast transfer and Diesel Generator start both failed to occur automatically.
- The E-4 Diesel Generator (DG) was started with the "Quick Start" pushbutton.
- The E-42 breaker is closed and the DG is now carrying all the loads on the E-42 4KV Bus.

Which of the following describes the current Mode of operation of the DG and what is required to synchronize the DG back to the Grid?

The E-4 DG is operating in:

A	Droop (Parallel), the DG Quick Start pushbutton must be pressed again and synch must be completed within 3 minutes.
B	Isochronous (Unit), the DG Quick Start pushbutton must be pressed again and synch must be completed within 3 minutes.
C	Droop (Parallel), the DG Auto Start Bypass pushbutton must be pressed and synch must be completed within 3 minutes.
✔ D	Isochronous (Unit), the DG Auto Start Bypass pushbutton must be pressed and synch must be completed within 3 minutes.

Explanation of Answer

A. Incorrect mode, this pushbutton determines mode.
B. Correct mode, pushbutton selected that mode.
C. Incorrect mode
D. Correct answer

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.7 SRO Val: 3.7 55.43

System:	264000	Emergency Generators (Diesel/Jet)
KA Group Num:	A4	Ability to manually operate and/or monitor in the control room.
KA Detail Num:	A4.04	Manual start, loading, and stopping of emergency generator: Plant-Specific

Question Source Information

Ques Source: 1998 PBAPS NRC Exam   Question Source:

Ques Mod Met: Terminology updated.

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Diesel Generators and Auxiliaries	PLOT-0670	IV.D.2.h	1 & 32	6	1b

Question Data for Test: 1999 RO

Question: 33

Which of the following conditions will result in Recirc flow controller output being limited to 30%?

A. Total feedwater flow greater than 85% and any condensate pump trip.

B. Individual feedpump flow less than 20% and Reactor level less than 17".

C. Total feedwater flow greater than 20% and Reactor level less than 17".

✔ D. Reactor scram and Reactor level less than 17".

Explanation of Answer

A. Incorrect - results in 45% limiter
B. Incorrect - results in 45% limiter
C. Incorrect - no action
D. Correct

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 1   SRO Grp: 1   RO Val: 3.1   SRO Val: 3.2   55.43

System:	202002	Recirculation Flow Control System
KA Group Num:	K1	Knowledge of the physical connections and/or cause effect relationship between recirc flow control system and the following
KA Detail Num:	K1.09	Reactor water level

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Low Level	OT-101	4.0	2	9	
Recirc Flow Control	PLOT-0040	IV.B	15	8	5b

Question Data for Test: 1999 RO

Question: 34

The following conditions exist on Unit 2 after a LOCA.

- Drywell pressure 7 psig, rising slowly
- Reactor pressure 400 psig, dropping slowly
- Reactor level -75"
- All low pressure ECCS pumps were manually secured
- Level is being maintained with condensate injection.
- "D" RHR pump was placed in Torus Sprays at 1000 gpm and Drywell sprays at 1000 gpm

If level were to drop to -200" what would be the response of the LPCI system with no additional operator actions?

A. A, B, C RHR pumps would start, "D" RHR would continue to run, LPCI outboard injection valve (MO-154) would auto open, spray valves would auto close.

B. A, B, C RHR pumps would start, "D" RHR would continue to run, LPCI outboard injection valve (MO-154) would auto open, spray valves would remain open.

✔ C. A, B, C RHR pumps would NOT start, "D" RHR would continue to run, LPCI outboard injection valve (MO-154) would remain closed, spray valves would remain open.

D. A, B, C RHR pumps would NOT start, "D" RHR would continue to run, LPCI outboard injection valve (MO-154) would remain closed, spray valves would auto close.

Explanation of Answer:

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.9 SRO Val: 4.1 55.43

System:	203000	RHR/LPCI Injection Mode
KA Group Num:	K4	Knowledge of RHR/LPCI Injection mode design features and/or interlocks which provide for the following
KA Detail Num:	K4.10	Dedicated injection system during automatic system initiation (injection valve interlocks)

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Initiation of Drywell Sprays Using R	T-204			1	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Residual Heat Removal	PLOT-0370	H-PLOT-0370-2	2	10	5a

Question Data for Test: 1999 RO

Question: 35

Following a valid HPCI initiation due to high Drywell pressure on Unit 3, HPCI was secured using the "Short Term HPCI System Shutdown When an Initiation Condition IS Present" method of SO-23.2.2A-3, "HPCI System Shutdown". The PRO has been directed to initiate HPCI injection into the Reactor Vessel from this condition.

Under these conditions, HPCI Turbine speed during startup is controlled by:

A. The ramp generator initiated by the opening of HPCI steam supply valve, MO-3-23-014.

B. The slow opening of the HPCI Turbine Stop Valve, HO-3-23-4513.

C. The ramp generator initiated by opening of the HPCI Turbine Control Valve, HO-3-23-4512.

✔ D. The ramp generator initiated by opening of the HPCI Turbine Stop Valve, HO-3-23-4513.

Explanation of Answer

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS | RO Grp: 1 | SRO Grp: 1 | RO Val: 3.3 | SRO Val: 3.3 | 55.43

System:	206000	High Pressure Coolant Injection (HPCI)
KA Group Num:	K5	Knowledge of the operational implications of the following concepts as they apply to HPCI
KA Detail Num:	K5.05	Turbine Speed Control

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
High Pressure Coolant Injection	PLOT-5023	II.C.3.d	14	0	5.d

Question Data for Test: 1999 RO

Question: 36

An ADS blowdown has occurred following a LOCA. The ADS valve control switches remain in "Auto". Pressure is 200 psig and lowering slowly. All Core Spray and RHR pumps were initially injecting. "D" Core Spray pump has tripped. All RHR pumps were secured when level recovered above -100". Level is being restored using A, B, and C Core Spray pumps.

An additional Core Spray pump needs to be shutdown to control level recovery.

Which of the following statements accurately describe the response of the ADS system to pump shutdown?

A	ADS blowdown will stop when the "A" Core Spray pump is shutdown.
B	ADS blowdown will stop when the "B" Core Spray pump is shutdown.
✔ C	ADS blowdown will stop when the "C" Core Spray pump is shutdown.
D	An ADS seal in prevents inadvertent blowdown termination by pump shutdown.

Explanation of Answer: A or B AND C or D Core Spray pumps are required for the ADS blowdown to continue.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.8 SRO Val: 3.9 55.43

System:	209001	Low Pressure Core Spray Subsystem
KA Group Num:	K3	Knowledge of the effect that a loss or malfunction of the low pressure core spray system will have on
KA Detail Num:	K3.02	ADS logic

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
ADS and Relief Valve Alignment fo	SO 1.G.1.A	3.1	1	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Automatic Depressurization Syste	PLOT-5001G	11.E.1.r.3	19	0	5

Question Data for Test: 1999 RO

Question: 37

An ATWS condition has occurred on Unit 3. Reactor level is 23 inches and pressure is 1000 psig with the turbine still running. The CRS has directed the URO to inject Standby Liquid Control (SBLC). The URO positions the SLBC switch to "PUMP 'A' RUN". Identify the expected SBLC System response.

A. Squib continuity light are lit, pump discharge pressure is 1450 psig.

✔ B. Squib continuity lights are lit, pump discharge pressure is 1100 psig.

C. Squib continuity lights are out, pump discharge pressure is 1450 psig.

D. Squib continuity lights are out, pump discharge pressure is 1100 psig.

Explanation of Answer: SBLC is expected to inject at approximately 100 psig greater than reactor pressure the continuity lights will stay lit as long as the pump is energized.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 1   SRO Grp: 1   RO Val: 3.6   SRO Val: 3.6   55.43

System:	211000	Standby Liquid Control System
KA Group Num:	A1	Ability to predict and/or monitor changes in parameters associated with SBLC including
KA Detail Num:	A1.03	Pump discharge pressure

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Standby Liquid Control System	PLOT-5011	II.D.3, II.F.2	14, 19	0	4h

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
SBLC Initiation	SO 11.1.B	4.0 Note	1	3	

Question Data for Test: 1999 RO

Question: 39

Unit 2 was operating at 100% power when the "A" Recirc pump tripped. The pump was isolated in accordance with the procedure.

Which of the following statements describes the relationship between INDICATED total core flow and ACTUAL total core flow?

Total core flow indicated on DPFR-2-3-095 dP/F will be:

A. Less than actual by an amount TWICE idle loop flow.

B. Less than actual by an amount EQUAL to idle loop flow.

✔ C. Greater than actual by an amount TWICE idle loop flow.

D. Greater than actual by an amount EQUAL to idle loop flow.

Explanation of Answer

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.4 55.43

System:	216000	Nuclear Boiler Instrumentation
KA Group Num:	A3	Ability to monitor automatic operations of the Nuclear Boiler Instrumentation
KA Detail Num:	A3.01	Relationship between meter/recorder readings and actual parameter values

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Vessel Instrumentation	PSYS-5002B	III.J.k	29	0	4d

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS Power Flow Operation Ma	Exhibit GP-5-1		2	0	

Question Data for Test: 1999 RO

Question: 40

The RCIC system was being restored to its normal alignment following maintenance, when a high steam flow isolation occurred due to stroking open the valves too quickly. A few minutes later, a feedwater transient results in a scram and the need for RCIC system operation. Current level is -50 inches and dropping slowly. The SRO has directed that RCIC be recovered and injection initiated into the vessel at 600 gpm.

After depressing the isolation reset pushbutton, which of the following actions will be necessary to inject with RCIC?

✔ A. The RCIC turbine trip throttle valve will need to be reset from the control room.

B. The RCIC turbine trip throttle valve will need to be reset locally.

C. The MO-131, steam admission valve, must be stroked open manually.

D. RCIC will automatically align and inject when the isolation reset pushbutton is depressed.

Explanation of Answer: A RCIC turbine trip is received with an isolation signal. RCIC turbine trips must be manually reset. Only an overspeed trip must be reset locally.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS | RO Grp: 1 | SRO Grp: 1 | RO Val: 3.8 | SRO Val: 3.8 | 55.43

System:	217000	Reactor Core Isolation Cooling (RCIC)
KA Group Num:	A2	Ability to predict the impact of the following on RCIC and based on those . . .
KA Detail Num:	A2.15	Steam Line Break

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recovery from RCIC System Isolat	SO 13.7.A	4.1	3	10	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RCIC	PLOT-5013	11.D.4	18019	0	4f

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recovery from a RCIC System Isol	SO 13.7.A	4.1	2-3	10	

Question Data for Test: 1999 RO

Question: 41

Given the following conditions:

- Unit 2 has experienced a loss of all AC power (station blackout).
- The Reactor Core Isolation Cooling (RCIC) system automatically initiated.
- Reactor water level is now -52 inches and rising.
- The Control Room Supervisor directs the Unit Reactor Operator to isolate RCIC.

What will be the expected RCIC system response when the operator depresses the Manual Isolation Pushbutton?

A	A normal RCIC system isolation and turbine trip will occur.
✔ B	A RCIC turbine trip and system isolation will occur except the Inboard Steam Isolation Valve (MO-15) will not close.
C	No RCIC isolation actions or turbine trip will occur.
D	A RCIC turbine trip and system isolation will occur except the Outboard Steam Isolation Valve (MO-16) will not close.

Explanation of Answer

A. MO-15 has no power.
B. Correct answer, MO-15 is only AC RCIC valve
C. This would be true if level was back above -48 inches, initiation auto reset point
D. MO-16 is a DC valve, should close.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: SYS — RO Grp: 1 — SRO Grp: 1 — RO Val: 2.8 — SRO Val: 2.8 — 55.43

System:	217000	Reactor Core Isolation Cooling System (RCIC)
KA Group Num:	K2	Knowledge of electrical power supplies to the following:
KA Detail Num:	K2.01	Motor Operated valves

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Core Isolation Cooling	PLOT-5013	II.E.6	34	0	2a

Question Data for Test: 1999 RO

Question: 42

A small Main Steam Line leak has occurred in the Turbine Building on Unit 2. The following plant conditions exist:

- The Reactor is scrammed.
- The "A" Main Steam Line has failed to isolate.
- Reactor Pressure is 800 psig.
- The PRO shutdown all low pressure ECCS pumps immediately after they started on LO-LO-LO level since no injection or minimum flow path was available.
- HPCI is blocked.
- RCIC has been maintaining reactor level steady at -165" for 12 minutes.

Starting the "A" RHR pump will:

A. Result in an ADS blowdown after a 9 minute time delay.

✔ B. Result in an immediate ADS blowdown.

C. Result in an ADS blowdown after a 105 second time delay.

D. NOT result in an ADS blowdown.

Explanation of Answer: The 9 minute timer and 105 second timer have both timed out. When the RHR pump is started, the blowdown will occur immediately.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 4.2 SRO Val: 4.2 55.43

System:	218000	Automatic Depressurization System (ADS)
KA Group Num:	A4	Ability to manually operate and/or monitor in the control room
KA Detail Num:	A4.02	ADS logic initiation

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Automatic Depressurization Syste	PLOT-5001G	II.E	16-18	0	4c

Question Data for Test: 1999 RO

Question: 43

A small recirc leak has resulted in 8 psig drywell pressure and -170" reactor level on Unit 2. After the Drywell Cooling Fans tripped, the CRS directed them to be restored using T-223. The trip was bypassed and the fans were restored in fast speed. 15 minutes later, the STA reports that the amber bypass light over the Drywell Cooler Fan bypass switch (43-5-0165) has gone out.

Describe the effect this will have on Drywell Cooler Fan operation and why.

✔ A — Fans will continue to run, light goes out when both trip signals clear.

B — Fans will continue to run, light goes out if either trip signal clears.

C — Fans will trip, light goes out when both trip signals clear.

D — Fans will trip, light goes out when either trip signal clears.

Explanation of Answer: Light going out indicates that the bypass logic has dropped out. For the bypass to be active, an isolation signal must be present. If light clears, the isolation signals have cleared and the fans would have no\trip signal.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.5 SRO Val: 3.6 55.43

System:	223001	Primary Containment and Auxiliaries
KA Group Num:	A4	Ability to manually operate and/or monitor in the control room.
KA Detail Num:	A4.12	Drywell Cooler/Chillers

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Drywell Cooler Fan Bypass	T-223-2	4.4 Note	3	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Drywell Ventilation	PLOT-5040C	II.D.6.e	13	0	4c

Question Data for Test: 1999 RO

Question: 44

Unit 2 is operating in MODE 1 at full power. The 2B RPS MG set output breakers trip on underfrequency.

Under these conditions, which of the following PCIS isolations will occur and result in isolation valves repositioning?

A. A Group II Outboard half isolation.

✔ B. A Group III Outboard half isolation.

C. An Outboard MSIV auto isolation.

D. A full RWCU isolation.

Explanation of Answer: Loss of power to "B" RPS results in a half Group III outboard isolation. A half Group I is received but no valves move. Group 2 is not impacted.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS | RO Grp: 1 | SRO Grp: 1 | RO Val: 3.5 | SRO Val: 3.5 | 55.43

System:	223002	Primary Containment Isolation System (PCIS)
KA Group Num:	A3	Ability to Monitor Automatic Operation of PCIS including:
KA Detail Num:	A3.02	Valve Closures

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Group I, II, and III Outboard Half Is	GP-8D	Notes	2	12	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PCIS	PLOT-5007G	II.C.7.a.4	33	0	5h

Question Data for Test: 1999 RO

Question: 45

Unit 2 is operating in MODE 1 at full power when PISH-2-5-12A the drywell pressure input to RPS and PCIS fails high resulting in an "A" channel RPS half scram and associated annunciators.

Determine the expected Primary Containment Isolation System (PCIS) response to this condition.

The "GROUP II/III INBOARD ISOL RELAYS NOT RESET" annunciator will:

A	Alarm, but NO valves will reposition.
B	Alarm, and the inboard isolation valves will reposition.
✔ C	NOT alarm, and NO valves will reposition.
D	NOT alarm, but the inboard isolation valves will reposition.

Explanation of Answer: This condition will result in only half of the A channel logic picking up and will not result in any alarms or isolation.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.0 SRO Val: 3.2 55.43

System:	223002	Primary Containment Isolation System (PCIS)
KA Group Num:	A2	Ability to predict the impact of the following on PCIS
KA Detail Num:	A2.06	Containment Instrument Failures

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PCIS Groups II and III Channel A	GP-25 App. 5	4.0	2	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PCIS	PLOT-5007G			0	5e

Question Data for Test: 1999 RO

Question: 46

A T-112 BLOWDOWN is in progress with reactor pressure at 75 psig above Torus pressure. The URO notes that, although the ADS valve switches are in "OPEN", the SRV's are indicating closed. The green and white lights are lit for each of the ADS valves. All other SRV's have only green lights lit. The "SAFETY RELIEF VALVE OPEN" annunciator is NOT lit.

Given the above conditions, determine the current expected position of the ADS valves.

✔ A. Fully open.

B. Partially open, but not far enough for proper indication.

C. Failed closed.

D. Fully closed, due to low steam pressure.

Explanation of Answer: Although acoustic valve indication is lost in this pressure range, SRVs are designed to stay open until 50 psig and have actually stayed open to lower values during testing.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.1 SRO Val: 3.2 55.43

System:	239002	Relief/Safety Valves
KA Group Num:	K4	Knowledge of Relief/Safety Valve design features and/or interlocks which provide for:
KA Detail Num:	K4.07	Minimum steam pressure to keep an SRV open.

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Main Steam and Pressure Relief	PLOT-0120	5.B.8	27	14	5K

Question Data for Test: 1999 RO

Question: 47

Given the following conditions:

- Unit 2 was operating at 100% power.
- Annunciator 220 F-5, "Inverter Trouble", was received indicating a loss of 20Y050.
- The reactor was later scrammed and the turbine tripped.

Which of the following is the reason why this failure requires reactor pressure control via the Safety Relief Valves?

The static inverter loss will:

A. Cause a full Group I Main Steam Isolation Valve closure.

B. Cause a "full open" signal to the Turbine Bypass Valves requiring the EHC Pumps to be tripped to prevent a rapid depressurization.

✔ C. Result in a loss of Turbine Bypass Valve opening capability.

D. Result in a closure of the Inboard Main Steam Isolation Valves.

Explanation of Answer

A. MSIVs are not affected.
B. TBV close on this loss.
C. Correct answer, power loss to EHC logic when it swaps to PMG, TBVs close
D. MSIVs not affected.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 2.8 SRO Val: 2.9 55.43

System:	241000	Reactor/Turbine Pressure Regulating System
KA Group Num:	K.6	Knowledge of the effect that a loss or malfunction of the following will have on the Reactor/Turbine
KA Detail Num:	K6.01	AC Electrical power

Question Source Information

Ques Source: 1997 PBAPS NRC Exam Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
ON-112-2 Loss of Uninterruptible A.	ON-112-2 Bases	2.0 Notes	2	5	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 RO

Question: 48

Unit 3 is performing a GP-2 Plant Startup. Power is being raised from 50% to 100%. The Plant Reactor Operator is monitoring Electrohydraulic Control (EHC) system performance.

Pressure averaging manifold pressure is initially:

A. Equal to reactor pressure with an increasing dP as turbine load is raised.

B. Equal to reactor pressure with a constant dP as turbine load is raised.

✔ C. Less than reactor pressure with an increasing dP as turbine load is raised.

D. Less than reactor pressure with a lowering dP as turbine load is raised.

Explanation of Answer: Answer C - PAM pressure remains less than reactor pressure with dP increasing as steam flow increases due to flow induced pressure drop through the steam lines.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.3 SRO Val: 3.3 55.43

System:	241000	Reactor/Turbine Pressure Regulating System
KA Group Num:	K5	Knowledge of the operational implications of the following concepts as they apply to reactor/turbine
KA Detail Num:	K5.04	Turbine inlet pressure vs. reactor pressure.

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
EHC	PLOT-5001DL	Transp. 3	1	0	1b

Question Data for Test: 1999 RO

Question: 49

Unit 2 is operating at 100% power, with the Digital Feedwater Control System (DFCS) in three-element control with the "B" Narrow Range Level automatically selected. A fault in the level detector causes it to fail downscale. Which of the following will occur?

A. DFCS will sense a low level and increase RFPT speed, thereby causing Reactor Vessel level to increase.

B. The "B" Narrow Range Level Detector will be automatically de-selected and the HIGHEST remaining narrow range level signal will be automatically selected.

✔ C. The "B" Narrow Range Level Detector will be automatically de-selected, and the LOWEST remaining narrow range level signal will be automatically selected.

D. A default valve of +23" will be automatically selected by the master level controller.

Explanation of Answer: The DFCS system automatically selects the middle narrow range for control.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.5 SRO Val: 3.5 55.43

System:	259002	Reactor Water Level Control System
KA Group Num:	K6	Knowledge of the effect that a loss or malfunction of the following will have on the reactor water level control system
KA Detail Num:	K6.05	Reactor water level input

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Feedwater Field Instrument Troubl	ARC 201 H1		1	3	
Reactor Feedwater Automatic Leve	SO 6C.1.D-2			4	

Question Data for Test: 1999 RO

Question: 50

Following a reactor scram from a power condition, Reactor Feedwater Pump (RFP) speed automatically goes up to compensate for the shrink experienced as the voids in the reactor collapse.

To protect the pumps from overspeed under these conditions, RFPs are limited to 85% following a scram:

A. With all three condensate pump running.

B. With less than three condensate pumps running.

✔ C. With individual feedwater flows greater than 20%.

D. With individual feedwater flows less than 20%.

Explanation of Answer: Self explanatory.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 1   SRO Grp: 1   RO Val: 3.0   SRO Val: 3.0   55.43

System: 259002 — Reactor Water Level Control System

KA Group Num: A3 — Ability to monitor automatic operations of the reactor water level control system including:

KA Detail Num: A3.01 — Runout flow control

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Feedwater Control Ssstem	PLOT-0550	V.D	28	7	4c

Question Data for Test: 1999 RO

Question: 52

Both Units were operating in MODE 1 at full power when the "3A" RPS bus was manually transferred to its alternate feed. Determine the expected condition of the Standby Gas Treatment (SBGT) system as a result of this transient.

A "B" SBGT fan has started, SBGT "A" filter inlet and outlet dampers have opened.

B "C" SBGT has started, SBGT "B" filter inlet and outlet dampers have opened.

C "B" SBGT fan has started, SBGT "B" filter inlet and outlet dampers have opened.

✔ D "C" SBGT fan has started, SBGT "A" filter inlet and outlet dampers have opened.

Explanation of Answer:

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 2.9 SRO Val: 3.0 55.43

System: 261000 Standby Gas Treatment (SBGT)

KA Group Num: K6 Knowledge of the effect that a loss or malfunction of the following will have on SBGT

KA Detail Num: K6.01 AC Electrical Distribution

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Group I, II, and III Inboard Half Isol	GP-8C	Notes	2	17	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
COL GP-8.C Groups II and III Inbo	GP-8.C COL		4	15	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Standby Gas Treatment	PSYS-5009A	V.L.3.a	23	1	8e

Question Data for Test: 1999 RO

Question: 53

Peach Bottom 4KV is aligned as follows:

- The #2 Emergency Auxiliary Transformer (OAX04) is out of service.
- All eight 4KV busses are being supplied by the #3 Emergency Auxiliary Transformer (OBX04).
- The 2A RHR and 2A HPSW pumps are running in Torus Cooling.

Determine the expected plant response to an automatic trip of the E-312 breaker.

A. The E-1 Diesel Generator will start after .25 seconds.

✔ B. The E-1 Diesel Generator will start after .5 seconds.

C. The 2A RHR and HPSW pumps will trip and restart on power restoration.

D. The E-124 Load Center will trip and lockout.

Explanation of Answer: Diesel Generator start will be required after .5 seconds since the alternate off-site source is not available.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 1 RO Val: 2.7 SRO Val: 2.9 55.43

System:	262001	AC Electrical Distribution
KA Group Num:	A2	Ability to predict the impact of the following on AC electrical distribution
KA Detail Num:	A2.06	De-energizing a Plant Bus

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Diesel Generators and Auxiliary	PLOT-0670	II.D.2	11	6	3c

Question Data for Test: 1999 RO

Question: 54

Unit 3 is in MODE 1 at full power with "B" RPS on its normal alternate feed. All other equipment is in its normal alignment. Both of the inservice off-site start up feeds trip simultaneously. All diesel generators start and close in on their buses as designed.

Determine the response of Unit 3 to this loss of AC power event. Unit 3 will:

A. Scram immediately due to the loss of power to the RPS system.

B. Scram immediately due to turbine stop and control valve closure.

✔ C. NOT scram immediately due to "B" RPS being powered by its alternate source.

D. NOT scram immediately due to the RPS MG Sets maintaining power until the diesel generators load their buses.

Explanation of Answer: With "B" RPS on its alternate feed, RPS will not entirely lose power during a loss of off-site power.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 1 RO Val: 3.8 SRO Val: 4.1 55.43

System: 262001 — AC Electrical Distribution

KA Group Num: K3 — Knowledge of the effect that a loss or malfunction of AC will have on:

KA Detail Num: K3.06 — Reactor Protection System

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Protection System	PLOT-5060F	II.C.2.b		0	6a

Question Data for Test: 1999 RO

Question: 55

Peach Bottom has experienced a complete loss of off-site power. The E-1 and E-2 Diesel Generators started and loaded their busses normally but the "A" ESW pump did not start. The E-3 and E-4 Diesels did not start. The E-1 and E-2 were then shutdown due to not having cooling water. The Power System Director (PSD) has been requested to configure Conowingo Station for Peach Bottom Station Blackout. The CRS has directed a backfeed in accordance with SE-11 Attachment D, "Backfeeding Safe Shutdown Loads with E-1 & E-2 Diesel Generators Available".

Given that both the 2SUE and 3SUE busses are available for backfeeding, the PRO should select:

A. The 2SUE bus because it is the normal power source for the bus that feeds the "B" ESW pump.

B. The 2SUE bus because this will allow use of the SBO line to power 4KV buses.

C. The 3SUE bus because it is the normal power source for the bus that feeds the "B" ESW pump.

✔ D. The 3SUE bus because this will allow use of the SBO line to power 4KV buses.

Explanation of Answer: Note from SE-11 Attachment "D" states that if the 2SUE bus is used for backfeeding, THEN the SBO line CANNOT be used to power 4KV buses.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.8 SRO Val: 4.1 55.43

System:	264000	Emergency Generators
KA Group Num:	K1	Knowledge of the physical connection and/or cause-effect relationship between emergency generators a
KA Detail Num:	K1.01	AC Electrical Distribution

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Station Blackout	SE-11 Att. D	Note 2	2	5	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Special Event Procedures	PLOT-1555			4	11d

Question Data for Test: 1999 RO

Question: 56

Which of the following statements describe the power supply to the Backup Scram Solenoid valves and their expected condition upon receipt of a full scram.

✔ A — Station batteries, energize on a Full Scram.

B — Station batteries, de-energize on a Full Scram.

C — Reactor Protection Bus, energize on a Full Scram.

D — Reactor Protection Bus, de-energize on a Full Scram.

Explanation of Answer

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.6 55.43

System:	201001	Control Rod Drive Hydraulics System
KA Group Num:	K2	Knowledge of Electrical Power Supplies to the following
KA Detail Num:	K2.03	Backup Scram Valve Solenoids

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Rod Drive Hydraulic Syste	PLOT-5003A	I.4.d	17	0	4d

Question Data for Test: 1999 RO

Question: 57

Given the following conditions:

- Unit 2 is making preparations for a reactor startup from a refueling outage.
- Reactor Building ambient temperature is 74 degrees F.
- The Reactor Building Equipment Operator is charging the hydraulic control unit accumulators with nitrogen to a pressure of 590 psig.
- Several days later with the Unit at 100% power, Reactor Building temperatures have stabilized at 92 degrees F.

Which of the following describes the expected impact on the Control Rod Drive Hydraulic system operations for these conditions? (Refer to attached figure.)

The individual control rod:

A. Normal insertion speeds will be slower and may result in control rod drift alarms.

B. Scram speeds will be slower and will result in reduced reactivity addition rates.

C. Normal insertion speeds will be faster and may result in "double notching".

✔ D. Scram speeds will be faster and may result in mechanism damage.

Explanation of Answer:

D. Excessive pressure at low RB temps results in even higher pressure as temps increase resulting in excessive scram speeds and possible damage to mechanisms.
B. Scram speeds are faster, not slower.
A & C Does not affect normal insert/withdraw functions.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	Accumulator Precharge Nitrogen Pressure vs. Ambient Temperature Graph

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 2 RO Val: 3.4 SRO Val: 3.8 55.43

System:	201001	Control Rod Drive Hydraulic System
KA Group Num:	2.1	Conduct of Operations
KA Detail Num:	2.1.32	Ability to explain and apply system limits and precautions

Question Source Information

Ques Source: 1998 PBAPS NRC Exam

Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Rod Drive Hydraulic Syste	PLOT-5003A	I.1.b	15	0	4e

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Rod Drive Hydraulic Syste	SO 3.7.A-2	Figure 1		7	

Question Data for Test: 1999 RO

Question: 58

Unit 2 is in MODE 2 with a heat up in progress. Vessel level is being maintained by the Control Rod Drive Hydraulic system and the Reactor Water Cleanup system in dump mode to the main condenser through the "RWCU Filter Bypass Valve", MO-74, which is full open.

What is the basis for the caution in procedure SO 12.1.A-2, "Reactor Water Cleanup System Start" which prohibits opening the "RWCU Outlet Valve" MO-68 in this system lineup?

A Excessive heat load on the Non-Regenerative Heat Exchanger.

B Group II isolation on greater than 125% system flow.

✔ C Excessive RWCU pump flows without control room indication.

D Auto closure of CV-55 "Dump Flow Control Valve".

Explanation of Answer

A. Incorrect opening MO-68 would reduce heat load on the NRHX.
B. Incorrect, opening MO-68 would not result in flow in excess of 125% of design.
C. Correct, with the demins bypassed through MO-74 the only system flow indication is dump flow, opening MO-68 will allow potential excessive unmonitored flows.
D. Incorrect, auto closure of CV-55 occurs on specific pressures in the dump flow line.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.5 55.43

System:	204000	Reactor Water Cleanup System
KA Group Num:	A1	Ability to predict and/or monitor changes in parameters associated with RWCU control including:
KA Detail Num:	A1.04	System Flow

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Water Cleanup System St	SO 12.1.A-2	Table 1		24	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Water Cleanup	PLOT-5012		0	4.g	

Question Data for Test: 1999 RO

Question: 59

Given the following conditions:

- Unit 3 has had a complete loss of the E13 4160VAC Bus.
- This results in a loss of power to the "A" Residual Heat Removal (RHR) Pump and to the "A" Loop Inboard LPCI Injection Valve (MO-25A).
- A valid LOCA signal occurs.

What must occur to result in a final, design RHR injection flowrate for these conditions of 30,000 gpm.

A. The RHR Loop Cross-Tie Valve (MO-20) must be unlocked and opened by an operator.

B. An operator must manually transfer the Inboard LPCI Injection Valve (MO-25A) to the alternate power supply.

C. The Outboard LPCI Injection Valve (MO-154A) must automatically open to inject through the normally open MO-25A.

✔ D. The Inboard LPCI Injection Valve (MO-25A) must automatically transfer to the alternate power supply.

Explanation of Answer

A. No procedural guidance for this step.
B. Power transfer is automatic.
C. MO-154A is normally open, MO-25A is normally closed.
D. Correct answer, power transfer automatically, 30K flowrate with no operator action.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 2.5 SRO Val: 2.7 55.43

System:	205000	Shutdown Cooling System (RHR Shutdown Cooling Mode)
KA Group Num:	K2	Knowledge of electrical power supplies to the following.
KA Detail Num:	K2.02	Motor Operated Valves

Question Source Information

Ques Source: 1998 PBAPS NRC Exam Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Residual Heat Removal System	PLOT-0370	III.D	18	10	3b

Question Data for Test: 1999 RO

Question: 60

Unit 2 is in MODE 4 with "A" RHR pump in Shutdown Cooling (SDC) returning to the vessel through the MO-25A, "Inboard Disch". Loss of inventory causes level to drop to -20". SDC isolates and the "A" RHR pump trips.

Which of the following statements describes the response of LPCI should level continue to drop to
< -160" with no additional operator actions.

A "A" RHR restarts, "B", "C", and "D" start and inject.

B "A" RHR restarts, "B", "C", and "D" start and run on min. flow.

C RHR "B", "C", and "D" start and inject.

✔ D RHR "B", "C", and "D" start and run on min flow.

Explanation of Answer: 1" Reactor level will cause a PCIS Group IIb isolation. MO-17, 18, 25A and 25B will receive a close signal. At < -160" B, C, and D RHR pumps will start but not inject due to the MO-25 closure. "A" RHR will not start due to no suction flow path (17 and 18 closed MO-13A Torus Suction, closed).

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 2   SRO Grp: 2   RO Val: 3.5   SRO Val: 3.7   55.43

System:	205000	Shutdown Cooling System
KA Group Num:	A2	Ability to Predict the Impacts of the following on the SDC System
KA Detail Num:	A2.05	System Isolation

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
System I RHR Relays Not Reset	ARC 227 D-3		1	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Groups II and III Isolations	GP-8B COL	Table Notes	4, 8	17	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Residual Heat Removal	PLOT-0370	Handout 3	2	10	5.b

Question Data for Test: 1999 RO

Question: 61

Following a reactor scram and scram reset, the Unit Reactor Operator notes that the full core display for rod 02-23 is blank with no position indicated and no green back light. All other rods indicate 00 with a green back light.

If the blank display is due to a rod 02-23 Position Indicating Probe (PIP) problem, the operational impact will be the inability to select and move:

✔ A. Other rods in REFUEL due to a lack of "REFUEL MODE SELECT PERMISSIVE".

B. Other rods due to "RPIS INOPERATIVE".

C. Rod 02-23 due to lack of position indication and backlight.

D. Rod 02-23 due to "ROD SELECT BLOCK TIMER MALFUNCTION".

Explanation of Answer

A. Correct, position of all rods full in from the green backlight PIP reed switch is required for the REFUEL MODE SELECT PERMISSIVE white light.
B. Incorrect, loss of position indication does not cause RPIS INOP (ARC 211 D-5).
C. Incorrect, see correct answer A.
D. Incorrect, loss of position indication is not a cause of ROD SELECT BLOCK TIMER MALFUNCTION (ARC 211 E-3).

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 2.7 SRO Val: 2.8 55.43

System:	214000	Rod Position Information System
KA Group Num:	K5	Knowledge of the operational implications of the following concepts as they apply to Rod Position Information System
KA Detail Num:	K5.01	Reed Switches

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Manual Control System	PSYS-5062	IV.C.6	18	0	2g

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Rod Drive Mechanism	PLOT-5003	II.B.3	20	0	8c

Question Data for Test: 1999 RO

Question: 65

Unit 2 is operating at 100% power when a leak develops in the TBCCW system. Shortly thereafter TBCCW Head Tank level drops out of sight low. The operating TBCCW pump starts cavitating and discharge pressure drops to 0 psig.

Assuming no operator actions are taken, which of the following statements describe the operational impact of this event?

A "ISO-PHASE BUS TROUBLE" alarm is received immediately, "ISO-PHASE BUS LOSS OF COOLING" is received 10 minutes later, and an automatic turbine runback is initiated.

B "ISO-PHASE BUS TROUBLE" and ISO-PHASE BUS LOSS OF COOLING" alarms are received immediately, and an automatic turbine runback is initiated.

✔ C "ISO-PHASE BUS TROUBLE" alarm is received immediately, followed by "ISO-PHASE BUS LOSS OF COOLING" alarm 10 minutes later. No automatic turbine runback will occur in this condition.

D "ISO-PHASE BUS TROUBLE" and "ISO-PHASE BUS LOSS OF COOLING" alarms are received immediately. No automatic turbine runback will occur in this condition.

Explanation of Answer

Isophase bus trouble alarm is caused immediately by low water flow and other parameters.
Isophase bus loss of cooling is caused by either low cooling water flow or low air flow for 10 minutes.
There is no automatic load runback on loss of isophase bus cooling.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 2.6 SRO Val: 2.6 55.43

System:	245000	Main Turbine Generator and Auxiliary Systems
KA Group Num:	K1	Knowledge of the Physical Connection and/or cause and effect relationship between main turbine general
KA Detail Num:	K1.06	Component Cooling Water Systems

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Isophase Bus Trouble	ARC 206 F-5			5	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of TBCCW	ON-118	2	2	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Iso-phase Bus Loss of Cooling	ARC 206 F-4			3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
TBCCW	PLOT-5034	II.E	11	0	3.b

Question Data for Test: 1999 RO

Question: 66

Unit 2 is operating at 95% power with all condensate pumps and all feedpumps running. The "A" CONDENSATE PUMP trips on motor overload. The RO verified that vessel level was maintained in the normal band.

Which of the following statements describe the plant response to this trip?

A. A Reactor Recirculation pump runback to 30% occurred due to the "A" condensate pump trip.

✔ B. A Reactor Recirculation pump runback to 45% occurred due to the "A" condensate pump trip.

C. A Reactor Recirculation runback did NOT occur since vessel level was maintained in the normal band.

D. A Reactor Recirculation runback did NOT occur since total feed flow is > 85%.

Explanation of Answer:
B. Correct, A condensate pump trip with feed flow greater than 85% results in a recirc runback to 45%.
A. Incorrect, Interlocks not met for 30% runback.
C. Incorrect, No level input to 45% runback.
D. Incorrect, Feed flow is limited to 85% on a condensate pump trip.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.5 55.43

System:	259001	Reactor Feedwater System
KA Group Num:	K4	Knowledge of Reactor Feedwater System design features and/or interlocks which provide for the following:
KA Detail Num:	K4.11	Recirculation Runbacks

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
A Condensate Pump Brk Trip	ARC 203 E-2			3	

Question Data for Test: 1999 RO

Question: 67

Both Units were operating at full power when the following alarm and indications were received:
- "CONTROL ROOM RAD MONITOR DIV. II INITIATED" (003 A-3)
- MCR Radiation Monitors RI-0760B and RI-0760D were reading approximately 14,000 cpm with their red high lights lit.

Thirty seconds later, the following alarms and indication were received:
- "CONTROL ROOM VENT SUPPLY FAN HI-LO" (003 A-1)
- "CONTROL ROOM VENT SUPPLY LO FLOW CREV START" (003 A-5)
- FR-0765 is reading 200 scfm and dropping.

The Control Room Emergency Ventilation System:

A. Has NOT realigned since the complete initiation logic has not been satisfied.

B. Has NOT realigned as indicated by the low flow condition.

C. Has realigned due to a low flow condition.

✔ D. Has realigned due to a high radiation condition.

Explanation of Answer: CREV initiated due to high radiation condition on B and D radiation monitors. After the CREV initiation, a low flow to the Fresh Air Supply Fans resulted in a second CREV initiation signal.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 2   SRO Grp: 2   RO Val: 3.3   SRO Val: 3.5   55.43

System:	290003	Control Room HVAC
KA Group Num:	A3	Ability to Monitor Automatic Operations of the Control Room HVAC including
KA Detail Num:	A3.01	Initiation/Re-Configuration

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Room Vent Supply Flow Hi	ARC 003 A-1		1	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Room Rad Monitor Div I Ini	ARC 003 A-2		1	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Room Ventilation Startup a	SO 40D.1.A			9	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Room Ventilation	PLOT-0450	V	12-13	10	4

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Room Vent Supply Lo Flow	ARC 003 A-5		1	4	

Question Data for Test: 1999 RO

Question: 68

Unit 2 has experienced a total loss of instrument air with the Instrument Air headers reading 0 psig.

Which of the following statements describe the pneumatic sources available to operate ALL of the Safety Relief Valves (SRVs).

✔ A Seismic Grade Instrument Gas (via T-261).

B Instrument Nitrogen (via GP-8E).

C Backup N2 bottles (via SV 8130 A &B).

D Relief Valve accumulators.

Explanation of Answer: AO-2969A and B, drywell instrument N2 supply valves to the drywell fail closed on loss of instrument air. N2 supply from SGIG taps into the B header downstream of AO-2969B and is therefore available. Backup N2 bottles via SU 8130 A, B have a separate supply line to the ADS valves. Only the ADS valves are equipped with accumulators.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 2.7 SRO Val: 2.9 55.43

System: 300000 Instrument Air System (IAS)

KA Group Num: K3 Knowledge of the effect that a loss or malfunction of the Instrument Air System will have on:

KA Detail Num: K3.01 Containment Air System

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Instrument Nitrogen Ssytem	PSYS-5016	II	9, 12	0	4a

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
P&ID Instrument Nitrogen	M-333			53	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Placing the Backup Instrument Nitr	T-261			1	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Backup Instrument Nitrogen to AD	SO 16A.1.A			4	

Question Data for Test: 1999 RO

Question: 70

The Standby Liquid Control (SBLC) injection sparger has become clogged with debris.

Which of the following instruments will be impacted by this event?

A Calibrated Jet Pump flow indication.

B Core Spray line break detection.

C Control Rod Drive (CRD) cooling water differential pressure.

✔ D Core Plate differential pressure.

Explanation of Answer

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 3 SRO Grp: 3 RO Val: 3.1 SRO Val: 3.1 55.43

System: 290002 Reactor Vessel Internals

KA Group Num: K3 Knowledge of the effect that a loss or malfunction of Reactor Vessel Internals will have on the following

KA Detail Num: K3.07 Nuclear Boiler Instrumentation

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Standby Liquid Control	PLOT-5011	II.D.5	15-16	0	3c

Question Data for Test: 1999 RO

Question: 71

The Traversing In-core Probe (TIP) system is in use with a probe in the core when the reactor scrams on low level following a loss of feedwater. HPCI automatically starts and recovers level, containment parameters are normal.

Which of the following statements describe the expected response of the TIP system to this transient.?

✔ A. TIP automatically retracts from the core, TIP Ball valves close, TIP Nitrogen Purge valves close.

B. TIP automatically retracts from the core, TIP Ball valves close, TIP Nitrogen purge valves remain open.

C. TIP automatically retracts from the core, TIP Ball valves and TIP Nitrogen purge valves remain open.

D. NO TIP system response to a reactor low level condition.

Explanation of Answer: A. Correct, Tip automatically retracts, ball valves and purge valve close on 1" Group II isolation.
D. Incorrect, Plausible since some GP II isolations such as RWCU do not occur on Rx lo level condition.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 3 SRO Grp: 3 RO Val: 3.4 SRO Val: 3.5 55.43

System: 215001 — Traversing In-Core Probe

KA Group Num: K4 — Knowledge of Traversing In-Core Probe Design Features and/or interlockes which provide for the following:

KA Detail Num: K4.01 — Primary Containment Isolation

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Group II and III	GP-8B	2.1	1	15	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Groups II and III Isolations	GP-8B COL	1	3,8	17	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Tip System	PSYS-5007F	IV.E	15, 16	0	4.a

Question Data for Test: 1999 RO

Question: 72

The following conditions exist on Unit 3:

- A leak on the "3A" RWCU pump discharge has resulted in Reactor Building Ventilation Stack Radiation Levels rising.
- The Reactor Building Equipment Cell Exhaust had just been aligned to Standby Gas Treatment (SBGT) in accordance with SO 9 when a loss of instrument air occurred.
- The "3A" and "3B" instrument air headers and the Unit 3 service air header are fully depressurized.
- ON-119 has been entered.

Under these conditions, Standby Gas Treatment:

✔ A. Will remain in service. Reactor Building Ventilation will isolate.

B. Will remain in service. Reactor Building Ventilation will NOT isolate.

C. Will NOT remain in service. Reactor Building Ventilation will isolate.

D. Will NOT remain in service. Reactor Building Ventilation will NOT isolate.

Explanation of Answer: SBGT will remain in service and Reactor Building will isolate because these systems fail to their isolation condition positions on a loss of instrument air.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 3 SRO Grp: 3 RO Val: 2.7 SRO Val: 2.7 55.43

System:	288000	Plant Ventilation Systems
KA Group Num:	K6	Knowledge of the effect that a loss or malfunction of the following will have on the plant ventilation system
KA Detail Num:	K6.03	Plant Air Systems

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Instrument Air	ON-119	Attachment 1	17, 18	14	
Reactor Building HVAC	PSYS-5040	V.F.2	28	1	5.c
Reactor Building HVAC	PSYS-5040	III.B.7.c	16	1	

Question Data for Test: 1999 RO

Question: 73

Unit 2 is operating at 100% power with all 10 Condensate Filter Demineralizers are in service in the AUTOMATIC mode. Condensate filter demin system dP momentarily spikes high and returns to normal. The Reactor Operator acknowledges receipt of the "CONDENSATE FILTER-DEMIN TROUBLE" alarm (20C207L A-2) and notes that the Condensate Filter Demineralizer Bypass Valve (MO-2114) is full open.

After the dP spike returns to normal, Feedpump suction pressure:

A. Will drop, due to Condensate Demin "E" Valve closure.

B. Will drop, due to Condensate Demin "E" Valve opening.

C. Will NOT drop, due to Condensate Demin "E" Valve closure.

✔ D. Will NOT drop, due to Condensate Demin "E" Valve opening.

Explanation of Answer

The Condensate Filter Demin Bypass Valve, MO-2114, opens on high dP of 60 psi.
The Condensate Filter Demin"E" Valves open on high dP of 50 psi.
If MO-2114 is open on high dP, the "E" valves will be open.
The "E" valves and the MO-2114 open to maintain Condensate pressure to the Feedpump suctions.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: SYS | RO Grp: 2 | SRO Grp: 3 | RO Val: 2.9 | SRO Val: 2.9 | 55.43

System:	256000	Reactor Condensate System
KA Group Num:	A1	Ability to predict and/or monitor changes in parameters associated with condensate system conditions
KA Detail Num:	A1.01	System Flow

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
System Diff Press High	RC 20C089R D-5		1	5	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Condensate	PLOT-0520	III.F	14-16	6	1b

Question Data for Test: 1999 RO

Question: 74

A refueling outage is in progress on Unit 2, with the reactor cavity flooded and the Fuel Pool gates removed. CRDH is in service and RWCU is rejecting inventory to maintain fuel pool level. A trip of the in-service CRD pump occurs. With no operator action, which of the following will occur as a result of the CRD pump trip?

Fuel pool cooling pumps (FCP) will trip on:

A. Low skimmer surge tank level to prevent Fuel Pool pump down.

✔ B. Low skimmer surge tank level to provide FPC pump protection.

C. Low Fuel Pool level to prevent Fuel Pool pump down.

D. Low booster pump suction pressure to provide FPC pump protection.

Explanation of Answer

A. Incorrect, FPC pumps trip on skimmer surge tank to 40" but will not pump down Fuel Pool due to physical arrangement of skimmer surge tanks and fuel pool.
B. Correct, FPC pumps trip on skimmer surge tank level of 40".
C. Incorrect, there are no automatic actions, other than alarms, off fuel pool level.
D. Incorrect, low booster pump suction pressure causes booster pump trip, low FPC pump suction causes FPC pump trip.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 3 SRO Grp: 3 RO Val: 2.6 SRO Val: 2.6 55.43

System:	233000	Fuel Cooling and Cleanup
KA Group Num:	A3	Ability to monitor automatic operation of fuel pool cooling and cleanup
KA Detail Num:	A3.02	Pump Trip

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Fuel StoragePool High/Low Level	ARC C075 B-1		1	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Skimmer Surge Tank Low Level	ARC C075 B-3		1	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Fuel Pool Cooling	PLOT-0750	IV	9	7	3b

Question Data for Test: 1999 RO

Question: 75

The following annunciators are alarming on Unit 2:

- "B RECIRC FLUID DRIVE SCOOP TUBE BRAKE ON" alarm 214 J-1
- "B RECIRC FLUID DRIVE SCOOP TUBE LOCK" alarm 213 C-3

Given that the "B" Recirc pump is continuing to run, select the condition that caused these alarms.

A. Loss of brake circuit continuity.

B. Recirc Lube Oil pressure at < 15 psi for 20 sec.

✔ C. Loss of scoop tube positioner power.

D. Recirc Lube Oil temperature at 221 degrees F.

Explanation of Answer

A. Incorrect, results in alarm 214 J-1 ONLY.
B. Incorrect, lube oil pressure < 20 psi for > 15 sec results in trip.
C. Correct, see ARC 213 C-3.
D. Incorrect, lube oil temp > 210 degrees F results in trip.

Exam Level	Cognitive Level	Facility	Materials
RO	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.1 SRO Val: 3.1 55.43

System: 202002 Recirculation

KA Group Num: K4 Knowledge of recirc flow control system design features and/or interlocks which provide for the following

KA Detail Num: K4.01 Scoop Tube Breaker

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Scoop Tube Lock Up	SO 2D.7.B-2				

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
B Recirc Fluid Drive Scoop Tube B	ARC 214 J-1				

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
B Recirc Fluid Drive Scoop Tube L	ARC 213 C-3				

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recirculation Flow Control	PLOT-0040	III.F.6	13	8	4.a

Question Data for Test: 1999 RO

Question: 76

A LOCA occurs on Unit 2 causing drywell pressure to rise to 12 psig and reactor pressure to drop 200 psig and continue to lower.

The Plant Reactor Operator monitoring the response of "B" LPCI reports receipt of "SYSTEM II RHR INJ. VALVES OVERCURRENT" alarm 226 D-3.

What is the expected response of MO-2-10-25B "Inboard Disch" valve to these conditions?

✔ A. Valve position lights are lit, valve continues to stroke open automatically.

B. Valve position lights are NOT lit, valve continues to stroke open automatically.

C. Valve position lights are lit, valve stroke stops but may be opened manually.

D. Valve position lights are NOT lit, valve stroke stops but may be opened manually.

Explanation of Answer: RHR Injection Valve bypass thermal overloads when they have an automatic opening signal (or when the switch is held to open.)

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.6 55.43

System:	203000	RHR/LPCI Injection Mode
KA Group Num:	A2	Ability to predict the impacts of the following on the RHR/LPCI injection mode
KA Detail Num:	A2.11	Motor Operated Valve Failures

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
System II RHR Inj. Valves Overcurr	ARC 226 D-3		1	0	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RHR Logic	M-1-S-65		20		

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Residual Heat Removal System	PLOT-0370	III.D	22	10	7.a

Question Data for Test: 1999 RO

Question: 77

The CRS directs you to use the arm and depress pushbutton to start the Core Spray system. Normal off-site power is available.

After arming and depressing "CS A INITIATION" pushbutton (14A-510A), what is the expected response of the Core Spray system?

A	"A" and "C" Core Spray pumps start immediately.
✔ B	"A" and "C" Core Spray pumps start after a time delay.
C	"A", "B" ,"C", and "D" Core Spray pumps start immediately.
D	"A", "B", "C", and "D" Core Spray pumps start after a time delay.

Explanation of Answer: Pushbutton start is like an auto signal which results in time delays. For Core Spray "A" pushbutton only starts A & C pumps. (On RHR, all 4 start.)

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 1 SRO Grp: 1 RO Val: 3.8 SRO Val: 3.6 55.43

System:	209001	Low Pressure Core Spray System
KA Group Num:	A4	Ability to manually operate and/or monitor in the control room.
KA Detail Num:	A4.05	Manual Initiation Controls

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Core Spray	PLOT-5014	V.B.7	18	0	5.h

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Core Spray Logic	M-1-S-40		2, 3		

Question Data for Test: 1999 RO

Question: 78

Unit 2 is in MODE 2 with a start up in progress. Which of the following valid alarm conditions will prevent control rod insertion using "Emergency Rod In".

A "APRM FLOW BIAS OFF NORMAL" alarm 211 A-4.

✔ B "RWM ROD BLOCK" alarm 211 F-5.

C "RBM DOWNSCALE" alarm 211 C-4.

D "A WRNM TRIP/INOP" alarm 210 G-3.

Explanation of Answer

A. Incorrect - Rod withdraw block
B. Correct - RWM insert block prevents use of emergency in
C. Incorrect -Rod withdraw block
D. Incorrect -Rod withdraw block

Exam Level	Cognitive Level	Facility	Materials
RO	Memory	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 1   SRO Grp: 2   RO Val: 3.4   SRO Val: 3.5   55.43

System:	201002	Reactor Manual Control System
KA Group Num:	K1	Knowledge of the physical connections and/or cause effect relationship between the reactor manual/control system and the following:
KA Detail Num:	K1.05	Rod Worth Minimizer

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
A WRNM Trip/Inop	ARC 210 G-3		1	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
APRM Flow Bias Off Normal	ARC 211 A-4		1	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RBM Downscale	ARC 211 C-4		1	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RWM Rod Block	ARC 211 F-5		1	5	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Manual Control System	PSYS-5062	IV.A.2.d	13	0	2.e

Question Data for Test: 1999 RO

Question: 79

Unit 2 is operating at 100% power when the PRO responds to a "OFF-GAS TROUBLE" alarm. The "A" SJAE and "A" Jet Compressor are in service. At the Recombiner Panel (00C196) the PRO acknowledges the first in annunciator for Jet Compressor "STEAM FLOW LOW" alarm 231 A-3.

If this alarm condition persists, what will be the expected response of the off-gas system?

A	Jet Compressor "STEAM" supply valve MO-2990A close.
B	Recombiner "RECYCLE" valves AO-2791 and AO-2792 opens.
C	SJAE "A 1st STAGE" steam supply valves AO 2238 A/B/C close.
✔ D	SJAE "OFF-GAS INLET" valves AO 2236A/B/C close.

Explanation of Answer

A. Incorrect - MO-2990A close on high recombiner condenser pressure of 8 psig.
B. Incorrect - Recycle valves open on recombiner condenser pressure of 7 psig.
C. Incorrect - Steam supply valves interlocked to inner and after condenser condensate valves.
D. Correct - low steam flow will close jet comp inlet MO-2991, when at 50% close, SJAE off-gas inlets AO-2236 A/B/C close.

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 3.3 SRO Val: 3.3 55.43

System:	271000	Off-Gas
KA Group Num:	A3	Ability to monitor automatic operations of the off-gas system including
KA Detail Num:	A3.01	Automatic System Isolations

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Steam Flow Low	ARC 231 A-3		1	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off-Gas Recombiner System	PLOT-5008	II.D.2	23	0	4.h

Question Data for Test: 1999 RO

Question: 80

A plant startup is in progress on Unit 2 with Reactor power at 40%. A loss of stator cooling has occurred and the Turbine Generator has runback. Generator megavars indicate +100 megavars lagging. You have been directed to reduce generator VARS to minimum.

Select the operator action listed below which will reduce generator VARS to minimum.

A RAISE the AUTO VOLTAGE REGULATOR RHEOSTAT setpoint.

✔ B LOWER the AUTO VOLTAGE REGULATOR RHEOSTAT setpoint.

C RAISE the MAN DC VOLT REG setpoint.

D Lower the MAN DC VOLT REG setpoint.

Explanation of Answer

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 2.5 SRO Val: 2.5 55.43

System:	245000	Main Generator and Auxiliary Systems
KA Group Num:	A4	Ability to manually operate and/or monitor in the control room.
KA Detail Num:	A4.14	Generator Megavar output

Question Source Information

Ques Source: New Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Main Generator Synchronizing and	SO 50.1.A-2			7	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Main Generator and Auxiliaries	PLOT-5050	II.G	30	0	4.g

Question Data for Test: 1999 RO

Question: 81

Unit 3 was operating in MODE 1 at full power when it experienced a loss of all off-site power. All 4 Diesel Generators have started and closed in on their buses.

Under these conditions, which of the following components will continue to receive cooling water flow?

A. Instrument Nitrogen Compressor Coolers.

✔ B. Station Air Compressors.

C. Reactor Water Cleanup Non-regenerative Heat Exchangers.

D. Condensate Pump Coolers.

Explanation of Answer

A. Instrument Nitrogen compressor coolers lose flow when RBCCW backs up DWCW.
B. Correct answer since TBCCW is backed up by RBCCW for the Air Compressors.
C. Non-regenerative Heat Exchangers are cooled by system flow and the system will have isolated under these conditions.
D. Condensate pumps lose cooling when TBCCW loses power.

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 2.9 SRO Val: 3.0 55.43

System:	400000	Component Cooling Water System (CCWS)
KA Group Num:	K2	Knowledge of electrical power supplies of the following
KA Detail Num:	K2.01	CCW Pump

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
TBCCW	PLOT-5034	V.A.2		0	4.b

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RBCCW	PLOT-5035	II.D.1.b	12	0	4.b

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of TBCCW Bases	ON-118 Bases	2.5	3	4	

Question Data for Test: 1999 RO

Question: 82

Sufficient NPSH for unrestricted Reactor Recirculation pump operation is assured by:

A. The height of water above the pump suction

✔ B. Feedwater flow

C. Steam Dryer return flow

D. RPV pressure

Explanation of Answer:
A. While the height of water above the suction provides NPSH for low pump speeds, feedwater flow is necessary to support unrestricted operation.
B. Correct answer.
C. Steam dryer return flow is hotter water and will actually reduce NPSH.
D. RPV pressure is sensed on both sides of the pump.

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: SYS   RO Grp: 2   SRO Grp: 2   RO Val: 3.1   SRO Val: 3.2   55.43

System: 202001 — Recirculation System

KA Group Num: K4 — Knowledge of Recirculation System design feature and/or interlocks which provide for the following

KA Detail Num: K4.02 — Adequate recirculation pump NPSH

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recirculation Systems	PLOT-0030		47	9	5.b
A Recirc Flow Limit	ARC 214 B-3			12	

Question Data for Test: 1999 RO

Question: 83

Unit 2 is in MODE 1 at 100% power, both Recirc pumps in service at 76% speed.

Which of the following conditions will result in an "A" Recirc Drive Motor Breaker trip?

✔ A. Aux Bus #1 Low Voltage.

B. Exciter field breaker opens.

C. Recirc Pump Cooling Water Low Flow (RBCCW).

D. Recirc Pump Motor High Vibration.

Explanation of Answer:
A. Correct. Low aux. Bus voltage results in a 13 KV fast transfer and MG Set drive motor breaker trip. (ARC 219 B-1)
B. Incorrect, No automatic actions.
C. Incorrect, No automatic actions (ARC 214 A-5)
D. Incorrect, No automatic actions (ARC 214 B-1)

Exam Level	Cognitive Level	Facility	Materials
RO	Memory	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 2.9 SRO Val: 3.0 55.43

System: 202001 Recirculation

KA Group Num: K6 Knowledge of the effect that a loss or malfunction of the following will have on the recirculation system

KA Detail Num: K6.03 AC power

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Aux Bus Low Voltage	ARC 219 B-1		1	0	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
A Recirc Pump Cooling Water Lo F	ARC 214 A-5		1	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
A Recirc Pump Motor Hi Vibration	ARC 214 B-1		1	8	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Recirc System	PLOT-0030	IV.C.2	42	9	2.h

Question Data for Test: 1999 RO

Question: 85

Which of the following is the most likely cause of a "RBCCW Head Tank High Level" alarm?

A. Broken tube inside the in-service RBCCW Heat Exchanger.

B. RBCCW makeup valve (AO-2440) failure.

C. Tube rupture in RWCU regenerative Heat Exchanger.

✔ D. Reactor Recirc Pump Seal Cooler internal leak.

Explanation of Answer

A. Incorrect, because RBCCW is at higher pressure than service water.
B. Incorrect because the makeup valve is normally isolated.
C. The RWCU regenerative heat exchanger is not cooled by RBCCW/only NRHX.
D. Correct answer.

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 2 RO Val: 2.9 SRO Val: 2.9 55.43

System: 400000 — Component Cooling Water System (CCWS)

KA Group Num: K6 — Knowledge of the effect that a loss or malfunction of the following will have on the CCWS

KA Detail Num: K6.06 — Heat exchanger and condensers

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of RBCCW Bases	ON-113 Bases	2	2	11	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
React Bldg Cooling Water Header	ARC 217 G-5			4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RBCCW System	PLOT-5035	I.D.3.d	13	0	6.f

Question Data for Test: 1999 RO

Question: 129

Unit 3 was operating at full power when a reactor scram occurred due to a low reactor level condition. Mechanical binding prevented the scram inlet valve on control rod 26-31 from opening.

Determine the expected indications for this control rod.

A. Full Core Display blue light lit, CRDM damage will prevent rod insertion.

B. Full Core Display blue light lit, rod will move in slowly.

C. Full Core Display blue light NOT lit, CRDM damage will prevent rod insertion.

✔ D. Full Core Display blue light NOT lit, rod will move in slowly.

Explanation of Answer: Both inlet and outlet scram valves must be open for blue light to be lit. Rod will move in slowly.

Exam Level	Cognitive Level	Facility	Materials
RO	Comprehension	PBAPS	N/A

KA Information

Tier: SYS RO Grp: 2 SRO Grp: 3 RO Val: 3.3 SRO Val: 3.3 55.43

System:	201003	Control Rod and Drive Mechanism (CRDM)
KA Group Num:	2.4	Emergency Procedure/Plan
KA Detail Num:	2.4.48	Ability to interpret control room indications to verify the status and operation of system

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Rod Drive Mechanism	PLOT-5003	II.C.2	24	0	3.d

Question Data for Test: 1999 RO

Question: 69

Unit 3 is in a refueling outage with a core shuffle in progress.

Which of the following unanticipated conditions is a symptom requiring entry into ON-124, Fuel Floor and Fuel Handling Problems?

A. Inservice, operable "A" Wide Range Neutron Monitor count rate doubles between CCTAS steps during fuel handling.

B. An irradiated fuel support piece is dropped in the fuel transfer canal (cattle chute) during movement to spent fuel pool.

✔ C. A Fuel Storage Pool High Radiation alarm is received.

D. A Refuel Floor Vent Exhaust High Radiation alarm is received.

Explanation of Answer: Only C, is a symptom for entry listed in ON-124.

Exam Level	Cognitive Level	Facility	Materials
RO	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 3 SRO Grp: 1 RO Val: 4.0 SRO Val: 4.3 55.43

System: 295023 — Refueling Accidents

KA Group Num: 2 — Emergency Procedures/Plan

KA Detail Num: 2.4.4 — Ability to recognize abnormal indication for system operating parameters which are entry level condition

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Fuel Floor and Fuel Handling Probl	ON-124	1	1	2	
Off Normal Procedures	PLOT-1550	B.1	6	7	1

Question Data for Test: 1999 RO

Question: 84

To deinert the containment for personnel entry, a Unit 2 Drywell vent and purge is in progress exhausting through the Inboard and Outboard 18" Vents (AO-2506 and AO-2507) using SBGT.

Which of the following conditions will result in an auto closure of these valves.

A — Drywell radiation monitor reading exceeds the setpoint of 3.4 E-3 uCi/cc.

✔ B — Main Stack radiation Hi Hi exceeds the setpoint of 1 E-2 uCi/cc.

C — 2 vent exh stack rad monitor Hi Hi exceeds 5E-5 uCi/cc.

D — Containment High Range Rad Monitor Hi, exceeds 16 R/hr.

Explanation of Answer: Only Condition B will cause an isolation of the AO-2506 & AO-2507.

Exam Level	Cognitive Level	Facility	Materials
RO	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.7 SRO Val: 4.1 55.43

System:	272000	Radiation Monitoring System
KA Group Num:	K4	Knowledge of Radiation Monitoring System design features and/or interlocks which provide for the following
KA Detail Num:	K4.02	Automatic actions to contain radioactive release in the event that pre-determined release rates are exceeded

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Groups II & III	GP-8B		2	15	
Drywell Rad Monitor Trouble	ARC 225 D-5		1	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Main Stack Rad Hi Hi	ARC 003 D-1		1	7	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
2 Vent Exch Stack Rad Monitor Hi	ARC 218 B-4		1	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Unit 2 Contaiment Radiation Monit	ARC 002 A-3		1	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Isolation Syst	PLOT-5007G	II.C.4.b.3	31	0	1.I

Question Data for Test: 1999 RO

Question: 86

Unit 3 was operating at 50% power when it experienced a loss of vacuum transient. Currently power is 20% and condenser vacuum is 24.5" and steady. A circ water problem has been discovered to be the cause of the vacuum loss. Maintenance estimates that it will be 4 hours until the circ water problem will be corrected. Under these conditions, the next operator action is to:

A. Continue to reduce power.

B. Hold power constant.

✔ C. Trip the main turbine.

D. Scram and enter T-100.

Explanation of Answer: OT-106 Ste- 3.2 directs that if vacuum is > 25" and generator Mwe are < 325 Mwe, then .ithin bypass capability trip the main turbine.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.2 SRO Val: 3.2 55.43

System:	295002	Loss of Main Condenser Vacuum
KA Group Num:	AA1	Ability to operate and/or monitor the following as they apply to the loss of main condenser vacuum
KA Detail Num:	AA1.05	Main Turbine

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Condenser Low Vacuum	OT-106	3.2	1	18	
Operational Transient Procedures	PLOT-1540			6	4

Question Data for Test: 1999 RO

Question: 87

Unit 2 is experiencing a low condenser vacuum transient and has entered OT-106, Condenser Low Vacuum. Vacuum is currently 24.5" Hg and dropping. The "C CONDENSER LO VAC" annunciator (203 D-2) is lit.

During a brief the CRS states that a full reactor scram will not be received until the "A" or "B" low vacuum alarms come in.

The CRS statement is:

A	Correct, since the "C" condenser provides only a "A" Channel RPS input.
B	Correct, since the scram setpoint cannot be achieved without all three condenser losing vacuum.
✔ C	Incorrect, since the "C" condenser inputs into both RPS channels.
D	Incorrect, since low vacuum in any condenser (A, B, C) can result in a full scram.

Explanation of Answer: Note in OT-106 for low condenser vacuum explains that the "C" condenser has two low vacuum RPS inputs for RPS channels A and B and can cause a full scram by itself.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.7 SRO Val: 3.8 55.43

System:	295002	Loss of Main Condenser Vacuum
KA Group Num:	AK3	Knowledge of the reasons for the following responses as they apply to loss of Main Condenser Vacuum
KA Detail Num:	AK3.01	Reactor Scram

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Condenser Low Vacuum - Bases	OT-106	Note	1	18	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RPS	PLOT-5060F			0	1.j

Question Data for Test: 1999 RO

Question: 88

Unit 2 has experienced a high drywell pressure transient. The reactor has been scrammed and the URO is controlling level manually. Due to overfeeding with HPCI, reactor level has exceeded the band of +5" to +35", HPCI was then secured.

Current conditions are:

- Reactor Pressure 1000 psig.
- Narrow range level indicators are upscale.
- Wide Range Level indicators reads +45" to +50" and steady.
- LI-2-2-3-86 is reading +75" and steady (figure 1 is attached).

Actual level should be verified using:

A. LI-2-2-3-86 and is currently ABOVE the Main Steam Lines.

B. LI-2-2-3-86 and is currently BELOW the Main Steam Lines.

C. Wide Range indication and is currently ABOVE the Main Steam Lines.

✔ D. Wide Range indication and is currently BELOW the Main Steam Lines.

Explanation of Answer: Step 3.2 of OT-110 directs that LI-2-2-3-86 should not be used if other level indicators are available. Wide Range Level is significantly below the steam lines.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	Figure 1 OT-110

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.9 SRO Val: 3.9 55.43

System:	295008	High Reactor Water Level
KA Group Num:	AA2	Ability to determine and/or interpret the following as they apply to high reactor water level
KA Detail Num:	AA2.01	Reactor Water Level

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor High Level	OT-110 Bases	Step 3.2	2	6	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operational Transient Procedures	PLOT-1540			6	4

Question Data for Test: 1999 RO

Question: 89

ON-118, loss of Turbine Building Closed Cooling Water (TBCCW), directs that if TBCCW cannot be restored, Main Turbine Generator load should be reduced to less than 18,000 amps in accordance with GP-9-2.

The basis for this ON-118 step is to:

✔ A	Permit heat generated by the isophase bus bars to be absorbed by the environment.
B	Reduce the heat load so that RBCCW is not overloaded when it backs up TBCCW.
C	Permit condensate pumps to be alternated to prevent condensate pump overheating.
D	Reduce the heat load on TBCCW so that the station air compressors will NOT trip on high temperature.

Explanation of Answer

A. Correct, at < 18,000 amps heat generated by the bus bars can be absorbed by the environment without bus duct cooling.
B. Incorrect, Isophase bus cooling is not a TBCCW load that is backed up by RBCCW.
C. Incorrect, the basis for lowering to 18,000 amps is not to alternate Condensate pumps.
D. Incorrect, Station air compressors are backed up by RBCCW on a loss of TBCCW.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.3 SRO Val: 3.4 55.43

System:	295018	Partial or Complete loss of component cooling water
KA Group Num:	AK3	Knowledge of the reasons for the following responses as they apply to partial or complete loss of component cooling water
KA Detail Num:	AK3.02	Reactor Power Reduction

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Turbine Building Closed Co	ON-118	2	2	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 RO

Question: 91

ON-119, Loss of Instrument Air, directs that the reactor be scrammed if any rod begins to drift in due to lowering scram pilot air header pressure.

What is the bases for this direction?

A. To ensure that the scram discharge volume is fully isolated during the scram.

✔ B. To ensure that various scram valve opening pressures do not result in a random rod pattern.

C. To ensure that the individual control rod scram inlet valves do not open before the scram outlet valves.

D. To ensure that sufficient volume exists in the scram discharge volume to complete a full scram.

Explanation of Answer

A. Incorrect, Loss of air will result in SDV isolation.
B. Correct, To avoid random rod insertion due to varying scram valve opening pressures.
C. Incorrect, scram outlet valves open prior to scram inlet valves due to greater spring preload.
D. Incorrect, an automatic scram would be initiated off SDV high level PRIOR to there being insufficient volume in the SDV.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.4 SRO Val: 3.6 55.43

System:	295019	Partial or Complete Loss of Instrument Air
KA Group Num:	2.4	Emergency Procedure/Plan
KA Detail Num:	2.4.11	Knowledge of abnormal condition procedures

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Instrument Air - Bases	ON-119	Step 2.1 Bases	2		

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 RO

Question: 92

A loose fitting has resulted in the loss of instrument air to the in-service Control Rod Drive (CRD) Flow Control Valve (AO-19).

Determine which of the following conditions could result from this instrument air loss.

A. Control Rod Drive accumulator alarms due to low pressure.

✔ B. Control Rod Drive alarms due to high temperatures.

C. Control Rods begin to drift due to excessive flow.

D. High rod speeds during control rod withdrawal.

Explanation of Answer:
A. Incorrect, CRD accumulator pressure is not affected by loss of air.
B. Correct, loss of instrument air will cause AO-19 to fail closed resulting in reduced cooling water flow to CRDMs.
C. Incorrect, Cooling water flow and dP is reduced due to AO-19 closure.
D. Incorrect, Drive water flow and dP is reduced due to AO-19 closure.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.8 SRO Val: 3.9 55.43

System: 295019 — Partial or complete loss of instrument air

KA Group Num: AK2 — Knowledge of the interrelationship between loss of instrument air and the following

KA Detail Num: AK2.01 — CRD Hydraulics

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Instrument Air	ON-119	Attachment 1	12	13	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 RO

Question: 93

Unit 2 has experienced a loss of shutdown cooling, ON-125, Loss of Shutdown Cooling, directs you to determine the expected decay heat load using Operator Aid 95-04 located on the back of Panel 20C005A.

The information necessary to determine expected heat load using this Operator Aid is:

A. Current heat up rate.

B. Current WRNM indicated power.

C. Power history before shutdown.

✔ D. Elapsed time since shutdown.

Explanation of Answer: The operator aid relates time since shutdown to decay heat load in megawatts.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE   RO Grp: 3   SRO Grp: 2   RO Val: 3.6   SRO Val: 3.8   55.43

System:	295021	Loss of Shutdown Cooling
KA Group Num:	AK1	Knowledge of the operational implications of the following concepts as they relate to a loss of shutdown cooling
KA Detail Num:	AK1.01	Decay Heat

Question Source Information

Ques Source: New   Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Shutdown Cooling - Bases	ON-125	Step 2.8.7	11	1	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Expected Decay Heat Operator Aid	OP Aid 95-04				

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 RO

Question: 94

A Unit 3 reactor startup was in progress with reactor pressure at 500 psig and reactor power at 1% when the running "A" Control Rod Drive (CRD) pump tripped. A start of the "B" CRD pump is in progress. CRD charging header pressure was 920 psig and dropping when 3 accumulator trouble alarms were received on withdrawn control rods.

Under these conditions, ON-107, Loss of CRD Regulation Function, directs that a full reactor scram be inserted. The basis for this direction is that:

✔ A. At this reactor pressure, operable HCU accumulators are required to ensure proper scram force.

B. At this reactor pressure the CRDM ball check valves will NOT reposition to permit reactor pressure to insert the control rods.

C. This condition may result in unanalyzed rod patterns due to rods inserting randomly on low accumulator pressure.

D. This condition exceeds the Tech Spec Limit for the number of withdrawn control rods that can be declared "slow".

Explanation of Answer: INOP accumulators could lead to a potentially severe degradation of scram performance. At reactor pressures less than 900 psig accumulators become very important in providing the scram force especially during a depressurization event or at low reactor pressures.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.3 SRO Val: 3.4 55.43

System:	295022	Loss of CRD Pumps
KA Group Num:	AK1	Knowledge of operational implications of the following concepts as they apply to loss of CRD pumps
KA Detail Num:	AK1.01	Reactor pressure vs. rod insertion capability

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of CRD Regulating Function	ON-107 Bases	7.2	2	7	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 RO

Question: 95

Unit 2 has experienced a drywell steam leak with an ATWS. Current conditions are as follows:

- Reactor pressure being maintained 950-1050 psig.
- TI-2501 point 126 is not available.
- TI-2501 point 127 indicates 520 degrees F.
- Narrow range RPV level indicates +5 inches.
- Wide range RPV level indicates -115 inches.
- Fuel Zone RPV level range indicates -125 inches.
- Refuel range RPV level (Shutdown Range Instrument LI-2-2-3-86) indicates -21 inches.

Evaluate the above conditions and then use Table DW/T-1 from T-102 (attached), "Primary Containment Control" to determine which RPV level indication ranges may be used.

A. Narrow Range and Refuel Range

B. Narrow Range and Wide Range

✔ C. Wide Range and Fuel Zone Range

D. Fuel Zone Range and Refuel Range

Explanation of Answer:

With point 126 unavailable, point 127 must plot on the "safe" side.
Point 127 of 520 degrees F. and 950 to 1050 psig plots on the "safe" side of the RPV saturation curve.
Wide Range level at -115 inches is ABOVE the minimum indicated run level of -120".
Refuel Range at -21 inches plots to the unsafe side.
Narrow Range is BELOW the minimum indicated run level of 10 inches and point 127 at 520 degrees F. is above the max run temperature of 450 degrees F.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	T-102 Table DW/T-1

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.7 SRO Val: 3.9 55.43

System:	295028	High Drywell Temperature
KA Group Num:	EA2	Ability to determine and/or interpret the following as they apply to High Drywell Temperature
KA Detail Num:	EA2.03	Reactor Water Level

Question Source Information

Ques Source:	New	Question Source	
Ques Mod Met			

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1650			8	9

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control	T-102 Bases	DW/T-4	19	14	

Question Data for Test: 1999 RO

Question: 96

T-102, Primary Containment Control, provides direction to maintain Torus level in the band of 14.5 ft. to 14.9 ft. In accordance with the TRIP Bases what is the first concern during a rising torus level transient?

A. Submerging the Reactor Building to Torus Vacuum Breaker Line.

✔ B. Excessive stress on SRV tail pipes.

C. Submergence of the Torus Spray Header.

D. Excessive stress on ECCS suction piping.

Explanation of Answer: T/L-18 Basis - Increased submergence of SRV tailpipes can cause excessive stress on SRV pipes, quenchers, and associated supports.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.4 SRO Val: 3.7 55.43

System: 295029 — High Suppression Pool Water Level

KA Group Num: EK1 — Knowledge of the operational implications of the following as they apply to high suppression pool level

KA Detail Num: EK1.01 — Containment Integrity

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control - Bas	T-102 Bases	T/L-18	8	14	
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 RO

Question: 97

T-102 step PC/P-6 directs use of Torus Sprays before Torus pressure reaches 9 psig if Torus level is below 21 ft.

What are the bases for the 9 psig and 21 feet limitations?

✔ A. Threshold for downcomer chugging and Torus Spray header becomes submerged.

B. Threshold for downcomer chugging and Torus to drywell vacuum breakers become submerged.

C. Threshold for evaporative cooling and Torus to drywell vacuum breakers become submerged.

D. Threshold for evaporative cooling and Torus Spray header becomes submerged.

Explanation of Answer

A. Correct
B. Incorrect, Torus to drywell vacuum breaker becomes submerged at 18 ft.
C. Incorrect, See B and no maximum dP.
D. Incorrect, Evaporative cooling is part of D/W spray initiation limit curve bases.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.1 SRO Val: 3.3 55.43

System:	295029	High Suppression Pool Water Level
KA Group Num:	EK2	Knowledge of the interrelationship between high suppression pool water level and the following
KA Detail Num:	EK2.05	Containment/Drywell vacuum breakers

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control - Bas	T-102 Bases	PC/P-6	13	14	
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 RO

Question: 98

Plant conditions on Unit 3 are as follows:

- A steam leak exists in the Unit 3 Reactor Building.
- The Reactor has been shutdown and depressurized to a steady value of 30 psig.
- TR-3-13-139 point 22 indicates 325 degrees F.
- Wide Range RPV level indicates -150 inches.
- Fuel Zone RPV level indicates -172 inches.

Evaluate the above conditions and then use Table SC/T-4 from T-103, "Secondary Containment Control" (attached) to determine which RPV level range may be used.

A. Wide Range may be used, Vigilant Monitoring required.

B. Wide Range may be used, Vigilant Monitoring NOT required.

✔ C. Fuel Zone may be used, Vigilant Monitoring required.

D. Fuel Zone may be used, Vigilant Monitoring NOT required.

Explanation of Answer:
TR-139 pt. 22 at 325 degrees F. and 30 psig reactor pressure plots to the "vigilant" monitoring side of the RPV saturation curve.
Wide Range level at -150 inches is below the minimum indicated level and 325 degrees F. is above the max run temp and is therefore not available.
Fuel Zone level at-172 inches is above the minimum indicated level and is available for use.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	T-103 Table SC/T-4

KA Information

Tier: E/APE RO Grp: 3 SRO Grp: 2 RO Val: 3.3 SRO Val: 3.5 55.43

System:	295032	High Secondary Containment Area Temperature
KA Group Num:	EA2	Ability to determine and/or interpret the following as they apply to high secondary containment area temperature:
KA Detail Num:	EA2.02	Equipment Operability

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Secondary Containment Control -	T-103 Bases	SC/T-3	5	12	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 RO

Question: 99

A Designated Alternate (DA) is moving an old jet pump in the Unit 2 fuel pool when it falls off the auxiliary hoist. It is reported to the Control Room that a jet pump fell on an irradiated fuel bundle and damaged some fuel pins.

The Control Room also receives the following alarms and indications

- Refueling Floor Vent Exhaust Hi Radiation (218 A-1)
- Reac. Bldg. Zone Vent Exhaust Hi Radiation (218 B-1)
- Reac. Bldg. Or Refueling Floor Vent Exh. Hi Rad Trip (218 D-4)
- Refueling Floor Radiation Trip Units A and D High lights are lit.

Evaluate these conditions and determine the expected ventilation lineup.

✔ A
Reactor Building Ventilation trips.
Refuel Floor Ventilation trips.
SBGT initiates and aligns to the entire Reactor Building/Refuel Floor.

B
Reactor Building Ventilation continues to run.
Refuel Floor Ventilation trips.
SBGT initiates and aligns to the Refuel Floor.

C
Reactor Building Ventilation continues to run.
Refuel Floor Ventilation continues to run.
SBGT initiates and aligns to the Refuel Floor.

D
Reactor Building Ventilation continues to run.
Refuel Floor Ventilation continues to run.
SBGT remains in standby.

Explanation of Answer
A trip of "A" and "D" Refuel Floor rad will result in a Group III isolation.
A Group III isolation will trip Reactor Bldg. And Refuel Floor vent, SBGT will align to the entire Reactor Building and Refuel Floor.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 4.0 SRO Val: 3.9 55.43

System:	295034	Secondary Containment Ventilation High Radiation
KA Group Num:	EA1	Ability to operate and/or monitor the following as they apply to secondary containment ventilation high radiation
KA Detail Num:	EA1.03	Secondary Containment Ventilation

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Refueling Floor Vent Exhaust Hi R	ARC 218 A-1			2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reac. Bldg. Zone Vent Exhaust Hi	ARC 218 B-1			2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reac. Bldg. Or Refueling Floor Ven	ARC 218 D-4			3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PCIS	PLOT-5007G	II.B.4.h	18	0	1.c

Question Data for Test: 1999 RO

Question: 100

Unit 2 is in T-103, "Secondary Containment Control", due to high water level condition in Secondary Containment. The Reactor has been conservatively scrammed and the Group II/III isolations (from the level shrink) are complete.

The CRS is currently attempting to determine whether a Primary System is discharging into the Reactor Building. Given the above conditions, evaluate the following and determine which constitutes a primary system discharging into the Reactor Building.

A. Leakage from a pipe flange on the discharge of the Reactor Water Cleanup Non-regenerative Heat Exchanger.

B. Steam leakage from a rupture on the piping of the #2 Main Steam stop valve inlet.

C. Leakage from a weld crack on the "A" RHR suction piping penetration to the Torus.

✔ D. Steam leakage from the Standby Liquid Control Injection line just outboard of the drywell penetration.

Explanation of Answer

A. Incorrect, RWCU is isolated on a complete Group II isolation.
B. Incorrect, #2 MSV is not in the Reactor Building and not a T-103 issue.
C. Incorrect, RHR suction is not a primary system.
D. Correct

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.3 SRO Val: 4.0 55.43

System:	295036	Secondary Containment High Jump/Area Water Level
KA Group Num:	2.4	Emergency Procedure/Plan
KA Detail Num:	2.4.20	Knowledge of operational implications of EOP Warnings/Cautions/and Notes

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Secondary Containmnet Control -	T-103	Note 25.1	11	12	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 RO

Question: 101

Unit 3 was operating in MODE 1 at 75% power when a fire was reported in the Reactor Building 135' elevation. The Crew has entered ON-114, the procedure for an "actual fire", and the CRS has directed that the Equipment Operator isolate the RPV Condensing Chamber Backfill System.

The basis for isolation of this system under these conditions is to prevent inaccurate level indication and unreliable automatic initiations due to:

A	Lowering Instrumentation Variable Leg density.
B	Raising Instrumentation Variable Leg density.
✔ C	Lowering Instrumentation Reference Leg density.
D	Rising Instrumentation Reference Leg density.

Explanation of Answer: Localized heating of the 3B reference leg backfill system could eventually raise reference leg temperature. With the rise in reference leg temperature, the density of the reference leg will go down resulting in unreliable indications and unreliable automatic initiations.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 2 RO Val: 3.1 SRO Val: 3.6 55.43

System:	600000	Plant Fire on Site
KA Group Num:	AA2	Ability to determine and interpret the following as they apply to a plant fire on site
KA Detail Num:	AA2.17	Systems that may be affected by the fire

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Actual Fire Reported - Bases	ON-114	Note 1	1	6	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question Data for Test: 1999 RO

Question: 104

Unit 2 was operating in MODE 1 at 40% power when it experienced a loss of 20Y050. All required control room actions have been completed.

Under these conditions, operator actions will be impacted by a loss of power to:

A	The RBCCW backup of DWCW which will require manual transfer.
B	The lighting in vital areas which will require the use of flashlights.
C	The Fire Alarm Panel which will require continuous roving fire watches.
✔ D	The Control Room radios which will require the use of alternate communications.

Explanation of Answer

A. Incorrect, RBCCW backup of TBCCW is impacted (NOT DWCW).
B. Incorrect, SE-11 directs use of flashlights.
C. Incorrect, Plausible wrong answer.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.5 55.43

System:	295003	Partial or Complete loss of AC Power
KA Group Num:	AK2	Knowledge of the interrelations between partial or complete loss of AC power and
KA Detail Num:	AK2.04	AC Electrical Loads

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Uninterrutable AC Power -	ON-112-2	Note 4	2	6	
Off Normal Procedures	PLOT-1550	II	6	7	2

Question Data for Test: 1999 RO

Question: 106

Unit 2 is operating in MODE 1 at 100% power when the following occurs:

- "REACTOR HI PRESS" alarm 210 G-2 annunciates.
- Reactor Pressure indicates 1075 psig and rising slowly.

In accordance with OT-102 "Reactor High Pressure" which of the following is an appropriate immediate operator action?

A. Control reactor pressure by raising the Bypass Jack setting.

B. Control reactor pressure by lowering the Max Combined Flow Limit Pot.

✔ C. Control reactor pressure by lowering reactor power.

D. Control reactor pressure by raising the Max Combined Flow Limit Pot.

Explanation of Answer

A. Incorrect, EHC pressure set is lowered if reactor pressure has stabilized (OT-102 step 2.2)
B. Incorrect, Max combined flow limit put is lowered for reactor low pressure (OT-111 step 1)
C. Correct, Per OT-102 Step 2.1.1.
D. Incorrect, Raising Max Combined Flow Limit Pot would have no effect.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.5 SRO Val: 3.7 55.43

System:	295007	Reactor High Pressure
KA Group Num:	AK2	Knowledge of the interrelations between high reactor pressure and the following
KA Detail Num:	AK201	Reactor/Turbine Pressure Regulating System

Question Source Information

Ques Source:	New	Question Source	
Ques Mod Met			

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor High Pressure	OT-102	2	1	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Low Pressure	OT-111	1	1	2	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operational Transient Procedures	PLOT-1540			6	3

Question Data for Test: 1999 RO

Question: 107

Unit 2 is operating at 87% power when the "A" Condensate pump shaft coupling shears. The Condensate pump continues to run at low motor amps.

Given that all three Reactor Feedpumps (RFPs) remain in service and no Operator action is taken, what is the expected plant response to this event?

A. A Recirc runback to 45% speed will occur immediately.

B. A Recirc runback to 45% speed will occur when level is less than +17".

C. A Recirc runback to 30% speed will occur immediately.

✔ D. A Reactor scram will occur when level is less than +1".

Explanation of Answer

A. Incorrect, All condensate pumps continue to run, condensate pump "tripped" is from breaker position which is still closed, runback requirements will not be met and will not occur.
B. Incorrect, Feed pump flow will rise on the loss of level and remain > 20%, no runback.
C. Incorrect, Total feed flow will remain > 20% no runback.
D. Correct, Level will slowly be lost due to reduced condensate flow and power remaining at 87%.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.9 SRO Val: 3.9 55.43

System: 295009 — Low Reactor Water Level

KA Group Num: AA1 — Ability to operate and/or monitor the following as they apply to low reactor water level

KA Detail Num: AA1.01 — Reactor Feedwater

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Low Level	OT-100	4.0	2	9	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operational Transient Procedures	PLOT-1540			6	3

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recirculation Flow Control	PLOT-0040	IV	15	8	2k

Question Data for Test: 1999 RO

Question: 108

Unit 2 is at 100% power when Drywell pressure begins to rise.

In accordance with OT-101 "HIGH DRYWELL PRESSURE" follow up actions the following parameters and alarms are noted.

- "A RECIRC PUMP SEAL STAGE 2 HI FLOW" alarm 214 A-1
- PI-2-02-2-033A "Seal 1 Inner" 1056 psig
- PI-2-02-2-032A "Seal 2 Outer" 1043 psig

Evaluate these indications, using the attached drawing, and select the appropriate statement below.

✔ A. The 1st stage seal has failed but it is NOT the source of high drywell pressure.

B. The 2nd stage seal has failed but it is NOT the source of high drywell pressure.

C. The 1st stage seal has failed and is the source of high drywell pressure.

D. The 2nd stage seal has failed and is the source of high drywell pressure.

Explanation of Answer: A. Correct - High flow alarm is due to a high second stage seal pressure caused by a failure of the recirc pump first stage seal. PI-032A is typically half of the first stage pressure, high second stage seal pressure indicates failure of first stage seal (ARC 214 A-1). With the 2nd stage seal intact, this would not be a source of high drywell pressure. A 2nd stage seal failure would cause PI-32A to indicate near 0 psig.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	T-PLOT-0030-3 Recirculation Pump Seal Piping

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.5 SRO Val: 3.8 55.43

System: 295010 High Drywell Pressure

KA Group Num: AK3 Knowledge of the reasons for the following responses as they apply to high drywell pressure

KA Detail Num: AK3.04 Leak investigation

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
High Drywell Pressure	OT-101	3.5	2	10	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
A Recirc Pump Seal Stage 2 Hi Flo	ARC 214 A-1		1	3	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Recirculation System	PLOT-0030	III.A.3	17, 18	9	2cc

Question Data for Test: 1999 RO

Question: 109

Unit 3 was operating at 70% power when it experienced a rising drywell pressure. Using OT-101, High Drywell Pressure, the source of the leak has been determined to be the "A" Recirculation pump seals. The CRS has directed you to trip and isolate the "A" Recirculation pump.

Given these conditions, what is the proper sequence for isolating the recirculation pump and why?

A	Shut the suction valve first since it can close against a higher dP.
B	Shut the discharge valve first since it can close against a higher dP.
✔ C	Shut the suction valve first since it is limited to closing against a lower dP.
D	Shut the discharge valve first since it is limited to closing against a lower dP.

Explanation of Answer: OT-101 Bases

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.6 55.43

System:	295010	High Drywell Pressure
KA Group Num:	2.4	Emergency Procedure/Plan
KA Detail Num:	2.4.11	Knowledge of abnormal condition procedures

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
High Drywell Pressure - Bases	OT-101	Note	4	10	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operational Transient Procedures	PLOT-1540			6	4

Question Data for Test: 1999 RO

Question: 110

Unit 2 is at 100% power.

Which of the following events would require power to be reduced or maintained in accordance with OT-104, "Positive Reactivity Insertion"?

✔ A "A" Reactor Feedpump min flow valve fails open.

B EHC pressure set setpoint drops 10 psi.

C Condensate pump trip.

D Loss of RBCCW to RWCU Non-regen Heat Exchanger.

Explanation of Answer

A. Correct, flow through min flow valves causes additional flow through feedwater heaters resulting in a reduction in feed water heating, a positive reactivity insertion.
B. Incorrect, a reduction in pressure set setpoint will cause reactor pressure to drop, causing additional voiding a negative reactivity addition.
C. Incorrect,, A condensate pump trip at 100% power will cause a 45% recirc runback, a negative reactivity addition.
D. Incorrect, a loss of RBCCW will result in a RWCU isolation. RWCU returns cooler water to the reactor, a loss of RWCU will result in a higher core inlet temperature.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.0 SRO Val: 4.3 55.43

System:	295014	Inadvertent Reactivity Addition
KA Group Num:	AA2	Ability to determine and/or interpret the following as they apply to inadvertent reactivity addition.
KA Detail Num:	AA2.03	Cause of reactivity addition

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Positive Reactivity Insertion	OT-104 Bases	3	1	14	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operational Transient Procedures	PLOT-1540			6	4

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Feedwater System	PLOT-0540			6	4.j

Question Data for Test: 1999 RO

Question: 112

Which of the following is the reason why the Main Steam Isolation Valves (MSIV) are closed prior to evacuating the Main Control Room in accordance with SE-1, "Plant Shutdown from the Remote Shutdown Panel"?

✔ A	With MSIVs closed, all reactor inventory and pressure control may take place at the Remote Shutdown Panel.
B	Since plant release points cannot be monitored at the Remote Shutdown Panel, closing the MSIVs precludes any concern for off-site releases.
C	The MSIV closure outside the Main Control Room requires access to plant areas that may not be accessible during an evacuation.
D	If the MSIVs are closed from outside the Main Control Room, there is no method for verification of complete closure.

Explanation of Answer:

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE | RO Grp: 2 | SRO Grp: 1 | RO Val: 3.4 | SRO Val: 3.6 | 55.43

System:	295016	Control Room Abandonment
KA Group Num:	2.4	Emergency Procedures/Plans
KA Detail Num:	2.4.11	Knowledge of abnormal condition procedures

Question Source Information

Ques Source: 1997 PBAPS NRC Exam

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Plant Shutdown from the Remote S	SE-1	Immeidate Actio	5 1	16	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Special Events	PLOT-1555			4	1c

Question Data for Test: 1999 RO

Question: 113

Unit 2 Reactor Operator is controlling reactor level using HPCI at the Unit 2 Alternate Shutdown Panel following Control Room Abandonment. Indicated reactor level on LI-2-2-3-112 is currently 20" and reactor pressure is 500 psig. Using SE-10 Attachment 9, provided, determine the current reactor level and the expected HPCI response if an actual high level condition occurs.

A. Actual level is > 40", HPCI will automatically trip on high level condition.

B. Actual level is > 40", HPCI must be manually tripped on high level condition.

C. Actual level is between 0" and 40", HPCI will automatically trip on a high level condition.

✔ D. Actual level is between 0" and 40", HPCI must be manually tripped on a high level condition.

Explanation of Answer: SE-10 Bases, Caution #100 "HPCI Operation is Manual. All Trips, Isolations, and Auto Starts are Bypassed".

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	SE-10 ATT. 9

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 4.0 SRO Val: 4.1 55.43

System: 295016 — Control Room Abandonment

KA Group Num: AA1 — Ability to operator and/or monitor the following as they apply to control room abandonment

KA Detail Num: AA1.06 — Reactor Water Level

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Special Events	PLOT-1555	.		4	2.e
Reactor Water Level Determination	SE-10	Att. 9 Fig. 1		0	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Plant Shutdown from the Alternativ	SE-10 Bases	Caution #100	7	10	

Question Data for Test: 1999 RO

Question: 114

Unit 2 was operating at full power in MODE 1 when a positive reactivity event occurred due to a control rod drifting out. The CRS has directed you to monitor for evidence of fuel damage.

Which of the following indications would be the first indication of a small fuel pin leak from this transient?

A	Main Steam Line Radiation Recorders.
✔ B	Air Ejector Discharge Log Monitor Recorders.
C	Off-Gas Adsorber Outlet Radiation Indication.
D	Main Stack Gas Recorder.

Explanation of Answer

A. Incorrect, Fission gasses from a small fuel leak would be diluted in the background rad level from N-16 and steam flow.
B. Correct, Air Ejector discharge radiation levels is primarily due to fission product gasses since N-16 would have decayed away at this point. The low volume of process flow makes this a sensitive indication of fission product gasses (ARC 218 E-1).
C. Incorrect, Off-gas adsorber outlet radiation indication is at the discharge of the hold up pipe and would not be the first indication of fuel damage.
D. Incorrect, Main stack is at the end of the off-gas process flow and although it will go up due to gland seal exhaust, it would not be the first indication of fuel failure.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N./A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.6 55.43

System:	295017	High Off-Site Release Rate
KA Group Num:	AA1	Ability to operator and/or monitor the following as they apply to high off-site release rate
KA Detail Num:	AA1.07	Process radiation monitoring system

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Main Condenser Air Removal	PSYS-5008A			0	6d

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Air Ejector Discharge Radiation Hig	ARC 218 E-1			3	

Question Data for Test: 1999 RO

Question: 116

Following a LOCA on Unit 2 the CRS directs restoration of Drywell Cooling, using T-223, "Drywell Cooler Fan Bypass" for Drywell pressure control. The Unit Reactor Operator reports that the Drywell Cooler fans cannot be placed inservice without an engineering evaluation due to plant conditions falling on the UNSAFE side of T-223 Figure 1, "Drywell Chilled Water (DWCW) Saturation Curve.

Which of the following describes the basis for restricting Drywell Fan restoration when on the UNSAFE side of the curve?

✔ A. Water hammer and rupture of piping inboard of DWCW Isolation valves when flow is restored.

B. Inadvertent lifting of overpressure relief valves inboard of the DWCW Isolation valves when flow is restored.

C. Overcurrent trips of the Drywell Cooler Fans if restarted with a LOCA condition.

D. Overpressurization and rupture of piping inboard of the closed DWCW Isolation valves with a LOCA condition.

Explanation of Answer

A. Correct, Drywell temperatures above saturation may cause boiling within the piping resulting in water hammer when flow is re-established.
B. Incorrect, setpoint of DWCW relief valves should prevent spurious actuation during flow restoration.
C. Incorrect, fan trip concerns are due to moisture present and starting fans in FAST speed.
D. Incorrect, basis for relief valves installed on DWCW piping.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE — RO Grp: 1 — SRO Grp: 1 — RO Val: 3.4 — SRO Val: 3.5 — 55.43

System:	295024	
KA Group Num:	EA1	Ability to operate and/or monitor the following as they apply to High Drywell Pressure
KA Detail Num:	EA1.14	Drywell Ventilation System

Question Source Information

Ques Source:	New	Question Source	
Ques Mod Met			

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
	NRC GL 96-06				

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
	MOD P00802				

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Drywell Cooler Fan Bypass	T-223	2	1	3	

Question Data for Test: 1999 RO

Question: 117

Unit 2 was operating at 100% power when a total loss of Instrument Air occurred resulting in a plant scram. T-101, "RPV Control" was entered on high reactor pressure at the time of the scram. Normal scram actions have been completed, no other actions have been performed.

In accordance with T-101, RPV pressure control leg, which of the following is the correct method for pressure control under these conditions?

A	Manual operation of SRVs between 950 psig and 1050 psig.
B	Automatic operation of the EHC system at 920 psig.
C	Manual operation of ADS SRVs to stabilize pressure below 1050 psig.
✔ D	Automatic operation of SRVs at their setpoint.

Explanation of Answer

A. Incorrect, opening and closing of SRV following a GPI is NOT cycling per T-101 RC/P-5 bases.
B. Incorrect, EHC controlled bypass valves are not available due to MSIV closure on loss of instrument air.
C. Incorrect, use of ADS valves with only their accumulators available is not permitted per RC/P-13 bases due to loss of instrument air and inability to bypass and restore instrument nitrogen.
D. Correct, SRV will be permitted to operate automatically at their setpoint, which is not cycling due to ADS accumulators being the only pneumatic supply.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.4 SRO Val: 4.4 55.43

System:	295025	High Reactor Pressure
KA Group Num:	EA1	Ability to operate and/or monitor the following as they apply to high reactor pressure
KA Detail Num:	EA1.03	Safety/Relief Valves

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RPV Control - Bases	T-101 Bases	Step RC/P-13	24, 25	21	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 RO

Question: 118

Unit 3 has experienced a reactor scram following a steam leak in the Drywell. The CRS directs restoration of Drywell Instrument Nitrogen from T-101, RPV Control, to permit manual reactor pressure control. Restoring Instrument Nitrogen to the Drywell in accordance with GP-8E, "Primary Containment Isolation Bypass":

✔ A. May contribute to a flammable environment in the Drywell.

B. Will only supply nitrogen to the "B" Instrument Nitrogen Header.

C. May deplete CAD nitrogen tank inventory.

D. Will only be permitted if Instrument Air Header pressure is greater than Drywell pressure.

Explanation of Answer

A. With the N2 compressors isolated by a Group II/III, instrument air will back up instrument nitrogen and may release air into the drywell during pneumatic valve operation.
B. Using SGIG only supplies B header, restoring supplies both.
C. Using SGIG will deplete the CAD tank inventory, restoration will not.
D. May be bypassed as long as instrument nitrogen pressure is greater than drywell pressure.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.3 SRO Val: 4.0 55.43

System:	295025	High Reactor Pressure
KA Group Num:	2.4	Emergency Procedures/Plans
KA Detail Num:	2.4.20	Knowledge of operational implications of EOP warnings/cautions/and notes

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RPV Control - Bases	T-101	Caution #7	20	21	

Question Data for Test: 1999 RO

Question: 119

Unit 3 has experienced a transient and the following is observed:

- Torus pressure: 9 psig
- Torus temperature: 200 degrees F
- Torus level: 14 feet
- Reactor pressure: 1000 psig
- RHR "A" Loop Flow: 23,000 gpm
- Core Spray "B" Loop Flow: 7500 gpm
- All other low pressure ECCS pump are NOT in service.

Use the attached T-102 Sheet 3 curves to determine if Net Positive Suction Head (NPSH) requirements are being met.

A. There is sufficient NPSH for the "A" Loop of the RHR ONLY.

✔ B. There is sufficient NPSH for the "B" Loop of Core Spray ONLY.

C. There is sufficient NPSH for both the "A" Loop of RHR and the "B" Loop of Core Spray.

D. There is NOT sufficient NPSH for either the "A" Loop of RHR or the "B" Loop of Core Spray.

Explanation of Answer: Using the T-102 curves, only the B loop of Core Spray is operating in the safe region.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	T-102 Sh. 3

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 3.0 SRO Val: 3.4 55.43

System: 295026 Suppression Pool High Water Temperature

KA Group Num: EK1 Knowledge of the operational implications of the following concepts as they apply to Suppression Pool High Water Temperature

KA Detail Num: EK1.01 Pump NPSH

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	11

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
TRIP/SAMP Curves Tables, and Li			17	3	

Question Data for Test: 1999 RO

Question: 121

For a lowering suppression pool level T-102, "Torus Level", directs that if Torus level cannot be maintained above 9.5' secure HPCI. It does not direct that RCIC be secured until < 6'.

What is the basis for securing HPCI but not RCIC at 9.5'?

A. HPCI turbine exhaust becomes uncovered at 9.5', RCIC turbine exhaust becomes uncovered at 6'.

✔ B. HPCI turbine exhaust becomes uncovered at 9.5', RCIC turbine exhaust is an insignificant containment input.

C. HPCI NPSH becomes a concern at 9.5', RCIC turbine exhaust becomes uncovered at 6'.

D. HPCI NPSH becomes a concern at 9.5', RCIC turbine exhaust is a insignificant containment input.

Explanation of Answer: Self explanatory.
RCIC is secured at 6' if it is aligned to the Torus to prevent vortexing.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 3.6 SRO Val: 3.7 55.43

System:	295030	Low Suppression Pool Water Level
KA Group Num:	EK3	Knowledge of the reasons for the following responses as they apply to low suppression pool water level
KA Detail Num:	EK3.03	RCIC Operations

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control	T-102	/L-11 to T/L-16	3a7-8	14	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 RO

Question: 122

T-111, "Level Restoration" was entered on Unit 3 following a loss of all off-site power and a failure of all diesel generators to start. Current plant conditions are as follows:

- Reactor pressure is 800 psig.
- Reactor level -195" and dropping slowly.
- HPCI tripped on a loss of lube oil.
- RCIC is blocked out of service.

Evaluate these plant conditions and determine the status of Adequate Core Cooling (ACC).

A. ACC exists until level is below -200".

✔ B. ACC exists until level is below -210".

C. ACC does NOT exist, since level is below -172".

D. ACC does NOT exist, since injection is not present.

Explanation of Answer: ACC is provided by steam cooling with no RPV injection until -210".

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.6 SRO Val: 4.7 55.43

System:	295031	Reactor Low Water Level
KA Group Num:	EK1.01	Knowledge of the operational/implications of the following concepts as they apply to reactor low water level
KA Detail Num:	EK1.01	Adequate Core Cooling

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Introduction to TRIPS and SAMPS	T-BAS (INTRO)	5.1	17	4	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	8

Question Data for Test: 1999 RO

Question: 123

Level recorder LR-2-02-3-110A blue pen is fed by LT-2-02-3-072C "Wide Range" and LT-2-02-3-073C "Fuel Zone" level transmitters.

If level transmitter LT-73C failed upscale and then actual reactor level dropped to -172", what would be the impact on vessel level indications and ECCS initiation from reactor level?

✔ A. LR-110A blue pen input would swap at -100", low level ECCS initiations would NOT be impacted.

B. LR-110A blue pen input would swap at -100", low level ECCS initiations would be impacted.

C. LR-110A blue pen input would NOT swap at -100", low level ECCS initiations would NOT be impacted.

D. LR-110A blue pen input would NOT swap at -100" low level ECCS initiations would be impacted.

Explanation of Answer: Blue pen input swaps from LT-72 to LT-73 when LT-72 senses < -100", (indication would go high), ECCS -160" inputs continue to be taken from LT-72.

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.4 SRO Val: 4.4 55.43

System:	295031	Reactor Low Water Level
KA Group Num:	EK2	Knowledge of interrelations between reactor low water low level and the following
KA Detail Num:	EK2.01	Reactor Water Level Indication

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactro Vessel Instrumentation an	PSYS-5002B	HO 4	1	0	2c

Question Data for Test: 1999 RO

Question: 124

Following an ATWS and Group I Isolation on Unit 2, the following conditions exist:

- Reactor power: 30%
- Reactor level: -100"
- Torus temperature: 115 degrees F.
- SRV's A, B, C, G open

T-117 level power control directs RPV injection be terminated and prevented using T-240.

For the conditions listed above, which of the following concerns is the basis for performing T-240?

A. Uncontrolled injection of large amounts of cold water.

✔ B. Power generation which is a threat to primary containment.

C. Neutron flux oscillations which challenge fuel clad integrity.

D. Power excursions while establishing minimum alternative RPV flooding pressure.

Explanation of Answer

A. Incorrect, basis for performing T-240 prior to blowdown, T-117 LQ-21
B. Correct, LQ-11
C. Incorrect, Basis for lowering level to -60", T-117 LQ-13
D. Incorrect, Basis for performing T-240 prior to establishing MARFP, T-116 RF-25

Exam Level	Cognitive Level	Facility	Materials
Both	Comprehension	PBAPS	N/A

KA Information

Tier: E/APE — RO Grp: 1 — SRO Grp: 1 — RO Val: 4.0 — SRO Val: 4.2 — 55.43

System: 295037 Scram Condition present and reactor power above APRM downscale or unknown

KA Group Num: EK2 — Knowledge of the interrelationship between scram condition present and reactor power above APRM downscale or unknown and the following

KA Detail Num: EK2.09 — Reactor Water Level

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Level/Power Control	T-117		1	12	

Question Data for Test: 1999 RO

Question: 125

Unit 2 was operating at 100% power when a Reactor high pressure scram condition occurred due to a total loss of instrument air. Control rods failed to insert, reactor pressure peaked at 1180 psig.

The following plant conditions currently exist:

- Reactor power: 35%
- Reactor level: +23"
- Reactor pressure: 1140 psig
- Full core display blue lights lit
- A & B Air Header pressure: 0 psig

Determine which of the following TRIP procedures will insert the control rods.

A	T-213, "Scram Solenoid De-Energization"
B	T-214, "Isolating and Venting the Scram Air Header"
✔ C	T-215, "Control Rod Insertion by Withdraw Line Venting"
D	T-216 "Control Rod Insertion by Manual Scram or Individual Scram Test Switches"

Explanation of Answer

A. Incorrect, T-213 N/A due to scram valves open, evidenced by blue lights lit.
B. Incorrect, T-214 N/A ARI initiated at 1106 psig and blue lights lit.
C. Correct
D. Incorrect, No instrument air available for closing scram inlet and outlet and open SDV for accumulator charge and discharge volume draining.

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 4.2 SRO Val: 4.3 55.43

System:	295037	Scram condition present and reactor power above APRM downscale or unknown
KA Group Num:	EK3	Knowledge of the reasons for the following responses as they apply to scram condition present and reactor power above APRM downscale or unknown
KA Detail Num:	EK3.07	Various alternate methods of control rod insertion

Question Source Information

Ques Source:	New	Question Source	
Ques Mod Met			

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RPV Control	T-101	RC/Q-19	12	21	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.

Question Data for Test: 1999 RO

Question: 126

A steam leak exists in the Unit 3 Turbine Building. T-104, "Radioactivity Release", has been entered due to high ventilation stack radiation alarms. The Equipment Operator (EO) then reports that Turbine Building Ventilation is tripped.

Under these conditions, determine the appropriate response to the EO's report that Turbine Building Ventilation is tripped.

✔ A. Restart ventilation to monitor the release.

B. Restart ventilation to lower the radioactive release.

C. Maintain ventilation tripped to prevent an unmonitored release.

D. Maintain ventilation tripped to lower the radioactive release.

Explanation of Answer: T-104 Step RR-6 directs that ventilation be restored to maintain personal accessibility and prevent a ground level unmonitored release.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 2 SRO Grp: 1 RO Val: 3.6 SRO Val: 3.8 55.43

System:	295038	High Off-Site Release Rate
KA Group Num:	EK2	Knowledge of the interrelationship between off-site release rates and the following:
KA Detail Num:	EK2.03	Plant Ventilation Systems

Question Source Information

Ques Source: New

Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Radioactivity Release - Bases	T-104	Step RR-6	3	10	
PBAPS TRIPS	PLOT-1560			8	9

Question Data for Test: 1999 RO

Question: 127

For which of the following conditions would direction be given to initiate Drywell Sprays regardless of whether Adequate Core Cooling is assured?

A. To prevent exceeding the Pressure Suppression Pressure Limit.

B. To maintain Drywell pressure below the Drywell Spray Initiation Limit.

✓ C. To mitigate the consequence of a H2 deflagration.

D. To mitigate the consequences of containment overpressurization.

Explanation of Answer

A. Incorrect - Sprays are not used to prevent exceeding this limit.
B. Incorrect - Sprays are utilized prior to exceeding this limit but not regardless of ACC.
C. Correct - See T-102 DW/G-3.9 Bases.
D. Incorrect - If ACC is assured sprays are secured to address containment overpressurization.

Exam Level	Cognitive Level	Facility	Materials
Both	Memory	PBAPS	N/A

KA Information

Tier: E/APE RO Grp: 1 SRO Grp: 1 RO Val: 3.3 SRO Val: 3.9 55.43

System:	500000	High Containment Hydrogen Concentrations
KA Group Num:	EK1	Knowledge of the operational implications of the following concepts as they apply to high containment hydrogen concentrations
KA Detail Num:	EK1.01	Containment Integrity

Question Source Information

Ques Source: New Question Source:

Ques Mod Met:

References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control	T-102 - Bases	DW/G-3.9	3.6	14	

As Given

PECO NUCLEAR
A Unit of PECO Energy

FINAL EXAM

NRC AUDITOR
COPY 2

Reactor Operator
Senior Reactor Operator
Operating Examination

Peach Bottom Atomic Power Station
Initial License Examination
September 1999

Scenario Outline

ES-D-1

Simulation Facility	Peach Bottom	**Scenario No.**	#1	**Op Test No.**	
Examiners	__________		**Operators**	__________	CRS
	__________			__________	PRO
	__________			__________	URO

Objectives Evaluate the ability of the crew to swap Steam Jet Air Ejectors while maintaining vacuum requiring the manipulation of several components. The crew should recognize and respond to receipt of a control rod withdraw block due to an INOP failure of the "B" Rod Block Monitor (RBM) requiring a Tech Spec determination. Following the Tech Spec determination, the crew will be evaluated in their response to the "F" SRV failing open. The crew will perform a Rapid Power Reduction as part of their procedure directed efforts to close the SRV . A small leak that develops on the SRV mounting boss will result in a rise in drywell pressure. The crew will take action per the Drywell High Pressure Procedure to attempt to identify and isolate the leak but will eventually be required to initiate a manual SCRAM. Twelve control rods will fail to insert when the scram is initiated resulting in an ATWS. Six rods will be able to be inserted using T-220 but an ATWS will still exist. Steam cutting at the break will cause the leak to increase resulting in containment pressure and temperature to continue to degrade requiring use of containment sprays. Pressure instrument failures will prevent use of containment sprays when they are attempted. As containment temperature rises the crew must terminate and prevent all injection per T-240 prior to performing the Emergency Blowdown at 281 F. due to the ATWS.

Initial Condition IC-14, 100% power with the "A" RHR Loop Blocked For MO-154A valve work.

Turnover: See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	PRO CRS	Place "B" SJAE in service, remove "A" SJAE from service.
2	RBM03B	I	URO CRS	"B" Rod Block Monitor failure (Tech Spec)
3	MSS08F	C	URO PRO CRS	"F" Safety Relief Valve fails open
4		R	URO PRO CRS	Rapid power reduction.
5	MSS01	M	URO PRO CRS	Steam Leak In The Drywell, (small progressing to large leak).
6	Pre-inserted Control Rod Malfunctions	C	URO PRO CRS	Twelve control rods will fail to insert or will insert slowly during SCRAM (ATWS)
7	Pre-inserted Instrument Failure	I	PRO CRS	Pressure instrument failure prevents using containment sprays.

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

Op Test No.: **Scenario No.:** **#1** **Event No.:** **1** **Page 1of 9**

Event Description: SJAE Swap

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct placing the "B" SJAE inservice and removing the "A" SJAE from service in accordance with SO 8A.6.A-2 "Placing The Standby SJAE In Service and Placing the In Service SJAE In Standby"
	PRO	Place the "B" SJAE in service in accordance with SO 8A.6.A-2: • Verify condensate flow through SJAE inner/after condensers. • Verify Steam Pressure controller (PIC-2239B) in manual and closed • Open second stage SJAE valves • Direct the Equipment Operator to adjust HCS-2-8A-2466B for 35-40 psi. • Slowly raise PIC-2239B setpoint to 115-125 psig on PI-2472B • Open first stage SJAE valves when second stage is >13" Hgv • When steam pressure stabilizes, open the Off Gas Inlets to the "B" SJAE by placing AO-2236D/E/F in AUTO.
	PRO	Place the "A" SJAE in standby in accordance with SO 8A.6.A-2: • Close the Off gas inlets to the "A" SJAE by placing AO-2236A/B/C in CLOSE. • Adjust PIC-2239A to minimum setpoint • Direct the Equipment Operator to adjust HCS-2-8A-2466A to 0 psi. • Close first stage SJAE valves • Close second stage SJAE valves

Op Test No.: **Scenario No.: #1** **Event No.: 2**

Event Description: RBM Channel "B" Fails INOP

Cause: Failure of 5 volt power supply to INOP trip reference circuit.

Effects: Receipt of a Rod Withdraw Block and associated alarms

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize/take action IAW ARC 211 C-3 "RBM HIGH INOPERATIVE" and ARC 211 D-3 "ROD WITHDRAW BLOCK" alarms and inform the CRS.
	CRS	Refer to Tech Spec 3.3.2.1 and determine that the "B" RBM must be restored to OPERABLE status within 24 hours.
	CRS	Determine that the "B" RBM can be bypassed IAW SO 60B.7.A-2 "Rod Block Monitor Bypassing" for up to 24 hours at which time it must be restored to operable status or placed in trip.
	CRS	Direct the URO to bypass the "B" RBM (CRS may elect to maintain the RBM in the tripped condition until troubleshooting has begun).
	URO	If directed, place the Joystick for the "B" RBM in the Bypass position.
	CRS	Direct the URO/PRO to contact the WWM or EDM for troubleshooting support for the RBM.
	URO PRO	Contact the WWM or EDM for troubleshooting support for the RBM as directed.

Op Test No.: **Scenario No.: #1** **Event No.: 3** **Page 3 of 9**

Event Description: "F" SRV Fails Open

Cause: Mechanical failure of relief valve pilot.

Automatic Actions: Alarms 210 D-2 "SAFETY RELIEF VALVE OPEN" and 227 B-4 "BLOWDOWN RELIEF VALVES HI TEMP"

Effects: Loss of Generator load, steam/feedwater mismatch, heat input to primary containment.

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize/take action IAW 210 D-2 "SAFETY RELIEF VALVE OPEN" and 227 B-4 "BLOWDOWN RELIEF VALVES HI TEMP"
	CRS	Enter/direct actions IAW OT-114: • Lead crew in confirming an SRV is open • Direct the B loop of Torus cooling be placed in service • Direct attempts to close the open SRV
	URO PRO	Confirm that SRV "F" is open IAW OT-114
	PRO	Place the B loop of Torus cooling in service IAW RRC 10.1-2 "RHR SYSTEM TORUS COOLING DURING A PLANT EVENT", when directed by the CRS and monitor Torus temperature.
	PRO	Cycle the SRV control switch when directed by the CRS.
	URO	Perform a Fast Power Reduction IAW GP-9-2 when directed by the CRS, (See details in Event 4)
	URO PRO	Coordinate removal of fuses by Equipment Operators and monitor valve status during attempts to close the SRV when directed by the CRS.
	PRO	Recognize/take action IAW 226 A4 "TORUS WATER LEVEL OUT OF NORMAL RANGE" Recognize entry condition to T-102 "Primary Containment Control".
	CRS	Enter/direct actions IAW T-102 for Torus water level high.

Op Test No.: **Scenario No.: #1** **Event No.: 4**

Event Description: Fast Power Reduction

Cause: Directed from OT-114, Inadvertent Opening of a Relief Valve

Automatic Actions: None

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct a Fast Power Reduction until recirculation flow is reduced to approximately 51.25 Mlbs/hr.
	URO	Perform a Fast Power Reduction until recirculation flow is reduced to approximately 51.25 Mlbs/hr. • Reduce Recirculation Flow to 90% power • Insert Table 1 Rods full in • Reduce Recirculation Flow to 51.25 Mlbs/hr
	PRO	Maintain the Main Generator Auto-Manual Regulator Balanced (when it alarms) Monitor Reactor Feed Pump Flows during the power drop. Remove a Reactor Feed Pump from service when required. Notify the Power System Director of the required power change.

Op Test No.: **Scenario No.: #1** **Event No.: 5**

Event Description: Steam leakage inside Primary Containment, (small progressing to large)

Cause: B Main Steam Leak at SRV F Mounting Boss. Steam cutting at break increases size of leak.

Automatic Actions: Initial Alarms: 210 F-2, 225 A-4, "DRYWELL HI-LO PRESS"

Effects: Drywell pressures and temperatures will rise at an increasing rate, eventually leading to a high drywell (DW) pressure alarm and scram if not scrammed manually, ECCS automatic start signals and PCIS isolation signals will be received. Conditions escalate to requiring containment sprays.

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize/take immediate actions IAW OT-101 "HIGH DRYWELL PRESSURE": • Maximize drywell cooling • Verify no drywell inerting
	CRS	Enter/direct follow up actions IAW OT-101: • Direct Fast Power Reduction IAW GP-9-2 and transfer of house loads at drywell pressure of 1.5 psig and rising. • Direct manual scram at drywell pressure of 1.7 psig and rising. • Direct investigation into source of drywell leakage. • Direct drywell venting. • Direct isolation of potential leak sources.
	URO	Take Scram Actions when directed: • Reduce reactor power IAW GP-9-2. • Place the Mode Switch to Shutdown • Verify Rods inserting • Manually control the Reactor Feed Water System to control Reactor Level • Verify APRMs are downscale • Recognize that all rods did not insert, ATWS, (See Event 6) • Report to the CRS
CT	URO	Recognize and report ATWS.

PRO	Transfer House Loads and take scram actions when scram occurs: • Verify House Loads Transferred • Trip the turbine at 50 Mwe • Verify the Generator Lockout • Verify all isolations • Report to the CRS and get permission to bypass and restore DW Instrument Nitrogen • Restore Instrument Nitrogen to the DW Investigate sources of drywell leakage.
URO PRO	Recognize drywell pressure/temperature are continuing to rise, inform CRS.
URO PRO	Recognize and report 2# Drywell T-101, T-102 entry conditions.
URO PRO	Verify and take action for 2# automatic initiations and isolations. (HPCI initiation, Diesel Generator auto start, Group II/III isolations)
CRS	Enter/direct actions for T-101, RPV Control Direct actions for the ATWS condition, (See Event 6 for details) • Verify URO/PRO Scram Actions • Direct Level to be restored and maintained +5 to 35 inches • Direct DW Instrument Nitrogen to be restored • Direct the reactor to be depressurized not to exceed 100 degrees per hour
CRS	Enter/direct actions for T-102, Primary Containment Control • Monitor Primary Containment Conditions • Direct restoration of DW Cooling per T-223 "Drywell Cooler Fan Bypass" • Direct torus sprays and/or DW sprays after verifying that conditions meet the DW Spray Initiation Curve. (See Event 7 for details)
PRO	Perform T-223 "Drywell Cooler Fan Bypass" when directed.

Op Test No.: Scenario No.: #1 Event No.: 6 Page 7 of 9

Event Description: Twelve Rods Fail to Scram - ATWS

Cause: Three control rods have slow scram times, three rods Fail to Scram, and six rods are mechanically stuck.

Automatic Actions: None, no alarms

Effects: Requires the operators to take actions to terminate ATWS, T-117 entry.

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct T-101 RC/Q ATWS actions: • Initiation of ARI • Entry into T-117 "Level/Power Control" • T-220 "Driving Control Rods During a Failure to SCRAM" • T-213 "SCRAM Solenoid Deenergization"
	CRS	Enter and execute T-117 concurrently with T-101: • Direct Inhibit ADS • Direct bypass MSIV -160" isolation using T-221 "Main Steam Isolation Valve Bypass" • Verify reactor power <4% • Direct monitoring of parameters requiring performance of T-240 • Direct level be maintained between -200" and +35"
	URO	Perform T-213, Direct an EO to perform applicable portions of the procedure.
	URO	Perform T-220, direct an EO to close the HV-2-3-56 CRD Charging Header Block valve
	PRO	Inhibit ADS
	URO	Monitor reactor power, level and pressure. Monitor parameters that requiring performance of T-240. Maintain level as directed.
	URO PRO	Direct an EO to perform T-221.

Op Test No.: **Scenario No.: #1** **Event No.: 7**

Event Description: Inability to spray Continiment

Cause: Drywell pressure input to spray logic permissive not functioning.

Automatic Actions: Alarm 225 B-3 "SYSTEM II DRYWELL PRESSURE PERMIT CONTAINMENT SPRAY" is NOT received

Effects: Prevents containment spray.

Time	Position	Applicant's Actions Or Behavior
	PRO	Initiate torus sprays when directed (crew may go directly to DW sprays) • Place CTMT Spray Override 2/3 Core Coverage switch in "Manual Override" • Place CTMT Spray Valve Control switch in "Manual" momentarily • Secure one running RHR Pump (if two were running) • Open MO-39B (if not open for torus cooling already) • Throttle MO-34B to obtain 8000 gpm for Torus sprays, 9000 gpm for Drywell sprays.
CT		• Recognize the inability to throttle MO-38B to obtain 9000 gpm or simultaneously throttle MO-26B and MO-31B. • Recognize the lack of alarm 225 B-3 "SYSTEM II DRYWELL PRESSURE PERMIT CONTAINMENT SPRAY"
	CRS	Recognize the inability to maintain drywell bulk average temperature less than 281 F.
CT	CRS	Per T-117, direct performance of T-240 to terminate and prevent RPV injection prior to directing T-112 Emergency Blowdown.
	PRO	Perform T-240 Termination and Prevention of Injection into the RPV for the following systems: • HPCI • Feedwater/Condensate • Core Spray • RHR • ECCS Stayfull Inform the CRS when T-240 is completed.

CRS	Enter and execute T-112, Emergency Blowdown Direct the PRO to open all 5 ADS SRVs
PRO	Place the switches for all 5 ADS SRVs to the open position

TERMINATION CRITERIA: The scenario may be terminated when the Emergency Blowdown has been initiated.

POST SCENARIO EMERGENCY CLASSIFICATION: Alert on > 50 gpm leakage from the primary system (Table 3) OR on General Conditions (Table 1).

SHIFT TURNOVER

PLANT CONDITIONS:

- 100% power

INOPERABLE EQUIPMENT/LCOs:

- "A" RHR Loop out of service and drained for MO-154A work, day 2 of the 7 day TSA per LCO 3.5.1, expected return to service in 2 days

SCHEDULED EVOLUTIONS:

- Place the "B" SJAE in service, remove the "A" SJAE from service

SURVEILLANCES DUE THIS SHIFT:

- None

ACTIVE CLEARANCES:

- "A" RHR Loop blocked and drained.

GENERAL INFORMATION:

- Immediately following shift turnover, place "B" SJAE in service and the "A" SJAE in standby IAW SO-8A.6.A-2 to support maintenance on a valve packing leak. Equipment operators are stationed locally to support the evolution.

Scenario Outline

ES-D-1

Simulation Facility Peach Bottom **Scenario No.** #2 **Op Test No.**

Examiners ____________ **Operators** ____________ CRS

____________ ____________ PRO

____________ ____________ URO

Objectives Evaluate the crew during placing the standby CRD pump in service and having the pump amps fail high. The crew will take action for a control rod drift in IAW ON-121 "Control Rod Drift". The ON will require the crew to perform a Fast Power Reduction. The crew will determine that the control rod is INOP and make a Tech Spec determination. An instrument malfunction will cause a spurious RCIC initiation requiring the crew to shut it down and making the system unavailable for level control during the ATWS. A Tech Spec determination will be made for the RCIC inoperabiity. Following the Tech Spec determination, main condenser vacuum will begin to degrade due to air inleakage. The crew will attempt to maintain vacuum by performing an additional Fast Power Reduction and initiating a leak search IAW OT-106 "Condenser Low Vacuum". The crew is expected to insert a manual scram, prior to the automatic signal, when they determine that vacuum cannot be maintained above 24" Hg vac. When the manual or automatic scram is inserted an electric ATWS will occur. T-101 "RPV Control" and T-117 "Level/Power Control" will be entered to address the ATWS. When ARI is initiated in an attempt to insert control rods, an ARI fuse will blow disabling the system. Level will be lowered to below -60" IAW T-240 "Termination and Prevention of Injection into the RPV". When the main turbine trips due to loss of vacuum, the operators will control reactor pressure manually using SRVs. Standby Liquid Control (SBLC) will be placed in service prior to Torus temperature reaching 110 °F. Panel awareness will alert the operators to a trip the SBLC pump after it has run for approximately one minute. The other SBLC pump should be started and will run. The crew will further lower level to control power when suppression pool temperature reaches 110 °F. When the crew is controlling level in its band, T-214, "Isolating and Venting the Scram Air Header" will be successful in inserting control rods. The crew will then transition to a non-ATWS level control band.

Initial Condition IC-14 100% power

Turnover: See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1	Override	I	URO CRS	Standby CRD Pump Motor Current Indication fails high during start
2	CRH041847	C	URO CRS	Control Rod 18-47 Drifts into the Core
3		R	URO PRO CRS	Fast Power Reduction
4	Override	I	PRO CRS	RCIC Spurious Initiation
5	CAR01 50	M	URO PRO CRS	Main Condenser Air Inleakage

6	RPS01 RPS02 RPS05	M	URO PRO CRS	Electrical ATWS
7	ARIF2A ARI01TO	I	URO CRS	ARI Fuse Failure
8		N	URO CRS	Place Standby Liquid Control System in service
9	SLC01A(B)	C	URO CRS	Trip of running Standby Liquid Control Pump

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

SHIFT TURNOVER

PLANT CONDITIONS:

- 100% Power
- SO 3.6.A-2 is in progress to place the "B" CRD pump in service and remove the "A" CRD pump from service to permit cleaning of the motor fans.

INOPERABLE EQUIPMENT/LCOs:

- NONE

SCHEDULED EVOLUTIONS:

- Maintenance and Equipment Operators are standing by for the "B" CRD pump to be placed in service for a confidence run and the "A" CRD pump to be removed from service.

SURVEILLANCES DUE THIS SHIFT:

- NONE

ACTIVE CLEARANCES:

- NONE

GENERAL INFORMATION:

- Place the standby "B" CRD pump in service in accordance with SO 3.6.A-2 "U/2 PLACING STANDBY CONTROL ROD DRIVE HYDRAULIC SYSTEM IN SERVICE". Procedure SO 3.6.A-2 is complete up through and including step 4.1.8.

Op Test No.:	Scenario No.:	#2	Event No.:	1	Page 1 of 12

Event Description: Stby CRD Pump Motor Current Indication fails high during start.

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct CRD Pump swap in accordance with SO 3.6.A-2 "U/2 Placing Standby Control Rod Drive Hydraulic System Pump In Service"
	URO	Contact EO and verify pump start prerequisites are complete and standby for B pump start IAW. SO 3.6.A-2 "U/2 Placing Standby Control Rod Drive Hydraulic System Pump In Service"
	URO	Start the B CRD pump and monitor pump amps. Recognize that Motor Current Indication is upscale. Report this indication to the CRS. Shutdown the B CRD Pump
	CRS	Direct troubleshooting of the B CRD pump

Op Test No.: **Scenario No.: #2** **Event No.: 2**

Event Description: Control Rod 18-47 drifts into the core

Cause: Scram outlet valve leaks

Automatic Actions: 211 D4, "ROD DRIFT ALARM"
Full core display rod drift light illuminates

Effects: Small power reduction

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize and report receipt of 211 D4 "Rod Drift" alarm and rod drift light for rod 18-47.
	CRS	• Enter/direct actions IAW ON-121 "Drifting Control Rod" • Select the drifting rod • Monitor: Reactor power, Generator load, Reactor water level, Reactor pressure • Insert the drifting control rod to full-in using Emergency in and hold for 30 sec. • Determine if the rod settles at full-in • Reset "Rod Drift" alarm • Reduce power IAW GP-9 "Fast Reactor Power Reduction" to 950 Mwe (see Event 3) • Demand Official 3D P1 and determine status of thermal limits • Request Reactor Engineering and work week manager support • Declare the rod inop and reference Tech Spec 3.1.3 • Notify the Operations Manager
	URO	• Execute ON-121 actions: • Select the drifting rod • Monitor: Reactor power, Generator load, Reactor water level, Reactor pressure • Insert the drifting control rod to full-in using Emergency in and hold for 30 sec. • Report that the rod settled at full-in • Reset "Rod Drift" alarm • Reduce power IAW GP-9 to 950 Mwe (see Event 3) • Demand Official 3D P1 and determine status of thermal limits • Direct the EO of inspect the HCU for possible cause of the rod drift

Op Test No.: Scenario No.: #2 Event No.: 3

Event Description: Fast Power Reduction

Cause: Directed from ON-121, Drifting Control Rod

Automatic Actions: None

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct a Fast Power Reduction IAW GP-9 "Fast Reactor Power Reduction" until generator load is 950 Mwe
	URO	Perform a Fast Power Reduction until generator load is 950 Mwe • Reduce Recirculation Flow to 90% power • Insert Table 1 Rods as required to reduce power to 950 Mwe
	PRO	Maintain the Main Generator Auto-Manual Regulator Balanced (when it alarms) Monitor Reactor Feed Pump Flows during the power drop. Notify the Power System Director of the required power change.

Event Description: RCIC INITIATION

Cause: RCIC Logic Failure

Automatic Actions: RCIC starts and injects into the vessel

Effects: Feedwater control responds to the RCIC injection

Time	Position	Applicant's Actions Or Behavior
	PRO	Recognize/report RCIC initiation as evidenced by associated alarms, valve position and flow indication.
	CRS	Direct verification of actual reactor level.
	PRO URO	Verify by two independent indications that water level is normal and RCIC injection is not required.
	CRS	Direct that RCIC be removed from service.
	PRO	Trips RCIC to shut the system down.
	CRS	Determine that RCIC is INOP and reference Tech Spec 3.5.3 to determine that HPCI must be verified OPERABLE immediately and RCIC must be restored to OPERABLE status within 14 days.
	CRS	Request technical support in troubleshooting the RCIC initiation

Op Test No.: Scenario No.: #2 Event No.: 5

Event Description: Condenser Air Inleakage

Cause: Crack in Condenser weld joint

Automatic Actions: Reactor scram @23" Hg vac
Main Turbine and RFP turbines trip @ 20" Hg vac

Effects: Vacuum drops, Offgas flow rises, generator load reduction

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize, report, and take actions IAW ARC 206 D-2 "Condenser Lo Vacuum"
	URO	Reduce reactor power IAW GP-9-2 "Fast Reactor Power Reduction" until vacuum stops dropping • Insert Table 1 Rods full in • Reduce Recirculation Flow to 51.25 Mlbs/hr
	CRS	Enter/direct actions IAW OT-106 "Condenser Low Vacuum" • Direct a SCRAM if condenser vacuum cannot be maintained or restored above 24" Hg vac and enter T-100 "SCRAM" • Direct performance of SO 5.7.A "Condensate System Vacuum Leak Search"
	PRO	Maintain the Main Generator Auto-Manual Regulator Balanced (when it alarms) Monitor Reactor Feed Pump Flows during the power drop. Remove a Reactor Feed Pump from service when required. Notify the Power System Director of the required power change.
	PRO	Recognize, report, and take actions IAW ARC 203 B-2, or C-2,or D-2 "A Condenser Lo Vac" (or B or C)
	CRS	Direct a Reactor Scram at 24" Hg vac.
CT	URO	Attempt to scram the reactor and report the ATWS and entry into T-101, "RPV Control". (see event 6 for ATWS details)
	URO PRO	Monitor and report main condenser vacuum approaching 7" Hg vac

Time	Position	Applicant's Actions Or Behavior
	CRS	Anticipate lockout of the Main Turbine Bypass Valves at 7" Hg vac and direct reactor pressure be stabilized below 1050 psig using additional SRVs.
	URO PRO	Recognize and report lockout and closure of the Main Turbine Bypass Valves at 7" Hg vac
	PRO	Stabilize reactor pressure below 1050 psig using additional SRVs to compensate for the Bypass valve lockout.
	PRO	Monitor and report the increasing rate of Torus water temperature rise.
	CRS	When vacuum reaches 5 inches, then direct the MSIVs and Main Steam Line Drain valves to be closed.
	CRS	Direct Chemistry personnel to remove Condensate System Oxygen Injection from service.
	URO PRO	Close the MSIVs and Main Steam Line Drain valves when directed.

Op Test No.: **Scenario No.: #2** **Event No.: 6**

Event Description: Failure to scram (Electric ATWS)

Cause: RPS Logic Channels A1, A2, A3 fail to de-energize

Automatic Actions: Alarms 211 B-1"A CHANNEL REACTOR AUTO SCRAM & D-1 "A CHANNEL REACTOR MANUAL SCRAM" are NOT received

Effects: All RPS "A" channel automatic and manual scram signals fail to initiate automatic or manual scram

Time	Position	Applicant's Actions Or Behavior
	URO	Carry out Scram actions - Recognize ATWS - Report that control rods are not inserting and the APRMs are NOT downscale
	CRS	Direct T-101 "RPV Control", RC/Q ATWS actions: • Initiation of ARI • Entry into T-117 "Level/Power Control" • T-220 "Driving Control Rods During a Failure to SCRAM" • T-213 "SCRAM Solenoid Deenergization" • T-214 "Isolating and Venting the Scram Air Header"
	URO	Press Manual Scram pushbuttons or ARI manual pushbuttons
	URO	Report that rods are not inserting and receipt of 207 E3 "ARI-RPT SYSTEM INOP LOSS OF POWER" alarm. (see event 7 for details)
	CRS	Enter and execute T-117 concurrently with T-101: • Direct Inhibit ADS • Direct monitoring of parameters requiring performance of T-240 "Termination and Prevention of Injection into the RPV" • Direct level be lowered to below -60" using T-240
	URO	Perform T-213, Direct an EO to perform applicable portions of the procedure.
	URO	Perform T-214, Direct an EO to perform applicable portions of the procedure.

Time	Position	Applicant's Actions Or Behavior
	URO	Perform T-220, direct an EO to close the HV-2-3-56, CRD Charging Header Block valve
	PRO	Inhibit ADS
	PRO	Terminate and prevent RPV injection using T-240 to lower level to below -60"
	URO PRO	Monitor reactor power, level and pressure and parameters that requiring performance of T-240.
	PRO	Recognize, report, and take actions IAW ARC 206 D-1, Condenser Lo Vacuum Trip"
	CRS	Direct that reactor pressure be stabilized below 1050 psig IAW T-101 using SRVs
	PRO	Stabilize reactor pressure using SRVs below 1050 psig
	URO PRO	Recognize, report, receipt of ARC 207 A-1 "Torus Water Hi Temp". as a T-102 "Primary Containment Control" entry condition of >95°F
	CRS	Enter/direct actions IAW T-102 Maximize Torus cooling
	PRO	Maximize Torus cooling, monitor Torus water temperatures
CT	CRS	Before Torus temperature of 110 °F recognize the need to initiate SBLC and direct it be initiated.
	URO	Place SBLC in service (see event 8 for details)
	URO PRO	Recognize and report SBLC pump failure (see event 9 for details)
	URO PRO	Recognize, report, receipt of ARC 207 A-2 "Torus Water Hi Hi Temp" for Torus water temperature >110 °F

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct performance of T-240 IAW T-117 until any of the following: • RPV level reaches -172" • Reactor power drops below 4% • All SRVs remain closed
	PRO	Terminate and prevent RPV injection using T-240 until any of the following: • RPV level reaches -172" • Reactor power drops below 4% • All SRVs remain closed
	CRS	Direct that level be restored and maintained between -200" and the level to which it was intentionally lowered.
	PRO	Restore and maintain level between -200" and the level to which it was intentionally lowered.
	URO	Recognize and report receipt of 211 D-2 "SCRAM VALVE PILOT AIR HEADER PRESS HI-LO" and monitor scram air header pressure.
	URO	Recognize and report inward control rod motion.
	URO	Take Scram Actions: • Verify Rods inserting • Verify APRMs are downscale • Verity that all control rods have inserted • Report to the CRS
	CRS	Recognize termination of the ATWS Exit T-117, T-101 RC/Q Enter T-101 RC/L-1 Direct level restoration to +5" to +35".
	PRO	Begin level restoration +5" to +35".

Op Test No.: **Scenario No.:** **#2** **Event No.:** **7**

Event Description: ARI FUSE FAILURE

Cause: ARI "A" power supply fuse blows

Automatic Actions: 207 E3 "ARI RPT SYSTEM INOP LOSS OF POWER" ALARM

Effects: Scram air header remains pressurized requiring other means of terminating the ATWS

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize and report the receipt of 207 E3 "ARI RPT SYSTEM INOP LOSS OF POWER" ALARM
	URO	Recognize and report the loss of the valve position lights for ARI A channel and the failure of ARI to actuate as evidenced by lack of the ARI initiated alarm
	CRS	Acknowledge the report and pursue alternate means of venting the SCRAM air header (T-214)

Op Test No.: **Scenario No.: #2** **Event No.: 8**

Event Description: Place Standby Liquid Control System in-service

Cause: Normal

Automatic Actions: None

Effects: SBLC system placed in service

Time	Position	Applicant's Actions Or Behavior
	URO	Unlock SBLC switch and place it in the "START SYS A" or "START SYS B" position.
	URO	Verify that the RWCU system isolates.
	URO	Verify A (B) SBLC pump started as follows: • Red indicating light is on. • Raised discharge pressure. • Lowering tank level • Reactor power lowering.
	URO	Report to the CRS that the SBLC system is in service.

Op Test No.: **Scenario No.: #2** **Event No.: 9**

Event Description: Trip of Running Standby Liquid Control Pump

Cause: Contact in 42 device fails causing pump to stop

Automatic Actions: None

Effects: SBLC tank level remains constant, red pump running light out, green pump off light on

Time	Position	Applicant's Actions Or Behavior
CT	URO	Recognize, report the trip of the inservice Standby Liquid Control Pump.
	CRS	Direct the start of the other SBLC pump.
	URO	Start the other SBLC pump and verify it is injecting boron into the reactor vessel.

TERMINATION CRITERIA: The scenario may be terminated after the ATWS has been terminated and level is restored above -172".

POST SCENARIO EMERGENCY CLASSIFICATION: Site Area Emergency - Scram condition, Rx NOT shutdown and torus temperature above 110 degrees F. (Table 13).

Scenario Outline

Simulation Facility	Peach Bottom	**Scenario No.**	#3	**Op Test No.**	
Examiners	______		**Operators**	______	CRS
	______			______	PRO
	______			______	URO

Objectives Evaluate the ability of the crew to transfer "B" RPS to the Alternate Feed requiring the reset of the resulting half scrams and isolations. The crew should recognize and respond to the failure of a Drywell Pressure Transmitter which fails to give the expected RPS Trip. Evaluate the crew's response to the closure of an MSIV requiring the crew to enter and execute the High Pressure and Positive Reactivity procedures. The Crew will then perform a Rapid Power Reduction with Control Rods to lower steam flow to within the limitations of the three open steam lines. A steam leak in the Main Steam Tunnel of the Reactor Building will require the shutdown of the plant. A manual Group I isolation will be required due to an isolation failure. One MSIV is mechanically stuck and will not shut to isolate the leak in the Reactor Building. The crew should perform an Emergency Blowdown when the second temperature exceeds its action level in the Secondary Containment. When performing the blowdown, one ADS SRV will not open and an additional SRV must be opened.

Initial Condition IC-14, reduced to 85% power with the "A" RBCCW Pump Blocked For Motor Replacement

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	URO PRO CRS	Transfer the "B" RPS Bus to the Alternate Power Supply
2	Override	I	URO PRO CRS	Drywell Pressure Transmitter Failure Without Giving the Expected RPS Trip (Tech Spec)
3	MSS06G	C	URO PRO CRS	Inboard MSIV Fails Closed
4		R	URO PRO CRS	Fast Power Reduction with Control Rods
5	MSS03	M	URO PRO CRS	Steam Leak In The Steam Tunnel (Inside Secondary Containment)
6	Override	I	URO PRO CRS	Group I Fails To Auto Isolate Due to Failed Temperature Instruments
7	Override	C	URO PRO CRS	Failure Of The Inboard "C" MSIV To Manually Isolate
8	MSS08C	C	PRO CRS	"C" ADS SRV Fails to Open During Manual Blowdown

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

SHIFT TURNOVER

PLANT CONDITIONS:

- Approximately 85% power with a GP-2 Startup in Progress
- GP-2 is complete through step 6.3.50
- Rods are in a full power lineup.

INOPERABLE EQUIPMENT/LCOs:

- "A" RBCCW Pump out of service for Motor Replacement

SCHEDULED EVOLUTIONS:

- Transfer "B" RPS to the Alternate Power Supply

SURVEILLANCES DUE THIS SHIFT:

- None

ACTIVE CLEARANCES:

- "A" RBCCW Pump

GENERAL INFORMATION:

- The "B" RPS MG Set has excessive vibration and is being shutdown for inspection. An Equipment Operator, Maintenance, and the System Manager are standing by at the "B" RPS MG Set to observe the shutdown and conduct the inspection. The EO has a calibrated digital voltmeter and a copy of SO 60F.6.A-2.

- Power is being held at 85% while RPS B is transferred to the Alternate Feed and the REs evaluate the plan for continued power ascension.

Op Test No.: Scenario No.: #3 Event No.: 1

Event Description: Transfer the "B" RPS Bus to the Alternate Power Supply

Time	Position	Applicant's Actions Or Behavior
	CRS	Brief the crew on the transfer of the "B" RPS Bus. Direct the transfer of the "B" RPS Bus to its alternate power supply. Direct the reset of PCIS isolations. Direct the reset of the half scram.
	PRO	Transfer the "B" RPS Bus - Verify the "ALT SOURCE AVAILABLE " light is lit on 20C017 - Verify the CRD Scram Solinoid group lights are lit on 20C015 - Place the Transfer Switch in the "ALTERNATE" position Reset the Group I and III half isolations using GP8.D. Restore normal Reactor Building Ventilation
	URO	Monitor the Full Core Display for drifting rods while RPS is transferred. Reset the half scram using GP-11E, Scram Reset.

Event Description: Drywell Pressure Indicating Switch Fails Upscale Without Sending the Expected RPS Trip

Cause: Spurious Failure of the PIS-12B Drywell Pressure Transmitter Trip Unit

Automatic Actions: Results in a High Drywell Pressure Trip (210 F-1) alarm and the RPS/PCIS Trip Units in Calibration or Gross Failure (210 D-4) alarm.

Effects: Expected half scram fails to occur.

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize and report the annunciators for High Drywell Pressure Trip (210 F-1) and Gross Failure (210 D-4). Recognize and report the failure of the half scram to be initiated with the DW Pressure Trip.
	CRS	Direct and Equipment Operator be sent to investigate the alarms. Use Tech Specs to determine that both RPS and PCIS should have been impacted and that the channels must be tripped using GP-25. Use GP-25, Table 1 to direct the tripping of the B1 RPS Channel using Appendix 2. Use GP-25, Table 1 to direct the tripping of PCIS using Appendix 6.
	PRO	Verify actual Drywell pressure is normal. Trip the B1 RPS channel using GP-25, Appendix 2.
	NOTE	Appendix 6 can not be completed in the simulator, so the scenario must move on before the operators are expected to achieve this.

Op Test No.: **Scenario No.: #3** **Event No.: 3**

Event Description: Inboard Main Steam Isolation Valve (MSIV) fails closed

Cause: Equipment Failure

Automatic Actions: None.

Effects: The closure of the MSIV at this power will result in a significant power and pressure spike but will not result in a reactor scram.

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize rising reactor pressure, inform the CRS and announce entry into the High Reactor Pressure OT (OT-102)
	CRS	Enter/direct actions IAW OT-102 - Lead crew in determining that the high pressure was from a failed shut MSIV - Direct reactor power to be dropped until total steam flow is less that 10.5 Mlbs/hr (See Event #4 for details) (GP9) Direct troubleshooting of the MSIV problem
	URO PRO	Investigate cause of the pressure rise - Recognize the MSIV closure, inform CRS

Op Test No.: **Scenario No.: #3** **Event No.: 4**

Event Description: Fast Power Reduction

Cause: Directed from OT-102, High Reactor Pressure

Automatic Actions: None

Effects: Power is dropped first with Control Rods and then with Recirculation Flow

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct a Fast Power Reduction until Total Steam Flow is < 10.5 Mlbs/hr using GP-9 Monitor Power to Flow Conditions as directed by the procedure.
	URO	Perform a Fast Power Reduction until Total Steam Flow is < 10.5 Mlbs/hr using GP-9 - Insert Table 1 Rods as required - Monitor Total Steam Flow
	PRO	Monitor Total Steam Flow Maintain the Main Generator Auto-Manual Regulator Balanced (when it alarms) Monitor Reactor Feed Pump Flows during the power drop. Notify the Power System Director of the required power change.

Op Test No.: **Scenario No.: #3** **Event No.: 5**

Event Description: Steam Leak In The Steam Tunnel (Inside Secondary Containment)

Cause: Crack on the "C" Steam Line Between the Inboard and Outboard MSIVs which was created due to the hydraulic shock which occurred when the Outboard MSIV failed closed

Automatic Actions: Initially Reactor Building High Differential Pressure Alarms will be received, high temperatures will be received first in the steam tunnel and spread throughout the reactor building.

Effects: Steam Tunnel temperatures will eventually reach the Group I setpoint.

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize and report REACTOR BUILDING & REFUEL FLOOR HI-LO DIFF PRESSURE (217 K-5 & L-1) Take action IAW the ARCs • Monitor FR-2805 to determine that vent stack flow is high. • Investigate the cause of the high pressure.
	URO PRO	Recognize and report a Potential T-103 Entry on High Temperature Verify which temperature point is alarming and confirm T-103 Entry
	CRS	Enter and execute T-103, Secondary Containment Control. Direct a GP-15, Local Evacuation, of the Reactor Building
	PRO	Perform a GP-15, Local Evacuation, of the Reactor Building
	CRS	Determine that a primary system is discharging into the Reactor Building. Direct a GP-4, Rapid Plant Shutdown. Enter T-101, RPV Control, from T-103.

URO Rapidly Reduce Recirc Flow to Minimum
Place the Mode Selector Switch in Shutdown
Perform Scram Actions:
Report that the Mode Switch is in Shutdown, Rods are going in and that the APRMs are downscale.

URO When level turns, depress Emergency Stop for all Reactor Feed Pumps (RFP) and then for one depress slow or fast raise.
Close the RFP discharge valves and open the Startup Level Controller Isolation Valve.

PRO Transfer House Loads
Trip the Main Turbine at 50 MWe and verify the generator lockout
Verify isolations and that SBGT is aligned and running
Verify that instrument air pressure is > Drywell pressure
Verify that Hydrogen Injection and the Scram Discharge Volume are isolated.
Report Scram Actions to the CRS.
Bypass and restore Drywell Instrument Nitrogen.

Event Description: Group I Failure To Auto Isolate (Manual works) due to failed Temperature Instruments

Cause: Temperature instruments which input into the "B" Group I logic are failed

Automatic Actions: None, no alarms will be received for initiation of the "B" Group I logic.

Effects: Group 1 failure to isolate, manual isolation will work on all MSL with the exception of the "C" Inboard MSIV (See Event 7 for details).

Time	Position	Applicant's Actions Or Behavior
CT	URO PRO	Recognize and report the failure of the group I isolation (due to the System B High Temperature instruments not giving a proper high temperature isolation).
	CRS	Direct the isolation of the MSIVs (due to the failed Group I isolation and to isolate systems discharging in the the area IAW T-103).

Op Test No.: **Scenario No.: #3** **Event No.: 7**

Event Description: Failure Of The Inboard "C" MSIV To Manually Isolate

Cause: The "C" Inboard MSIV was damaged by the hydraulic shock which occurred when the "C" Outboard MSIV failed closed.

Automatic Actions: None

Effects: The leak which is located between the "C" Main Steam Line Inboard and Outboard MSIVs can not be isolated

Time	Position	Applicant's Actions Or Behavior
	PRO	Close MSIVs with handswitches, recognize and report the "C" Inboard MSIV's Failure to manually isolate.
	URO PRO	Recognize and report additional temperature alarms in the Reactor Building.
CT	CRS	Recognize that the second area has temperatures greater that the Action Level. Enter and execute T-112, Emergency Blowdown. Direct the PRO to Open all 5 ADS SRVs.
	PRO	Place the switches for all 5 ADS SRVs to the open position.

Op Test No.: **Scenario No.: #3** **Event No.: 8**

Event Description: "C" ADS SRV Fails to Open During Manual Blowdown

Cause: SRV is mechanically failed in the closed position

Automatic Actions: None

Effects: When the "C" ADS SRV fails to open, the operator must open one additional non-ADS SRV.

Time	Position	Applicant's Actions Or Behavior
CT	PRO	Recognize and report that the "C" ADS SRV fails to open when the manual emergency blowdown is commensed.
	CRS	Direct an additional SRV to be opened to achieve 5 SRVs open.
	PRO	Open an additional SRV to ensure that 5 SRVs are open.

TERMINATION CRITERIA: The scenario may be terminated when the Emergency Blowdown has been initiated.

POST SCENARIO EMERGENCY CLASSIFICATION: Alert on > 50 gpm leakage from the primary system (Table 3) OR on General Conditions (Table 1).

ES-D-1

Scenario Outline

Simulation Facility Peach Bottom . **Scenario No.** #4 **Op Test No.**

Examiners ____________ **Operators** ____________ CRS

____________ ____________ PRO

____________ ____________ URO

Objectives Evaluate the ability of the crew to perform a Main Turbine Stop Valve Routine Test while at power. Evaluate the crew's response to the loss of Feedwater Heaters requiring the crew to enter and execute the positive reactivity procedure and reduce power. The crew should recognize and respond to the failure of an RPS Low Vacuum Pressure Transmitter. The crew should diagnose a steam leak in the Turbine Building and when the steam leak grows in magnitude, the crew should recognize the need to shutdown the plant. A Reactor Mode Switch failure will require the crew to use the manual pushbuttons or Alternate Rod Insertion (ARI) to terminate the ATWS. A manual Group I isolation will be required due to the isolation failure. The crew should utilize the TRIP procedures to determine the need for an Emergency Blowdown of the RPV via alternate depressurization methods.

Initial Condition IC-20, 75% power with the "B" RHR Pump Blocked For Motor Replacement

Turnover: See Attached "Shift Turnover" Sheet

Event No.	Malfunction No.	Event Type*		Event Description
1		N	URO PRO CRS	Perform the Main Turbine Stop Valve Routine Test
2	Override	C	URO PRO CRS	Loss Of Extraction Steam To Feedwater Heaters
3		R	URO PRO CRS	Reduce Reactor Power
4	Override	I	URO PRO CRS	Failure of a Vacuum Transmitter (Tech Spec)
5	MSS10	M	URO PRO CRS	Steam Leak In The Turbine Building
6	PCI01 Override	C	URO PRO CRS	Group I Failure To Auto Isolate (Manual works)/Failure Of The "D" MSL To Manually Isolate
7	Override	I	URO PRO CRS	Failure To Scram (Reactor Mode Switch/B RPS Auto Channel Failure)
8	Override MSS08	C	URO PRO CRS	Unable To Restore Drywell Nitrogen/Only 2 SRVs Operate On Emergency Blowdown/Depressurization Via Alternate Methods

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

Not Used

SHIFT TURNOVER

PLANT CONDITIONS:

- Approximately 75% power with a GP-2 Startup in Progress
- GP-2 is complete through step 6.3.48
- REs are currently evaluating the rod pattern and will contact you with directions
- The Unit 2 Turbine Building 116' Cardox Tank is being refilled
- A routine Diesel Fuel Oil delivery is expected this shift

INOPERABLE EQUIPMENT/LCOs:

- "B" RHR Pump out of service for motor replacement, 6 hours into LCO 3.5.1, expected return to service in 2 days

SCHEDULED EVOLUTIONS:

- Perform RT-0-001-400-2, "Individual Full Closure of Main Turbine Stop Valves". It is already completed through step 6.1.3.

SURVEILLANCES DUE THIS SHIFT:

- Perform RT-0-001-400-2, "Individual Full Closure of Main Turbine Stop Valves". It is already completed through step 6.1.3.

ACTIVE CLEARANCES:

- "B" RHR Pump

GENERAL INFORMATION:

- Complete the Main Turbine Stop Valve RT

Op Test No.: **Scenario No.: #4** **Event No.: 1**

Event Description: Main Turbine Stop Valve Routine Test

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct PRO to perform RT-O-001-400-2, the Main Turbine Stop Valve Individual Full Closure Routine Test.

	PRO	Perform RT-O-001-400-2, the Main Turbine Stop Valve Individual Full Closure Routine Test:
		- Review RT
		- Inform the Unit Reactor Operator that the test is going to be conducted and what indications he can expect to receive (this may be covered during a CRS briefing)
		- Place the CV/SV Test Selector to SV TEST
		- Verify all four MSV test button lights are ON
		- Place the backup EHC Pump in Run and document in RT
		- For Each Main Turbine Stop Valve
		  - Depress and Hold the Test pushbutton
		  - Verify the position indicator moves smoothly at low speed to less then 10% open and then fast closes
		  - After 2-3 seconds at full close, release the pushbutton
		  - Verify that the indicator moves smoothly from 0-100%
		- Place the CV/SV Test switch to OFF
		- Verify the lights on all four MSV test buttons are OFF
		- Place the backup EHC Pump in STOP and then AUTO

	URO	Monitor plant parameters/assist as directed

Op Test No.: **Scenario No.: #4** **Event No.: 2**

Event Description: Loss Of Extraction Steam To Feedwater Heaters

Cause: AO Valves supplying various heaters fail closed due to a common airline break

Automatic Actions: None, no alarms

Effects: Loss of extraction steam to heaters, lowering feed temps, rising reactor power

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize rising reactor power, inform CRS and announce entry into the Positive Reactivity OT (OT-104)
	CRS	Enter/direct actions IAW OT-104 - Monitor position on Figure 1 of OT-104 - Reduce Total Core Flow to 60 M#/hr - Insert control rods as required - Lead crew in determining the cause of the Positive Reactivity - Direct troubleshooting of feedwater heater problem - Direct isolation of the air leak
	URO PRO	Investigate cause of power rise - Recognize lowering feedwater temperatures, inform CRS - Recognize loss of extraction steam to feedwater heaters, inform CRS
	URO	Reduce power as directed by the CRS (see Event #3 for details).
	PRO	Assist with troubleshooting feedwater heaters as directed

Op Test No.: **Scenario No.:** **#4** **Event No.:** **3**

Event Description: Reduce reactor power.

Time	Position	Applicant's Actions Or Behavior
	CRS	Direct power to be lowered as directed by OT-104 • Lower recirc flow to 60 M#/hr • Drive Table 1 rods as required
	URO	Reduce Total Core Flow as directed by the CRS Maintain power 10% below initial pre-transient level by driving Table 1 Rods as required
	PRO	Inform Power Systems Director of the power reduction. Monitor plant parameters/assist as necessary.

Op Test No.:	Scenario No.: #4	Event No.: 4	Page 4 of 8

Event Description: Failure of a Vacuum Transmitter (Tech Spec)

Cause: PT-2-5-11C fails resulting in an RPS Trip

Automatic Actions: 210 B-1 "CONDENSER LO VACUUM TRIP" Alarm
"A" RPS Channel Half Scram

Effects: "A" RPS Channel Half Scram, no rod motion

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize and report 210 D-1, "CONDENSER LO VACUUM TRIP" Recognize and report the "A" Channel Half Scram Verify actual condenser vacuum is normal
	URO	Take action IAW ARC 210 D-1 "CONDENSER LO VACUUM TRIP" and 211 B-1 ("A" Channel Auto Scram)
	CRS	Direct troubleshooting of failed instrument Refer to Tech Spec 3.3.1.1 to determine that a trip must be inserted in "A2" RPS within 12 hours Initiate GP-25 to insert a redundant trip into the "A2" RPS logic using Appendix 1.
	PRO	Perform GP-25 Appendix 1 to insert a redundant trip into the "A2" RPS logic

Op Test No.: **Scenario No.:** **#4** **Event No.:** **5**

Event Description: Steam Leak In The Turbine Building

Cause: "D" MSL weld cracks

Automatic Actions: Initially alarms will be received indicating vent stack problems and then will progress to Group 1 conditions

Effects: High steam line flow Group 1 isolation condition and resultant reactor scram signal on MSIV closure

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize, report, and take actions IAW ARC 218 B-5 & C-5 (Vent Exhaust Stack Hi Radiation) - Monitor RI-2979 to verify a valid signal - Enter ON-104
	CRS	Enter ON-104 and direct search for source of high vent exhaust rad
	URO PRO	Recognize and report High Area Temperature Alarm with a potential T-103 (Secondary Containment Control) Entry
	PRO	Monitor Area Temperatures and determine that the leak is in the turbine building and NOT a T-103 entry Recognize the Group 1 alarms and failure of the Group 1 to occur - Report Group 1 Failure to the CRS
	CRS	Direct a Reactor Scram and closure of the MSIVs
	URO	Attempt to scram the reactor and report the ATWS and entry into T-101, "RPV Control" SEE EVENT #7 FOR FAILURE TO SCRAM DETAILS
	PRO	- Attempt to manually isolate the MSIVs - Report inability to isolate the "D" Main Steam Line to the CRS SEE EVENT #6 FOR FAILURE TO ISOLATE DETAILS

Event Description: Group I Failure To Auto Isolate (Manual works)/Failure Of The "D" MSL To Manually Isolate

Cause: Failure of remaining channel of isolation logic to actuate (see Event 4), "D" MSL will not isolate manually

Automatic Actions: None, no alarms

Effects: Group 1 failure to isolate, manual isolation will work on all MSL with the exception of the "D" line, reactor scram signal from MSIV closure will not occur until MSIVs closed by operator

Time	Position	Applicant's Actions Or Behavior
CT	PRO	Recognize indications of major steam leak, MSIVs failing to close, inform CRS - Close MSIVs with handswitches, recognize the "D" Main Steam Line Failure to manually isolate
	CRS	Direct the performance of AO 1A.2-2, Closing Stuck Open MSIVs Direct a GP-15 evacuation of the Turbine Building
	PRO	Direct an EO to perform AO 1A.2-2 for the MSIVs Perform a GP-15 evacuation of the Turbine Building
	URO PRO	Recognize, report alarms 218 B-4 & C-4 (Vent Stack Exhaust Hi Hi Rad), announce T-104 "Radiation Release" Entry
	CRS	Enter/direct actions IAW T-104, "Radiation Release" - Initiate Dose Assessment/Reference ERP101 as appropriate - Continue to attempt to isolate the MSIVs - Continue to take action in T-101, "RPV Control" to shutdown and depressurize the plant (SEE EVENT #7) When the release can not be maintained below the General Emergency Level by Dose Assessment Reports, then direct T-112, "Emergency Blowdown" (SEE EVENT #8 FOR DETAILS)

Event Description: Failure to scram (Reactor Mode Switch/B RPS Auto Scram Channel failure)

Cause: Mode Selector Switch (MSS) contacts do not make up, MSS remains in "Run", B RPS Channel does not trip

Automatic Actions: Alarms 211 D-1 & E-1 are NOT received

Effects: Manual pushbuttons or ARI will scram the reactor

Time	Position	Applicant's Actions Or Behavior
	URO	Carry out Scram actions - Recognize ATWS - Report that control rods are not inserting and APRMs are NOT downscale
	CRS	Exit T-100 and enter T-101 based upon scram condition with power greater than 4% (MSS failure) - Direct that Manual Scram Pushbuttons be pressed or ARI be initiated
CT	URO	Press Manual Scram pushbuttons or press ARI manual pushbuttons Verify rods inserting and APRMs downscale
	CRS	Verify URO/PRO Scram Actions completed Direct that level be maintained +5 to +35 inches Direct the restoration of drywell instrument nitrogen Direct a depressurization
	URO	Attempt to control level +5 to +35 inches
	PRO	Carry out Scram actions - Verify house loads transferred - Verify main turbine tripped and generator locked out - Attempt to restore Drywell instrument nitrogen (SEE EVENT #8) - Initiate a depressurization (if time allows – RPV is depressurizing slowly through the break)

Op Test No.: **Scenario No.: #4** **Event No.: 8**

Event Description: Only 2 SRVs Operate On Emergency Blowdown/Depressurization Via Alternate Methods

Cause: Drywell nitrogen not available and some SRVs with mechanical failures

Automatic Actions: None

Effects: Only able to open 2 of the required 5 SRVs for the Emergency Blowdown, required to depressurize via alternate methods

Time	Position	Applicant's Actions Or Behavior
	PRO	Attempt to restore DW instrument nitrogen, discover that the valves will not reopen, report to the CRS
CT	CRS	Direct alternate methods of supplying nitrogen to the SRVs Determine that release rates are going to reach General Emergency level Emergency depressurize the reactor using T-112, 'Emergency Blowdown" - Direct URO to control condensate injection - Direct PRO to open all ADS SRVs
	URO	Prevent uncontrolled condensate injection
	PRO	Take the switches to open on all ADS valves Recognize that 5 ADS valves will not open, inform CRS
	CRS	Direct additional SRVs to be opened until 5 are open
	PRO	Attempt to open SRVs until 5 are open Recognize only 2 SRVs can be opened, inform CRS
	CRS	Direct depressurization using alternate means

TERMINATION - Scenario may be terminated when alternate depressurization is directed.

Post Scenario Emergency Classification: GENERAL EMERGENCY based on ERP-101 Table 5 for Radioactive Release.

Scenario Outline

Simulation Facility:	Peach Bottom	**Scenario No.:**	#5	**Op Test No.:**	
Examiners	______		**Operators**	______	CRS
	______			______	URO
	______			______	PRO

Objectives Evaluate the ability of the crew to place a RFP in service and perform a normal power ascension. During the power ascension, a recirc pump will runaway requiring the crew to take action for positive reactivity addition. Evaluate the crew's response to the Tech Spec implications of mismatched Recirc Pump Speed. The crew should recognize the Recirc Pump high vibration and seal failures requiring a manual trip. The recirc pump discharge valve will fail to close resulting in an unisolable leak in the drywell. The main generator will fail to lockout when the turbine is tripped requiring manual operator action. Evaluate crew's ability to spray the drywell with the other loop when the first is not available. Demonstrate the ability to utilize TRIP procedures.

Initial Conditions IC-20, 75% power with the "B" RHR Pump Blocked For Motor Replacement

Turnover See Attached "Shift Turnover" Sheet

Event No.	Malf. No.	Event Type*		Event Description
1		N	URO PRO CRS	Place the "A" Reactor Feed Pump in service
2		R	URO PRO CRS	Continue Power Ascension IAW GP-2
3	RFC01A	I	URO PRO CRS	Recirc Pump Runaway (includes Tech Spec for mismatched flows)
~~4~~	~~RRS11A~~	~~C~~	URO ~~PRO~~ CRS	~~Recirc Pump High Vibration Requiring Manual Trip~~
5	RRS13A/ RRS14A	C	URO PRO CRS	"A" Recirc Pump Seals both fail.
6	VED01_74	C	URO PRO CRS	Recirc Pump Discharge Valve Trips on Overcurrent
7	RRS20	M	URO PRO CRS	Small Recirc Line Break/LOCA Inside Primary Containment Leading To Drywell Sprays
8	MGA01	I	PRO CRS	Main Generator Fails to Lock Out Automatically
9	Override	C	PRO CRS	CTMT Spray Override 2/3 Core Coverage Switch failure (one loop)

SHIFT TURNOVER

PLANT CONDITIONS:

-- At approximately 75% power with a full power rod pattern performing reactor and plant startup
-- At Step 6.3.53 of GP-2

INOPERABLE EQUIPMENT/LCOs:

-- "B" RHR Pump out of service for motor replacement, 6 hours into LCO 3.5.1, expected return to service in 2 days

SCHEDULED EVOLUTIONS:

-- N/A

SURVEILLANCES DUE THIS SHIFT:

-- N/A

ACTIVE CLEARANCES:

-- "B" RHR Pump

GENERAL INFORMATION:

-- Place the "A" Reactor Feed Pump in service using SO 6C.1.C-2 beginning with step 4.4 to permit continued power ascension

-- Continue with power ascension to 100%. The RE has determined that power may be raised to 90% using recirc flow not to exceed 10 Mwe/Min. At 90% power contact the REs to reevaluate the power ascension.

Event Description: Continue Power Ascension IAW GP-2

Time	Position	Applicant's Actions Or Behavior
	CRS	Directs placing the "A" Reactor Feed Pump in service
	URO PRO	Place the "A" Reactor Feed Pump (RFP) in service using the normal system operating procedure. - Raise "A" RFP Discharge Pressure to greater than reactor pressure. - Slowly stroke open the RFP Discharge Valve while monitoring RPV Level - Place the "A" RFP in Automatic - Close the "A" RFP Min Flow Valve
	URO PRO	Monitor plant parameters/assist as directed

Op Test No.: Scenario No.: #5 Event No.: 2 Page 2 of 10

Event Description: Continue Power Ascension IAW GP-2

Time	Position	Applicant's Actions Or Behavior
	CRS	Directs continued power increase using recirc flow per GP-2 not to exceed 10 Mwe/minute
	URO	Raise recirculation flow at a rate not to exceed 10 Mwe/Min - Raises recirc flow with the individual pump controllers, one loop at a time, maintaining loop flow matched -Monitors rate of power rise to prevent exceeding 10 Mwe/Min
	PRO	Informs Power System Director of continued power increase Monitor plant parameters/assists URO as directed

Op Test No.: **Scenario No.:** **#5** **Event No.:** **3**

Event Description: "A" Recirc Pump Runaway

Cause: Scoop tube positioner fails to its high speed stop

Initial Automatic Actions: None, no alarms received

Effects (General Sequence): Pump speed rises to high speed stop, flow and power rise, rod blocks may occur, event can be terminated by a manual scoop tube lockup

Time	Position	Applicant's Actions Or Behavior
	URO	Recognize reactor power going up (may notice recirc speed first) -Announce entry into OT-104, Positive Reactivity Addition -Announce entry into OT-112, Unexpected/Unexplained Change in Core Flow
	CRS	Enters and execute OT-104, Positive Reactivity Addition Exit OT-104 when Recirc Pump speed change is identified Enters and executes OT-112, Unexpected/Unexplained Change in Core Flow
CT	URO PRO	Recognize rising "A" Recirc Pump speed, inform CRS
	CRS	Directs scoop tube lockup
	URO PRO	- Locks scoop tube with the selector switch - Verifies post scoop tube lockup actions and indications per SO 2D.7.B-2, Recirculation MG Set Scoop Tube Lockup and Reset - Monitors pump speed, power, level and pressure
	URO PRO	Lower Core Flow to or below initial level using the "B" Recirc Pump Monitor plant parameters/assists as necessary
	CRS	Verify compliance with Tech Specs Section 3.4.1 for mismatched recirculation flows. If flows are outside of the limits, then: - Declare the pump in the low flow loop inoperable - Start a 12 hour time clock per Tech Spec 3.4.1

Op Test No.: Scenario No.: #5 Event No.: 4 Page 4 of 10

Event Description: "A" Recirc Pump High Vibration requiring Manual Trip

Cause: Pump shaft misalignment

Initial Automatic Actions: Rising pump vibrations requiring action per ARC 214 B-1

Effects (General Sequence): Rising pump vibrations, unable to reduce pump speed (due to locking up earlier) or shutdown IAW SO, will require pump trip

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize "A" Recirc Pump high vibration alarm 214 B-1, inform CRS - Monitor pump vibration - Report pump vibration and trend
	CRS	Determine that pump speed cannot be reduced below the "Danger" level due to scoop tube lockup and that pump shutdown is required in accordance with ARC 214 B-1 - Direct "A" Recirc Pump tripped
	PRO	Trip the "A" Recirc Pump when directed - Close "A" Recirc Pump Dischage Valve (MO-053A)
	CRS	Enter OT-112 for the Recirc Pump Trip - Verify URO is driving table 1 rods and monitoring for THI - Plot plant condition on the power to flow map (may find plant to be in Region 1, if so direct an immediate scram)
	URO	Take OT-112 Immediate Operator Actions - Drive in all G-9-2 Appendix 1 Table 1 control rods - Monitor for THI
	PRO	Provide necessary data to the CRS to Plot power to flow as requested

Op Test No.: **Scenario No.:** **#5** **Event No.:** **5**

Event Description: "A" Recirc Pump Seals both Fail

Cause: Excessive vibration of the "A" Recirc Pump fails its seals.

Initial Automatic Actions: Take action in accordance with the OT-101, High Drywell Pressure. Trip and attempt to isolate the Recirc Pump.

Effects (General Sequence): Seal Failure alarms, both seals' pressure will drop to drywell pressure.

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize Recirc Pump Seal Failure Alarms Recognize lowering pressures on both Seals and report to CRS Recognize that Drywell pressure is going up and announce entry into OT for High Drywell Pressure - Maximize Drywell Cooling - Verify that inerting is not in progress Trend the Drywell Pressure Increase
	CRS	Enter/direct actions in accordance with OT-101, High Drywell Pressure - Verify that the URO/PRO have taken their Immediate Operator Actions - Direct the "A" Recirc Pump to be isolated - Direct the following if the rate of rise of DW Pressure permits: - At or before 1.5# DW Pressure direct house loads to be transferred and a GP-9 Shutdown to be commenced - At or before 1.7# DW Pressure, direct a manual scram (continued on event #7)

Op Test No.: **Scenario No::** **#5** **Event No.:** **6**

Event Description: Recirc Pump Discharge Valve Trips on Overcurrent

Cause: Recirc Discharge Valve trips on magnetic overcurrent

Initial Automatic Actions: Valve stops moving if stroking, both lights (green and red) go out

Effects (General Sequence): Valve can not be operated electrically, "A" Recirc Pump can not be isolated

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize the MO-53A, "A" Recirc Pump Discharge Valve has tripped on Magnetics Report to the CRS Send an Equipment Operator to investigate
	CRS	Direct Investigation to attempt to isolate the "A" Recirc Discharge Valve Recognize that the "A" Recirc Pump and the leak can not be isolated unless the Discharge Valve can be closed

Op Test No.: **Scenario No.:** **#5** **Event No.:** **7** **Page 7 of 10**

Event Description: Small Recirc Line Break/LOCA

Cause: Break of the Recirc Line where it attaches to the "A" Recirc Pump

Initial Automatic Actions: Drywell pressures and temperatures will rise at an increasing rate, eventually leading to a high drywell (DW) pressure alarm and scram if not scrammed manually, ECCS automatic start signals and PCIS isolation signals will be received.

Effects (General Sequence): Provides primary containment control problems, conditions escalate to requiring drywell sprays.

Time	Position	Applicant's Actions Or Behavior
	URO PRO	Recognize/take Immediate Operator Actions for rising drywell (DW) pressures and temperatures, inform CRS (These actions were scripted with Event #6 when the recirc pump seals failed)
	CRS	Enter/direct actions for OT-101, High DW Pressure (scripted for Event #6 when the recirc pump seals failed) Enter/direct actions for ON-120, High DW Temperature (basically similar to High DW Pressure actions)
	URO PRO	Recognize drywell pressure/temperature are continuing to rise, inform CRS
	CRS	When or before drywell pressure reaches 1.7#, direct a manual scram

Time	Position	Applicant's Actions Or Behavior
	PRO	Transfer House Loads and take scram actions when scram occurs: - Verify House Loads Transferred - Trip the turbine at 50 Mwe - Verify the Generator Lockout - Verify all isolations - Report to the CRS and get permission to bypass and restore DW Instrument Nitrogen - Restore Instrument Nitrogen to the DW
	URO	Take Scram Actions when directed: - Place the Mode Switch to Shutdown - Verify Rods inserting - Manually control the Reactor Feed Water System to control Reactor Level - Verify APRMs are downscale -Report to the CRS
	CRS	At 2# Drywell Pressure enter/direct actions for T-101, RPV Control - Verify URO/PRO Scram Actions - Direct Level to be restored and maintained +5 to 35 inches - Direct DW Instrument Nitrogen to be restored - Direct the reactor to be depressurized not to exceed 100 degrees per hour
	CRS	At 2# Drywell Pressure enter/direct actions for T-102, Primary Containment Control - Monitor Primary Containment Conditions - Direct restoration of DW Cooling - Direct torus sprays - Direct DW sprays after verifying that conditions meet the DW Spray Initiation Curve

Note: Refer to Event #9 for continuing actions

Event Description: Main Generator Lockout fails when turbine is tripped

Time	Position	Applicant's Actions Or Behavior
	PRO	Recognize and report the failure of the Main Generator Lockout
	CRS	Direct the Manual Lockout of the Main Generator
	PRO	Manually Lockout the Main Generator

Event Description: CTMT Spray Override 2/3 Core Coverage Switch Failure

Time	Position	Applicant's Actions Or Behavior
	PRO	Initiate torus sprays when directed (crew may go directly to DW sprays) - Place CTMT Spray Override 2/3 Core Coverage switch in "Manual Override"
CT		Recognize CTMT Spray Override 2/3 Core Coverage switch failure, inform CRS, complete spray lineup on the other loop - Place other CTMT Spray Override 2/3 Core Coverage switch in "Manual Override" - Place CTMT Spray Valve Control switch in "Manual" momentarily - Secure one running RHR Pump (if two were running) - Open MO-39A(B) (if not open for torus cooling already) - Throttle MO-34A(B) to obtain 8000 gpm - Throttle MO-38A(B) to obtain 9000 gpm
	PRO	Initiate DW sprays - Throttle open MO-26A(B) and MO-31A(B) to raise flow to 10,000 gpm - Throttle closed MO-34A(B) to reduce RHR flow - Throttle open MO-26A(B) and MO-31A(B) restore flow to 10,000 gpm - Repeat as necessary to control DW Pressure - Monitor DW pressure

TERMINATION -- After control of primary containment is established

Post Scenario Emergency Classification: ALERT based on ERP-101 Table 3 Reactor Coolant System Leakage > 50 gpm

Facility: Peach Bottom Unit 2 & 3 Date of Examination: Week of Sep. 13, 1999
Examination Level (circle one): RO / SRO Operating Test Number: SRO - 1 .

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Plant Parameter Verification – Rod Position JPM	Verify rod positions following a fast power reduction (alternate path).
	Temporary Modifications of Procedures – Partial Procedure JPM	Prepare a "Partial Procedure" for post-maintenance testing of a component.
A.2	Surveillance Testing – Tech Spec Action Log JPM	Given equipment failing surveillance testing, determine and make appropriate Tech Spec Action Log entries.
A.3	Use of Portable Survey Instruments – Rad Survey instrument use JPM	Use a portable radiation instrument.
A.4	Emergency Protective Action recommendations – PAR JPM	Given General Emergency plant conditions, make a protective action recommendation (PAR).

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: New-Control Rod Verif K/A: 201003A3.01

URO: 3.7 SRO: 3.6

TASK DESCRIPTION: Control Rod Position Verification – (Alternate Path)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard. is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Official 3D MONICORE P1 performed before transient.

C. REFERENCES

1. GP-9-2, Rev. 26, "Fast Power Reduction"
2. ON-122, Rev. 5, "Misposition Control Rod"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the trainee has performed a control rod position verification, identified the mispositioned control rod and taken the required Off Normal procedure actions.
2. Estimated time to complete: 10 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to verify control rod positions following a GP-9-2 power reduction. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. A vacuum transient occurred on Unit 2 requiring power to be lowered using GP-9-2.
2. The power drop was stopped 5 minutes ago when vacuum stabilized at 27".
3. Table 1 control rods have been inserted.
4. An Official 3D P1 was completed just prior to the transient.

G. INITIATING CUE

The Control Room Supervisor directs you, the 4th RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain the recent official 3D P1 or control rod position log. (Cue: Provide a copy of the P1 or control rod position log.)	P	Operator gets a copy of the recent official 3D P1 or control rod position log.
2	Compare current control rod position to the position prior to the transient. (Cue: Acknowledge checks in progress.)	P	Operator checks current position as compared to pre-transient position.
*3	Identify control rod 54-31 is not driven to position 00. (Cue: Control rod 54-31 is at position 04.)	P	Operator identifies and reports that control rod 54-31 is not at position 00.
4	Recognize and announce entry into ON-122, "Mispositioned Control Rod". (Cue: Acknowledge entry into ON-122, DIRECT the operator to take appropriate ON-122 actions.	P	Operator recognizes and reports entry into ON-122, "Mispositioned Control Rod".
5	Contact Reactor Engineering for assistance, in accordance with ON-122, "Mispositioned Control Rod",. (Cue: Reactor Engineering acknowledges the request.)	P	Operator contacts the Reactor Engineers and requests their assistance.
6	Notify the Shift Manager in accordance with ON-122, "Mispositioned Control Rod",. (Cue: The Shift Manger acknowledges report.)	P	Operator contacts the Shift Manager and reports the mispositioned control rod.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When Reactor Engineering and Shift Manger is informed, the evaluator will terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. A vacuum transient occurred on Unit 2 requiring power to be lowered using GP-9-2.

2. The power drop was stopped 5 minutes ago when vacuum stabilized at 27".

3. Table 1 control rods have been inserted.

4. An Official 3D P-1 was completed just prior to the transient.

INITIATING CUE

The Control Room Supervisor directs you, the 4th RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

PECO Energy Company
Peach Bottom Unit 2

GP-9-2 FAST REACTOR POWER REDUCTION

1.0 PURPOSE

To rapidly reduce reactor power as required by plant conditions.

2.0 PREREQUISITES

2.1 Plant conditions require a fast reduction in power.

3.0 PERFORMANCE STEPS

NOTES
1. Steps for power reduction may be exited when power reduction is no longer required.
2. Core thermal hydraulic instability may be occurring if ANY of the following conditions exist:
o APRM oscillations of greater than OR equal to 10 percent peak-to-peak,
o LPRM OR APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, OR
o WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.

3.1 IF evidence of core thermal hydraulic instability exists, THEN place the reactor mode switch in "SHUTDOWN" AND enter T-100, "Scram", AND exit this procedure. **CM-1, CM-2**

3.2 Lower recirculation flow until ANY of the following occur:

- o percent reactor core thermal power is reduced to the value specified in Step 1 of GP-9-2 Appendix 1

OR

- o an "APRM HIGH" alarm occurs, **CM-3**

OR

- o FLLLP exceeds 0.995.

3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch OR the Emergency In/Notch Override handswitch. **CM-4**

3.4 Reduce recirculation flow to lower total core flow to approximately 51.25 Mlbs/hr (50% core flow) as indicated on PMS point B015 OR on Reactor Total Core Flow Indicator, DPFR-2-02-3-095, on Panel 20C005A. **CM-5**

NOTE
Pre-transient rod positions may be obtained from a recent OFFICIAL 3D P1, a recent CONTROL ROD POSITION LOG, RE-C-01 Appendix 7, Control Rod Position Data Sheets, RE-C-01, Exhibit RE-C-01-01, Quarter Core Map or RE-C-01, Exhibit RE-C-01-02, Full Core Map.

3.5 WHEN plant conditions permit, THEN a second licensed operator shall verify control rods on GP-9-2 Appendix 1, Table 1, inserted in Step 3.3 are at position 00 and ALL other control rods are at their pre-transient positions AND signoff Step 3 of GP-9-2 Appendix 1, Table 1.

3.6 Demand an OFFICIAL 3D P1 from PMS or 3D MONICORE to obtain thermal limit values (MFLCPR, MFLPD and MAPRAT).

3.7 IF any thermal limit value is equal to or greater than 1.000, THEN take corrective action in accordance with GP-13, "Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern", and RE-C-01, "Reactor Engineering General Instructions".

3.8 IF further power reduction is required, THEN exit this procedure AND enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure AND enter GP-5, "Power Operations".

4.0 REFERENCES

4.1 GP-3, Normal Plant Shutdown

4.2 GP-5, Power Operations

4.3 GP-9-2 Appendix 1, U/2 Fast Reactor Power Reduction Table

4.4 GP-13, Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern

4.5 RE-C-01, Reactor Engineering General Instructions

4.6 RE-C-01 Appendix 7, Control Rod Movement Guidelines PBAPS Only

4.7 Letter from L. F. Rubino to J. T. Budzynski, 11/8/88

4.8 CM-1, NRC Bulletin No. 88-07 Supplement 1 (T00313)

4.9 CM-2, NRC Generic Letter 94-02 (T03567)

4.10 CM-3, OE 5194, Partial Loss of Feedwater Heating

4.11 CM-4, INPO SER 4-88 (T00462)

4.12 CM-5, GE Letter 11-7-88, Recirc Pump Trip Guidelines (T000157)

4.11 INPO SOER 94-01 (T03905)

PECO Energy Company
Peach Bottom Units 2 and 3

ON-122 MISPOSITIONED CONTROL ROD - PROCEDURE

1.0 SYMPTOMS

1.1 An incorrectly selected control rod was moved.

1.2 A correctly selected control rod was moved two or more notches beyond it's targeted position.

1.3 A correctly selected control rod was moved to an incorrect location AND the operator was NOT immediately cognizant.

2.0 OPERATOR ACTIONS

2.1 Halt all control rod motion and power changes.

2.2 Notify Shift Management.

2.3 IF the mispositioned control rod is caused by a Rod Drift THEN:

2.3.1 Perform ON-121, "Drifting Control Rod".

2.3.2 Exit this procedure.

2.4 IF thermal power is below the RWM low power setpoint AND control rods are positioned such that more than two insert errors OR more than one withdraw error exists, THEN manually scram in accordance with GP-4, "Manual Reactor Scram".

2.5 IF the control rod had been mispositioned less than two minutes THEN:

2.5.1 Immediately return the rod to its proper position.

2.5.2 Notify Reactor Engineering.

NOTE

PCIOMR surveillance status sign is posted to inform the Reactor Operator if PCIOMR recommendations are in effect. The sign is posted on the 2(3)0C05A console at the four rod display panel.

2.6 IF the control rod has been mispositioned for longer than two minutes AND PCIOMR surveillance is required, THEN:

2.6.1 Initiate a 100 MWe load drop, do not go below 500 MWe.

2.6.2 Immediately contact Reactor Engineering for assistance per RE-C-01, "Reactor Engineering General Instructions".

2.6.3 Notify the Shift Manager.

2.7 IF the control rod has been mispositioned for longer than two minutes AND PCIOMR surveillance is NOT required, THEN:

2.7.1 Immediately contact the Reactor Engineering for assistance per RE-C-01, "Reactor Engineering General Instructions".

2.7.2 Notify the Shift Manager.

PLANT NAME: PEACH BOTTOM-2 CY-13

15-SEPT-1999 17:23 CALCULATED
CONTROL ROD POSITIONS 15-SEPT-1999 17:23 PRINTED

	02	06	10	14	18	22	26	30	34	38	42	46	50	54	58
59															
L															
55								18							
51															
L															
47						10				10					
43															
L															
39				10		36		08		36		10			
35															
L															
31		18				08				08				18	
27															
L															
23				10		36		08		36		10			
19															
L															
15						10				10					
11															
L															
07								18							
03															
			L		L		L		L		L		L		L

S = SUBSTITUTE VALUE
L = LPRM
-99 = MISSING CONTROL ROD POSITION

CONTROL ROD DENSITY 7.12%
SEQUENCE A-2

LOAD LINE SUMMARY
CORE POWER 99.39%
CORE FLOW 85.10%
LOAD LINE 110.54%
FLLLP 0.961

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: New-Partial Proc K/A: 2.2.11

URO: 2.5 SRO: 3.4

TASK DESCRIPTION: Prepare a Partial Procedure

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

ST-O-011-301-2, Rev. 12, "Standby Liquid Control Pump Functional Test for IST"

C. REFERENCES

1. A-3, Rev. 18, "Temporary Changes to Procedures and Partial Procedure Use"

2. ST-O-011-301-2, Rev. 12, "Standby Liquid Control Pump Functional Test for IST"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the candidate has correctly prepared ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" as a partial for the completion of Post Maintenance Testing on the "B" Standby Liquid Control (SBLC) pump.

2. Estimated time to complete: 20 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to prepare a partial procedure for Post Maintenance Testing of the "B" Standby Liquid Control (SBLC) pump using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. The "B" Standby Liquid Control (SBLC) pump has failed step 6.3.23 of ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" due to having insufficient pump flow.

2. Maintenance has completed repairs on the pump and it is ready for Post Maintenance Testing.

G. INITIATING CUE

The Control Room Supervisor directs you to prepare a Partial Procedure from ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" to complete Post Maintenance Testing of the "B" Standby Liquid Control (SBLC) pump. Submit the completed partial procedure for review and approval.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*1	Enter the word "PARTIAL" on the first page of the procedure.	P	The word "PARTIAL" is entered on the front page.
*2	Record the reason for the partial and whether additional testing is required to fulfill surveillance test requirements.	P	Candidate writes words that indicate the partial is being used as Post Maintenance Test and that is will meet the surveillance requirements for the "B" SBLC pump.
*3	Indicate changes on the procedure to those steps or portions of the procedure that are not required to be performed.	P	Steps which do not support the testing of the "B" SBLC pump are changed or crossed out. • Step 6.1.1 should be made to apply to the "B" SBLC Pump Only. • Steps 6.1.2 –6.1.5 should be crossed out. • Steps 6.2.1 –6.2.28 (all of section 6.2) should be crossed out (individual steps or entire pages may be crossed out at a time).
4	Submit the partial for approval. (Cue: Accept partial for approval.)	P	Candidate will give evaluator the marked up procedure for approval.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the candidate submits the Partial Procedure for approval, the evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. The “B” Standby Liquid Control (SBLC) pump has failed step 6.3.23 of ST-O-011-301-2, “Standby Liquid Control Pump Functional Test for IST” due to having insufficient pump flow.

2. Maintenance has completed repairs on the pump and it is ready for Post Maintenance Testing.

INITIATING CUE

The Control Room Supervisor directs you to prepare a Partial Procedure from ST-O-011-301-2, “Standby Liquid Control Pump Functional Test for IST” to complete Post Maintenance Testing of the “B” Standby Liquid Control (SBLC) pump. Submit the completed partial procedure for review and approval.

2

ST-O-011-301-2 STANDBY LIQUID CONTROL PUMP FUNCTIONAL TEST FOR IST

TEST FREQUENCY: Once/92 days (See Section 1.0)
TECH SPEC: SR 3.1.7.5, SR 3.1.7.8, SR 3.1.7.10, Section 5.5.6
APPLICABILITY: Modes 1 and 2

1 **CHECK** why this procedure is being performed:

☐ Schedule ☐ OVF ☐ Retest Due To Unsat Test

☐ Other Reason: ____________________

Approved By SMgt: ____________ ______ __/__/__ ________
Printed Name Time Date Initials

2 **INITIAL** one of the following Test Results:

A: All */I steps are **SATISFACTORY** ________

B: One or More */I steps are **UNSATISFACTORY**
Refer to Section 9.0 for Tech Spec LCO's

Performed By: ____________ ______ __/__/__ ________
Printed Name Time Date Initials

RO/PRO Informed of
Test Completion: ____________ ______ __/__/__ ________

Reviewed By SMgt: ____________ ______ __/__/__ ________

UNSAT Notification: ____________________
SMgt Discretion: Plant Mgr or Others

Notified By: ____________ ______ __/__/__ ________

3 If other portions of the test did NOT function properly,
Or other discrepancies were noted Then **COMPLETE** the following:

IST Step(s) in ALERT range: ____________________
DESCRIBE discrepancies/actions taken: A/R or ETT #: ________

____

4 Reviewed/Approved
Plant Staff: ____________ ______ __/__/__ ________
Printed Name Time Date Initials

1.0 PURPOSE

This test verifies operability and performance of the Standby Liquid Control (SBLC) Pumps and Discharge Check Valves once/92 days in accordance with the Inservice Testing Program. This test satisfies Tech Spec SR 3.1.7.8. This test partially satisfies SR 3.1.7.5, SR 3.1.7.10, and Inservice Testing requirements for components in compliance with PBAPS Inservice Testing Program Spec. M-710 which implements requirements of Tech Spec Section 5.5.6. **CM-1**

2.0 TEST EQUIPMENT

2.1

Description	Req Min Accuracy	M&TE No.	Cal Due Date
Stopwatch	None	________	___/___/___
Vibration meter Raw Signal Single Integration (Min. Req. Freq. Range 2.8-1000 Hz) **CM-2**	 ± 1.5% ± 3.0%	________	___/___/___
Vibration probe (Min. Req. Freq. Range 2.8-1000 Hz) **CM-2**	± 4.0%	________	___/___/___
Test Gauge 0-1500 psig	± 5.0%	________	___/___/___
Test Gauge 0-1500 psig (N/A if one test rig is to be used)	± 5.0%	________	___/___/___

2.2 (1 or 2) - Test rig(s) with Schrader fitting (see Figure 1)

2.3 SBLC Measuring Stick

2.4 Non-contaminated hose for flushing test tank 20T017 (with quick disconnect).

2.5 Locked Valve Key For:

NUMBER	DESCRIPTION	NORMAL POS
HV-2-11-11	SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040	LOCKED OPEN
HV-2-11-15	SBLC Disch Header To RPV Outboard Isolation Valve	LOCKED OPEN
HV-2-11-26	SBLC Pumps Disch Recirc HDR Block To Tks 20T017 + 20T018	LOCKED CLOSED

2.0 TEST EQUIPMENT (Continued)

NUMBER	DESCRIPTION	NORMAL POS
HV-2-11-41	SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR	LOCKED CLOSED

3.0 PREREQUISITES Initial

3.1 Test Initiation

3.1.1 **COMPLETE** Section 1 of cover page. ________

3.2 Document Review

3.2.1 **ENSURE** procedure is current revision. ________

3.3 Equipment Configuration

None

3.4 Required Redundant Safety Related Equipment

None

3.5 Other Prerequisite Activities

3.5.1 **VERIFY** at least two operators are available to perform this test. ________

3.5.2 **VERIFY** SBLC Test Tank empty and **NO** foreign objects in tank. ________

3.5.3 **VERIFY** one 55 gallon drum which is empty or near empty available at Rx Bldg 165' by SBLC system drain lines. ________

3.5.4 **VERIFY** that qualified personnel are available for vibration data collection and lube oil sampling. Operators may view the training video for Operations Role in Predictive Maintenance to refresh on proper technique. ________

3.5.5 **OBTAIN** oil sampling equipment from the Oil Sample Drop-off Box located on Turbine Bldg 116' outside the ferrography lab. ________

3.0 PREREQUISITES (Continued)

3.6 Approval to Start Test

3.6.1 **OBTAIN** RO Permission to begin.

______ __/__/__ ______
Time Date RO

4.0 PRECAUTIONS, LIMITATIONS, AND GENERAL INSTRUCTIONS

4.1 Plant Impact Statement

4.1.1 This test will operate both Standby Liquid Control (SBLC) Pumps using local control. SBLC system will be isolated from the Reactor which will make the system out of service for the duration of the test. This test may be performed in any Reactor Mode.

4.2 Precautions

4.2.1 Do **NOT** START SBLC Pumps from the Control Room. Starting SBLC Pumps from Control Room will fire the explosive valves.

4.2.2 SBLC Pumps should not be lined up to take suction on the Test Tank when the suction is uncovered. The suction comes off the side of the test tank.

4.2.3 **DO NOT PLACE** hands in pump cavity during performance of this procedure.

4.2.4 **OBSERVE** proper safety precautions when working with Sodium Pentaborate solution and avoid contact with the skin.

4.2.5 At least one person shall stay at SBLC area on 195' elevation while the valves are out of normal alignment to restore the system to normal in an emergency situation.

4.3 Limitations

None

4.4 General Instructions

4.4.1 Communications will be required between Control Room and Standby Liquid Control Tank Area, 195', R2-49 and Reactor Bldg West, at Standby Liquid Control System waste water drums on 165'.

4.4.2 This test must be completed in a timely manner. **IF** delays occur during this test, **THEN NOTIFY** SMgt so SBLC System OPERABILITY may be determined.

4.0 PRECAUTIONS, LIMITATIONS, AND GENERAL INSTRUCTIONS (Continued)

4.4.3 **IF** system initiation becomes necessary while performing test, **THEN STOP** test **AND PERFORM** Section 6.4 "Restoring SBLC System to Operable Status" **AND NOTIFY** Control Room.

4.4.4 **IF** procedure is aborted, **THEN RESTORE** SBLC per section 6.4, notify SMgt **AND** write **"TEST ABORTED"** in Section 3 of Cover Page.

4.4.5 **IF** any procedure step can **NOT** be completed **OR** produces an unexpected response **THEN STOP** the test **AND RETURN** the equipment to a safe condition **AND NOTIFY** the RO or SMgt.

4.4.6 **IF** any Black Box is initialed **THEN STOP** the test **AND RETURN** the equipment to a safe condition **AND NOTIFY** the RO or SMgt.

4.4.7 All persons who initial steps in Sections 3.0, 6.0, or 7.0 are responsible for completing Section 10.0.

4.4.8 Initial blanks designated as IV are provided for Independent Verification.

4.4.9 All applicable ***/I** steps are identified immediately in front of the initials.

5.0 ACCEPTANCE CRITERIA

5.1 Each SBLC Pump develops a flow rate of ≥ 43 gpm at a discharge pressure ≥1255 psig.

5.2 SBLC Pump pressures, flows, and vibration are obtained, and vibration and flows are NOT in the action range limits of Section 6.0.

5.3 Operability of CHK-2-11-43A and B is verified in the OPEN and CLOSED directions.

5.4 The combination of SBLC boron concentration, pump flow rate, and boron enrichment is greater than or equal to 1 as determined by Equation specified in Step 6.6.4.

6.0 PERFORMANCE STEPS

		Initial Sat	Initial UnSat
6.1	Test Preparation and Valve Lineup		
	< At Standby Liquid Control Tank Area 195', R2-49 >		
6.1.1	**VERIFY** both SBLC Pump oil levels are between the min static and max static level on pump oil sightglasses.	____	____
6.1.2	**REMOVE** cap **AND INSTALL** test rig with 1500 psig test gauge to 2AT076 "Stby Liquid Control N2 Accumulator A".	____	____
6.1.3	**LEAK TEST** test rig as desired.	____	____
6.1.4	**VERIFY** accumulator 2AT076 pressure is from 325 to 450 psig **AND CHARGE** accumulator if necessary.	____	____
6.1.5	**IF** one test rig is to be used, **THEN REMOVE** test rig at 2AT076. **OTHERWISE, N/A** this step.	____	____
6.1.6	**REMOVE** cap **AND INSTALL** test rig with 1500 psig test gauge to 2BT076 "Stby Liquid Control N2 Accumulator B".	____	____
6.1.7	**LEAK TEST** test rig as desired.	____	____
6.1.8	**VERIFY** accumulator 2BT076 pressure is from 325 to 450 psig **AND CHARGE** accumulator if necessary.	____	____
6.1.9	**REMOVE** cover on 20T017 "Standby Liquid Control Test Tank" **AND INSTALL** SBLC measuring stick inside of tank.	____	____
6.1.10	**VERIFY** HV-2-11-11 "SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040" LOCKED OPEN.	____	____
6.1.11	**UNLOCK AND CLOSE** HV-2-11-15 "SBLC Disch Header To RPV Outboard Isolation Valve".	____	____
6.1.12	**UNLOCK AND OPEN** HV-2-11-26 "SBLC Pumps Disch Recirc Hdr Block to Tks 20T017 + 20T018".	____	____
6.1.13	**OPEN** HV-2-11-30 "SBLC Pumps Disch Recirc Blk to SBLC Tank 20T018".	____	____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.2 SBLC Pump A Test **CM-1**

6.2.1 **RECORD** 2BT076 pressure.

_______ psig _____ _____

****
* **CAUTION** *
*
* **DO NOT START** SBLC Pumps from the Control Room. Starting SBLC Pumps from the Control Room will fire the explosive valves. *
*
****

6.2.2 **NOTIFY** Reactor Operator 2AP040 "Standby Liquid Control Pump A" will be started. _____ _____

6.2.3 LOCALLY **START** 2AP040. _____ _____

NOTE

Manufacturer recommends running pump for 30 minutes following pump maintenance before operating at full load.

6.2.4 **IF** Surveillance Test is being performed to satisfy pump post maintenance testing, **THEN PERFORM** this step, **OTHERWISE N/A AND PROCEED** to step 6.2.5.

1. **RUN** pump for 5 minutes unloaded **THEN** SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 250 to 350 psig as indicated on PI-2-11-03 **AND RUN** pump for 5 additional minutes. _____ _____

2. SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 550 to 650 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. _____ _____

3. SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 850 to 950 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. _____ _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

NOTE

Fluctuations on PI-2-11-053 may be dampened by throttling IIV-2-11-053. If throttling is used, the valve may be opened and closed to verify pressure indication is valid.

6.2.5 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1200 (1160-1200) psig as indicated on PI-2-11-053. ____ ____

CAUTION

DO NOT EXCEED a pump discharge pressure of 1300 psig while throttling HV-2-11-26. Relief valve is set to lift at 1400 psig. Pressure will continue to increase slightly when valve throttling is stopped.

6.2.6 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053. ____ ____

6.2.7 **RECORD** 2BT076 pressure.

______ psig ____ ____

NOTE

The next step verifies CHK-2-11-43B "SBLC Pump 2BP040 Discharge Check Valve" in the CLOSED direction.

6.2.8 **VERIFY** pressure recorded in Step 6.2.7 is less than 100 psig above the pressure recorded in Step 6.2.1. I ____

6.2.9 **RUN** 2AP040 for at least 2 minutes to ensure accurate vibration data. I ____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.2.10 **OBTAIN** pump housing vibration data in velocity (in/sec) at inboard locations marked X1 and Y1 and outboard locations marked X1 and Y1 **AND RECORD** vibration data on Data Sheet 1. _____ _____

DATA SHEET 1
2AP040 PUMP HOUSING VIBRATION DATA

MEASURED VIBRATION AT MARKED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
INBOARD			
X1________IN/SEC PK	≤ 0.716	0.716 to 1.719	> 1.719
Y1________IN/SEC PK	≤ 0.225	0.225 to 0.540	> 0.540
OUTBOARD			
X1________IN/SEC PK	≤ 0.803	0.803 to 1.929	> 1.929
Y1________IN/SEC PK	≤ 0.496	0.496 to 1.192	> 1.192

6.2.11 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1220 (1200-1240) psig as indicated on PI-2-11-053. _____ _____

6.2.12 **STOP** 2AP040. _____ _____

6.2.13 **CLOSE** HV-2-11-30. _____ _____

6.2.14 **OPEN** HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 20T017". _____ _____

NOTE

It will take 2 minutes for SBLC Test Tank level to reach the lower mark on the SBLC Measuring Stick therefore Step 6.2.15 must be performed in a timely manner.

6.2.15 LOCALLY **START** 2AP040 **AND THROTTLE** HV-2-11-26 as required to obtain a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053 **AND RECORD** pressure on Data Sheet 2. _____ _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.2.16 **WHEN** Test Tank level reaches the lower mark on the SBLC Measuring Stick, **START** stopwatch, **THEN MEASURE** the time required to raise Test Tank level to the upper mark on the SBLC Measuring Stick. _____ _____

6.2.17 **STOP** 2AP040. _____ _____

6.2.18 **RECORD** time required for level change on Data Sheet 2 to one tenth of a second. _____ _____

NOTES

1. The following step may be performed out of sequence as directed by the step.
2. **IF** it is not possible to obtain sample within 15 minutes after securing pump due to oil being distributed in crankcase, **THEN** attempt to obtain a sample at thirty minute intervals until a sample is successfully obtained **AND** record time elapsed between securing pump and withdrawing sample, in step 6.2.19.6.

6.2.19 **PERFORM** the following to obtain 2AP040 oil samples no more than 15 minutes after the pump has been secured:

1. **LOCATE** oil sample fittings on the pump crankcase **AND** motor housing. _____ _____
2. **RECORD** equipment number, equipment serial number (if available), sample point, sample date, **AND** "Sampled by" name on labels. _____ _____
3. **OBTAIN** oil sample from each reservoir by removing oil sample fitting cap, inserting plastic probe, and drawing vacuum on sample bottle with sampling pump. _____ _____
4. **DISCONNECT** sample probe **AND REPLACE** sampling fitting cap hand tight. _____ _____
5. **REMOVE** sample bottle from sampling pump **AND REPLACE** sample bottle cap. _____ _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6. **IF** sample could not be obtained within 15 minutes after securing pump, **THEN RECORD** time elapsed between securing pump and withdrawing sample **AND RECORD** time elapsed on sample bottle.

   ______ min. ______ ______

6.2.20 **CALCULATE** 2AP040 flow rate as follows **AND RECORD** flow rate on Data Sheet 2:

$$\frac{52.8 \text{ gal} \times 60 \text{ sec/min}}{\text{Step 6.2.16}} = \text{Flow Rate}$$

3168 / ______ sec = ______ gpm ______ ______

______ IV ______

DATA SHEET 2
2AP040 IST DATA

> **NOTE**
>
> Pump flow rate acceptance criteria is based on a reference value of 53.0 gpm at a discharge pressure of 1255.0 psig.

PARAMETER	ACTUAL VALUE	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
TIME (Seconds)		N/A	N/A	N/A
FLOW RATE (gpm) (3168/Time)		50.2 to 58.1	< 50.2 to 49.1	< 49.1 or > 58.1
DISCH PRESSURE (psig)		1255-1280	N/A	N/A

6.2.21 **VERIFY** flow and pressure recorded in Data Sheet 2 is ≥43 gpm at ≥1255 psig. * ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

> **NOTE**
>
> The next step verifies CHK-2-11-43A "SBLC Pump 2AP040 Discharge Check Valve" in the OPEN direction.

6.2.22 **VERIFY** pump test data on Data Sheets 1 and 2 do **NOT** fall within Action Range. I ____ ____

6.2.23 **CLOSE** HV-2-11-27. ____ ____

6.2.24 **OPEN** HV-2-11-26. ____ ____

6.2.25 **OPEN** HV-2-11-30. ____ ____

6.2.26 **UNLOCK AND OPEN** HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR". ____ ____

6.2.27 **IF** test tank level reaches top of suction line on side of tank by gravity draining, **THEN N/A** the next 3 sign-offs. **OTHERWISE, PERFORM** the following:

1. **UNLOCK AND CLOSE** HV-2-11-11. ____ ____

```
**********************************************
*                 CAUTION                    *
*                                            *
*    Do not run SBLC Pump when Test Tank     *
*    is empty.                               *
*                                            *
**********************************************
```

2. LOCALLY **START** 2AP040 **THEN STOP** pump when Test Tank level reaches top of suction line on side of test tank. ____ ____

3. **OPEN** HV-2-11-11. ____ ____

6.2.28 **CLOSE** HV-2-11-41. ____ ____

6.3 SBLC Pump B Test **CM-1**

6.3.1 **IF** one test rig is being used, **THEN REMOVE** test rig at 2BT076 **AND INSTALL** cap. **OTHERWISE, N/A** this step. ____ ____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.3.2 **IF** one test rig is being used, **THEN INSTALL** test rig at 2AT076. **OTHERWISE, N/A** this step. _____ _____

6.3.3 **RECORD** 2AT076 pressure.

_______ psig _____ _____

****
CAUTION

DO NOT START SBLC Pumps from the Control Room. Starting SBLC Pumps from the Control Room will fire the explosive valves.
****

6.3.4 **NOTIFY** Reactor Operator 2BP040 "Standby Liquid Control Pump B" will be started. _____ _____

6.3.5 LOCALLY **START** 2BP040. _____ _____

NOTE

Manufacturer recommends running pump for 30 minutes following pump maintenance before operating at full load.

6.3.6 **IF** Surveillance Test is being performed to satisfy pump post maintenance testing, **THEN PERFORM** this step, **OTHERWISE N/A** this step **AND PROCEED** to step 6.3.7.

1. **RUN** pump for 5 minutes unloaded **THEN** SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 250 to 350 psig as indicated on PI-2-11-053 **AND RUN** pump for 5 additional minutes. _____ _____

2. **SLOWLY THROTTLE** HV-2-11-26 to a pressure between 550 to 650 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. _____ _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

3. **SLOWLY THROTTLE** HV-2-11-26 to a pressure between 850 to 950 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. _____ _____

NOTE

Fluctuations on PI-2-11-053 may be dampened by throttling IIV-2-11-053. IIV-2-11-053 may be opened and closed to verify pressure indication is valid.

6.3.7 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1200 (1175-1200) psig as indicated on PI-2-11-053. _____ _____

CAUTION

DO NOT EXCEED a pump discharge pressure of 1300 psig while throttling HV-2-11-26. Relief valve is set to lift at 1400 psig. Pressure will continue to increase slightly when valve throttling is stopped.

6.3.8 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053. _____ _____

6.3.9 **RECORD** 2AT076 pressure.

_______ psig _____ _____

NOTE

The next step verifies CHK-2-11-43A in the CLOSED direction.

6.3.10 **VERIFY** pressure recorded in Step 6.3.9 is less than 100 psig above the pressure recorded in Step 6.3.3. I _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.3.11 **RUN** 2BP040 for at least 2 minutes to ensure accurate vibration data. I _____ _____

6.3.12 **OBTAIN** pump housing vibration data in velocity (in/sec) at inboard locations marked X1 and Y1 and outboard locations marked X1 and Y1 **AND RECORD** vibration data on Data Sheet 3. _____ _____

DATA SHEET 3
2BP040 PUMP HOUSING VIBRATION DATA

MEASURED VIBRATION AT MARKED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
INBOARD			
X1_______ IN/SEC PK	≤ 0.527	0.527 to 1.266	> 1.266
Y1_______ IN/SEC PK	≤ 0.355	0.355 to 0.853	> 0.853
OUTBOARD			
X1_______ IN/SEC PK	≤ 0.499	0.499 to 1.197	> 1.197
Y1_______ IN/SEC PK	≤ 0.404	0.404 to 0.969	> 0.969

6.3.13 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1220 (1200-1240) psig as indicated on PI-2-11-053. _____ _____

6.3.14 **STOP** 2BP040. _____ _____

6.3.15 **CLOSE** HV-2-11-30. _____ _____

6.3.16 **OPEN** HV-2-11-27. _____ _____

6.0 PERFORMANCE STEPS (Continued) | Initial Sat UnSat

NOTE

It will take 2 minutes for SBLC Test Tank level to reach the lower mark on the SBLC Measuring Stick therefore Step 6.3.17 must be performed in a timely manner.

6.3.17. LOCALLY **START** 2BP040 **AND THROTTLE** HV-2-11-26 as required to obtain a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053 **AND RECORD** pressure on Data Sheet 4. _____ _____

6.3.18 **WHEN** Test Tank level reaches the lower mark on the SBLC Measuring Stick, **START** stopwatch, **THEN MEASURE** the time required to raise Test Tank level to the upper mark on the SBLC Measuring Stick. _____ _____

6.3.19 **STOP** 2BP040. _____ _____

6.3.20 **RECORD** time required for level change on Data Sheet 4 to one tenth of a second. _____ _____

NOTES

1. The following step may be performed out of sequence as directed by the step.
2. **IF** it is not possible to obtain sample within 15 minutes after securing pump (due to oil being distributed in crankcase,) **THEN** attempt to obtain a sample at ten or fifteen minute intervals until a sample is successfully obtained **AND** record time elapsed between securing pump and obtaining sample, in step 6.3.21.6.

6.3.21 **PERFORM** the following to obtain 2BP040 oil samples no more than 15 minutes after the pump has been secured:

1. **LOCATE** oil sample fittings on the pump crankcase **AND** motor housing. _____ _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

2. **RECORD** equipment number, equipment serial number (if available), sample point, sample date, **AND** "Sampled by" name on labels. ____ ____

3. **OBTAIN** oil sample from each reservoir by removing oil sample fitting cap, inserting plastic probe, and drawing vacuum on sample bottle with sampling pump. ____ ____

4. **DISCONNECT** sample probe **AND REPLACE** sampling fitting cap hand tight. ____ ____

5. **REMOVE** sample bottle from sampling pump **AND REPLACE** sample bottle cap. ____ ____

6. **IF** sample could not be obtained within 15 minutes after securing pump, **THEN** record time elapsed between securing pump and withdrawing sample **AND RECORD** time elapsed on sample bottle. ____ ____

   ________ Min.

6.3.22 **CALCULATE** 2BP040 flow rate as follows **AND RECORD** Flow rate on Data Sheet 4:

$$\frac{52.8 \text{ gal} \times 60 \text{ sec/min}}{\text{Step 6.3.18}} = \text{Flow rate}$$

3168 / ______ sec = ______ gpm ____ ____

____ ____
IV

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

DATA SHEET 4
2BP040 IST DATA

NOTE

Pump flow rate acceptance criteria is based on a reference value of 53.0 gpm at a discharge pressure of 1255.0 psig.

PARAMETER	ACTUAL VALUE	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
TIME (Seconds)		N/A	N/A	N/A
FLOW RATE (gpm) (3168/Time)		51.2 to 59.3	< 51.2 to 50.1	< 50.1 or > 59.3
DISCH PRESSURE (psig)		1255-1280	N/A	N/A

6.3.23 **VERIFY** flow recorded in Data Sheet 4 is ≥ 43 gpm **AND** pressure is ≥ 1255 psig. * ____ ____

NOTE

The next step verifies CHK-2-11-43B "SBLC Pump 2BP040 Discharge Check Valve" in the OPEN direction.

6.3.24 **VERIFY** pump test data on Data Sheets 3 and 4 do **NOT** fall within Action Range. I ____ ____

6.3.25 **REMOVE** test rig at 2AT076 **AND INSTALL** cap. ____ ____

6.3.26 **IF** two test rigs were used, **THEN REMOVE** test rig at 2BT076 **AND INSTALL** cap. **OTHERWISE, N/A** this step. ____ ____

6.3.27 **CLOSE** HV-2-11-27. ____ ____

6.3.28 **OPEN** HV-2-11-30. ____ ____

6.3.29 **OPEN** HV-2-11-41. ____ ____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.3.30 **IF** test tank level reaches top of suction line on side of tank by gravity draining, **THEN N/A** the next 3 sign-offs. **OTHERWISE, PERFORM** the following:

1. **UNLOCK AND CLOSE** HV-2-11-11. _____ _____

****
CAUTION

Do not run SBLC Pump when Test Tank is empty.
****

2. LOCALLY **START** 2BP040 **THEN STOP** pump when Test Tank level reaches top of suction line on side of test tank. _____ _____

3. **OPEN** HV-2-11-11. _____ _____

6.3.31 **CLOSE** HV-2-11-41. _____ _____

6.4 Restoring SBLC System to Operable Status

6.4.1 **LOCK** closed HV-2-11-41. _____ _____

6.4.2 **VERIFY OR LOCK OPEN** HV-2-11-11. _____ _____

6.4.3 **CLOSE OR VERIFY CLOSED** HV-2-11-30. _____ _____

6.4.4 **CLOSE AND LOCK** HV-2-11-26. _____ _____

6.4.5 **OPEN AND LOCK** HV-2-11-15. _____ _____

6.4.6 **NOTIFY** Reactor Operator SBLC System has been returned to service. _____ _____

6.0 PERFORMANCE STEPS (Continued)

	Initial Sat	Initial UnSat
6.5 Flushing Test Tank 20T017		
CAUTION: **DO NOT OVERFILL** Waste Water Drum on 165'. If necessary, HV-2-11-23143 may be closed while changing drums.		
< At Rx Bldg 165', West Wall>		
6.5.1 **OPEN** HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve".	____	____
< At Standby Liquid Control Tank Area, 195', R2-49 >		
6.5.2 **REMOVE** SBLC measuring stick from Test Tank.	____	____
6.5.3 **INSTALL** hose at a demin water supply valve HV-2-38D-29 "Demin Wtr Hose Blk Vv for SBLC Test Tank 20T017.	____	____
6.5.4 **OPEN** HV-2-11-28 "SBLC Test Tank 20T017 Inner Drain Valve".	____	____
6.5.5 **OPEN** HV-2-38D-29 **AND FLUSH** Test Tank with demineralized water.	____	____
6.5.6 **CLOSE** HV-2-38D-29.	____	____
6.5.7 **CLOSE** HV-2-11-28.	____	____
6.5.8 **VERIFY** Test Tank empty.	____	____
6.5.9 **INSTALL** cover on Test Tank.	____	____
6.5.10 **REMOVE** hose from demin water supply valve HV-2-38D-29.	____	____
< At Rx Bldg 165', West Wall>		
6.5.11 **CLOSE** HV-2-11-23143.	____	____
6.5.12 **PLACE** oil sample bottles in the drop-off box located on Turbine Bldg 116' outside the ferrography lab.	____	____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.6 SBLC System Operability Verification

6.6.1 **RECORD** lowest SBLC Pump flow rate from Data Sheet 2 or 4.
________ gpm ______ ______

6.6.2 **OBTAIN** most recent figures for SBLC Concentration and Enrichment from Chemistry Unit 2 SBLC Sample Log.

________ Concentration ________ Enrichment ______ ______

6.6.3 **PROVIDE** lowest SBLC pump flow rate data to Shift Chemist for entry into Unit 2 SBLC Sample Log. ______ ______

6.6.4 **PERFORM** the following calculation for determination of SBLC System operability:

$$\frac{C}{13\%\ WT} \times \frac{Q}{86\ gpm} \times \frac{E}{19.8\%} = O$$

$$\frac{\_\_\_\_\_\_}{13\%\ WT} \times \frac{\_\_\_\_\_\_}{86\ gpm} \times \frac{\_\_\_\_\_\_}{19.8\%} = \_\_\_\_$$

Where: C = Concentration from Step 6.6.2
Q = Lowest SBLC Pump flow rate from Step 6.6.1
E = Enrichment from Step 6.6.2
O = Operability factor ______ ______

6.6.5 **VERIFY** Operability Factor calculated in previous step is greater than or equal to 1. * ______

7.0 PROCEDURE COMPLETION

Initial

7.1 Independent Verification

7.1.1 **VERIFY** calculation in Step 6.6.4 is correct. ________
IV

< At Standby Liquid Control Tank Area 195', R2-49 >

7.1.2 **VERIFY** HV-2-11-15 "SBLC Disch Header To RPV Outboard Isolation Valve" is LOCKED OPEN. ________
IV

7.0 PROCEDURE COMPLETION (Continued) Initial

7.1.3 **VERIFY** HV-2-11-11 "SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040" is LOCKED OPEN. ______ IV

7.1.4 **VERIFY** HV-2-11-26 "SBLC Pumps Disch Recirc HDR Block To Tks 20T017 + 20T018" is LOCKED CLOSED. ______ IV

7.1.5 **VERIFY** HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR" is LOCKED CLOSED. ______ IV

7.1.6 **VERIFY** HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 20T017" is CLOSED. ______ IV

7.1.7 **VERIFY** HV-2-11-30 "SBLC Pumps Disch/Recirc Blk To SBLC Tank 20T018" is CLOSED. ______ IV

7.1.8 **VERIFY** HV-2-11-28 "SBLC Test Tank 20T017 Drain Valve" is CLOSED. ______ IV

7.1.9 **VERIFY** test rig at 2AT076 "Stby Liquid Control N2 Accumulator A" REMOVED **AND** cap INSTALLED. ______ IV

7.1.10 **VERIFY** test rig at 2BT076 "Stby Liquid Control N2 Accumulator B" REMOVED **AND** cap INSTALLED. ______ IV

7.1.11 **VERIFY** IIV-2-11-053 "PI-2-11-053 Instr Isol SBLC PPs Disch Header Press" is OPEN. ______ IV

< At Rx Bldg 165', West Wall>

7.1.12 **VERIFY** HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve" is CLOSED. ______ IV

7.2 Records Completion

7.2.1 **COMPLETE** Section 2 of Cover Page (and Section 3 if applicable). ______

8.0 REFERENCES

8.1 Governing

8.1.1 Tech Spec SR 3.1.7.5

8.1.2 Tech Spec SR 3.1.7.8

8.1.3 Tech Spec SR 3.1.7.10

8.0 REFERENCES (Continued)

8.1.4 Tech Spec 5.5.6

8.1.5 CM-1, Letter to NRC from G. A. Hunger, Jr. dated Sept. 29, 1994 transmitting TSCR 93-16 (A0902903-10, T03675)

8.1.6 CM-2, Deviation from Instrument Range Requirement, (T03589)

8.1.7 ASME OM Code, Code for Operation and Maintenance of Nuclear Power Plants, 1990 Edition

8.2 Interfacing

8.2.1 A-8, Control of Locked Valves

8.3 Developmental

8.3.1 Prints

M-358, Sht 1, Standby Liquid Control System

M-1-S-46, Sht 5, Electrical Schematic Standby Liquid Control System

8.3.2 M-1-JJ-40, Union Pump Manual

8.3.3 Response to NRC Inspection Report 50-277/78-12

8.3.4 RCM analysis - SBLC, (T02979)

8.3.5 This procedure supersedes ST 6.1.2-3

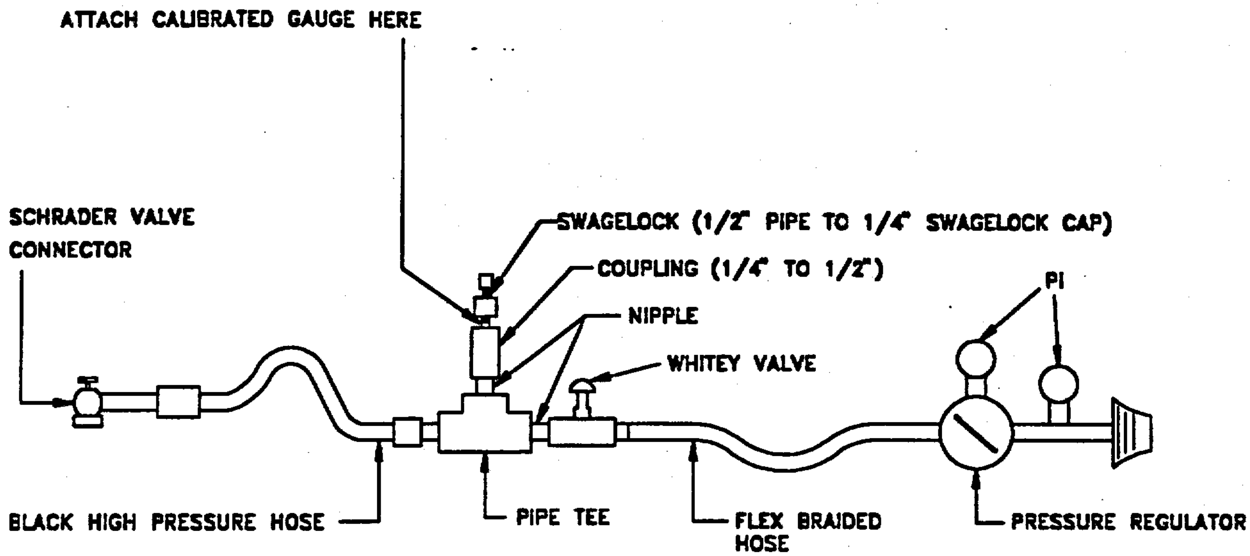
9.0 TECH SPEC LIMITING CONDITIONS FOR OPERATION (LCOs)

Section 3.1.7

10.0 PARTICIPANTS RECORD

Printed Name	Initials

Figure 1
TEST RIG



SRO EQUIP CONTROL

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: New-TSA Log K/A: 2.2.23

URO: 2.6 SRO: 3.8

TASK DESCRIPTION: Complete Tech Spec Log Entries

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Blank copies of the Tech Spec Action Log (Exhibit OM-P-12.1:1) from OM-P-12.1, Rev. 7, Operations Manual, Section 12.1, Operations Action Logs.

C. REFERENCES

1. OM-P-12.1, Rev. 7, "Operations Manual, Section 12.1 Operations Actions Logs"
2. M-356 Sh. 1, Rev. 61, "P&ID Control Rod Drive Hydraulic System"
3. ST-O-003-450-2, Rev. 4, "Scram Discharge Vent and Drain Valve Functional Test"
4. Technical Specification 3.1.8, "Scram Discharge Volume (SDV) Vent and Drain Valves"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the Tech Spec Action Log Sheets have been completed for the SDV vents AO-2-03-32A and AO-203-32B (one sheet for each valve).
2. Estimated time to complete: 15 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, complete the manual Tech Spec Action Log sheets for SDV vents AO-203-32A and AO-2-03-32B. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. Unit 2 is operating at full power.
2. At 0800 this morning AO-2-03-032A and AO-2-03-32B were declared inoperable due to failing ST-O-003-450-2, "Scram Discharge Vent and Drain Valve Functional Test", step 6.3.1 due to excessive stroke times.
3. AR A1188549 has been initiated to repair the valves.
4. All other Tech Spec plant equipment is operable.
5. The Unified Control Room Log Computer is not operating.

G. INITIATING CUE

Determine the Tech Spec impact of these inoperabilities, make manual Tech Spec Action Log entries in accordance with the Operations Manual, and submit the completed form to the Shift Manger for review.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*1	Determine the applicable Tech Spec for SDV vents AO-2-03-32A and AO-2-03-032B INOP. (Cue: Acknowledge the determination.)	P	It is determined that Tech Spec 3.1.8 "SDV Vent and Drain Valves" is applicable.
*2	Determine that both INOP vent valves are in different lines. (Cue: Acknowledge the determination.)	P	It is determined that both vent valves are in different lines using P&IDs or Control Room panel mimics.
*3	Determine that Condition A of Tech Spec 3.1.8 is applicable for AO-2-03-032A and AO-2-03-032B INOP. (Cue: Acknowledge the determination.)	P	It is determined that Condition A of Tech Spec 3.1.8 is applicable.
*4	Determine the completion time for Required Action A.1 to be 0800, 7 days from today's date. (Cue: Acknowledge the determination.)	P	It is determined that the completion time for Required Action A.1 is 0800, 7 days from today's date.
*** NOTE *** The following Exhibit OM-P-12.1:1 entries may differ slightly from those listed in the task standard as long as the important information is included.			
*5	Complete Exhibit OM-P-12.1:1 "Technical Specification Action Log" of OM-P-12.1 Operations Manual Section 12.1 "Operator Action Logs" by completing the following fields for AO-2-03-032A: • Unit – "unit experiencing inoperability" Entry # - sequential number consisting of year, unit and sequential TSA # • Tech Spec Number – "Tech Spec number for inoperability" • Discovery Date/Time – "date and time inoperability discovered" • Equipment ID – "alpha-numeric designator for inop equipment" • System Number – "system number for equipment inop"	P	The following data is entered in the fields listed below on Exhibit 1 OM-P-12.1:1 "Technical Specification Action Log". • Unit – "Unit 2" Entry # - "99-2 – next TSA number" • Tech Spec number – "3.1.8" • Discovery Date/Time – "today's date/0800" • Equipment ID – "AO-2-03-032A" • System # - "3"

STEP NO	STEP	ACT	STANDARD
	• Reference # - "AR number associated with the INOP feature". • Condition – "applicable Tech Spec condition letter and condition statement" • Reason – "short reason system is inop" • Required Action 1 – "Applicable required action statement" • Completion Time Date/Time – "Date and time for required action to be completed"		• Reference # - "A1188549" • Condition – "A", one or more SDV vent or drain lines with one valve inoperable. • Reason – "failed step 6.3.1 of ST-O-003-450-2" • Required Action 1 – "restore valve to OPERABLE status" • Completion Time – "0800/7 days from today's date"
6	Complete Exhibit OM-P-12.1:1 "Technical Specification Action Log" of OM-P-12.1 Operations Manual Section 12.1 "Operator Action Logs" by completing the following fields for AO-2-03-032B: • Unit – "unit experiencing inoperability" Entry # - sequential number consisting of year, unit and sequential TSA # • Tech Spec Number – "Tech Spec number for inoperability" • Discovery Date/Time – "date and time inoperability discovered" • Equipment ID – "alpha-numeric designator for inop equipment" • System Number – "system number for equipment inop" • Reference # - "AR number associated with the INOP feature" • Condition – "applicable Tech Spec condition letter and condition statement"	P	The following data is entered in the fields listed below on Exhibit 1 OM-P-12.1:1 "Technical Specification Action Log". • Unit – "Unit 2" Entry # - "99-2 – next TSA number" • Tech Spec number – "3.1.8" • Discovery Date/Time – "today's date/0800" • Equipment ID – "AO-2-03-032B" • System # - "3" • Reference # - "A1188549" • Condition – "A", one or more SDV vent or drain lines with one valve inoperable.

STEP NO	STEP	ACT	STANDARD
	• Reason – "short reason system is inop" • Required Action 1 – "Applicable required action statement" • Completion Time Date/Time – "Date and time for required action to be completed"		• Reason – "failed step 6.3.1 of ST-O-003-450-2" • Required Action 1 – "restore valve to OPERABLE status" • Completion Time – "0800/7 days from today's date"
7	Submit the completed forms to the Shift Manger for review. (Cue: Role play as the Shift Manager and acknowledge receipt of the completed TSA log for review.	P	Completed forms are given to the Shift Manger for review (one sheet for each valve).

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When Tech Spec Action Log sheets for AO-2-03-32A and AO-2-03-32B have been submitted to the Shift Manager, the evaluator will terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. Unit 2 is operating at full power.

2. At 0800 this morning AO-2-03-032A and AO-2-03-32B were declared inoperable due to failing ST-O-003-450-2, "Scram Discharge Vent and Drain Valve Functional Test", step 6.3.1 due to excessive stroke times.

3. AR A1188549 has been initiated to repair the valves.

4. All other Tech Spec plant equipment is operable.

5. The Unified Control Room Log Computer is not operating.

INITIATING CUE

Determine the Tech Spec impact of these inoperabilities, make manual Tech Spec Action Log entries in accordance with the Operations Manual, and submit the completed form to the Shift Manger for review.

PORC	NO
SQR	YES
QR	NO
50.59	NO

TECHNICAL SPECIFICATION ACTION LOG

UNIT __________ (2 or 3)
(This revision is a complete rewrite.)

CONTROLLED BY
DS

1-18-96

Entry #	TS#	Discovery Date/Time	Equipment ID	System #	Reference #

Condition	Reason	Required Action 1
Is a SFD required? YES / NO Are any other SFDs currently active? YES / NO (If YES, verify SFD is still valid.)		Completion Time Date/Time

Required Action 2	Required Action 3	Required Action 4	Required Action 5
Completion Time Date/Time	Completion Time Date/Time	Completion Time Date/Time	Completion Time Date/Time

Exit Justification	Exit Date/Time	Exit Entries Made By

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: NEW–RAD INST   K/A: 2.3.5

URO: 2.3   SRO: 2.5

TASK DESCRIPTION: Use A Portable Radiation Instrument – Alternate Path (Instrument Zero)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

1. Eberline RO-2A with the the following instrument setup items verified:

   a. Calibration Sticker – within calibration for today's date and listing a Beta correction factor of "4". (If using a non-calibrated "Training Only" instrument, ensure the "Training Only" calibration sticker indicates an appropriate calibration due date or replace the sticker and fill in a future due date)

   b. Source Check Sticker – indicates source checked for today's date. (If using a non-calibrated "Training Only" instrument, ensure the "Training Only" Source Check Sticker indicates source checked for today's date or replace the sticker and fill in today's date)

   c. Physical Condition – satisfactory

   d. Battery Check 1 & 2 – ensure both batteries indicate beyond the "Batt OK" range.

   e. Zero Check – Adjust the zero knob to make the meter indicate a value above zero (for use on this alternate path JPM).

C. REFERENCES

1. PLOT-1780, Rev. 10, "Dosimeter & Instrumentation" lesson plan, objective 1A

2. HP-CG-400, Rev. 2, "Health Physics Instrumentation Operations Guideline"

3. HP-CG-400-3, Rev. 0, "Eberline RO-2/2A/20"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the candidate has completed the instrument checks, including rezeroing and properly obtained an on-contact reading for both gamma and beta radiation on an evaluator selected object.

2. Estimated time to complete: 12 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to take an on-contact reading for both gamma and beta on the specified object. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. This Eberline RO-2A has just been obtained from the instrument cage.

G. INITIATING CUE

You are directed to complete the required instrument checks and obtain on-contact gamma and beta readings of the indicated item using the RO-2A provided.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
** NOTE *** Instrument checks may be conducted in any order.			
*1	Perform a calibration check of the RO-2A. (Cue: Calibration is not due until October 1999)	P	The candidate locates the Calibration Sticker on the RO-2A and verifies that the instrument is in calibration.
*2	Verify that the RO-2A has been Source Checked. (Cue: The source check was conducted 4 hours ago)	P	The candidate locates the Source Check Sticker and observes that the RO-2A was source checked today.
*3	Perform a check of the physical condition of the RO-2A. (Cue: Acknowledge physical check completed)	P	The candidate performs a careful physical inspection of the RO-2A for any damage.
*4	Perform a battery check of the RO-2A. (Cue: Positions BAT 1 and BAT 2 indicate that battery voltage is in the Batt OK range)	P	Candidate places the function switch to BOTH positions BAT 1 and BAT 2 and verifies that voltage is indicated in the 'Batt OK" range
*5	Perform a Zero check of the RO-2A. (Cue: Needle is indicating above the Zero indication)	P	Candidate places the function switch to the Zero position and observes that the indication is greater than Zero.
*6	Zero the RO-2A (Cue: acknowledge adjustment of knob to obtain a Zero indication)	P	Candidate adjusts the Zero Knob to obtain a Zero indication.
*7	Take a Closed Window Gamma reading on the selected object. (Cue: Depending on selected scale indicate that the reading is upscale or downscale until the appropriate scale is reached. Then indicate that the meter is reading 10 mR/hr)	P	Candidate holds meter with the beta window closed at approximately one inch and takes readings, shifting scales until an appropriate reading is obtained.

STEP NO	STEP	ACT	STANDARD
*8	Take an Open Window reading on the selected object. (Cue: Depending on selected scale indicate that the reading is upscale or downscale until the appropriate scale is reached. Then indicate that the meter is reading 12 mR/hr)	P	Candidate holds meter with the beta window open at approximately one inch and takes readings, shifting scales until an appropriate reading is obtained.
9	Candidate calculates the Beta Radiation Reading.	P	Candidate subtracts the closed window reading (10 mR/hr) from the open window reading (12 mRem/hr) and multiplies the result times the Beta Correction Factor (BCF) of 4. (12 – 10) X 4 = 8 mR/hr Beta
10	Candidate reports Gamma and Beta Radiation levels on the object. (Cue: Acknowledge report)	P	Candidate reports that the object is reading 10 mR/hr gamma and 8 mR/hr Beta.

Under "ACT" P - must perform
S - must simulate

TERMINATING CUE

When the Gamma and Beta radiation levels are reported, the evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

This Eberline RO-2A has just been checked out from the instrument cage.

INITIATING CUE

You are directed to complete the required instrument checks and obtain on-contact gamma and beta readings of the indicated item using the RO-2A provided.

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: NEW-PRO ACT K/A: 2.4.44

URO: 2.1 SRO: 4.0

TASK DESCRIPTION: Protective Action Recommendation Determination

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Partially completed ERP-200 Appendix 4, Rev. 3, "General Emergency Initial Actions"

C. REFERENCES

1. ERP-200, Rev. 15, "Emergency Director (ED)"
2. ERP-200 Appendix 4, Rev. 3, "General Emergency Initial Actions"
3. ERP-101, Rev. 20, "Classification of Emergencies"

D. TASK STANDARD

1. Satisfactory task completion is indicated when state agencies have been notified of the PAR to evacuate a full 360 degrees for 5 miles and sectors E, ENE, and ESE for 5 to 10 miles.
2. Estimated time to complete: 15 minutes Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to complete step 5 of ERP-200 Appendix 4, "General Emergency Initial Action" using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. Unit 2 is shutdown with a reactor level of +10" and reactor pressure of 200 psig
2. No release in progress.
3. A General Emergency has just been declared based on fuel damage with a steam leak into primary containment.
4. Containment radiation on RI-8103A-D is 4.0 E5 R/hr
5. Containment pressure on PR-2508 is 14 psig.
6. Primary containment is expected to remain intact.
7. MESOREM printout is not yet available.
8. The TSC and EOF are not yet activated.

G. INITIATING CUE

You are directed to complete step 5 of ERP-200 Appendix 4, "General Emergency Initial Actions".

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*** NOTE **** Provide the candidate with a partially completed ERP-200 Appendix 4.			
1	Obtain a copy of ERP-101.	P	A copy of ERP-101 is obtained.
*2	Evaluate plant conditions and determine that Table 2 "Fuel Damage" General Emergency requires: • Evacuate a full 360 degrees for 5 miles • Evacuate affected and 2 adjacent sectors for 5-10 miles.	P	Table 2 "Fuel Damage" General Emergency.
3	Complete the ERP-200, Appendix 4 PAR worksheet portions. • Wind speed 10 mph. • Wind direction "from" instrumentation 270 degrees. • Wind direction "to" +/- 180 = 90 degrees. (Cue: Wind speed 10 mph, wind direction from 270 degrees.)	P	Determine wind speed to be 10 mph determine wind direction "from" to be 270 degrees and subtract 180 to determine wind direction "to" of 90 degrees.
*4	Determine: • Evacuate all sectors 360 degrees 5 miles.	P	Evacuate all sectors 360 degrees, 5 miles determined from ERP-101 Table 2, General Emergency "2" direction.
*5	Determine: • Evacuate sectors E, ENE, and ESE, 5 to 10 miles.	P	Evacuate affected sector E from wind direction "to" and adjacent 2 sectors ENE and ESE 5 to 10 miles from ERP-101 Table 2, General Emergency "2" directions.
*** NOTE *** When the candidate attempts to contact Maryland MDE and Pennsylvania BRP role play as these state agencies to receive the PAR notification.			
*6	Notify Maryland MDE and Pennsylvania BRP of the following PAR: • Evacuate all sectors 360 degrees 5 miles. • Evacuate Sectors E, ENE, ESE 5 to 10 miles. (Cue: Acknowledge receipt of report.)	P	Maryland MDE and Pennsylvania BRP are contacted by OMNI phone using the numbers in ERP-200 Appendix 4 "PAR Worksheet".

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When Maryland MDE or Pennsylvania BRP has been notified of the PAR the evaluator will terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. Unit 2 is shutdown with a reactor level of +10" and reactor pressure of 200 psig
2. No release in progress.
3. A General Emergency has just been declared based on fuel damage with a steam leak into primary containment.
4. Containment radiation on RI-8103A-D is 4.0 E5 R/hr
5. Containment pressure on PR-2508 is 14 psig.
6. Primary containment is expected to remain intact.
7. MESOREM printout is not yet available.
8. The TSC and EOF are not yet activated.

INITIATING CUE

You are directed to complete step 5 of ERP-200 Appendix 4, "General Emergency Initial Actions".

APPENDIX 4

GENERAL EMERGENCY INITIAL ACTIONS

1. ✓ Complete the General Emergency Notification Form and provide to the ED Communicator.

2. ✓ Ensure the General Emergency Station Public Address Announcement is completed.

3. ✓ Appoint an NRC Communicator to contact the NRC per the Reportability Reference Manual Form, "Event Notification Worksheet" and ensure the Emergency Response Data System (ERDS) is activated.

4. ✓ Direct the shift dose assessment personnel (SDAP) to begin performing dose projections (if appropriate).

5. ______ Complete the PAR Worksheet and notify Maryland MDE and Pennsylvania BRP of the PAR (if the EOF is not activated).

6. ______ Complete the Turnover/Briefing Form.

GENERAL EMERGENCY NOTIFICATION FORM

NOTE:	THE ED COMMUNICATOR SHOULD OBTAIN AND IMPLEMENT ERP-110.

☐ This is a Drill ☑ This is not a Drill

1. This is: John Doe at Peach Bottom Atomic Power Station.
   Communicators Name

   My phone number is: 717-456-7014 Ext. 4414 or Emergency Ext. 4225

2. A GENERAL EMERGENCY is being declared for:

   ☒ Unit 2 ☐ Unit 3 ☐ Units 2 & 3

THIS REPRESENTS AN: ☐ Escalation In ☒ Initial CLASSIFICATION STATUS:

3. BRIEF NON-TECHNICAL DESCRIPTION OF THE EVENT:

   Unit 2 Shutdown, Level +10", reactor pressure 200 psig
   Fuel Failure with steam leak into primary containment

4. THERE IS: ☒ No Radioactive Release in Progress
   ☐ Airborne Radioactive Release in Progress
   ☐ Liquid Radioactive Release in Progress

5. Wind Direction is "from" (installed instrumentation) ____ degrees and blowing "to" ____ degrees. Wind speed is ____mph.

☐ This is a Drill ☒ This is not a Drill

APPROVED: E. Director (Emergency Director) XXXX Time 9/XX/99 Date

GENERAL EMERGENCY

STATION PUBLIC ADDRESS ANNOUNCEMENT

NOTE: CIRCLE THE APPROPRIATE PHRASE(S) TO BE ANNOUNCED.

DECLARATION MESSAGE

THIS (IS) (IS NOT) A DRILL. REPEAT, THIS (IS) (IS NOT) A DRILL.

ATTENTION ALL PERSONNEL. ATTENTION ALL PERSONNEL.

THE EMERGENCY DIRECTOR HAS DECLARED A GENERAL EMERGENCY.

ALL MEMBERS OF THE EMERGENCY RESPONSE ORGANIZATION REPORT TO YOUR EMERGENCY FACILITY OR EMERGENCY ASSEMBLY AREA.

ALL NON-ESSENTIAL PERSONNEL AWAIT FURTHER PUBLIC ADDRESS INSTRUCTIONS.

ALL VISITORS WITH THEIR ESCORTS WILL REPORT TO THE GUARDHOUSE AND FOLLOW THE INSTRUCTIONS OF THE SECURITY PERSONNEL.

THIS (IS) (IS NOT) A DRILL. REPEAT, THIS (IS) (IS NOT) A DRILL.

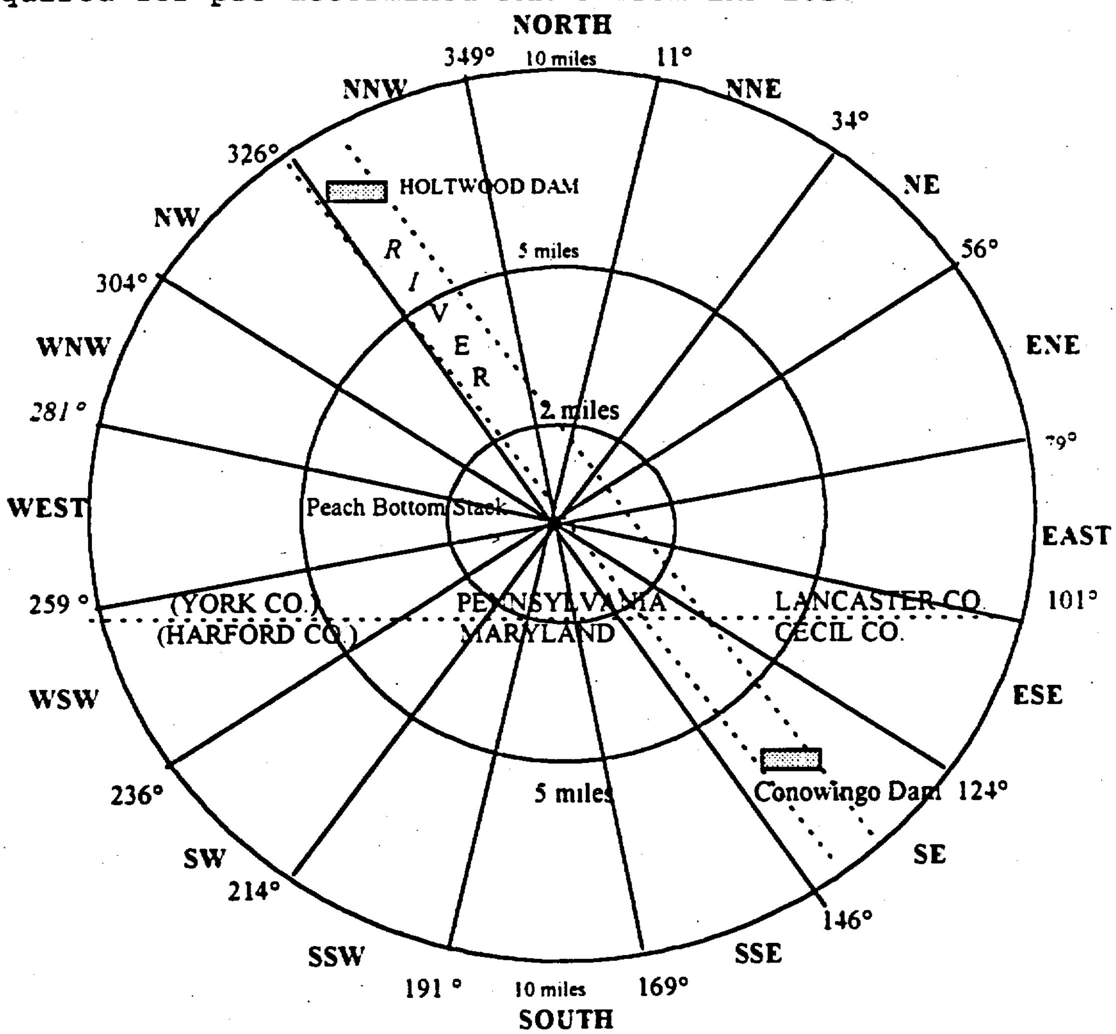
PAR WORKSHEET

PAR DATA: ______ Plant Status (based on ERP-101, table ________)
______ Dose Projection (based on MESOREM run __________ , __________
Time Date

METEOROLOGICAL DATA: Wind Direction "from" instrumentation _________ degrees
Windspeed _______ mph Wind Direction "to" +/- 180 = _________ degrees

PAR SECTORS: AREA	SHELTER	EVACUATE	NO ACTION
0-2 miles			
2-5 miles			
5-10 miles			
* >10 miles			

* Not required for pre-determined PAR's from ERP-101.



	PERSON NOTIFIED	TIME	DATE
PENNSYLVANIA BRP (Ext. 236 or 239)			
MARYLAND MDE (Ext. 235 or 292)			

TURNOVER / BRIEFING FORM

CURRENT EMERGENCY CLASSIFICATION:________________ Time: ______________

EAL TABLE:_____________________ Date: ______________

CURRENT PLANT CONDITIONS:____

____

____

____

____

____

PERSONNEL INJURIES:____

____

EVACUATION STATUS:____

ACCOUNTABILITY STATUS:____

OFF SITE ELECTRICAL POWER STATUS:____________________________________

EMERGENCY DIESEL STATUS:____

RADIOLOGICAL CONDITIONS IN PLANT:____________________________________

____

OFF SITE RELEASE CONDITIONS:____

____

PRIORITIES:____

____

Control Room Shift Manager: ____

OSC Director:____

Emergency Director:____________________ EOF ERM:____________________

NRC contacted: ___________ ERDS data link activated:_________________

TURNOVER/BRIEFING FORM

UNIT 2 STATUS: Reactor Power Level or Mode: ____________________

Reactor Level: ________ Reactor Pressure: ____________

System Availability: Comments:

HPCI	Yes_____	No _____	____________
RCIC	Yes_____	No _____	____________
ADS	Yes_____	No _____	____________
CONF/FEED	Yes_____	No _____	____________
A Loop C/S	Yes_____	No _____	____________
B Loop C/S	Yes_____	No _____	____________
A Loop RHR	Yes_____	No _____	____________
B Loop RHR	Yes_____	No _____	____________
HPSW	Yes_____	No _____	____________
ESW	Yes_____	No _____	____________
SBLC	Yes_____	No _____	____________
CRD	Yes_____	No _____	____________
SBGTS	Yes_____	No _____	____________
RPV Intact	Yes_____	No _____	____________
Cont. Intact	Yes_____	No _____	____________

UNIT 3 STATUS: Reactor Power Level or Mode: ____________________

Reactor Level: ________ Reactor Pressure: ________

System Availability: Comments:

HPCI	Yes_____	No _____	____________
RCIC	Yes_____	No _____	____________
ADS	Yes_____	No _____	____________
CONF/FEED	Yes_____	No _____	____________
A Loop C/S	Yes_____	No _____	____________
B Loop C/S	Yes_____	No _____	____________
A Loop RHR	Yes_____	No _____	____________
B Loop RHR	Yes_____	No _____	____________
HPSW	Yes_____	No _____	____________
ESW	Yes_____	No _____	____________
SBLC	Yes_____	No _____	____________
CRD	Yes_____	No _____	____________
SBGTS	Yes_____	No _____	____________
RPV Intact	Yes_____	No _____	____________
Cont. Intact	Yes_____	No _____	____________

Complete by: ____________________ Time: ______ Date: __________

Facility: Peach Bottom Unit 2 & 3 Date of Examination: Week of Sep. 13, 1999
Examination Level (circle one): RO / SRO Operating Test Number: RO - 1

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Plant Parameter Verification - Rod Position JPM	Verify rod position following a fast power reduction (alternate path).
	Temporary Modifications of Procedures - Partial Procedure JPM	Prepare a "Partial Procedure" for post-maintenance testing of a component.
A.2	Familiarity with and use of P&IDs - P&ID JPM	When an instrument is reported damaged, use P&IDs to determine the effect on system operations.
A.3	Use of portable survey instruments – Rad Survey Instrument Use JPM	Use a portable radiation instrument.
A.4	Emergency Communica-tions – Evacuation JPM	Direct an evacuation for a declared emergency.

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: New-Control Rod Verif K/A: 201003A3.01

URO: 3.7 SRO: 3.6

TASK DESCRIPTION: Control Rod Position Verification – (Alternate Path)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard. is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Official 3D MONICORE P1 performed before transient.

C. REFERENCES

1. GP-9-2, Rev. 26, "Fast Power Reduction"

2. ON-122, Rev. 5, "Misposition Control Rod"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the trainee has performed a control rod position verification, identified the mispositioned control rod and taken the required Off Normal procedure actions.

2. Estimated time to complete: 10 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to verify control rod positions following a GP-9-2 power reduction. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. A vacuum transient occurred on Unit 2 requiring power to be lowered using GP-9-2.

2. The power drop was stopped 5 minutes ago when vacuum stabilized at 27".

3. Table 1 control rods have been inserted.

4. An Official 3D P1 was completed just prior to the transient.

G. INITIATING CUE

The Control Room Supervisor directs you, the 4th RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain the recent official 3D P1 or control rod position log. (Cue: Provide a copy of the P1 or control rod position log.)	P	Operator gets a copy of the recent official 3D P1 or control rod position log.
2	Compare current control rod position to the position prior to the transient. (Cue: Acknowledge checks in progress.)	P	Operator checks current position as compared to pre-transient position.
*3	Identify control rod 54-31 is not driven to position 00. (Cue: Control rod 54-31 is at position 04.)	P	Operator identifies and reports that control rod 54-31 is not at position 00.
4	Recognize and announce entry into ON-122, "Mispositioned Control Rod". (Cue: Acknowledge entry into ON-122, DIRECT the operator to take appropriate ON-122 actions.	P	Operator recognizes and reports entry into ON-122, "Mispositioned Control Rod".
5	Contact Reactor Engineering for assistance, in accordance with ON-122, "Mispositioned Control Rod",. (Cue: Reactor Engineering acknowledges the request.)	P	Operator contacts the Reactor Engineers and requests their assistance.
6	Notify the Shift Manager in accordance with ON-122, "Mispositioned Control Rod",. (Cue: The Shift Manger acknowledges report.)	P	Operator contacts the Shift Manager and reports the mispositioned control rod.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When Reactor Engineering and Shift Manger is informed, the evaluator will terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. A vacuum transient occurred on Unit 2 requiring power to be lowered using GP-9-2.

2. The power drop was stopped 5 minutes ago when vacuum stabilized at 27".

3. Table 1 control rods have been inserted.

4. An Official 3D P-1 was completed just prior to the transient.

INITIATING CUE

The Control Room Supervisor directs you, the 4th RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

PECO Energy Company
Peach Bottom Unit 2

GP-9-2 FAST REACTOR POWER REDUCTION

1.0 PURPOSE

To rapidly reduce reactor power as required by plant conditions.

2.0 PREREQUISITES

2.1 Plant conditions require a fast reduction in power.

3.0 PERFORMANCE STEPS

NOTES

1. Steps for power reduction may be exited when power reduction is no longer required.
2. Core thermal hydraulic instability may be occurring if ANY of the following conditions exist:
   - o APRM oscillations of greater than OR equal to 10 percent peak-to-peak,
   - o LPRM OR APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, OR
   - o WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.

3.1 IF evidence of core thermal hydraulic instability exists, THEN place the reactor mode switch in "SHUTDOWN" AND enter T-100, "Scram", AND exit this procedure. **CM-1, CM-2**

3.2 Lower recirculation flow until ANY of the following occur:

- o percent reactor core thermal power is reduced to the value specified in Step 1 of GP-9-2 Appendix 1

OR

- o an "APRM HIGH" alarm occurs, **CM-3**

OR

- o FLLLP exceeds 0.995.

3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch OR the Emergency In/Notch Override handswitch. **CM-4**

3.4 Reduce recirculation flow to lower total core flow to approximately 51.25 Mlbs/hr (50% core flow) as indicated on PMS point B015 OR on Reactor Total Core Flow Indicator, DPFR-2-02-3-095, on Panel 20C005A. **CM-5**

NOTE

Pre-transient rod positions may be obtained from a recent OFFICIAL 3D P1, a recent CONTROL ROD POSITION LOG, RE-C-01 Appendix 7, Control Rod Position Data Sheets, RE-C-01, Exhibit RE-C-01-01, Quarter Core Map or RE-C-01, Exhibit RE-C-01-02, Full Core Map.

3.5 WHEN plant conditions permit, THEN a second licensed operator shall verify control rods on GP-9-2 Appendix 1, Table 1, inserted in Step 3.3 are at position 00 and ALL other control rods are at their pre-transient positions AND signoff Step 3 of GP-9-2 Appendix 1, Table 1.

3.6 Demand an OFFICIAL 3D P1 from PMS or 3D MONICORE to obtain thermal limit values (MFLCPR, MFLPD and MAPRAT).

3.7 IF any thermal limit value is equal to or greater than 1.000, THEN take corrective action in accordance with GP-13, "Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern", and RE-C-01, "Reactor Engineering General Instructions".

3.8 IF further power reduction is required, THEN exit this procedure AND enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure AND enter GP-5, "Power Operations".

4.0 REFERENCES

4.1 GP-3, Normal Plant Shutdown

4.2 GP-5, Power Operations

4.3 GP-9-2 Appendix 1, U/2 Fast Reactor Power Reduction Table

4.4 GP-13, Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern

4.5 RE-C-01, Reactor Engineering General Instructions

4.6 RE-C-01 Appendix 7, Control Rod Movement Guidelines PBAPS Only

4.7 Letter from L. F. Rubino to J. T. Budzynski, 11/8/88

4.8 CM-1, NRC Bulletin No. 88-07 Supplement 1 (T00313)

4.9 CM-2, NRC Generic Letter 94-02 (T03567)

4.10 CM-3, OE 5194, Partial Loss of Feedwater Heating

4.11 CM-4, INPO SER 4-88 (T00462)

4.12 CM-5, GE Letter 11-7-88, Recirc Pump Trip Guidelines (T000157)

4.11 INPO SOER 94-01 (T03905)

PECO Energy Company
Peach Bottom Units 2 and 3

ON-122 MISPOSITIONED CONTROL ROD - PROCEDURE

1.0 SYMPTOMS

1.1 An incorrectly selected control rod was moved.

1.2 A correctly selected control rod was moved two or more notches beyond it's targeted position.

1.3 A correctly selected control rod was moved to an incorrect location AND the operator was NOT immediately cognizant.

2.0 OPERATOR ACTIONS

2.1 Halt all control rod motion and power changes.

2.2 Notify Shift Management.

2.3 IF the mispositioned control rod is caused by a Rod Drift THEN:

2.3.1 Perform ON-121, "Drifting Control Rod".

2.3.2 Exit this procedure.

2.4 IF thermal power is below the RWM low power setpoint AND control rods are positioned such that more than two insert errors OR more than one withdraw error exists, THEN manually scram in accordance with GP-4, "Manual Reactor Scram".

2.5 IF the control rod had been mispositioned less than two minutes THEN:

2.5.1 Immediately return the rod to its proper position.

2.5.2 Notify Reactor Engineering.

> NOTE
>
> PCIOMR surveillance status sign is posted to inform the Reactor Operator if PCIOMR recommendations are in effect. The sign is posted on the 2(3)0C05A console at the four rod display panel.

2.6 IF the control rod has been mispositioned for longer than two minutes AND PCIOMR surveillance is required, THEN:

2.6.1 Initiate a 100 MWe load drop, do not go below 500 MWe.

2.6.2 Immediately contact Reactor Engineering for assistance per RE-C-01, "Reactor Engineering General Instructions".

2.6.3 Notify the Shift Manager.

2.7 IF the control rod has been mispositioned for longer than two minutes AND PCIOMR surveillance is NOT required, THEN:

2.7.1 Immediately contact the Reactor Engineering for assistance per RE-C-01, "Reactor Engineering General Instructions".

2.7.2 Notify the Shift Manager.

PLANT NAME: PEACH BOTTOM-2 CY-13

15-SEPT-1999 17:23 CALCULATED

CONTROL ROD POSITIONS 15-SEPT-1999 17:23 PRINTED

59															
L															
55								18							
51															
L															
47						10				10					
43															
L															
39				10		36		08		36		10			
35															
L															
31		18				08				08				18	
27															
L															
23				10		36		08		36		10			
19															
L															
15						10				10					
11															
L															
07								18							
03															
			L		L		L		L		L		L		L
	02	06	10	14	18	22	26	30	34	38	42	46	50	54	58

S = SUBSTITUTE VALUE
L = LPRM
-99 = MISSING CONTROL ROD POSITION

CONTROL ROD DENSITY 7.12%
SEQUENCE A-2

LOAD LINE SUMMARY
CORE POWER 99.39%
CORE FLOW 85.10%
LOAD LINE 110.54%
FLLLP 0.961

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: New-Partial Proc

K/A: 2.2.11

URO: 2.5 SRO: 3.4

TASK DESCRIPTION: Prepare a Partial Procedure

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

ST-O-011-301-2, Rev. 12, "Standby Liquid Control Pump Functional Test for IST"

C. REFERENCES

1. A-3, Rev. 18, "Temporary Changes to Procedures and Partial Procedure Use"

2. ST-O-011-301-2, Rev. 12, "Standby Liquid Control Pump Functional Test for IST"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the candidate has correctly prepared ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" as a partial for the completion of Post Maintenance Testing on the "B" Standby Liquid Control (SBLC) pump.

2. Estimated time to complete: 20 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to prepare a partial procedure for Post Maintenance Testing of the "B" Standby Liquid Control (SBLC) pump using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. The "B" Standby Liquid Control (SBLC) pump has failed step 6.3.23 of ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" due to having insufficient pump flow.

2. Maintenance has completed repairs on the pump and it is ready for Post Maintenance Testing.

G. INITIATING CUE

The Control Room Supervisor directs you to prepare a Partial Procedure from ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" to complete Post Maintenance Testing of the "B" Standby Liquid Control (SBLC) pump. Submit the completed partial procedure for review and approval.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*1	Enter the word "PARTIAL" on the first page of the procedure.	P	The word "PARTIAL" is entered on the front page.
*2	Record the reason for the partial and whether additional testing is required to fulfill surveillance test requirements.	P	Candidate writes words that indicate the partial is being used as Post Maintenance Test and that is will meet the surveillance requirements for the "B" SBLC pump.
*3	Indicate changes on the procedure to those steps or portions of the procedure that are not required to be performed.	P	Steps which do not support the testing of the "B" SBLC pump are changed or crossed out. • Step 6.1.1 should be made to apply to the "B" SBLC Pump Only. • Steps 6.1.2 –6.1.5 should be crossed out. • Steps 6.2.1 –6.2.28 (all of section 6.2) should be crossed out (individual steps or entire pages may be crossed out at a time).
4	Submit the partial for approval. (Cue: Accept partial for approval.)	P	Candidate will give evaluator the marked up procedure for approval.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the candidate submits the Partial Procedure for approval, the evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. The "B" Standby Liquid Control (SBLC) pump has failed step 6.3.23 of ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" due to having insufficient pump flow.

2. Maintenance has completed repairs on the pump and it is ready for Post Maintenance Testing.

INITIATING CUE

The Control Room Supervisor directs you to prepare a Partial Procedure from ST-O-011-301-2, "Standby Liquid Control Pump Functional Test for IST" to complete Post Maintenance Testing of the "B" Standby Liquid Control (SBLC) pump. Submit the completed partial procedure for review and approval.

ST-O-011-301-2 STANDBY LIQUID CONTROL PUMP FUNCTIONAL TEST FOR IST

TEST FREQUENCY: Once/92 days (See Section 1.0)
TECH SPEC: SR 3.1.7.5, SR 3.1.7.8, SR 3.1.7.10, Section 5.5.6
APPLICABILITY: Modes 1 and 2

1 **CHECK** why this procedure is being performed:

☐ Schedule ☐ QVF ☐ Retest Due To Unsat Test

☐ Other Reason: ____________________

Approved By SMgt: ____________ ______ __/__/__ ______
Printed Name Time Date Initials

2 **INITIAL** one of the following Test Results:

A: All */I steps are **SATISFACTORY** ______

B: One or More */I steps are **UNSATISFACTORY** ☐
Refer to Section 9.0 for Tech Spec LCO's

Performed By: ____________ ______ __/__/__ ______
Printed Name Time Date Initials

RO/PRO Informed of
Test Completion: ____________ ______ __/__/__ ______

Reviewed By SMgt: ____________ ______ __/__/__ ______

UNSAT Notification: ____________________
SMgt Discretion: Plant Mgr or Others

Notified By: ____________ ______ __/__/__ ______

3 If other portions of the test did NOT function properly,
Or other discrepancies were noted Then **COMPLETE** the following:

IST Step(s) in ALERT range: ____________________
DESCRIBE discrepancies/actions taken: A/R or ETT #: ____________

____

4 Reviewed/Approved
Plant Staff: ____________ ______ __/__/__ ______
Printed Name Time Date Initials

1.0 PURPOSE

This test verifies operability and performance of the Standby Liquid Control (SBLC) Pumps and Discharge Check Valves once/92 days in accordance with the Inservice Testing Program. This test satisfies Tech Spec SR 3.1.7.8. This test partially satisfies SR 3.1.7.5, SR 3.1.7.10, and Inservice Testing requirements for components in compliance with PBAPS Inservice Testing Program Spec. M-710 which implements requirements of Tech Spec Section 5.5.6. **CM-1**

2.0 TEST EQUIPMENT

2.1

Description	Req Min Accuracy	M&TE No.	Cal Due Date
Stopwatch	None	________	___/___/___
Vibration meter Raw Signal Single Integration (Min. Req. Freq. Range 2.8-1000 Hz) **CM-2**	 ± 1.5% ± 3.0%	________	___/___/___
Vibration probe (Min. Req. Freq. Range 2.8-1000 Hz) **CM-2**	± 4.0%	________	___/___/___
Test Gauge 0-1500 psig	± 5.0%	________	___/___/___
Test Gauge 0-1500 psig (N/A if one test rig is to be used)	± 5.0%	________	___/___/___

2.2 (1 or 2) - Test rig(s) with Schrader fitting (see Figure 1)

2.3 SBLC Measuring Stick

2.4 Non-contaminated hose for flushing test tank 20T017 (with quick disconnect).

2.5 Locked Valve Key For:

NUMBER	DESCRIPTION	NORMAL POS
HV-2-11-11	SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040	LOCKED OPEN
HV-2-11-15	SBLC Disch Header To RPV Outboard Isolation Valve	LOCKED OPEN
HV-2-11-26	SBLC Pumps Disch Recirc HDR Block To Tks 20T017 + 20T018	LOCKED CLOSED

2.0 TEST EQUIPMENT (Continued)

NUMBER	**DESCRIPTION**	**NORMAL POS**
HV-2-11-41	SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR	LOCKED CLOSED

3.0 PREREQUISITES <u>Initial</u>

3.1 Test Initiation

3.1.1 **COMPLETE** Section 1 of cover page. ________

3.2 Document Review

3.2.1 **ENSURE** procedure is current revision. ________

3.3 Equipment Configuration

None

3.4 Required Redundant Safety Related Equipment

None

3.5 Other Prerequisite Activities

3.5.1 **VERIFY** at least two operators are available to perform this test. ________

3.5.2 **VERIFY** SBLC Test Tank empty and **NO** foreign objects in tank. ________

3.5.3 **VERIFY** one 55 gallon drum which is empty or near empty available at Rx Bldg 165' by SBLC system drain lines. ________

3.5.4 **VERIFY** that qualified personnel are available for vibration data collection and lube oil sampling. Operators may view the training video for Operations Role in Predictive Maintenance to refresh on proper technique. ________

3.5.5 **OBTAIN** oil sampling equipment from the Oil Sample Drop-off Box located on Turbine Bldg 116' outside the ferrography lab. ________

3.0 PREREQUISITES (Continued)

3.6 Approval to Start Test

3.6.1 **OBTAIN** RO Permission to begin.

_______ __/__/__ _______
Time Date RO

4.0 PRECAUTIONS, LIMITATIONS, AND GENERAL INSTRUCTIONS

4.1 Plant Impact Statement

4.1.1 This test will operate both Standby Liquid Control (SBLC) Pumps using local control. SBLC system will be isolated from the Reactor which will make the system out of service for the duration of the test. This test may be performed in any Reactor Mode.

4.2 Precautions

4.2.1 Do **NOT** START SBLC Pumps from the Control Room. Starting SBLC Pumps from Control Room will fire the explosive valves.

4.2.2 SBLC Pumps should not be lined up to take suction on the Test Tank when the suction is uncovered. The suction comes off the side of the test tank.

4.2.3 **DO NOT PLACE** hands in pump cavity during performance of this procedure.

4.2.4 **OBSERVE** proper safety precautions when working with Sodium Pentaborate solution and avoid contact with the skin.

4.2.5 At least one person shall stay at SBLC area on 195' elevation while the valves are out of normal alignment to restore the system to normal in an emergency situation.

4.3 Limitations

None

4.4 General Instructions

4.4.1 Communications will be required between Control Room and Standby Liquid Control Tank Area, 195', R2-49 and Reactor Bldg West, at Standby Liquid Control System waste water drums on 165'.

4.4.2 This test must be completed in a timely manner. **IF** delays occur during this test, **THEN NOTIFY** SMgt so SBLC System OPERABILITY may be determined.

4.0 PRECAUTIONS, LIMITATIONS, AND GENERAL INSTRUCTIONS (Continued)

4.4.3 **IF** system initiation becomes necessary while performing test, **THEN STOP** test **AND PERFORM** Section 6.4 "Restoring SBLC System to Operable Status" **AND NOTIFY** Control Room.

4.4.4 **IF** procedure is aborted, **THEN RESTORE** SBLC per section 6.4, notify SMgt **AND** write **"TEST ABORTED"** in Section 3 of Cover Page.

4.4.5 **IF** any procedure step can **NOT** be completed **OR** produces an unexpected response **THEN STOP** the test **AND RETURN** the equipment to a safe condition **AND NOTIFY** the RO or SMgt.

4.4.6 **IF** any Black Box is initialed **THEN STOP** the test **AND RETURN** the equipment to a safe condition **AND NOTIFY** the RO or SMgt.

4.4.7 All persons who initial steps in Sections 3.0, 6.0, or 7.0 are responsible for completing Section 10.0.

4.4.8 Initial blanks designated as IV are provided for Independent Verification.

4.4.9 All applicable ***/I** steps are identified immediately in front of the initials.

5.0 ACCEPTANCE CRITERIA

5.1 Each SBLC Pump develops a flow rate of ≥ 43 gpm at a discharge pressure ≥1255 psig.

5.2 SBLC Pump pressures, flows, and vibration are obtained, and vibration and flows are NOT in the action range limits of Section 6.0.

5.3 Operability of CHK-2-11-43A and B is verified in the OPEN and CLOSED directions.

5.4 The combination of SBLC boron concentration, pump flow rate, and boron enrichment is greater than or equal to 1 as determined by Equation specified in Step 6.6.4.

6.0 PERFORMANCE STEPS

		Initial Sat	Initial UnSat
6.1	**Test Preparation and Valve Lineup**		
	< At Standby Liquid Control Tank Area 195', R2-49 >		
6.1.1	**VERIFY** both SBLC Pump oil levels are between the min static and max static level on pump oil sightglasses.	____	____
6.1.2	**REMOVE** cap **AND INSTALL** test rig with 1500 psig test gauge to 2AT076 "Stby Liquid Control N2 Accumulator A".	____	____
6.1.3	**LEAK TEST** test rig as desired.	____	____
6.1.4	**VERIFY** accumulator 2AT076 pressure is from 325 to 450 psig **AND CHARGE** accumulator if necessary.	____	____
6.1.5	**IF** one test rig is to be used, **THEN REMOVE** test rig at 2AT076. **OTHERWISE, N/A** this step.	____	____
6.1.6	**REMOVE** cap **AND INSTALL** test rig with 1500 psig test gauge to 2BT076 "Stby Liquid Control N2 Accumulator B".	____	____
6.1.7	**LEAK TEST** test rig as desired.	____	____
6.1.8	**VERIFY** accumulator 2BT076 pressure is from 325 to 450 psig **AND CHARGE** accumulator if necessary.	____	____
6.1.9	**REMOVE** cover on 20T017 "Standby Liquid Control Test Tank" **AND INSTALL** SBLC measuring stick inside of tank.	____	____
6.1.10	**VERIFY** HV-2-11-11 "SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040" LOCKED OPEN.	____	____
6.1.11	**UNLOCK AND CLOSE** HV-2-11-15 "SBLC Disch Header To RPV Outboard Isolation Valve".	____	____
6.1.12	**UNLOCK AND OPEN** HV-2-11-26 "SBLC Pumps Disch Recirc Hdr Block to Tks 20T017 + 20T018".	____	____
6.1.13	**OPEN** HV-2-11-30 "SBLC Pumps Disch Recirc Blk to SBLC Tank 20T018".	____	____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.2 SBLC Pump A Test **CM-1**

6.2.1 **RECORD** 2BT076 pressure.

_______ psig ______ ______

****
CAUTION

DO NOT START SBLC Pumps from the Control Room. Starting SBLC Pumps from the Control Room will fire the explosive valves.
****

6.2.2 **NOTIFY** Reactor Operator 2AP040 "Standby Liquid Control Pump A" will be started. ______ ______

6.2.3 LOCALLY **START** 2AP040. ______ ______

NOTE

Manufacturer recommends running pump for 30 minutes following pump maintenance before operating at full load.

6.2.4 **IF** Surveillance Test is being performed to satisfy pump post maintenance testing, **THEN PERFORM** this step, **OTHERWISE N/A AND PROCEED** to step 6.2.5.

1. **RUN** pump for 5 minutes unloaded **THEN** SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 250 to 350 psig as indicated on PI-2-11-03 **AND RUN** pump for 5 additional minutes. ______ ______

2. SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 550 to 650 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. ______ ______

3. SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 850 to 950 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. ______ ______

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

NOTE

Fluctuations on PI-2-11-053 may be dampened by throttling IIV-2-11-053. If throttling is used, the valve may be opened and closed to verify pressure indication is valid.

6.2.5 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1200 (1160-1200) psig as indicated on PI-2-11-053. _____ _____

CAUTION

DO NOT EXCEED a pump discharge pressure of 1300 psig while throttling HV-2-11-26. Relief valve is set to lift at 1400 psig. Pressure will continue to increase slightly when valve throttling is stopped.

6.2.6 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053. _____ _____

6.2.7 **RECORD** 2BT076 pressure.

_______ psig _____ _____

NOTE

The next step verifies CHK-2-11-43B "SBLC Pump 2BP040 Discharge Check Valve" in the CLOSED direction.

6.2.8 **VERIFY** pressure recorded in Step 6.2.7 is less than 100 psig above the pressure recorded in Step 6.2.1. I _____

6.2.9 **RUN** 2AP040 for at least 2 minutes to ensure accurate vibration data. I _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.2.10 **OBTAIN** pump housing vibration data in velocity (in/sec) at inboard locations marked X1 and Y1 and outboard locations marked X1 and Y1 **AND RECORD** vibration data on Data Sheet 1. ____ ____

DATA SHEET 1
2AP040 PUMP HOUSING VIBRATION DATA

MEASURED VIBRATION AT MARKED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
INBOARD			
X1________IN/SEC PK	≤ 0.716	0.716 to 1.719	> 1.719
Y1________IN/SEC PK	≤ 0.225	0.225 to 0.540	> 0.540
OUTBOARD			
X1________IN/SEC PK	≤ 0.803	0.803 to 1.929	> 1.929
Y1________IN/SEC PK	≤ 0.496	0.496 to 1.192	> 1.192

6.2.11 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1220 (1200-1240) psig as indicated on PI-2-11-053. ____ ____

6.2.12 **STOP** 2AP040. ____ ____

6.2.13 **CLOSE** HV-2-11-30. ____ ____

6.2.14 **OPEN** HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 20T017". ____ ____

NOTE

It will take 2 minutes for SBLC Test Tank level to reach the lower mark on the SBLC Measuring Stick therefore Step 6.2.15 must be performed in a timely manner.

6.2.15 LOCALLY **START** 2AP040 **AND THROTTLE** HV-2-11-26 as required to obtain a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053 **AND RECORD** pressure on Data Sheet 2. ____ ____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.2.16 **WHEN** Test Tank level reaches the lower mark on the SBLC Measuring Stick, **START** stopwatch, **THEN MEASURE** the time required to raise Test Tank level to the upper mark on the SBLC Measuring Stick. ____ ____

6.2.17 **STOP** 2AP040. ____ ____

6.2.18 **RECORD** time required for level change on Data Sheet 2 to one tenth of a second. ____ ____

NOTES

1. The following step may be performed out of sequence as directed by the step.
2. **IF** it is not possible to obtain sample within 15 minutes after securing pump due to oil being distributed in crankcase, **THEN** attempt to obtain a sample at thirty minute intervals until a sample is successfully obtained **AND** record time elapsed between securing pump and withdrawing sample, in step 6.2.19.6.

6.2.19 **PERFORM** the following to obtain 2AP040 oil samples no more than 15 minutes after the pump has been secured:

1. **LOCATE** oil sample fittings on the pump crankcase **AND** motor housing. ____ ____
2. **RECORD** equipment number, equipment serial number (if available), sample point, sample date, **AND** "Sampled by" name on labels. ____ ____
3. **OBTAIN** oil sample from each reservoir by removing oil sample fitting cap, inserting plastic probe, and drawing vacuum on sample bottle with sampling pump. ____ ____
4. **DISCONNECT** sample probe **AND REPLACE** sampling fitting cap hand tight. ____ ____
5. **REMOVE** sample bottle from sampling pump **AND REPLACE** sample bottle cap. ____ ____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6. **IF** sample could not be obtained within 15 minutes after securing pump, **THEN RECORD** time elapsed between securing pump and withdrawing sample **AND RECORD** time elapsed on sample bottle.

_______ min. _____ _____

6.2.20 **CALCULATE** 2AP040 flow rate as follows **AND RECORD** flow rate on Data Sheet 2:

$$\frac{52.8 \text{ gal} \times 60 \text{ sec/min}}{\text{Step } 6.2.16} = \text{Flow Rate}$$

3168 / ______ sec = ______ gpm _____ _____

_____ _____
IV

DATA SHEET 2
2AP040 IST DATA

> **NOTE**
>
> Pump flow rate acceptance criteria is based on a reference value of 53.0 gpm at a discharge pressure of 1255.0 psig.

PARAMETER	**ACTUAL VALUE**	**ACCEPTABLE RANGE**	**ALERT RANGE**	**ACTION RANGE**
TIME (Seconds)		N/A	N/A	N/A
FLOW RATE (gpm) (3168/Time)		50.2 to 58.1	< 50.2 to 49.1	< 49.1 or > 58.1
DISCH PRESSURE (psig)		1255-1280	N/A	N/A

6.2.21 **VERIFY** flow and pressure recorded in Data Sheet 2 is ≥43 gpm at ≥1255 psig. * _____

6.0 PERFORMANCE STEPS (Continued)

	Initial Sat	Initial UnSat

> **NOTE**
>
> The next step verifies CHK-2-11-43A "SBLC Pump 2AP040 Discharge Check Valve" in the OPEN direction.

6.2.22 **VERIFY** pump test data on Data Sheets 1 and 2 do **NOT** fall within Action Range. I ____ ____

6.2.23 **CLOSE** HV-2-11-27. ____ ____

6.2.24 **OPEN** HV-2-11-26. ____ ____

6.2.25 **OPEN** HV-2-11-30. ____ ____

6.2.26 **UNLOCK AND OPEN** HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR". ____ ____

6.2.27 **IF** test tank level reaches top of suction line on side of tank by gravity draining, **THEN N/A** the next 3 sign-offs. **OTHERWISE, PERFORM** the following:

1. **UNLOCK AND CLOSE** HV-2-11-11. ____ ____

```
*********************************************
*                 CAUTION                   *
*                                           *
*   Do not run SBLC Pump when Test Tank     *
*   is empty.                               *
*                                           *
*********************************************
```

2. LOCALLY **START** 2AP040 **THEN STOP** pump when Test Tank level reaches top of suction line on side of test tank. ____ ____

3. **OPEN** HV-2-11-11. ____ ____

6.2.28 **CLOSE** HV-2-11-41. ____ ____

6.3 SBLC Pump B Test **CM-1**

6.3.1 **IF** one test rig is being used, **THEN REMOVE** test rig at 2BT076 **AND INSTALL** cap. **OTHERWISE, N/A** this step. ____ ____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.3.2 **IF** one test rig is being used, **THEN INSTALL** test rig at 2AT076. **OTHERWISE, N/A** this step. _____ _____

6.3.3 **RECORD** 2AT076 pressure.

_______ psig _____ _____

****
CAUTION

DO NOT START SBLC Pumps from the Control Room. Starting SBLC Pumps from the Control Room will fire the explosive valves.
****

6.3.4 **NOTIFY** Reactor Operator 2BP040 "Standby Liquid Control Pump B" will be started. _____ _____

6.3.5 LOCALLY **START** 2BP040. _____ _____

NOTE

Manufacturer recommends running pump for 30 minutes following pump maintenance before operating at full load.

6.3.6 **IF** Surveillance Test is being performed to satisfy pump post maintenance testing, **THEN PERFORM** this step, **OTHERWISE N/A** this step **AND PROCEED** to step 6.3.7.

1. **RUN** pump for 5 minutes unloaded **THEN** SLOWLY **THROTTLE** HV-2-11-26 to a pressure between 250 to 350 psig as indicated on PI-2-11-053 **AND RUN** pump for 5 additional minutes. _____ _____

2. **SLOWLY THROTTLE** HV-2-11-26 to a pressure between 550 to 650 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. _____ _____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

3. **SLOWLY THROTTLE** HV-2-11-26 to a pressure between 850 to 950 psig as indicated on PI-2-11-053 **AND RUN** pump for 10 additional minutes. _____ _____

NOTE

Fluctuations on PI-2-11-053 may be dampened by throttling IIV-2-11-053. IIV-2-11-053 may be opened and closed to verify pressure indication is valid.

6.3.7 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1200 (1175-1200) psig as indicated on PI-2-11-053. _____ _____

CAUTION

DO NOT EXCEED a pump discharge pressure of 1300 psig while throttling HV-2-11-26. Relief valve is set to lift at 1400 psig. Pressure will continue to increase slightly when valve throttling is stopped.

6.3.8 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053. _____ _____

6.3.9 **RECORD** 2AT076 pressure.

_______ psig _____ _____

NOTE

The next step verifies CHK-2-11-43A in the CLOSED direction.

6.3.10 **VERIFY** pressure recorded in Step 6.3.9 is less than 100 psig above the pressure recorded in Step 6.3.3. I _____

6.0 PERFORMANCE STEPS (Continued) Initial

Sat UnSat

6.3.11 **RUN** 2BP040 for at least 2 minutes to ensure accurate vibration data. I ____

6.3.12 **OBTAIN** pump housing vibration data in velocity (in/sec) at inboard locations marked X1 and Y1 and outboard locations marked X1 and Y1 **AND RECORD** vibration data on Data Sheet 3. ____ ____

DATA SHEET 3
2BP040 PUMP HOUSING VIBRATION DATA

MEASURED VIBRATION AT MARKED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
INBOARD			
X1________IN/SEC PK	≤ 0.527	0.527 to 1.266	> 1.266
Y1________IN/SEC PK	≤ 0.355	0.355 to 0.853	> 0.853
OUTBOARD			
X1________IN/SEC PK	≤ 0.499	0.499 to 1.197	> 1.197
Y1________IN/SEC PK	≤ 0.404	0.404 to 0.969	> 0.969

6.3.13 SLOWLY **THROTTLE** HV-2-11-26 to a pressure of 1220 (1200-1240) psig as indicated on PI-2-11-053. ____ ____

6.3.14 **STOP** 2BP040. ____ ____

6.3.15 **CLOSE** HV-2-11-30. ____ ____

6.3.16 **OPEN** HV-2-11-27. ____ ____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

> **NOTE**
>
> It will take 2 minutes for SBLC Test Tank level to reach the lower mark on the SBLC Measuring Stick therefore Step 6.3.17 must be performed in a timely manner.

6.3.17 LOCALLY **START** 2BP040 **AND THROTTLE** HV-2-11-26 as required to obtain a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053 **AND RECORD** pressure on Data Sheet 4. _____ _____

6.3.18 **WHEN** Test Tank level reaches the lower mark on the SBLC Measuring Stick, **START** stopwatch, **THEN MEASURE** the time required to raise Test Tank level to the upper mark on the SBLC Measuring Stick. _____ _____

6.3.19 **STOP** 2BP040. _____ _____

6.3.20 **RECORD** time required for level change on Data Sheet 4 to one tenth of a second. _____ _____

> **NOTES**
>
> 1. The following step may be performed out of sequence as directed by the step.
>
> 2. **IF** it is not possible to obtain sample within 15 minutes after securing pump (due to oil being distributed in crankcase,) **THEN** attempt to obtain a sample at ten or fifteen minute intervals until a sample is successfully obtained **AND** record time elapsed between securing pump and obtaining sample, in step 6.3.21.6.

6.3.21 **PERFORM** the following to obtain 2BP040 oil samples no more than 15 minutes after the pump has been secured:

1. **LOCATE** oil sample fittings on the pump crankcase **AND** motor housing. _____ _____

6.0 **PERFORMANCE STEPS** (Continued)

	Initial Sat	UnSat
2. **RECORD** equipment number, equipment serial number (if available), sample point, sample date, **AND** "Sampled by" name on labels.	____	____
3. **OBTAIN** oil sample from each reservoir by removing oil sample fitting cap, inserting plastic probe, and drawing vacuum on sample bottle with sampling pump.	____	____
4. **DISCONNECT** sample probe **AND REPLACE** sampling fitting cap hand tight.	____	____
5. **REMOVE** sample bottle from sampling pump **AND REPLACE** sample bottle cap.	____	____
6. **IF** sample could not be obtained within 15 minutes after securing pump, **THEN** record time elapsed between securing pump and withdrawing sample **AND RECORD** time elapsed on sample bottle.	____	____

________ Min.

6.3.22 **CALCULATE** 2BP040 flow rate as follows **AND RECORD** Flow rate on Data Sheet 4:

$$\frac{52.8 \text{ gal} \times 60 \text{ sec/min}}{\text{Step 6.3.18}} = \text{Flow rate}$$

3168 / ______ sec = ______ gpm ____ ____

________ IV

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

DATA SHEET 4
2BP040 IST DATA

> **NOTE**
>
> Pump flow rate acceptance criteria is based on a reference value of 53.0 gpm at a discharge pressure of 1255.0 psig.

PARAMETER	ACTUAL VALUE	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
TIME (Seconds)		N/A	N/A	N/A
FLOW RATE (gpm) (3168/Time)		51.2 to 59.3	< 51.2 to 50.1	< 50.1 or > 59.3
DISCH PRESSURE (psig)		1255-1280	N/A	N/A

6.3.23 **VERIFY** flow recorded in Data Sheet 4 is ≥ 43 gpm **AND** pressure is ≥ 1255 psig. * ______

> **NOTE**
>
> The next step verifies CHK-2-11-43B "SBLC Pump 2BP040 Discharge Check Valve" in the OPEN direction.

6.3.24 **VERIFY** pump test data on Data Sheets 3 and 4 do **NOT** fall within Action Range. I ______

6.3.25 **REMOVE** test rig at 2AT076 **AND INSTALL** cap. ______ ______

6.3.26 **IF** two test rigs were used, **THEN REMOVE** test rig at 2BT076 **AND INSTALL** cap. **OTHERWISE, N/A** this step. ______ ______

6.3.27 **CLOSE** HV-2-11-27. ______ ______

6.3.28 **OPEN** HV-2-11-30. ______ ______

6.3.29 **OPEN** HV-2-11-41. ______ ______

6.0 PERFORMANCE STEPS (Continued)

	Initial Sat	Initial UnSat
6.3.30 **IF** test tank level reaches top of suction line on side of tank by gravity draining, **THEN N/A** the next 3 sign-offs. **OTHERWISE, PERFORM** the following:		
1. **UNLOCK AND CLOSE** HV-2-11-11.	_____	_____

CAUTION

Do not run SBLC Pump when Test Tank is empty.

	Initial Sat	Initial UnSat
2. LOCALLY **START** 2BP040 **THEN STOP** pump when Test Tank level reaches top of suction line on side of test tank.	_____	_____
3. **OPEN** HV-2-11-11.	_____	_____
6.3.31 **CLOSE** HV-2-11-41.	_____	_____
6.4 Restoring SBLC System to Operable Status		
6.4.1 **LOCK** closed HV-2-11-41.	_____	_____
6.4.2 **VERIFY OR LOCK OPEN** HV-2-11-11.	_____	_____
6.4.3 **CLOSE OR VERIFY CLOSED** HV-2-11-30.	_____	_____
6.4.4 **CLOSE AND LOCK** HV-2-11-26.	_____	_____
6.4.5 **OPEN AND LOCK** HV-2-11-15.	_____	_____
6.4.6 **NOTIFY** Reactor Operator SBLC System has been returned to service.	_____	_____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.5 Flushing Test Tank 20T017

CAUTION

DO NOT OVERFILL Waste Water Drum on 165'. If necessary, HV-2-11-23143 may be closed while changing drums.

< At Rx Bldg 165', West Wall>

Step	Action	Sat	UnSat
6.5.1	**OPEN** HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve".	____	____

< At Standby Liquid Control Tank Area, 195', R2-49 >

Step	Action	Sat	UnSat
6.5.2	**REMOVE** SBLC measuring stick from Test Tank.	____	____
6.5.3	**INSTALL** hose at a demin water supply valve HV-2-38D-29 "Demin Wtr Hose Blk Vv for SBLC Test Tank 20T017.	____	____
6.5.4	**OPEN** HV-2-11-28 "SBLC Test Tank 20T017 Inner Drain Valve".	____	____
6.5.5	**OPEN** HV-2-38D-29 **AND FLUSH** Test Tank with demineralized water.	____	____
6.5.6	**CLOSE** HV-2-38D-29.	____	____
6.5.7	**CLOSE** HV-2-11-28.	____	____
6.5.8	**VERIFY** Test Tank empty.	____	____
6.5.9	**INSTALL** cover on Test Tank.	____	____
6.5.10	**REMOVE** hose from demin water supply valve HV-2-38D-29.	____	____

< At Rx Bldg 165', West Wall>

Step	Action	Sat	UnSat
6.5.11	**CLOSE** HV-2-11-23143.	____	____
6.5.12	**PLACE** oil sample bottles in the drop-off box located on Turbine Bldg 116' outside the ferrography lab.	____	____

6.0 PERFORMANCE STEPS (Continued)

Initial
Sat UnSat

6.6 SBLC System Operability Verification

6.6.1 **RECORD** lowest SBLC Pump flow rate from Data Sheet 2 or 4.
_______ gpm ______ ______

6.6.2 **OBTAIN** most recent figures for SBLC Concentration and Enrichment from Chemistry Unit 2 SBLC Sample Log.

__________ __________ ______ ______
Concentration Enrichment

6.6.3 **PROVIDE** lowest SBLC pump flow rate data to Shift Chemist for entry into Unit 2 SBLC Sample Log. ______ ______

6.6.4 **PERFORM** the following calculation for determination of SBLC System operability:

$$\frac{C}{13\%\ WT} \times \frac{Q}{86\ gpm} \times \frac{E}{19.8\%} = O$$

$$\frac{\_\_\_\_}{13\%\ WT} \times \frac{\_\_\_\_}{86\ gpm} \times \frac{\_\_\_\_}{19.8\%} = \_\_\_\_$$

Where: C = Concentration from Step 6.6.2
Q = Lowest SBLC Pump flow rate from Step 6.6.1
E = Enrichment from Step 6.6.2
O = Operability factor ______ ______

6.6.5 **VERIFY** Operability Factor calculated in previous step is greater than or equal to 1. * ______ ______

7.0 PROCEDURE COMPLETION

Initial

7.1 Independent Verification

7.1.1 **VERIFY** calculation in Step 6.6.4 is correct. ______
IV

< At Standby Liquid Control Tank Area 195', R2-49 >

7.1.2 **VERIFY** HV-2-11-15 "SBLC Disch Header To RPV Outboard Isolation Valve" is LOCKED OPEN. ______
IV

7.0 PROCEDURE COMPLETION (Continued) Initial

7.1.3 **VERIFY** HV-2-11-11 "SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040" is LOCKED OPEN. ______ IV

7.1.4 **VERIFY** HV-2-11-26 "SBLC Pumps Disch Recirc HDR Block To Tks 20T017 + 20T018" is LOCKED CLOSED. ______ IV

7.1.5 **VERIFY** HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR" is LOCKED CLOSED. ______ IV

7.1.6 **VERIFY** HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 20T017" is CLOSED. ______ IV

7.1.7 **VERIFY** HV-2-11-30 "SBLC Pumps Disch/Recirc Blk To SBLC Tank 20T018" is CLOSED. ______ IV

7.1.8 **VERIFY** HV-2-11-28 "SBLC Test Tank 20T017 Drain Valve" is CLOSED. ______ IV

7.1.9 **VERIFY** test rig at 2AT076 "Stby Liquid Control N2 Accumulator A" REMOVED **AND** cap INSTALLED. ______ IV

7.1.10 **VERIFY** test rig at 2BT076 "Stby Liquid Control N2 Accumulator B" REMOVED **AND** cap INSTALLED. ______ IV

7.1.11 **VERIFY** IIV-2-11-053 "PI-2-11-053 Instr Isol SBLC PPs Disch Header Press" is OPEN. ______ IV

< At Rx Bldg 165', West Wall>

7.1.12 **VERIFY** HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve" is CLOSED. ______ IV

7.2 Records Completion

7.2.1 **COMPLETE** Section 2 of Cover Page (and Section 3 if applicable). ______

8.0 REFERENCES

8.1 Governing

8.1.1 Tech Spec SR 3.1.7.5

8.1.2 Tech Spec SR 3.1.7.8

8.1.3 Tech Spec SR 3.1.7.10

8.0 REFERENCES (Continued)

8.1.4 Tech Spec 5.5.6

8.1.5 CM-1, Letter to NRC from G. A. Hunger, Jr. dated Sept. 29, 1994 transmitting TSCR 93-16 (A0902903-10, T03675)

8.1.6 CM-2, Deviation from Instrument Range Requirement, (T03589)

8.1.7 ASME OM Code, Code for Operation and Maintenance of Nuclear Power Plants, 1990 Edition.

8.2 Interfacing

8.2.1 A-8, Control of Locked Valves

8.3 Developmental

8.3.1 Prints

M-358, Sht 1, Standby Liquid Control System

M-1-S-46, Sht 5, Electrical Schematic Standby Liquid Control System

8.3.2 M-1-JJ-40, Union Pump Manual

8.3.3 Response to NRC Inspection Report 50-277/78-12

8.3.4 RCM analysis - SBLC, (T02979)

8.3.5 This procedure supersedes ST 6.1.2-3

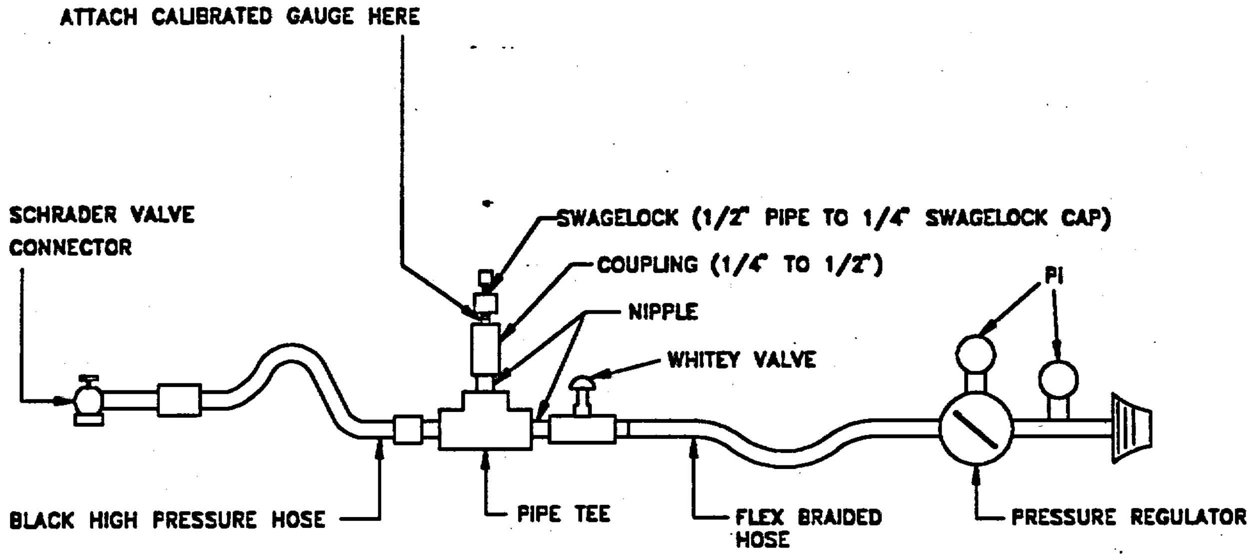
9.0 TECH SPEC LIMITING CONDITIONS FOR OPERATION (LCOs)

Section 3.1.7

10.0 PARTICIPANTS RECORD

Printed Name	Initials

Figure 1
TEST RIG



POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: NEW-P&ID USE K/A: 2.1.24

URO: 2.8 SRO: 3.1

TASK DESCRIPTION: Familiarity and Use of P&IDs

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

1. M-315 Sheet 1, Rev. 62, "Emergency Service Water and High Pressure Service Water System" print

2. M-315 Sheet 4, Rev. 50, "Emergency Service Water and High Pressure Service Water System" print

3. M-330 Sheet 1, Rev. 32, "Emergency Cooling System" print

C. REFERENCES

1. M-315 Sheet 1, Rev. 62, "Emergency Service Water and High Pressure Service Water System" print

2. M-315 Sheet 4, Rev. 50, "Emergency Service Water and High Pressure Service Water System" print

3. M-330 Sheet 1, Rev. 32, "Emergency Cooling System" print

D. TASK STANDARD

1. Satisfactory task completion is indicated when it has been determined that following any start of the Diesel Generators the:

   a. A and B ESW pump will automatically start and continue to run normally.

   b. ECW pump will automatically start and shut down after 45 seconds.

   c. ECW discharge valve (MO-0841) will remain closed.

2. Estimated time to complete: 15 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to determine the impact of a damaged instrument on cooling water operation using the appropriate prints. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

An Equipment Operator reports to the control room that PS-0246B, mounted on the "B" Emergency Service Water Pump (OBP057) discharge pipe has been damaged by scaffolding such that it cannot sense high pressure.

G. INITIATING CUE

The Control Room Supervisor directs you to use P&IDs to determine the impact of the damaged PS-0246B on cooling water operation during a Diesel Generator start without additional operator actions.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain M-315 Sh. 4, "P&I Diagram Emergency Service Water and High Pressure Service Water Sys's".	P	M-315 for ESW is located using the M-300 index. Sheet 4 is located as featuring the "B" ESW pump.
2	Locate the "B" ESW pump on M-315 Sh. 4.	P	"B" ESW is located at coordinates A-5 on M-315 Sh. 4.
3.	Locate PS-0246B on the discharge pipe of the "B" ESW pump.	P	PS-0246B is located at coordinates B-5 on M-315 Sh. 4.
*4	Determine that the "B" ESW pump will start on a Diesel Generator Start.	P	Diesel Generator start is identified as a start signal from the logic illustrated on M-315 Sh. 4 coordinates B-5 <u>OR</u> from individuals knowledge base.
5	Determine that if a damaged PS-0246B is unable to sense high pressure it will contribute a "LOW" to the logic.	P	Logical outputs of "LOW" and "NOT LOW" are located on M-315 Sh. 4 coordinates B-5. A logic output of "LOW" is determined.
6	Trace logic lines to M-315 Sh. 1 G-6.		Logic lines are traced to M-315 Sh.1 using continuation identifiers on M-315 Sh. 4 coordinates B-6.
7	Obtain M-315 Sh. 1, "P&I Diagram Emergency Service Water and High Pressure Service Water Sys's".	P	M-315 Sh. 1 is located using continuation identifiers on M-315 Sh. 4.
8	Determine that logic lines from M-315 Sh. 4 input to "AND" logic on M-315 Sh. 1 coordinates G-6.	P	Logic lines from M-315 Sh.4 are traced to "AND" logic on M-315 Sh. 1 coordinates G-6.
*9	Determine that the "A" ESW pump will start on a Diesel Generator start.	P	Diesel Generator start is identified as a start signal from the logic illustrated on M-315 Sh. 1 coordinates G-5 OR from individuals knowledge base.
10	Determine that PS-0246A will contribute a "NOT LOW" to the logic.	P	Logical outputs of "LOW" and "NOT LOW" are located on M-315 Sh. 1 coordinates G-7. A logic output of "NOT LOW" is determined.
11	Determine that the "AND" logic will <u>not</u> be satisfied due to <u>lack of</u> "LOW" from PS-0246A and "LOW" from PS-0246B.	P	Logic lines from PS-0246A are traced to "AND" logic on M-315 Sh. 1 coordinates G-6. "AND" logic is not satisfied due to lack of "LOW" from PS-0246A.
12	Determine that the "OR" logic will be satisfied by PS-0246A "NOT LOW".	P	Logic lines from PS-0246A are traced to "OR" logic on M-315 Sh. 1 coordinates G-6. "OR" logic is satisfied by singular input of "NOT LOW" from PS-0246A.
13	Trace logic lines to M-330 Sh. 1 coordinates G-3.	P	Logic lines are traced to M-330 Sh. 1 using continuation identifiers on M-315 Sh. 1 coordinates G-6.
14	Obtain M-330 Sh. 1 "P&I Diagram Emergency Cooling System".	P	M-330 Sh. 1 is located using continuation identifier on M-315 Sh.1.

STEP NO	STEP	ACT	STANDARD
15	Determine that the "AND" logic for the ECW pump will be satisfied by either ESW pump A or B discharge pressure "NOT LOW" and ECW pump not started manually when an auto start has existed for 45 seconds.	P	Logic lines from M-315 Sh. 1 G-6 are traced to "AND" logic on M-330 Sh. 1, coordinates G-3. "AND" logic is determined to be satisfied with inputs from either the A or B ESW pump discharge pressure "NOT LOW" and ECW not started manually when auto has existed for 45 seconds.
*16	Determine that the ECW pump will trip 45 seconds after an ECW auto start signal on Diesel Generator start.	P	Logic line from "AND" is traced to ECW "TRIP" when auto start signal has existed for 45 seconds.
*17	Determine that the "AND" logic for the ECW discharge valve MO-0841 will <u>NOT</u> be satisfied since ESW A <u>AND</u> B discharge pressure is <u>NOT</u> low. The ECW discharge valve will remain closed following an ECW auto start signal.	P	Logic lines are traced to "AND" logic on M-330 Sh. 1 coordinates H-3.
18	Control Room Supervisor informed of plant impact of damaged PS-0246B on cooling water should a Diesel Generator start occur. (Cue: Acknowledge report.)	P	Inform the Control Room Supervisor that on a Diesel Generator start, the: • A and B ESW pumps will automatically start and continue to run normally. • ECW pump will automatically start and shutdown after 45 sec. • ECW discharge valve (MO-0841) will remain closed.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the impact of the damaged PS-0246B on ESW and ECW operation following a Diesel Generator start has been determined, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

An Equipment Operator reports to the control room that PS-0246B, mounted on the "B" Emergency Service Water Pump (OBP057) discharge pipe has been damaged by scaffolding such that it cannot sense high pressure.

INITIATING CUE

The Control Room Supervisor directs you to use P&IDs to determine the impact of the damaged PS-0246B on cooling water operation during a Diesel Generator start without additional operator actions.

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: NEW–RAD INST K/A: 2.3.5

URO: 2.3 SRO: 2.5

TASK DESCRIPTION: Use A Portable Radiation Instrument – Alternate Path (Instrument Zero)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

1. Eberline RO-2A with the the following instrument setup items verified:

   a. Calibration Sticker – within calibration for today's date and listing a Beta correction factor of "4". (If using a non-calibrated "Training Only" instrument, ensure the "Training Only" calibration sticker indicates an appropriate calibration due date or replace the sticker and fill in a future due date)

   b. Source Check Sticker – indicates source checked for today's date. (If using a non-calibrated "Training Only" instrument, ensure the "Training Only" Source Check Sticker indicates source checked for today's date or replace the sticker and fill in today's date)

   c. Physical Condition – satisfactory

   d. Battery Check 1 & 2 – ensure both batteries indicate beyond the "Batt OK" range.

   e. Zero Check – Adjust the zero knob to make the meter indicate a value above zero (for use on this alternate path JPM).

C. REFERENCES

1. PLOT-1780, Rev. 10, "Dosimeter & Instrumentation" lesson plan, objective 1A

2. HP-CG-400, Rev. 2, "Health Physics Instrumentation Operations Guideline"

3. HP-CG-400-3, Rev. 0, "Eberline RO-2/2A/20"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the candidate has completed the instrument checks, including rezeroing and properly obtained an on-contact reading for both gamma and beta radiation on an evaluator selected object.

2. Estimated time to complete: 12 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to take an on-contact reading for both gamma and beta on the specified object. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. This Eberline RO-2A has just been obtained from the instrument cage.

G. INITIATING CUE

You are directed to complete the required instrument checks and obtain on-contact gamma and beta readings of the indicated item using the RO-2A provided.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
** NOTE *** Instrument checks may be conducted in any order.			
*1	Perform a calibration check of the RO-2A. (Cue: Calibration is not due until October 1999)	P	The candidate locates the Calibration Sticker on the RO-2A and verifies that the instrument is in calibration.
*2	Verify that the RO-2A has been Source Checked. (Cue: The source check was conducted 4 hours ago)	P	The candidate locates the Source Check Sticker and observes that the RO-2A was source checked today.
*3	Perform a check of the physical condition of the RO-2A. (Cue: Acknowledge physical check completed)	P	The candidate performs a careful physical inspection of the RO-2A for any damage.
*4	Perform a battery check of the RO-2A. (Cue: Positions BAT 1 and BAT 2 indicate that battery voltage is in the Batt OK range)	P	Candidate places the function switch to BOTH positions BAT 1 and BAT 2 and verifies that voltage is indicated in the 'Batt OK" range
*5	Perform a Zero check of the RO-2A. (Cue: Needle is indicating above the Zero indication)	P	Candidate places the function switch to the Zero position and observes that the indication is greater than Zero.
*6	Zero the RO-2A (Cue: acknowledge adjustment of knob to obtain a Zero indication)	P	Candidate adjusts the Zero Knob to obtain a Zero indication.
*7	Take a Closed Window Gamma reading on the selected object. (Cue: Depending on selected scale indicate that the reading is upscale or downscale until the appropriate scale is reached. Then indicate that the meter is reading 10 mR/hr)	P	Candidate holds meter with the beta window closed at approximately one inch and takes readings, shifting scales until an appropriate reading is obtained.

STEP NO	STEP	ACT	STANDARD
*8	Take an Open Window reading on the selected object. (Cue: Depending on selected scale indicate that the reading is upscale or downscale until the appropriate scale is reached. Then indicate that the meter is reading 12 mR/hr)	P	Candidate holds meter with the beta window open at approximately one inch and takes readings, shifting scales until an appropriate reading is obtained.
9	Candidate calculates the Beta Radiation Reading.	P	Candidate subtracts the closed window reading (10 mR/hr) from the open window reading (12 mRem/hr) and multiplies the result times the Beta Correction Factor (BCF) of 4. (12 – 10) X 4 = 8 mR/hr Beta
10	Candidate reports Gamma and Beta Radiation levels on the object. (Cue: Acknowledge report)	P	Candidate reports that the object is reading 10 mR/hr gamma and 8 mR/hr Beta.

Under "ACT" P - must perform
S - must simulate

TERMINATING CUE

When the Gamma and Beta radiation levels are reported, the evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

This Eberline RO-2A has just been checked out from the instrument cage.

INITIATING CUE

You are directed to complete the required instrument checks and obtain on-contact gamma and beta readings of the indicated item using the RO-2A provided.

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 3440230503 / PLOR-094C K/A: 2.4.43

URO: 2.8 SRO: 3.5

TASK DESCRIPTION: Direct a Site Evacuation

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

ERP-130, Rev. 13, "Site Evacuation"

D. TASK STANDARD

1. Satisfactory task completion is indicated when a site evacuation has been directed.

2. Estimated time to complete: 18 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to direct a site evacuation using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

A Site Area Emergency has just been declared by the Emergency Director.

G. INITIATING CUE

The Emergency Director has directed you to implement ERP-130, "Site Evacuation" Step 2.2 in order to evacuate the site of non-essential personnel and have them report to the North Substation.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure ERP-130.	P	A copy of procedure ERP-130 is obtained.
*2	Activate the Page Alert Tone system. (Cue: Siren noise audible on loudspeaker.)	P	Station Alert Tone system pushbutton is momentarily depressed at the Plant Reactor Operator's desk.
*3	Make evacuation announcement twice over the Plant Public Address system. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement.)	P	Depress and hold pushbutton on GAI-Tronics handset while making evacuation announcement twice over the Plant Public Address System.
*4	Rotate "Evacuation Alarm/Mic selector" switch to position 6 (plant). (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is placed in "POSITION 6" at panel 00C026B.
*5	Sound evacuation siren for approximately 1 minute by pulling handle out. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is PULLED OUT for approximately 1 minute at panel 00C026B.
6	Push switch #43 on Diesel Panel IN. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is PUSHED IN at panel 00C026B.

STEP NO	STEP	ACT	STANDARD
*7	Make evacuation announcement twice over the PLANT RADIO SYSTEM. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement)	P	Depress the pushbutton on the radio system microphone while making evacuation announcement twice over the PLANT RADIO SYSTEM.
*8	Rotate the "Evacuation Alarm/Mic selector" switch, (while in the IN mode) to position 2, (microphone river speakers). Activate microphone by pulling handle OUT. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, Switch 43, is placed in "POSITION 2", THEN handle is PULLED OUT at panel 00C026B.
*9	Make evacuation announcement twice over the Pond Paging system. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement.)	P	Key microphone at panel OOC026B while making evacuation announcement twice over Pond Paging System.
10	Push switch #43 selector switch on Diesel Generator Panel IN. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, Switch 43 is PUSHED IN at panel 00C026B.

STEP NO	STEP	ACT	STANDARD
*11	Activate the Page Alert Tone system. (Cue: Siren noise audible on loudspeaker.)	P	Station Alert Tone system pushbutton is momentarily depressed at the Plant Reactor Operator's desk.
*12	Make evacuation announcement twice over the Plant Public Address system. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement.)	P	Depress and hold pushbutton on GAI-Tronics handset while making evacuation announcement twice over the Plant Public Address System.
*13	Rotate "Evacuation Alarm/Mic selector" switch to position 6 (plant). (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is placed in "POSITION 6" at panel 00C026B.
*14	Sound evacuation siren for approximately 1 minute by pulling handle out. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is PULLED OUT for approximately 1 minute at panel 00C026B.
15	Push switch #43 on Diesel Panel IN. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, switch 43 is PUSHED IN at panel 00C026B.

STEP NO	STEP	ACT	STANDARD
*16	Make evacuation announcement twice over the PLANT RADIO SYSTEM. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement)	P	Depress the pushbutton on the radio system microphone while making evacuation announcement twice over the PLANT RADIO SYSTEM.
*17	Rotate the "Evacuation Alarm/Mic selector" switch, (while in the IN mode) to position 2, (microphone river speakers). Activate microphone by pulling handle OUT. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, Switch 43, is placed in "POSITION 2", THEN handle is PULLED OUT at panel 00C026B.
*18	Make evacuation announcement twice over the Pond Paging system. "This is NOT a drill. This is NOT a drill. Attention all Personnel. This is a site evacuation notification. All non-essential personnel evacuate to the North Substation. All members of the Emergency Response organization report to your emergency response facility. This is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement.)	P	Key microphone at panel OOC026B while making evacuation announcement twice over Pond Paging System.
19	Push switch #43 selector switch on Diesel Generator Panel IN. (Cue: Acknowledge control switch operation.)	P	Mic/Siren Selector, Switch 43 is PUSHED IN at panel 00C026B.

STEP NO	STEP	ACT	STANDARD
20	Inform Emergency Director of task completion. (Cue: Emergency Director acknowledges report.)	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When a site evacuation has been performed per ERP-130 the Emergency Director should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

A Site Area Emergency has just been declared by the Emergency Director.

INITIATING CUE

The Emergency Director has directed you to implement ERP-130, "Site Evacuation" Step 2.2 in order to evacuate the site of non-essential personnel and have them report to the North Substation.

PEACH BOTTOM UNITS 2 AND 3
EMERGENCY RESPONSE PROCEDURE

ERP-130 SITE EVACUATION

1.0 RESPONSIBILITIES

1.1 The Emergency Director (ED) is responsible for directing the use of this procedure.

1.2 Control Room Licensed Operators are responsible for notifying plant personnel via the evacuation siren, public address system, and plant radio system.

1.3 All non-essential personnel are responsible for evacuating the site and proceeding to the designated off-site assembly area as directed.

1.4 Emergency response personnel are responsible for reporting to their assigned facilities.

1.5 The Security Team is responsible for accountability of personnel and access control during the evacuation.

1.6 Health Physics personnel, as assigned by the Health Physics Team Leader (HPTL), are responsible for establishing and operating the vehicle and evacuee monitoring and decontamination stations.

2.0 INITIAL ACTIONS

NOTE
ATTACHMENT TITLED, "SITE EVACUATION FLOW CHART", MAY BE USED AS A GUIDE FOR THE FOLLOWING ACTIONS.

2.1 The ED shall:

2.1.1 Designate an assembly area while taking into consideration radiological conditions, weather conditions and any other emergency conditions. (Suggested assembly areas are the North Sub Station if wind is from North through West OR Unit 1 if wind is from South through East) (refer to site evacuation map on the flow chart attachment).

2.1.2 Notify the on shift Health Physics Supervisor or the HPTL of impending site evacuation and location of the assembly area.

2.1.3 Notify the Supervisor - Nuclear Security or the Security Team Leader (STL) of impending site evacuation and location of the assembly area.

2.1.4 Direct a Control Room Licensed Operator to make the site evacuation announcement.

2.1.5 Complete attachment 2, "Site Evacuation Notification Form" and delegate notifications to Pennsylvania Emergency Management Agency (PEMA) and Maryland Emergency Management Agency (MEMA).

NOTE
STEPS IN 2.2 SHOULD BE COMPLETED IN QUICK SUCCESSION TO AVOID CONFUSING PLANT PERSONNEL.

2.2 The Control Room Licensed Operator, when directed by the ED, shall:

2.2.1 Activate the Page Alert Tone and make the announcements over the **PLANT PUBLIC ADDRESS SYSTEM** twice, in a clear and distinct voice:

THIS (IS) (IS NOT) A DRILL.
THIS (IS) (IS NOT) A DRILL.
ATTENTION ALL PERSONNEL. THIS IS A SITE EVACUATION NOTIFICATION. ALL NON-ESSENTIAL PERSONNEL EVACUATE TO

____
(North Sub Station or Peach Bottom Unit 1)

ALL MEMBERS OF THE EMERGENCY RESPONSE ORGANIZATION REPORT TO YOUR EMERGENCY RESPONSE FACILITY.
THIS (IS) (IS NOT) A DRILL.
THIS (IS) (IS NOT) A DRILL.

2.2.2 Sound **EVACUATION ALARM.**

2.2.2.1 Rotate the "Evacuation Alarm/MIC Selector" switch to Position 6 (plant).

2.2.2.2 Sound the evacuation siren by pulling the handle OUT to activate.

2.2.2.3 Sound siren for approximately 1 minute.

2.2.2.4 Push switch #43 on Diesel Panel IN.

2.2.3 Repeat announcement over the **PLANT RADIO SYSTEM** (all channels known to be in use) twice, as stated above.

2.2.4 Announce event over the **POND PAGING SYSTEM** as follows:

2.2.4.1 Rotate the "Evacuation Alarm/MIC Selector" switch #43 on the Diesel Generator Panel C26B while in the IN mode to Position 2 (microphone river speakers).

2.2.4.2 Activate the microphone by pulling the handle OUT.

2.2.4.3 Repeat the evacuation announcement twice over the **POND PAGING SYSTEM.**

2.2.4.4 Push switch #43 on Diesel Generator Panel IN.

2.2.5 Repeat steps 2.2.1, 2.2.2, 2.2.3 and 2.2.4.

2.3 Plant personnel (except designated emergency response personnel) shall:

2.3.1 Exit site through the Guardhouse according to instructions of Security personnel.

2.3.2 Deposit security badge and dosimetry as directed.

2.3.3 Follow routes to the off-site assembly area as directed by Security Team members.

2.3.4 Follow instructions of Vehicle and Evacuee Control Group members upon arrival at the assembly area.

2.3.5 Await further instructions on returning to the plant or proceeding home.

2.4 Emergency response personnel shall proceed to their designated emergency response facility and card-in or log-in.

3.0 CONTINUING ACTIONS

3.1 None

4.0 FINAL CONDITIONS

4.1 Emergency has been terminated and personnel are instructed by the ED or Shift Management to return to their normal duty station; or

4.2 Personnel and vehicles have been checked for contamination and are released.

5.0 ATTACHMENTS AND APPENDICES

5.1 Attachment 1, "Site Evacuation Flow Chart"

5.2 Attachment 2, "Site Evacuation Notification Form"

6.0 SUPPORTING INFORMATION

6.1 PURPOSE

To define the actions required to be performed during a site evacuation.

6.2 CRITERIA FOR USE

6.2.1 This procedure shall be implemented when in the judgement of Shift Management or the Emergency Director, the health and safety of on site personnel warrants a full site evacuation.

6.2.2 Shift Management or the Emergency Director may wish to direct a site evacuation if:

a. A Site Area Emergency or General Emergency has been declared,

OR

b. Conditions such as smoke, fire, uncontrolled toxic materials, or flooding preclude habitation of large portions of the site,

OR

c. Airborne radioactivity outside the plant, but within the security fence, is greater than 1 N9 uc/cc unidentified.

6.3 REFERENCES

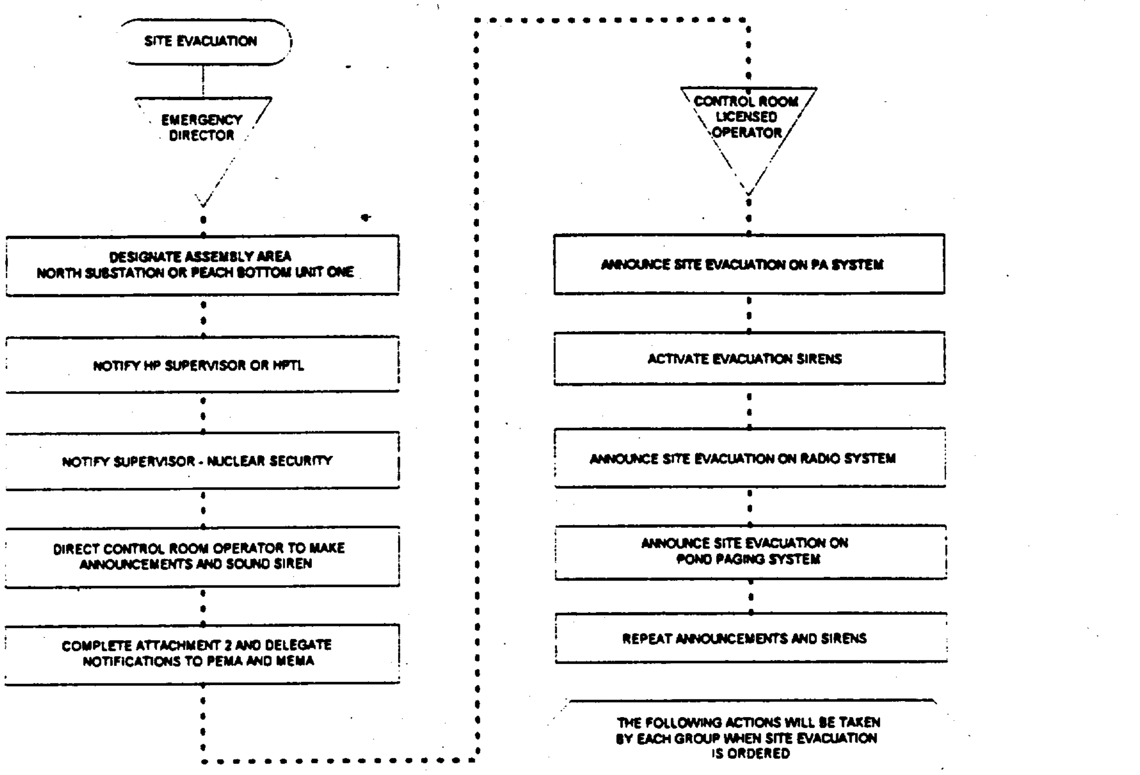
6.3.1 Nuclear Emergency Plan

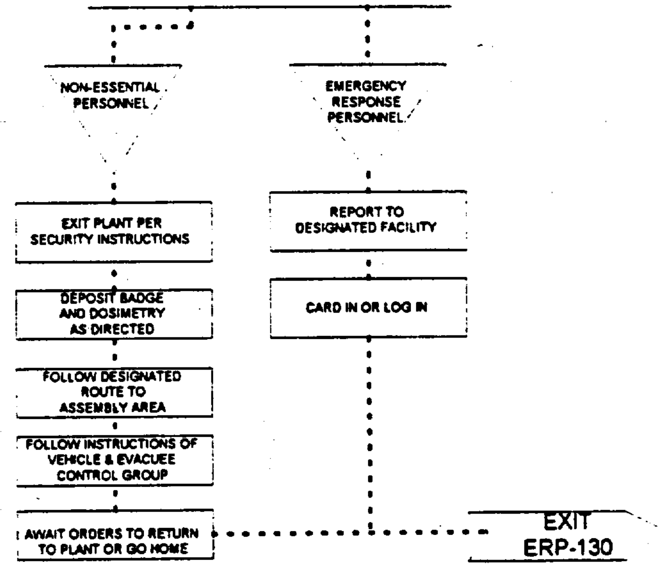
6.3.2 NUREG-0654 FEMA-REP-1, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"

6.4 COMMITMENT ANNOTATION

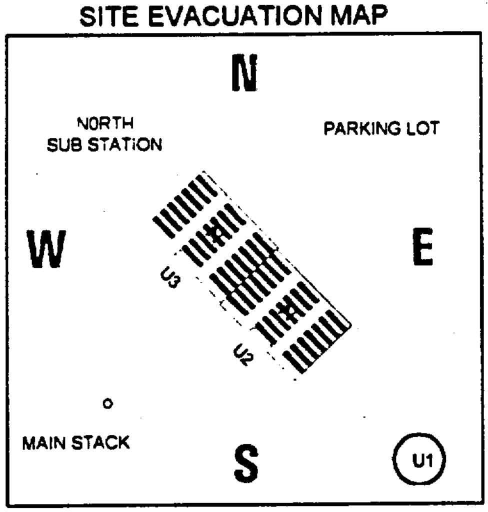
6.4.1 None

ATTACHMENT 1
SITE EVACUATION
FLOW CHART





SITE EVACUATION MAP



ATTACHMENT 2

SITE EVACUATION NOTIFICATION FORM

> **NOTE:**
>
> NOTIFY THE FOLLOWING TWO (2) AGENCIES OF A SITE EVACUATION.

1.) Maryland Emergency Management Agency (MEMA) 9-1-410-486-4422 or Emergency ext. 213

2.) Pennsylvania Emergency Management Agency (PEMA) 9-1-800-424-7362 or Emergency ext. 216

☐ THIS IS A DRILL ☐ THIS IS NOT A DRILL

This is the Peach Bottom Atomic Power Station.

My name is ______________________________

My phone number is (717) 456 - ____________ or Emergency ext. ______

The Emergency Director has declared a Site Evacuation

at ____________ (time) on ____________ (date)

Reason for Site Evacuation:

____

____

____

Site personnel are evacuating to:

____
(North Sub Station OR Peach Bottom Unit 1)

There ☐ IS ☐ IS NOT a Radioactive Release in Progress.

NOTIFICATION COMPLETE:			
MEMA	____________ (Person notified)	______ (Time)	______ (Date)
PEMA	____________ (Person notified)	______ (Time)	______ (Date)

Facility: Peach Bottom Units 2 & 3 Date of Examination: Sep. 13, 1999
Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: SRO-1

B.1 Control Room Systems SRO/RO JPM OUTLINE

System / JPM Title	Type Code*	Safety Function
a. Recirculation/Recirc Pump Trip – Alternate Path (THI)	D, A, S 304CA	1
b. Feedwater/Transfer RFPs to Master Level Control	D,S 155C	2
c. High Pressure Coolant Injection/Shutdown the System with an Injection Signal Present	N, S New–HPCI	4
d. Primary Containment/Vent During a High Drywell Pressure Transient	N, S New-DW Vent	5
e. Diesel Generators/Fast Start – Alternate Path (ESW fails to start)	N, A, S New-DG Start (alt)	6
f. PCIS/PRO Scram Actions – Alternate Path (Isolation Failure)	N, A, S New-PRO Scram (alt)	5
g. Main Generator/Synchronize Turbine Generator Output with Grid at Minimum Load	D, S, L 017C	6
B.2 Facility Walk-Through		
a. Instrument N_2/Backup Instrument Nitrogen to ADS	D, P, R 054P	8
b. Injection Systems/Maximizing CRD Flow to the Vessel (Unit 3)	D, P, R 123P	Emergency 2
c. Main Steam/Closing a Stuck Open MSIV (Unit 3)	D, A, P, R 313CA	Abnormal 3

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

Facility: Peach Bottom Units 2 & 3 Date of Examination: Sep. 13, 1999
Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: RO-1

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. Recirculation/Recirc Pump Trip – Alternate Path (THI)	D, A, S 304CA	1
b. Feedwater/Transfer RFPs to Master Level Control	D,S 155C	2
c. High Pressure Coolant Injection/Shutdown the System with an Injection Signal Present	N, S New–HPCI	4
d. Primary Containment/Vent During a High Drywell Pressure Transient	N, S New-DW Vent	5
e. Diesel Generators/Fast Start – Alternate Path (ESW fails to start)	N, A, S New-DG Start (alt)	6
f. PCIS/PRO Scram Actions – Alternate Path (Isolation Failure)	N, A, S New-PRO Scram (alt)	5
g. Main Generator/Synchronize Turbine Generator Output with Grid at Minimum Load	D, S, L 017C	6

B.2 Facility Walk-Through

a. Instrument N_2/Backup Instrument Nitrogen to ADS	D, P, R 054P	8
b. Injection Systems/Maximizing CRD Flow to the Vessel (Unit 3)	D, P, R 123P	Emergency 2
c. Main Steam/Closing a Stuck Open MSIV (Unit 3)	D, A, P, R 313CA	Abnormal 3

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2000010501 / PLOR-304CA K/A: 295001.10

RO: 3.8 SRO: 3.7

TASK DESCRIPTION: Reactor Operator Actions On A Recirc Pump Trip (Alternate Path - Thermal Hydraulic Instabilities Exist)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

1. GP-9-2, Rev. 26, "Fast Power Reduction"

2. OT-112, Rev 30, "Unexpected/Unexplained Change in Core Flow"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the Reactor has been scrammed.

2. Estimated time to complete: 5 minutes from the onset of Thermal Hydraulic Instability Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to respond to a Recirculation Pump trip. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. The reactor was initially operating at 100% power.

2. The "A" Recirculation Pump has tripped.

3. OT-112, "Unexpected/Unexplained Change in Core Flow", has been entered.

4. The CRS is currently evaluating the plant's position on Exhibit GP-5-1, "PBAPS Power Flow Operation Map".

G. INITIATING CUE

The Control Room Supervisor directs you, the Unit Reactor Operator, to perform the remaining Immediate Operator Actions of OT-112, "Unexpected/Unexplained Change in Core Flow".

ANCE CHECKLIST

STEP	ACT	STANDARD
GP-9-2, Appendix 1, Table 1 ods. Rod select matrix pushbuttons ght for each selected rod, Full Core ay rod position has green "00" on for inserted rod.)	P	At least one GP-9-2, Appendix 1, Table 1 control rod is selected and driven in by depressing the corresponding select matrix pushbutton and placing 3A-S2, ROD CONTROL switch <u>OR</u> 3A-S3, EMERGENCY IN/ NOTCH OVERRIDE switch in the IN position at panel 20C005A.
itor for Thermal Hydraulic Instabilities il) on the APRMs. ue: APRMs A, B, and D readings are winging from 45% to 60%.)	P	All APRM recorders are monitored for noise level growing by two or more times or oscillations greater than 10% peak to peak on panel 20C005A.
Recognize Thermal Hydraulic Instabilities THI) and perform a manual reactor scram. (Cue: Annunciators 211 B1, C1, D1 and E1 are alarming, A & B CHANNEL REACTOR AUTO AND MANUAL SCRAMS, all Full Core display rod positions have green "- -" on.)	P	5A-S1 REACTOR mode switch is placed in the SHUTDOWN position <u>OR</u> 5A-S3A and 5A-S3B Scram pushbuttons are DEPRESSED within 5 minutes of the onset of THI.
Inform Control Room Supervisor of the Thermal Hydraulic Instabilities and the insertion of a manual scram. (Cue: Control Room Supervisor acknowledges report.)	P	The presence of Thermal Hydraulic Instabilities and the insertion of a manual scram reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the Reactor has been manually scrammed due to the presence of thermal hydraulic instabilities, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. The reactor was initially operating at 100% power.
2. The "A" Recirculation Pump has tripped.
3. OT-112, "Unexpected/Unexplained Change in Core Flow", has been entered.
4. The CRS is currently evaluating the plant's position on Exhibit GP-5-1, "PBAPS Power Flow Operation Map".

INITIATING CUE

The Control Room Supervisor directs you, the Unit Reactor Operator, to perform the remaining immediate operator actions of OT-112, "Unexpected/Unexplained Change in Core Flow".

PECO Energy Company
Peach Bottom Unit 2

GP-9-2 FAST REACTOR POWER REDUCTION

1.0 PURPOSE

To rapidly reduce reactor power as required by plant conditions.

2.0 PREREQUISITES

2.1 Plant conditions require a fast reduction in power.

3.0 PERFORMANCE STEPS

NOTES

1. Steps for power reduction may be exited when power reduction is no longer required.

2. Core thermal hydraulic instability may be occurring if ANY of the following conditions exist:

   o APRM oscillations of greater than OR equal to 10 percent peak-to-peak,

   o LPRM OR APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, OR

   o WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.

3.1 IF evidence of core thermal hydraulic instability exists, THEN place the reactor mode switch in "SHUTDOWN" AND enter T-100, "Scram", AND exit this procedure. **CM-1, CM-2**

3.2 Lower recirculation flow until ANY of the following occur:

o percent reactor core thermal power is reduced to the value specified in Step 1 of GP-9-2 Appendix 1

OR

o an "APRM HIGH" alarm occurs, **CM-3**

OR

o FLLLP exceeds 0.995.

3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch OR the Emergency In/Notch Override handswitch. **CM-4**

3.4 Reduce recirculation flow to lower total core flow to approximately 51.25 Mlbs/hr (50% core flow) as indicated on PMS point B015 OR on Reactor Total Core Flow Indicator, DPFR-2-02-3-095, on Panel 20C005A. **CM-5**

> NOTE
>
> Pre-transient rod positions may be obtained from a recent OFFICIAL 3D P1, a recent CONTROL ROD POSITION LOG, RE-C-01 Appendix 7, Control Rod Position Data Sheets, RE-C-01, Exhibit RE-C-01-01, Quarter Core Map or RE-C-01, Exhibit RE-C-01-02, Full Core Map.

3.5 WHEN plant conditions permit, THEN a second licensed operator shall verify control rods on GP-9-2 Appendix 1, Table 1, inserted in Step 3.3 are at position 00 and ALL other control rods are at their pre-transient positions AND signoff Step 3 of GP-9-2 Appendix 1, Table 1.

3.6 Demand an OFFICIAL 3D P1 from PMS or 3D MONICORE to obtain thermal limit values (MFLCPR, MFLPD and MAPRAT).

3.7 IF any thermal limit value is equal to or greater than 1.000, THEN take corrective action in accordance with GP-13, "Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern", and RE-C-01, "Reactor Engineering General Instructions".

3.8 IF further power reduction is required, THEN exit this procedure AND enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure AND enter GP-5, "Power Operations".

4.0 REFERENCES

4.1 GP-3, Normal Plant Shutdown

4.2 GP-5, Power Operations

4.3 GP-9-2 Appendix 1, U/2 Fast Reactor Power Reduction Table

4.4 GP-13, Resolution of Reactor Thermal Limit Violations and Limiting Control Rod Pattern

4.5 RE-C-01, Reactor Engineering General Instructions

4.6 RE-C-01 Appendix 7, Control Rod Movement Guidelines PBAPS Only

4.7 Letter from L. F. Rubino to J. T. Budzynski, 11/8/88

4.8 CM-1, NRC Bulletin No. 88-07 Supplement 1 (T00313)

4.9 CM-2, NRC Generic Letter 94-02 (T03567)

4.10 CM-3, OE 5194, Partial Loss of Feedwater Heating

4.11 CM-4, INPO SER 4-88 (T00462)

4.12 CM-5, GE Letter 11-7-88, Recirc Pump Trip Guidelines (T000157)

4.11 INPO SOER 94-01 (T03905)

PECO Energy Company
Peach Bottom Units 2 and 3

OT-112 - UNEXPECTED/UNEXPLAINED CHANGE IN CORE FLOW - PROCEDURE
(This revision is a complete rewrite)

1.0 ENTRY CONDITIONS

Unexpected/unexplained change in core flow in Mode 1 OR 2.

2.0 IMMEDIATE OPERATOR ACTIONS

2.1 IF NO Recirc Pumps are operating, THEN **SCRAM** AND **ENTER** T-100, "Scram", AND **EXIT** this procedure.

2.2 **DETERMINE** position on Exhibit GP-5-1, "PBAPS Power Flow Operation Map" (Power to Flow Map).

2.3 IF IN Region 1 of the Power to Flow Map, THEN **SCRAM** AND **ENTER** T-100, "Scram", AND **EXIT** this procedure.

2.4 IF a Recirc Pump has tripped, THEN **INSERT** ALL GP-9-2(3) Appendix 1, Table 1 rods.

2.5 **MONITOR** for the following indications of Thermal Hydraulic Instability (THI):

- Any LPRM OR APRM noise level grows by two OR more times its initial noise level, OR
- APRM noise level of greater than OR equal to 10 percent (peak to peak), OR
- LPRM OR APRM oscillations change from random to regular (with approximately 1 to 2 second oscillation period).

2.6 IF THI is present, THEN **SCRAM** AND **ENTER** T-100, "Scram", AND **EXIT** this procedure.

3.0 FOLLOW-UP ACTIONS

3.1 IF IN Region 2 of the Power to Flow Map, THEN **PERFORM** the following:

3.1.1 Immediately **EXIT** Region 2 by performing any of the following:

1. **INSERT** GP-9-2(3) Appendix 1, Table 1 rods.

2. IF ALL GP-9-2(3) Appendix 1, Table 1 rods have been inserted, THEN **INSERT** GP-3-2(3) Appendix A1/A2 Table 2 rods.

3. **RAISE** Recirc Pump speed(s) without exceeding 56 Mlbm/hr actual core flow.

3.1.2 IF Region 2 cannot be exited within one hour, THEN **SCRAM** AND **ENTER** T-100, "Scram", AND **EXIT** this procedure.

3.1.3 WHEN an acceptable operating point outside of Region 2 has been established, THEN power ascension should be suspended until a Reactor Engineer is contacted.

3.2 IF Recirc Pump speed is inexplicably changing, THEN:

3.2.1 **PLACE** the associated SCOOP TUBE switch to "LOCK" at Panel 2(3)0C004A for the affected Recirc Pump.

3.2.2 IF Recirc Pump speed was rising AND continues to rise, THEN **TRIP** the affected Recirc Pump AND **RETURN** to step 2.0 of this procedure.

3.2.3 IF pump speed was rising, THEN **LOWER** unaffected Recirc Pump speed to reduce total core flow to just below the pre-transient value.

3.2.4 **REFER** to SO 2D.7.B-2(3), "Recirculation MG Set Scoop Tube Lockup and Reset" for the affected Recirc Pump.

NOTE

In single loop operation, the Wide Range RPV level instruments associated with the idle loop may oscillate and read up to 10 inches higher than the active loop instruments due to reverse flow through the idle Jet Pumps. This may cause the "FEEDWATER FIELD INSTRUMENT TROUBLE" alarm, 2(3)01 H-1.

3.3 IF a Recirc Pump has tripped, THEN:

3.3.1 **CLOSE** MO-2(3)-02-053A(B), "DISCH" valve OR MO-2(3)-02-043A(B), "SUCTION" valve associated with the tripped Recirc Pump at Panel 2(3)0C004A.

3.3.2 IF the tripped Recirc Pump is NOT required to be isolated, THEN after 5 minutes **REOPEN** the valve closed in step 3.3.1.

3.3.3 **VERIFY** operating Recirc Pump speed is less than 1485 rpm.

3.3.4 **PERFORM** AO 2A.1-2(3), "Recirculation System Single Loop Operation" within 12 hours from the time the Recirc Pump tripped (reference Tech Spec 3.4.1).

3.3.5 **PERFORM** SO 2A.2.A-2(3), "Recirculation System Shutdown" on the inactive loop.

3.4 IF BOTH Recirc Pumps are operating, THEN:

3.4.1 **VERIFY** recirculation jet pump loop flows are within the following limits (reference Tech Spec SR 3.4.1.1):

- 10.25 Mlbm/hr if core flow is less than 71.75 Mlbm/hr.
- 5.125 Mlbm/hr if core flow is greater than OR equal to 71.75 Mlbm/hr.

3.4.2 IF recirculation jet pump loop flow limits are NOT met, THEN:

1. **DECLARE** the pump in the low flow loop inoperable (single loop operation).
2. **START** a 12 hour time clock per Tech Spec 3.4.1.

NOTES

1. Core flow can be maintained fairly constant by alternately lowering speed of the high flow pump and raising speed of the low flow pump.

2. IF the mismatch is restored in the next step, THEN the 12 hour time clock started in the previous step is no longer required.

3. Within ONE hour, **RESTORE** the mismatch to within Tech Spec limits by performing any of the following:

   - **LOWERING** the speed of the high flow loop

   - **RAISING** the speed of the low flow loop

NOTE

The next step will secure a Recirc Pump. This may be either the high flow or low flow pump depending on the situation. Shift Management will determine which pump will remain in service.

4. IF recirculation jet pump loop flow limits can NOT be restored within one hour, THEN:

   - **INSERT** ALL GP-9-2(3) Appendix 1, Table 1 rods.

   - IF ALL Table 1 rods are inserted AND operation is above the 66.7% Rod Line, THEN **REDUCE** power to below the 66.7% Rod Line in accordance with GP-3-2(3) Appendix A1/A2 Table 2 rods.

   - **LOWER** Recirc Pump speed for the pump to remain in service to less than 1485 rpm.

   - **TRIP** the other Recirc Pump AND **RETURN** to step 2.0 of this procedure.

3.5 IF core thermal power is greater than 30% AND actual core flow is less than 50 Mlbm/hr, THEN frequently **MONITOR** for THI until the plant is stable as follows:

3.5.1 **SELECT** each of the control rods listed below on the Rod Select Matrix:

14-47	30-47	46-47
14-31	30-31	46-31
14-15	30-15	46-15

3.6 Obtain an OFFICIAL 3D P1 from PMS OR 3D MONICORE AND monitor thermal limits/FLLLP.

4.0 VERIFICATION OF AUTOMATIC ACTIONS

None

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2590060101 / PLOR-155C K/A: 259001A402
URO: 3.9 SRO: 3.7

TASK DESCRIPTION: TRANSFER RFPs TO MASTER LEVEL CONTROL

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

SO 6C.1.D-2, Rev. 4, Reactor Feedwater Automatic Level Control

D. TASK STANDARD

1. Satisfactory task completion is indicated when the all three RFPs are operating in AUTO on the Master Level controller.

2. Estimated time to complete: 15 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to transfer RFP control from the M/A stations to the Master Level Controller using the appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. The plant is at 100% power with all three RFPs being controlled in manual from their M/A Stations due to troubleshooting of the Master Level Controller.

2. Troubleshooting activities are complete.

3. All procedure prerequisites are complete.

G. INITIATING CUE

The Control Room Supervisor directs you to transfer RFP control to the Master Level Controller from RFP M/A Station IAW SO 6C.1.D-2 steps 4.2.1-4.2.7.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure SO 6C.1.D-2.	P	A copy of SO-6C.1.D-2 is obtained.
2	Verify "M/A SELECT" is lit for each operating RFP at Panel 20C005A. (Cue: "M/A SELECT" is lit for all three RFPs.)	P	Verify "M/A SELECT" is lit for each operating RFP at Panel 20C005A.
3	Verify RFP M/A Station, "RFP A(B)(C)", in "MANUAL" for each operating RFP. (Cue: The M/A Stations are in "MANUAL" for all three RFPs.)	P	Verify the RFP M/A Stations are in "MANUAL" for all three RFPs at Panel 20C005A.
4	Verify a Balanced flow condition exists on FR-2565, "Feed Water F (flow)". (Cue: A balanced flow condition exists on FR-2565.)	P	Verify a balanced flow condition exists on FR-2565, "Feed Water F (flow)" for all three RFPs at Panel 20C005A.
5	Verify the Master Level Controller (MLC) is in "Manual".) (Cue: The Master Level Controller (MLC) is in "MANUAL".)	P	Verify the Master Level Controller (MLC) is in "MANUAL" at Panel 20C005A.
6	Verify the "MLC" setpoint ("S" readout) and process ("P" readout-reactor water level) are matched. (Cue: The "MLC" setpoint ("S" readout and process ("P" readout-readout water level) are matched.)	P	Verify that the "MLC" setpoint ("S" readout) and process ("P" readout-readout water level) values are matched at Panel 20C005A.
7	Verify the "V" readout (Output) is displayed on the A(B)(C) RFP M/A Station (first RFP to be placed in AUTO). (Cue: The "V" readout (Output) is displayed on the A(B)(C) RFP M/A Station.)	P	Verify the "V" readout (output) is displayed on the A(B)(C) RFP M/A Station at Panel 20C005A.
8	Verify the "V" readout (output) is displayed on the "MLC".)	P	Verify the "V" readout (output) is displayed on the "MLC" at Panel 20C005A.

STEP NO	STEP	ACT	STANDARD
*9	Adjust the "MLC" control knob to match the "V" readout to the A(B)(C) RFP M/A Station "V" readout. (Cue: The "MLC" "V" readout is matched to the RFP M/A Station "V" readout.)	P	Adjust the "MLC" control knob as required to match the "V" readout to the A(B((C) RFP M/A Station "V" readout at Panel 20C005A.
*10	Place the "A (B)(C) RFP M/A Station in "AUTO". (Cue: The "A(B)(C) RFP M/A Station green light "ON" red light is "OFF".	P	The "A(B)(C)" RFP M/A button is depressed, the green "AUTO" light is lit, the red "MANUAL" light is out at Panel 20C005A.
*11	Place the Master Level Controller in "AUTO". (Cue: The Master Level Controller is in "AUTO".)	P	The operator depresses the Master Level Controller M/A pushbutton, the green "AUTO" light is lit, the red "MANUAL" light is out at Panel 20C005A.
12	Select the "V" readout (output) display on (one of the remaining RFPs) the A(B)(C) RFP M/A Station. (Cue: The "V" readout (output) is displayed on the A(B)(C) RFP M/A Station.)	P	Select the "V" readout (output) display on the A(B)(C) RFP M/A Station at Panel 20C005A.
13	Select the "V" readout (output) on the "MLC". (Cue: The "V" readout (output) is displayed on the "MLC".)	P	Select the "V" readout (output) display on the "MLC" at Panel 20C005A.
*14	Adjust the output ("V" display) on the A(B)(C) RFP M/A Station to match the output ("V" display) on the "MLC" (Cue: The "MLC" "V" readout is matched to the A(B)(C) RFP M/A Station "V" readout.)	P	Adjust the output ("V" display) on the A(B)(C) RFP M/A Station to match the output ("V" display) on the "MLC" by rotating the control knob as necessary at Panel 20C005A.
*15	Place A(B)(C) RFP M/A Station in "AUTO". (Cue: The A(B)(C) RFP M/A Station green light is "ON", red light is "OFF".	P	The A(B)(C) RFP M/A button is depressed, the green "AUTO" light is lit, the red "MANUAL" light is out at Panel 20C005A.

STEP NO	STEP	ACT	STANDARD
16	Select the "V" readout (output) display on the A(B)(C) RFP M/A Station (final RFP). (Cue: The "V" readout (output) is displayed on the A(B)(C) RFP M/A Station.)	P	Select the "V" readout (output) display on the A(B)(C) RFP M/A Station at Panel 20C005A.
17	Select the "V" readout (output) display on the "MLC". (Cue: The "V" readout (output) is displayed on the "MLC".)	P	Select the "V" readout (output) display on the "MLC" at Panel 20C005A.
*18	Adjust the output ("V" display) on the A(B)(C) RFP M/A Station to match the output ("V" display) on the "MLC". (Cue: The "MLC" "V" readout is matched to the A(B)(C) RFP M/A Station "V" readout.)	P	Adjust the output ("V" display) on the A(B)(C) RFP M/A Station to match the output ("V" display) on the "MLC" by rotating the control knob is necessary at Panel 20C005A.
*19	Place the A(B)(C) RFP M/A Station in "AUTO". (Cue: The A(B)(C) RFP M/A green light is "ON", red light is "OFF".	P	The A(B)(C) RFP M/A button is depressed, the green "AUTO" light is lit, the red "MANUAL" light is out at Panel 20C005A.
20	Inform Control Room Supervisor of task completion. (Cue: The Control Room Supervisor acknowledges the report).	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When all three RFPs have been transferred to Auto and are being controlled by the Master Level Controller, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. The plant is at 100% power with all three RFPs being controlled in manual from their M/A Stations due to troubleshooting of the Master Level Controller.

2. Troubleshooting activities are complete.

3. All procedure prerequisites are complete.

INITIATING CUE

The Control Room Supervisor directs you to transfer RFP control to the Master Level Controller from RFP M/A Station IAW SO 6C.1.D-2 steps 4.2.1-4.2.7.

PECO Energy Company
Peach Bottom Unit 2

SO 6C.1.D-2 REACTOR FEEDWATER AUTOMATIC LEVEL CONTROL

1.0 PURPOSE

This procedure provides the instructions necessary to operate the Reactor Feedwater Automatic Level Control System.

2.0 PREREQUISITES

2.1 One OR more Reactor Feedwater Pumps (RFP) running.

2.4 "STARTUP LEVEL CONTROL" and "BYPASS LEVEL CONTROL" stations are in "MANUAL".

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

3.2 IF annunciator 201 H-1, "FEEDWATER FIELD INSTRUMENT TROUBLE" is in ALARM, THEN verify that the alarm condition(s) will not adversely impact the successful performance of this procedure.

4.0 PERFORMANCE STEPS

NOTE

Communications shall be available between the Control Room AND Personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation OR alarms.

4.1 IF the RFP is being controlled manually from the MSC AND operation from the RFP M/A Station is desired, THEN perform steps 4.1.1 through 4.1.4.

4.1.1 Verify the RFP M/A Station is in "Manual".

4.1.2 Select the "Y" readout (MSC and M/A Station deviation) on the M/A Station.

NOTE

The RFPT M/A Station "Y" readout indicates the difference between the MSC speed setpoint and the RFP M/A Station speed setpoint.

For the next step:

IF "M/A PERMISSIVE" is NOT lit AND the "Y" readout is negative, THEN the MSC speed setpoint must be raised OR the M/A Station speed set point must be lowered.

IF "M/A PERMISSIVE" is NOT lit AND the "Y" readout is positive, THEN the MSC speed setpoint must be lowered OR the M/A Station speed set point must be raised.

4.1.3 Adjust turbine speed OR M/A Station output as required until "M/A PERMISSIVE" is lit.

NOTE

WHEN "M/A SELECT" is lit, THEN that RFPT is controlled from the associated RFP M/A Station.

4.1.4 Press "M/A SELECT" to transfer control to associated RFP M/A Station.

4.2 IF the operating RFP(s) is(are) being controlled manually from the RFP M/A Station(s) AND automatic operation from the Master Level Controller is desired, THEN perform steps 4.2.1 through 4.2.9.4.

4.2.1 Verify "M/A SELECT" lit for each operating RFP at Panel 20C005A.

4.2.2 Verify RFP M/A Station, "RFP A(B)(C)", in "MANUAL", for each operating RFP .

4.2.3 IF more than one RFP is operating, THEN verify a balanced flow condition exists on FR-2565, "Feed Water F (flow)".

4.2.4 Verify the Master Level Controller (MLC) in "MANUAL".

4.2.5 Verify "MLC" setpoint ("S" readout) AND process ("P" readout - reactor water level) are matched.

4.2.6 Place the first RFP in automatic as follows:

4.2.6.1 Verify the "V" readout (output) is displayed on the RFP M/A Station.

4.2.6.2 Verify the "V" readout (output) is displayed on the "MLC".

<u>NOTES</u>

1. The vertical bar displays on the RFP M/A Station will line up when the "MLC" is adjusted. The left bar display is the input from the "MLC". The right side is the output to the RFPT.

2. To allow transfer, the "MLC" output ("V" display) must be matched to within 5% of the RFP M/A Station output ("V" display).

4.2.6.3 Adjust the "MLC" control knob to match the "V" readout to the RFP M/A Station "V" readout.

<u>NOTE</u>

<u>WHEN</u> the RFP M/A control station is placed in "AUTO", <u>THEN</u> that RFPT is being controlled from the Master Level Controller.

4.2.6.4 Place the RFP M/A Station in "AUTO".

<u>NOTE</u>

Placing the Master Level Controller in "AUTO" with the selected RFP M/A Station in "AUTO", lines up the selected RFP to automatically control reactor water level.

4.2.6.5 Place the Master Level Controller in "AUTO".

4.2.7 Place the remaining RFP(s) in automatic as follows:

<u>NOTE</u>

The remaining RFPs will be placed in automatic one at a time.

4.2.7.1 Select the "V" readout (output) display on the RFP M/A Station for the selected RFP.

4.2.7.2 Select the "V" readout (output) display on the "MLC".

NOTE

To allow transfer, the RFP M/A Station output ("V" display) must be matched to within 5% of the Master Level Controller output ("V" display).

4.2.7.3 Adjust the output ("V" display) on the selected RFP M/A Station to match the output ("V" display) on the "MLC".

4.2.7.4 Place the RFP M/A Station in "AUTO".

4.2.7.5 Repeat steps 4.2.7.1 through 4.2.7.4 of this procedure for the remaining RFP, if applicable.

4.2.8 IF reactor water level setpoint adjustment is necessary, THEN perform steps 4.2.8.1 thru 4.2.8.3 of this procedure. Otherwise, go to step 4.2.9 of this procedure.

NOTE

RFP speed and flow should be carefully monitored while adjusting the Master Level Controller Level Setpoint.

4.2.8.1 Set the Master Level Controller to the desired reactor water level by selecting the "S" readout on the Digital Display and adjusting the control knob.

4.2.8.2 Monitor the following parameters on Panel 20C005A, while reactor water level is changing:

- SPI-2621A(B)(C), "Feed Pump Speed"
- FR-2565, "Feed Water F (flow)"
- LI-2-06-094A, B, & C, "Reactor Level L(NR)"

4.2.8.3 Verify reactor water level responds to the change in desired level.

4.2.9 Balance the feedwater flow output from each RFP, such that each RFP is carrying equal load, as follows:

4.2.9.1 Check feedwater flow from each RFP on FR-2565, "Feed Water F (flow)", located on Panel 20C005A.

NOTES

1. To balance feedwater flow for each RFP, the selected M/A Station must be in "AUTO" AND the "X" readout selected.

2. To decrease RFP flow (decrease RFPT speed), the control knob must be turned counterclockwise, inducing a negative bias. To increase RFP flow (increase RFPT speed), the control knob must be turned clockwise, inducing a positive bias.

4.2.9.2 Adjust the selected RFPT speed by selecting the "X" readout (bias) on the Digital Display and adjusting the control knob.

4.2.9.3 Once desired flow is achieved, THEN return the Digital Display to "V".

4.2.9.4 Repeat steps 4.2.9.1 through 4.2.9.3 for the other RFP(s), until all flows are balanced.

4.3 IF the operating RFP(s) is(are) being controlled automatically from the Master Level Controller AND manual operation from the Master Level Controller is desired, THEN perform steps 4.3.1 through 4.3.3

4.3.1 Verify the following on Panel 20C005A:

- RFP Master Level Controller is in "AUTO".
- RFP M/A Station is in "AUTO".

NOTE

WHEN the Master Level Controller is placed in "MANUAL", THEN the RFPT(s) is(are) being controlled manually from the control knob on the Master Level Controller.

CAUTION

Reactor water level must be closely monitored while operating in manual to ensure proper water level is maintained.

4.3.2 Verify reactor level is stable AND steam flow/feed flow are matched.

4.3.3 Place the Master Level Controller in "MANUAL".

4.4 IF the operating RFP(s) is(are) being controlled manually from the Master Level Controller AND automatic operation from the Master Level Controller is desired, THEN perform steps 4.4.1 through 4.4.5

4.4.1 Verify "MLC" setpoint ("S" readout) and process ("P" readout - reactor water level) are matched.

NOTE
RFP speed AND flow should be carefully monitored while adjusting the Master Level Controller Level Setpoint.

4.4.2 Place the Master Level Controller in "AUTO".

4.4.3 IF necessary, THEN adjust the "S" readout on the "MLC" to 23 inches or the desired water level.

4.4.4 Monitor the following parameters on Panel 20C005A, while reactor water level is changing:

- o SPI-2621A(B)(C), "Feed Pump Speed"
- o FR-2565, "Feed Water F (flow)"
- o LI-2-06-094A, B, & C, "Reactor Level L(NR)"

4.4.5 Verify reactor water level responds to the change in desired level.

4.5 IF a RFP is being controlled automatically from the Master Level Controller, AND manual operation from it's M/A Station is desired, THEN perform steps 4.5.1 through 4.5.4

NOTE
WHEN the RFP M/A Station is placed in "MANUAL", THEN the RFP is being controlled from the RFP M/A Station control knob.

****

CAUTION

Reactor water level must be closely monitored while operating in manual to ensure proper water level is maintained.

****

4.5.1 Place the RFP M/A Station for the selected RFP in "MANUAL".

4.5.2 To change the RFP discharge flow with the RFP M/A Station in "MANUAL" perform the following:

4.5.2.1 Select the "V" display on the associated RFP M/A Station.

4.5.2.2 Slowly adjust the RFP M/A Station Control Knob to achieve the desired flow.

4.5.3 Monitor the following parameters on Panel 20C005A, while RFP discharge flow is changing:

- o SPI-2621A,B AND C "Feed Pump Speed"
- o FR-2565 "Feed Water F"
- o LI-2-06-094A,B AND C "Reactor Level L(NR), steady
- o FR-2-06-098 "Total Steam Total F/W F/F", steady

4.5.4 Repeat step 4.5.1 through 4.5.3 for the remaining RFPs, if applicable.

4.6 IF a RFP is being controlled by the M/A Station AND MSC control is desired, THEN perform steps 4.6.1 through 4.6.2.

NOTE

In order to perform a "bumpless transfer" the MSC setpoint tracks the M/A setpoint when "M/A SELECT" is lit.

4.6.1 Press "MSC SELECT".

4.6.2 Place the RFP M/A Station in MANUAL AND adjust output ("V" setpoint) to 0%.

4.7 IF the mode of control of the Feedwater Level Control System is to be changed, THEN perform steps 4.7.1 through 4.7.3.

4.7.1 Verify the following on Panel 20C005A:

- o Feedwater Master Level Controller is in "AUTO".
- o RFP M/A Station is in "AUTO" for each RFP being used to provide feedwater to the reactor.
- o Reactor water level LI-2-06-094A, B, AND C, "Reactor Level L(NR)", steady.

- Reactor Steam flow AND Feed flow FR-2-06-098, "Total Steam Total F/W F/F", steady.

- Reactor Power at 30% OR greater, if going to three element control.

NOTES

1. The Digital feedwater system will automatically select single element OR three element control.
   - single element control approximately < 30% power.
   - three element control approximately > 30% power.
2. IF a failure of a steam flow OR feed flow signal has occurred, THEN the computer will NOT allow three element control to be selected AND will default to single element control.

4.7.2 Push the button corresponding to the desired condition: L (single element), LSF (three element) OR Auto L/LSF (auto selection).

NOTES

1. The selected button will flash.
2. IF the computer disagrees with the new selection, THEN the:
   - Disagree light will be solid - override is permissible.
   - Disagree light will be flashing - override is NOT permissible.
3. During the selection of a new mode, the system will resume the current configuration IF the "X" (execute) button is NOT pushed before the timer runs out (5 to 7 seconds).

4.7.3 Push the "X" (Execute) button to assume the selected condition.

4.8 IF it is desired to transfer "LEVEL SELECT" to an unselected channel, THEN perform steps 4.8.1 through 4.8.2.

4.8.1 Push the button corresponding to the desired level transmitter "A", "B", "C" OR "AUTO ABC".

NOTES
1. The selected button will flash.
2. IF the computer disagrees with the new selection, THEN the: o Disagree light will be solid - override is permissible. o Disagree light will be flashing - override is NOT permissible.

4.8.2 Push the "X" (Execute) button to assume the selected condition.

5.0 CONTROL STATIONS

5.1 20C005A

6.0 REFERENCES

6.1 P&ID M-308, "Feedwater & Feed Pumps"

6.2 P&ID M-321, "Turbine Lube Oil System"

6.3 M-1-S-25

6.4 E-126, "RFPT Lube Oil Pump 480V Starter"

6.5 E-128, "RFPT EMER Oil Pp 250V DC Starter"

6.6 E-129, "Reactor Feed Pump Control Scheme"

6.7 E-130, "RFPT Lube Oil Reservoir Vapor Extractor 480V Starter"

6.8 M-6-43-7, General Electric Steam Turbine, Boiler Feed Pump Drive

6.9 M-5, Byron Jackson Reactor Feed Pump Instruction Book

6.10 General Electric Level Diagram 509E 252 CX

6.11 General Electric Wiring Diagram 509E 254 BE

6.12 LER 2-89-12

7.0 TECHNICAL SPECIFICATIONS

None

8.0 INTERFACING PROCEDURES

None

PECO NUCLEAR
PEACH BOTTOM ATOMIC POWER STATION
JOB PERFORMANCE MEASURE

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2060050101 / NEW-HPCI K/A: 206000

URO: 3.9 SRO: 4.3

TASK DESCRIPTION: Shutdown HPCI with an Initiation Signal Present

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

    a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

    b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

    a. The task standard is met.

    b. JPM completion time requirement is met.

        1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

        2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

Procedure SO 23.2.A-2 Rev. 11, "HPCI System Shutdown"

D. TASK STANDARD

1. Satisfactory task completion is indicated when HPCI is shutdown and the HPCI "Aux Oil Pump" has been placed in "Pull to Lock".

2. Estimated time to complete: 8 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to manually perform a Short Term shutdown of the HPCI system while an injection signal is present using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. HPCI System spuriously initiated on failed -48" HPCI relays.

2. The -48" signal to HPCI is still present.

3. HPCI operation is not required.

G. INITIATING CUE

The Control Room Supervisor directs you to perform a Short Term shutdown of HPCI using SO 23.2.A-2, "HPCI System Shutdown".

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure SO 23.2.A-2, "HPCI SYSTEM SHUTDOWN".	P	A copy of procedure SO 23.2.A-2 is obtained.
2	Verify the " Aux Oil Pump", 20P026, control switch in "START".	P	The " Aux Oil Pump", 20P026, control switch is verified in "START".
3	Verify "HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on panel 221 A-2 is clear. (Cue: Annunciator 221 A-2 is not lit.)	P	"HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on panel 221 A-2 is verified clear.
4	Verify "HPCI DC MOTOR POWER LOSS" alarm on panel 221 A-1 is clear. (Cue: Annunciator 221 A-1 is not lit.)	P	"HPCI DC MOTOR POWER LOSS" alarm on panel 221 A-1 is verified clear.
5	Place the gland seal condenser "Vac Pump" control switch, in "START". (Cue: Acknowledge switch operation. The "Vac Pump" switch is in the "START" position.)	P	The gland seal condenser "Vac Pump" control switch, is placed in "START".
*6	Depress AND hold the HPCI System "Remote Trip" pushbutton. (Cue: Acknowledge switch operation. The HPCI System "Remote Trip" pushbutton is depressed and being held.)	P	The HPCI System "Remote Trip" pushbutton is being depressed and held.
*7	WHEN the "Remote Trip" pushbutton has been held for at least 90 seconds, THEN place the HPCI "Aux Oil Pump" control switch in "Pull to Lock". (Cue: Acknowledge control switch operation. The HPCI "Aux Oil Pump" control switch is in the "Pull to Lock" position.)	P	WHEN the "Remote Trip" pushbutton has been held for at least 90 seconds. THEN the HPCI "Aux Oil Pump" control switch is placed in "Pull to Lock".
8	Release the "Remote Trip" pushbutton. (Cue: Acknowledge pushbutton operation. The "Remote Trip" pushbutton has been released.)	P	The "Remote Trip" pushbutton has been released.
9	Inform Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report.)	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

TERMINATING CUE

When HPCI is shutdown and the "Aux Oil Pump" is in "Pull to Lock", the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. HPCI System spuriously initiated on failed -48" HPCI relays.

2. The -48" signal to HPCI is still present.

3. HPCI operation is not required.

INITIATING CUE

The Control Room Supervisor directs you to perform a Short Term shutdown of HPCI using SO 23.2.A-2, "HPCI System Shutdown".

PECO Energy Company
Peach Bottom Unit 2

SO 23.2.A-2 HPCI SYSTEM SHUTDOWN

1.0 PURPOSE

This procedure provides instructions to shutdown the HPCI System when system operation is no longer required. Sections are provided for HPCI shutdown with OR without an initiation condition present.

2.0 PREREQUISITES

2.1 HPCI System operation is no longer required OR as directed by TRIP procedures.

2.2 Concurrence of the Senior Licensed Operator (SLO) to secure the system.

2.3 HPCI System in operation.

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

3.2 Monitor Reactor water level AND pressure, AND primary containment temperatures AND pressure from multiple indications.

3.3 IF the Aux Oil Pump, 20P026, is left running after the turbine is shutdown AND the HPCI System subsequently initiates, THEN a high steam flow isolation may occur. **CM-1**

3.4 Do NOT secure OR place an ECCS in MANUAL Mode unless, by at least two independent indications, (1) misoperation in AUTOMATIC Mode is confirmed, OR (2) adequate core cooling is assured. IF an ECCS is placed in MANUAL Mode, THEN it will NOT initiate automatically. Make frequent checks of the initiating OR controlling parameter. WHEN manual operation is no longer required, THEN restore the system to AUTOMATIC/STANDBY Mode if possible.

3.5 Do NOT throttle the HPCI Turbine below 2200 rpm. A certain minimum speed is required to maintain the stop valve in its open position. Operation at excessively low speeds also positions the governor valve very close to its seat, causing intermittent exhaust flow AND water hammer in the exhaust line. During extended low speed operation, the resulting forces could damage the turbine exhaust line check valves.

4.0 PERFORMANCE STEPS

NOTES

1. Communications shall be available between the control room AND personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects control room instrumentation OR alarms.
2. Section 4.1 provides for HPCI shutdown when an initiation condition is NOT present.
3. Section 4.2 provides for short term HPCI shutdown when an initiation condition IS present. This method should be used when subsequent operation is anticipated.
4. Section 4.3 provides for long term HPCI shutdown when an initiation condition IS present. This method will quickly remove HPCI from service, but results in a system isolation making recovery more difficult. Long term shutdown should only be used when subsequent operation is NOT anticipated.

4.1 HPCI System Shutdown when an Initiation Condition is NOT present. **CM-3**

4.1.1 Verify 23A-S105, "HPCI Manual Initiation" collar in "DISARM".

CAUTION

During HPCI System shutdown, the Aux Oil Pump, 20P026, will NOT automatically start on lowering bearing oil pressure unless an initiation signal is present OR sealed-in. The HPCI "Aux Oil control switch shall be in "START" prior to tripping the turbine.

4.1.2 Verify the "Aux Oil Pump", 20P026, control switch in "START". **CM-2**

4.1.3 Verify "HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on Panel 221 A-2 is clear.

4.1.4 Verify "HPCI DC MOTOR POWER LOSS" alarm on Panel 221 A-1 is clear.

4.1.5 Verify gland seal condenser "Vac Pump", 20K002, control switch in "START". **CM-2**

4.1.6 Depress AND hold the HPCI System "Remote Trip" pushbutton.

4.1.7 Verify "Aux Oil Pump" starts as turbine slows down (1200 - 1500 rpm).

4.1.8 Fully close MO-2-23-14, "Supply."

4.1.9 Close MO-2-23-019, "To Feed Line".

4.1.10 <u>WHEN</u> MO-2-23-14 is fully closed, <u>THEN</u> release the HPCI System "Remote Trip" pushbutton.

4.1.11 <u>IF</u> HPCI is in CST to CST mode, <u>THEN</u> perform the following. Otherwise, proceed to step 4.1.12.

4.1.11.1 Close MO-2-23-021, "Full Flow Test".

4.1.11.2 <u>IF</u> RCIC is <u>NOT</u> in service to the CST, <u>THEN</u> close MO-2-23-024, "Cond Tank Return".

4.1.12 <u>IF</u> HPCI is in the Torus to Torus mode, <u>THEN</u> perform the following:

4.1.12.1 Close MO-2-23-021

4.1.12.2 Close MO-2-23-057

4.1.12.3 Close MO-2-23-058

4.1.12.4 Open MO-2-23-017

CAUTION

The following steps flush the HPCI pump piping to the torus. Do not exceed 14.9' Torus Level.

4.1.12.5 Throttle Open MO-2-23-021 <u>AND</u> Flush 1 ft of CST Water to the Torus.

4.1.12.6 Close MO-2-23-021

4.1.12.7 Close MO-2-23-031

4.1.13 <u>IF</u> a HPCI initiation condition had existed, <u>THEN</u> depress the "HPCI Initiation Signal" reset pushbutton, 23A-S21.

4.1.14 Verify "HPCI RELAYS NOT RESET" alarm on Panel 228 C-5 clear.

4.1.15 Verify open AO-2-23-042 <u>AND</u> AO-2-23-043, "Drain Isol to Mn Cndr".

4.1.16 Locally verify HPCI turbine shaft stopped.

4.1.17 Momentarily place the HPCI "Aux Oil Pump" control switch to "STOP" <u>AND</u> verify the control switch returns to "AUTO".

4.1.18 Shutdown the turbine vibration instrumentation, VBI and VBR 4506, AND mark the recorder chart with the date and time of the HPCI turbine run.

4.1.19 Verify HPCI flow controller in "AUTO" AND set for 5000 gpm.

4.1.20 WHEN torus water temperature is less than 95°F AND Torus Cooling is NOT required to support other plant operations, THEN remove Torus Cooling from service in accordance with SO 10.1.D-2, "RHR System Torus Cooling" AND return to step 4.1.21 of this procedure.

4.1.21 WHEN the HPCI gland seal condenser "Vac Pump" has run for 15 minutes, THEN place the HPCI gland seal condenser "Vac Pump" control switch in "STOP".

4.1.22 IF the Standby Gas Treatment System is NOT operating in support of other plant conditions, THEN Shutdown the Standby Gas Treatment System in accordance with SO 9A.2.A-2, "Standby Gas Treatment System Shutdown Following automatic Initiation" AND return to step 4.1.23 of this procedure.

4.1.23 Verify HPCI System aligned in accordance with SO 23.1.A-2, "HPCI System Alignment for Automatic or Manual Operation".

4.2 Short Term HPCI System Shutdown when an Initiation Condition IS Present. **CM-3**

CAUTION

During HPCI System shutdown, the Aux Oil Pump, 20P026, will NOT automatically start on lowering bearing oil pressure unless an initiation signal is present OR sealed-in. The HPCI "Aux Oil control switch shall be in "START" prior to tripping the turbine.

4.2.1 Verify the "Aux Oil Pump", 20P026, control switch in "START". **CM-2**

4.2.2 Verify "HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on Panel 221 A-2 is clear.

4.2.3 Verify "HPCI DC MOTOR POWER LOSS" alarm on Panel 221 A-1 is clear.

4.2.4 Place the gland seal condenser "Vac Pump" control switch, in "START". **CM-2**

****
CAUTION

MO-2-23-25, "Min Flow", opens with an initiation signal present AND the HPCI turbine shutdown. This will result in gravity drain of the CST to the Torus if HPCI suction is aligned to the CST.
****

4.2.5 Depress AND hold the HPCI System "Remote Trip" pushbutton.

4.2.6 WHEN the "Remote Trip" pushbutton has been held for at least 90 seconds, THEN place the HPCI "Aux Oil Pump" control switch in "Pull To Lock".

4.2.7 Release the "Remote Trip" pushbutton.

4.2.8 IF subsequent HPCI injection is desired, THEN perform the following substeps. Otherwise, proceed to step 4.2.9.

4.2.8.1 Place HPCI "Aux Oil Pump" in "AUTO".

4.2.8.2 Verify HPCI flowrate of 5000 gpm on FI-2-23-108.

4.2.8.3 WHEN HPCI operation is no longer required, THEN perform section 4.2 or 4.3 of this procedure as directed by Shift Management.

4.2.9 WHEN the HPCI Initiation condition(s) have cleared AND as directed by Shift Management, THEN perform SO 23.1.A-2, "High Pressure Coolant Injection System Setup for Automatic or Manual Operation".

4.3 Long Term HPCI System Shutdown when an Initiation Condition IS Present. **CM-3**

****
CAUTION

During HPCI System shutdown, the Aux Oil Pump, 20P026, will NOT automatically start on lowering bearing oil pressure unless an initiation signal is present OR sealed-in. The HPCI "Aux Oil control switch shall be in "START" prior to lowering turbine speed.
****

4.3.1 Verify the "Aux Oil Pump", 20P026, control switch in "START". **CM-2**

4.3.2 Verify "HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on Panel 221 A-2 clear.

4.3.3 Verify "HPCI DC MOTOR POWER LOSS" alarm on Panel 221 A-1 clear.

4.3.4 Verify gland seal condenser "Vac Pump", 20K002, control switch in "START". **CM-2**

NOTE
Step 4.3.5 will cause a HPCI System isolation.

4.3.5 Depress the "HPCI Isolation" pushbutton (23A-S27) AND verify the following valves close:

4.3.5.1 MO-2-23-015, "HPCI Steam Isol".

4.3.5.2 MO-2-23-016, "HPCI Steam Isol".

4.3.5.3 AO-4807, "Heatup Bypass".

4.3.5.4 HPCI turbine tripped AND HPCI stop valve closed.

4.3.5.5 AO-2-23-138, "Exh Line Drain Isol".

4.3.5.6 MO-2-23-025, "Min Flow".

4.3.5.7 MO-2-23-057, "Torus Suct Outboard".

4.3.5.8 MO-2-23-058, "Torus Suct Inboard".

NOTE
HPCI System is now isolated AND will NOT auto initiate.

4.3.6 Locally verify the HPCI turbine shaft has completely stopped.

4.3.7 Place the HPCI "Aux Oil Pump" control switch in "PULL TO LOCK".

4.3.8 IF subsequent HPCI operation is required, THEN perform SO 23.7.C-2, "HPCI System Recovery from System Isolation or Turbine Trip". Do NOT return to this procedure.

4.3.9 IF long term isolation of the HPCI System is necessary, AND sufficient time has passed to allow cooling of the turbine steam exhaust lines, THEN close MO-4245, "Vac Breaker".

4.3.10 Shutdown the turbine vibration instrumentation, VBI and VBR 4506, AND mark the recorder chart with the date and time of the HPCI turbine run.

4.3.11 Verify HPCI Flow controller in "AUTO" AND set for 5000 gpm.

4.3.12 WHEN torus water temperature is less than 95°F AND Torus Cooling is NOT required to support other plant operations, THEN remove Torus Cooling from service in accordance with SO 10.1.D-2, "RHR System Torus Cooling" AND return to step 4.3.13 of this procedure.

4.3.13 WHEN the HPCI gland seal condenser "Vac Pump" has run for 15 minutes, THEN stop the pump by placing it's control switch in "PULL TO LOCK".

4.3.14 IF the Standby Gas Treatment System is NOT operating in support of other plant conditions, THEN Shutdown the Standby Gas Treatment System in accordance with SO 9A.2.A-2, "Standby Gas Treatment System Shutdown Following automatic Initiation" AND return to step 4.3.15 of this procedure.

4.3.15 WHEN the HPCI initiation condition(s) have cleared AND as directed by Shift Management, THEN perform SO 23.7.C-2, "HPCI System Recovery From System Isolation or Turbine Trip".

5.0 CONTROL STATIONS

5.1 Panel 20C004B.

5.2 HPCI Pump Room.

6.0 REFERENCES

6.1 P&ID 6280-M-365 and 6280-M-366

6.2 6280-M-1-S-36 sheets 1 through 16

6.3 GE Drawing M-1-CC-14 through 16

6.4 GEK 9684 Volume IX, Part 1
GEK 9684 Volume V

6.5 CM-1, INPO SER 26-87 (CT T00414)

6.6 CM-2, IE Bulletin 80-06, "Engineered Safety Feature Reset Controls" (CT T00825)

6.7 CM-3, ISEG ER-34, (CT T00014)

6.8 TRMS 3.11

7.0 TECHNICAL SPECIFICATIONS

7.1 Section 3.3.5.1

7.2 Table 3.3.5.1.1

7.3 Section 3.5.1

7.4 Section 3.6.2.1

7.5 Section 3.6.2.2

7.6 Section 3.6.4.3

8.0 INTERFACING PROCEDURES

8.1 SO 9A.2.A-2 "Standby Gas Treatment System Shutdown Following Automatic Initiation"

8.2 SO 10.1.D-2 "RHR System Torus Cooling"

8.3 SO 23.1.A-2 "High Pressure Coolant Injection System Setup for Automatic or Manual Operations"

8.4 SO 23.7.C-2 "HPCI System Recovery from System Isolation or Turbine Trip"

(

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2230020101 / NEW-DWVENT K/A: 223001

URO: 4.2 SRO: 4.3

TASK DESCRIPTION: Drywell Venting via the 2" Vent

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

Procedure SO 7B.3.A-2, Rev. 9, "CONTAINMENT ATMOSPHERE PRESSURE CONTROL AND NITROGEN MAKEUP"

D. TASK STANDARD

1. Satisfactory task completion is indicated when drywell venting has been initiated.

2. Estimated time to complete: 10 minutes <u>Non-Time Critical</u>

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to initiate drywell venting via the 2" vent using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. Drywell pressure is 1 psig and going up slowly.

2. OT-101 has directed that the drywell be vented in accordance with SO 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup".

3. The primary containment has been inerted in accordance with SO 7B.1.A-2, "Containment Atmosphere Inerting".

4. Drywell and Torus Hydrogen/ Oxygen Sampling system is in operation in accordance with SO 7J.1.A-2, "Drywell and Torus H2/O2 Sampling System Startup and Normal Operation CAC Mode".

5. Drywell Ventilation System is in operation in accordance with SO 40C.1.A-2, "Drywell Ventilation System Startup and Normal Operations".

6. SBGT is currently operating on the 'A' Fan and the 'A' Train.

7. The Drywell Radiation Monitors are in service and being monitored by the STA.

8. The Main Stack Radiation Monitors are in service and being monitored by the STA.

9. Stack Dilution fans are in operation in accordance with SO 8.7.A, "Off-Gas Dilution Fan Operation".

10. Primary Containment Isolation System is reset in accordance with GP-8B, "PCIS Isolation - Group II & III".

11. Management has determined that COL 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup", is not required.

G. INITIATING CUE

The Control Room Supervisor directs you to maximize venting the drywell via the 2" vents in accordance with SO 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup" to lower drywell pressure.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure SO 7B.3.A-2.	P	A copy of procedure SO 7B.3.A-2 is obtained.
*2	Verify PR/RR-2-02-3-404B, "Reactor Pressure/Drywell Rad Gas Recorder" is <3.45 E-3 uCi/cc. (Cue: PR/RR-2-02-3-404B is reading 2 E-3 uCi/cc)	P	The candidate verifies that PR/RR-2-02-3-404B, "Reactor Pressure/Drywell Rad Gas Recorder" on panel 20C003 is indicating <3.45 E-3 uCi/cc.
2	Check open AO-2509, "Drywell Vent Inbd 2" Vent". (Cue: AO-2509 red light is lit, green light is out.)	P	AO-2509 red light is verified on.
*3	Open AO-2510, "Drywell Vent Outbd 2" Vent". (Cue: Acknowledge switch operation.)	P	AO-2510 switch is taken to open.
4	Verify AO-2510 is open. (Cue: AO-2510 red light is lit, green light is out.)		The AO-2510 red light is verified ON.
*5	Open CV-4957, "Drywell Bleed Flow", using manual control HCS-4957 to set the desired flowrate. (Cue: Acknowledge controller operation. HCS-4957 is indicating full open)	P	HCS-4957 is used to fully open CV-4957 to maximize venting via the 2" vents.
Note: If the candidate monitors drywell pressure on PR-2508, cue him that: "Drywell pressure is 1.2 psig and steady."			
6	Inform Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report.)	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When drywell venting via the 2" vents has been established, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. Drywell pressure is 1 psig and going up slowly.
2. OT-101 has directed that the drywell be vented in accordance with SO 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup".
3. The primary containment has been inerted in accordance with SO 7B.1.A-2, "Containment Atmosphere Inerting".
4. Drywell and Torus Hydrogen/ Oxygen Sampling system is in operation in accordance with SO 7J.1.A-2, "Drywell and Torus H2/O2 Sampling System Startup and Normal Operation CAC Mode".
5. Drywell Ventilation System is in operation in accordance with SO 40C.1.A-2, "Drywell Ventilation System Startup and Normal Operations".
6. SBGT is currently operating on the 'A' Fan and the 'A' Train.
7. The Drywell Radiation Monitors are in service and being monitored by the STA.
8. The Main Stack Radiation Monitors are in service and being monitored by the STA.
9. Stack Dilution fans are in operation in accordance with SO 8.7.A, "Off-Gas Dilution Fan Operation".
10. Primary Containment Isolation System is reset in accordance with GP-8B, "PCIS Isolation - Group II & III".
11. Management has determined that COL 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup", is not required.

INITIATING CUE

The Control Room Supervisor directs you to maximize venting the drywell via the 2" vents in accordance with SO 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup" to lower drywell pressure.

PECO Energy Company
Peach Bottom Unit 2

SO 7B.3.A-2 CONTAINMENT ATMOSPHERE PRESSURE CONTROL AND NITROGEN MAKEUP

1.0 PURPOSE

This procedure provides the instructions necessary to vent and to makeup to the primary containment to maintain drywell pressure between 0.25 to 0.75 psig, and O_2 concentration less than 3% in the drywell, and less than 1% in the torus.

2.0 PREREQUISITES

2.1 Primary containment inerted in accordance with SO 7B.1.A-2, "Containment Atmosphere Inerting".

2.2 Drywell and Torus Hydrogen/Oxygen Sampling system in operation in accordance with SO 7J.1.A-2, "Drywell and Torus H_2/O_2 Sampling System Startup and Normal Operation CAC Mode".

2.3 Drywell Ventilation System in operation in accordance with SO 40C.1.A-2, "Drywell Ventilation System Startup and Normal Operations".

2.4 IF venting of the containment is required, THEN:

2.4.1 SBGT System available in accordance with SO 9A.1.A, "Standby Gas Treatment System Lineup for Automatic Operation".

2.4.2 Drywell Radiation Monitors in operation.

2.4.3 Main Stack Radiation Monitors in operation.

2.4.4 Stack Dilution fans in operation in accordance with SO 8.7.A, "Off-Gas Dilution Fan Operation".

2.4.5 Primary Containment Isolation System reset in accordance with GP-8B, "PCIS Isolation - Group II & III".

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

3.2 Monitor drywell radiation levels and Main Stack radiation levels while venting the primary containment. IF any rise in radiation levels is observed, THEN stop venting AND notify Chemistry, unless directed by OT-101, "High Drywell Pressure".

3.3 Pressure at DPI-8143, Drywell/Torus Diff "P", should be maintained between 0 to 0.25 psid.

4.0 PERFORMANCE STEPS

NOTE

Communications shall be available between the Control Room AND Personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation OR alarms.

4.1 Perform COL 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup", as directed by Shift Management.

4.2 IF venting the drywell is required, THEN perform the following:

4.2.1 Verify PR/RR-2-02-3-404B, "Reactor Pressure/ Drywell Rad Gas Recorder", < 3.45×10^{-3} µCi/cc on Panel 20C003. (Refer to ST-C-095-819-2, "Drywell Atmosphere Radiation Monitor Operational And Surveillance Log").

4.2.2 Startup the Standby Gas Treatment (SBGT) system in accordance with SO 9A.1.B, "Standby Gas Treatment System Manual Startup", AND return to step 4.2.3 of this procedure.

4.2.3 Check open AO-2509, "Drywell Vent Inbd 2" Vent" on Panel 20C484B, "CAD".

4.2.4 Open AO-2510, "Drywell Vent Outbd 2" Vent" on Panel 20C484B, "CAD".

4.2.5 Open CV-4957, "Drywell Bleed Flow", using manual control HCS-4957 to set desired flow on Panel 20C484B.

4.2.6 WHEN pressure at PR-2508, Drywell "P", on Panel 20C003-03 is between 0.25 to 0.75 psig, THEN close AO-2510 on Panel 20C484B.

4.2.7 Close CV-4957 using HCS-4957 on Panel 20C484B.

4.2.8 Return SBGT System to standby operation in accordance with SO 9A.2.B, "Standby Gas Treatment System Shutdown Following Manual Start", AND return to step 4.3 of this procedure.

4.3 IF nitrogen addition to containment is required due to low containment pressure, THEN perform the following:

4.3.1 Verify Containment Atmosphere Control (CAC) System operating in accordance with SO 7B.1.B, "CAC Nitrogen Storage System Startup/Operation High Flow Mode", OR SO 7B.1.C, "CAC Nitrogen Storage System Startup/Operation Low Flow Mode".

NOTE

1. Maximum flowrate for Water Bath Vaporizer 00S216 is 3200 scfm.

2. Maximum flowrate for Ambient Vaporizers 00S492 & 00S493 is 100 scfm

4.3.2 Open AO-2523, "D/W & Torus N2 Make-up Inlet", on Panel 20C003-03.

4.3.3 WHEN flow is started, THEN perform SO 7B.8.B, "CAC Nitrogen Storage System Routine Inspection", concurrently with this procedure.

4.3.4 Verify makeup flow on FR-2522, N2 Makeup "F" on Panel 20C003-03.

4.3.5 WHEN pressure at PR-2508, Drywell "P", is between 0.25 to 0.75 psig, THEN close AO-2523 on Panel 20C003-03.

4.4 IF nitrogen addition to containment is required to reduce drywell O_2 concentration to less than 3%, THEN perform the following:

4.4.1 Verify the Containment Atmosphere Control (CAC) System operating in accordance with SO 7B.1.B, "CAC Nitrogen Storage System Startup/Operation High Flow Mode", OR SO 7B.1.C, "CAC Nitrogen Storage System Startup/Operation Low Flow Mode".

NOTE

Both Primary Containment H_2/O_2 Analyzer are placed in operation to maximize sampling capability during O_2 concentration reduction.

4.4.2 Place standby analyzer XIC-80411A(B), "A(B) CAC/CAD Analyzer" in operation in accordance with SO 7J.7.C-2, "Placing Drywell and Torus H_2/O_2 Sampling System in Standby Mode and Removing From Standby Mode" AND return to step 4.4.3 of this procedure.

4.4.3 Verify PR/RR-2-02-3-404B, "Reactor Pressure/ Drywell Rad Gas Recorder", < 3.45×10^{-3} µCi/cc on Panel 20C003. (Refer to ST-C-095-819-2 , "Drywell Atmosphere Radiation Monitor Operational And Surveillance Log").

4.4.4 Startup the SBGT System in accordance with SO 9A.1.B, "Standby Gas Treatment System Manual Startup", <u>AND</u> return to step 4.4.5 of this procedure.

4.4.5 Direct an operator to close HV-2-7B-40123B, "N2 Makeup Isolation to Torus Purge Valve".

4.4.6 Monitor Drywell sample points on Panels 20C484A <u>AND</u> 20C484B using the "7" key on XIC-80411A(B) to advance sample points as required.

POINT	SAMPLE LOCATION	ANALYZER
SV 3	Drywell Exhaust	XIC-80411A
SV 4	Upper Drywell	XIC-80411A
SV 5	Lower Drywell	XIC-80411A
SV 3	Middle Drywell	XIC-80411B

4.4.7 Verify open AO-2509, "Drywell Vent Inbd 2" Vent", on Panel 20C484B.

NOTE

1. Maximum flowrate for Water Bath Vaporizer 00S216 is 3200 scfm.

2. Maximum flowrate for Ambient Vaporizers 00S492 & 00S493 is 100 scfm.

4.4.8 Open AO-2523, "D/W & Torus N2 Makeup Inlet", on Panel 20C003-03.

4.4.9 <u>WHEN</u> flow is started, <u>THEN</u> perform SO 7B.8.B, "CAC Nitrogen Storage System Routine Inspection", concurrently with this procedure.

4.4.10 Verify makeup flow on FR-2522, N2 Makeup "F", on Panel 20C003-03.

4.4.11 Open AO-2510, "Drywell Vent Outbd 2" Vent" on Panel 20C484B.

4.4.12 Open CV-4957, "Drywell Bleed Flow", using manual control HCS-4957 on Panel 20C484B to maintain pressure at PR-2508, Drywell "P", between 0.25 to 0.75 psig on Panel 20C003-03.

4.4.13 WHEN drywell O_2 concentration at XIC-80411A AND B are between 1.5% to 3.0%, THEN close AO-2523 on Panel 20C003-03.

4.4.14 Close AO-2510 on Panel 20C484B.

4.4.15 Close CV-4957 using HCS-4957 on Panel 20C484B.

4.4.16 Direct an operator to open HV-2-7B-40123B, "N_2 Makeup Isolation To Torus Purge Valve".

4.4.17 Return the SBGT system to standby operation in accordance with SO 9A.2.B, "Standby Gas Treatment System Shutdown Following Manual Start", AND return to step 4.4.18 of this procedure.

NOTES

1. Either Primary Containment H_2/O_2 Analyzer may be left in operation at the discretion of Shift Management. Redundant analyzer should be placed in standby. XIC-80411A is the preferred in service analyzer due to better sampling flexibility.

2. IF nitrogen addition to containment is required in section 4.5 to reduce Torus O_2 concentration, THEN both analyzers may be left in operation until completion of section 4.5.

4.4.18 IF XIC-80411A(B) is to be placed in standby, THEN perform SO 7J.7.C-2, "Placing Drywell and torus H_2/O_2 Sampling System in Standby Mode and Removing From Standby Mode", AND return to step 4.5 of this procedure.

4.5 **IF nitrogen addition to containment is required to reduce torus O_2 concentration to less than 1%, THEN perform the following.**

4.5.1 Verify Containment Atmosphere Control (CAC) System operations in accordance with SO 7B.1.B, "CAC Nitrogen Storage System Startup/Operation High Flow Mode", OR SO 7B.1.C, "CAC Nitrogen Storage System Startup/Operation Low Flow Mode".

NOTE

Both Primary Containment H_2/O_2 Analyzers are placed in operation to maximize sampling capability during O_2 concentration reduction.

4.5.2 IF NOT already in operation, THEN place standby analyzer XIC-80411A(B), "A(B) CAC/CAD Analyzer" in operation in accordance with SO 7J.7.C-2, "Placing Drywell and Torus H_2/O_2 Sampling System in Standby Mode and Removing From Standby Mode", AND return to step 4.5.3 of this procedure.

4.5.3 Direct an operator to verify RIS-4132, "D/W Leak Detec Rad Gas", $< 3.45 \times 10^{-3}$ µCi/cc on Panel 20C200, "D/W Radioactive Gas Sampler". (Refer to ST-C-095-819-2)

4.5.4 Startup the SBGT System in accordance with SO 9A.1.B,"Standby Gas Treatment System Manual Startup" AND return to step 4.5.5 of this procedure.

4.5.5 Direct an operator to close HV-2-7B-40123A, "N_2 Makeup Isolation to Drywell Purge Valve".

4.5.6 Monitor Torus sample points on Panels 20C484A AND 20C484B using the "7" key on XIC-80411A(B) to advance sample points as required.

POINT	SAMPLE LOCATION	ANALYZER
SV 10	Middle Torus	XIC-80411A
SV 4	Upper Torus	XIC-80411B
SV 5	Torus Exhaust	XIC-80411B

NOTE

1. Maximum flowrate for Water Bath Vaporizer 00S216 is 3200 scfm.
2. Maximum flowrate for Ambient Vaporizers 00S492 & 00S493 is 100 scfm.

4.5.7 Open AO-2523, "D/W & Torus N2 Makeup Inlet", on Panel 20C003-03.

4.5.8 WHEN flow is started, THEN perform SO 7B.8.B, "CAC Nitrogen Storage System Routine Inspection", concurrently with this procedure.

4.5.9 Verify makeup flow on FR-2522, N_2 Makeup "F", on Panel 20C003-03.

4.5.10 Open AO-2513, "Torus Vent Inbd 2" Vent", AND AO-2514, "Torus Vent Outbd 2" Vent".

4.5.11 Open CV-4954, "Torus Bleed Flow", using manual control HCS-4954 on Panel 20C484A to maintain pressure at PR-2508, Drywell "P", between 0.25 to 0.75 psig on Panel 20C003-03.

4.5.12 WHEN torus O_2 concentration at XIC-80411A AND B are less than 1%, THEN close AO-2523 on Panel 20C003-03.

4.5.13 Close AO-2513 AND AO-2514 on Panel 20C484A.

4.5.14 Close CV-4954 using HCS-4954 on Panel 20C484A.

4.5.15 Direct an operator to open HV-2-7B-40123A, "N_2 Makeup Isolation To Drywell Purge Valve".

4.5.16 Return the SBGT system to standby operation in accordance with SO 9A.2.B, "Standby Gas Treatment System Shutdown Following Manual Start".

NOTE

Either Primary Containment H_2/O_2 Analyzer may be left in operation at the discretion of Shift Management. Redundant analyzer should be placed in standby. XIC-80411A is the preferred in service analyzer due to better sampling flexibility.

4.5.17 IF XIC-80411A(B) is to be placed in standby, THEN perform SO 7J.7.C-2, "Placing Drywell and Torus H_2/O_2 Sampling System in Standby Mode and Removing From Standby Mode".

5.0 CONTROL STATIONS

5.1 MCR 20C003-03, Containment Atmosphere panel

5.2 MCR 20C484A, CAD panel

5.3 MCR 20C484B, CAD panel

5.4 MCR 20C012, Plant Services panel

6.0 REFERENCES

6.1 P&ID M-367, Containment Atmosphere Control System

6.2 P&ID M-391, Primary & Secondary Containment Isolation Control Diagram

6.3 P&ID M-397, Standby Gas Treatment Control Diagram

6.4 P&ID M-372, Containment Atmosphere Dilution System

6.5 M-1-S-23, Primary Containment Isolation System

6.6 E-28, Instrumentation & Uninterruptible AC Unit 3

6.7 ST-C-095-819-2, "Drywell Atmosphere Radiation Monitor Operational and Surveillance Log"

6.8 Letter to MJC from ECK dated 8/27/76, "Torus Corrosion Protection"

6.9 Offsite Dose Calculation Manual

7.0 TECHNICAL SPECIFICATIONS

7.1 Section 3.3.3.1

7.2 Section 3.6.3.1

7.3 Section 3.6.3.2

7.4 Section 3.6.4.3

8.0 INTERFACING PROCEDURES

8.1 COL 7B.3.A-2, "Containment Atmosphere Pressure Control and Nitrogen Makeup"

8.2 SO 7B.1.B, "CAC Nitrogen Storage System Startup/Operation High Flow Mode"

8.3 SO 9A.1.B, "Standby Gas Treatment System Manual Startup"

8.4 SO 9A.2.B, "Standby Gas Treatment System Shutdown Following Manual Start"

8.5 SO 7B.1.C, "CAC Nitrogen Storage System Startup/Operation Low Flow Mode"

8.6 ST-C-095-819-2, "Drywell Atmosphere Radiation Monitor Operational and Surveillance Log"

8.7 SO 7B.8.B, "CAC Nitrogen Storage System Routine Inspection"

8.8 SO 7J.7.C-3, "Placing Drywell and Torus H_2/O_2 Sampling System in Standby Mode and Removing From Standby Mode"

8.9 OT-101, "High Drywell Pressure"

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2640020101 / PLOR-318CA K/A: 264000A4.04

URO: 3.7 SRO: 3.7

TASK DESCRIPTION: Diesel Generator Fast Start from the Control Room – (Alternate Path ESW Pumps Fail to Start)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

Procedure SO 52A.1.B Rev. 20, "Diesel Generator Operations"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the diesel is running and ESW has been manually started.

2. Estimated time to complete: 17 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to Fast Start the E-4 Diesel Generator using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. E-4 Diesel Generator available for operation in accordance with SO 52A.1.A, "Diesel Generator Lineup for Automatic Start"

2. Equipment Operators are standing by in the E-4 D/G Room.

3. GP-23 "Diesel Generator Inoperable", has been reviewed.

G. INITIATING CUE

The Control Room Supervisor directs you to Fast Start the E-4 Diesel Generator in accordance with steps 4.3.1 through 4.3.11 of SO 52A.1.B, "Diesel Generator Operations".

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure SO 52A.1.B.	P	A copy of procedure SO 52A.1.B is obtained.
2	Direct Equipment Operator to perform pre-start inspection for fast start of E-4 D/G per SO 52A.1.B, step 4.3.1. (Cue: Report pre-start checks for E-4 D/G are complete per SO 52A.1.B, step 4.3.1.)	P	Equipment Operator is contacted to perform pre-start inspection for E-4 D/G per SO 52A.1.B, step 4.3.1.
*3	Start the E-4 diesel generator by momentarily taking the "START MODE" switch (143-DG12) to "MAN" and the "START-STOP" switch (101-DG12) to "START". (Cue: Acknowledge control switch operation.)	P	Turn and hold "Start Mode" switch (143-DG12) to "MAN" and "Start-Stop" switch (101-DG12) to "START" then release both switches at panel 00C026D.
4	Verify E-4 diesel start after 3 minute prelube. (Cue: 3 minutes for prelube then E-4 D/G volts 4.28 KV, E-4 D/G Frequency 60 Hz and annunciator 005 F-4 is alarming.)	P	Wait 3 minutes then verify E-4 Diesel Frequency 58.8 - 61.2 Hz, and E-1 Diesel volts 4.16 - 4.40 KV at panel 00C026D.
5	Acknowledge the "E-4 DIESEL RUNNING" annunciator. (Cue: Annunciator 005 F-4 is lit solid.)	P	The annunciator "ACKNOWLEDGE" pushbutton is depressed on panel 00C026B.
6	Verify \`A' ESW pump start.  (Cue: \`A' ESW pump red light <u>NOT</u> lit, green light on; discharge pressure is 0 psig on PI-0236A and motor amps are 0 amps on \`A' pump ammeter and annunciator 002 A-5 is not alarming, "A" Emerg. Service Water Header Low Pressure 002D-5 is alarming.)	P	\`A' ESW pump red light not lit, discharge pressure is 0 psig on PI-0236A and motor amps are 0 amps on the \`A' pump ammeter are verified at panel 00C026B.

STEP NO	STEP	ACT	STANDARD
7	Verify `B' ESW pump start.  (Cue: `B' ESW pump red light NOT lit, green light on; discharge pressure is 0 psig on PI-0236B and motor amps are 0 amps on `B' pump ammeter, "B" Emerg. Service Water Header Low Pressure 004 D-5 is alarming.)	P	`B' ESW pump red light NOT lit, discharge pressure is 0 psig on PI-0236B and motor amps are 0 amps on the `B' pump ammeter are verified at panel 00C026C.
8	Verify ECW pump start. (Cue: ECW pump red light NOT lit, green light on; motor amps are 0 amps on the EM CLG WTR PP ammeter, and annunciator 212 B-2 is not alarming.)	P	ECW pump red light not lit and motor amps are 0 amps on the "EM CLG WTR PP" ammeter are verified at panel 00C026D.
9	Inform the Control Room Supervisor that "A" and "B" ESW pumps and the ECW pump failed to automatically start. (Cue: Control Room Supervisor acknowledges report.)	P	Control Room Supervisor informed of the ESW and ECW failure to start. Did not notify
*10	Manually start either the "A" or "B" ESW pump. (Cue: Acknowledge control switch operation.)	P	The control switch for either the "A" or "B" ESW pump is rotated clockwise to the start position and allowed to spring return to the neutral position.
11	Verify "A" ("B") ESW pump start. (Cue: "A" ("B") EDW pump red light lit, green light off, discharge pressure is 64 psig on PI-0236 A(B) and motor amps are 28 amps on A(B) pump ammeter.	P	"A" ("B") ESW pump red light lit, and discharge pressure is 25 to 64 psig on PI-0236A(B) and motor amps are 22 to 32 amps on the "A" ("B") pump ammeter are verified at panel OOC026B(C).

NOTE

The ECW pump will not start if attempted.

STEP NO	STEP	ACT	STANDARD
12	Inform the Control Room Supervisor that the "A" ("B") ESW pump has been started. (Cue: Control Room Supervisor acknowledges report.)	P	Control Room Supervisor informed that cooling water has been established to the E-4 Diesel Generator.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

After the E-4 D/G has been fast-started in accordance with Steps 4.3.1 through 4.3.4 of SO 52A.1.B, "Diesel Generator Operations" and cooling water has been manually established using the A or B ESW pump, the evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. E-4 Diesel Generator available for operation in accordance with SO 52A.1.A, "Diesel Generator Lineup for Automatic Start"

2. Equipment Operators are standing by in the E-4 D/G Room.

3. GP-23 "Diesel Generator Inoperable", has been reviewed.

INITIATING CUE

The Control Room Supervisor directs you to Fast Start the E-4 Diesel Generator in accordance with steps 4.3.1 through 4.3.11 of SO 52A.1.B, "Diesel Generator Operations".

PECO Energy Company
Peach Bottom Units 2 and 3

SO 52A.1.B DIESEL GENERATOR OPERATIONS

1.0 PURPOSE

This procedure provides the instructions necessary to operate the emergency diesel generator in its most commonly used operating modes. It includes slow starting the diesel generator (the preferred method for non-emergency starts), synchronization and loading as for surveillance testing/routine testing, synchronization and transferring of 4KV breakers and shutting down.

This procedure is divided into sections which can be performed separate from the rest of the procedure according to demand and existing conditions.

2.0 PREREQUISITES

2.1 Emergency Diesel Generator System available for operation in accordance with SO 52A.1.A, "Diesel Generator Lineup for Automatic Start". **CM-1**

2.2 Equipment Operator stationed in the diesel generator building to perform operational steps as directed by the control room operators.

2.3 GP-23 "Diesel Generator Inoperable", has been reviewed. Use of this procedure makes the associated diesel generator inoperable.

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

3.2 Notify the main control room if the CARDOX System for the diesel generator building is to be disabled. Do NOT disable the CARDOX System for greater than 15 minutes, without the approval from Shift Management.

3.3 IF the activity for which the CARDOX System was defeated is still in progress 15 minutes after the defeat switch was placed in defeat, THEN immediate arrangements shall be made to provide a fire watch in accordance with the Technical Requirements Manual within one hour after the defeat switch was originally placed in defeat.

3.4 IF severe engine vibrations OR unusual noises occur, THEN the diesel should be immediately unloaded AND shutdown, until the cause can be determined AND corrected.

3.5 Limit the amount of time the engine is operated at no-load or low load conditions. Excessive operation at no-load or low load will cause oil to build up in the exhaust piping leading to smoke and possibly fire. The engine should be loaded within 10 minutes of EDG start to minimize the accumulation of oil in the manifolds.

3.6 IF an emergency condition exists (MCA or dead bus), THEN the following actions will occur automatically:

3.6.1 Both associated output breakers will trip.

3.6.2 The governor and voltage regulator will convert to isochronous mode (Unit). Speed will increase depending on initial load and the amount of droop in the governing system. Manual control of the governor and voltage regulator is lost when in isochronous mode.

3.6.3 The governor motor operated potentiometer (MOP) and the regulator motor operated controller (MOC) go to their center position.

3.7 IF a Dead Bus condition exists, THEN diesel generator output breaker will anti-pump lockout. To reset the breaker anti-pumping device, the breaker control switch must be placed in "TRIP" and back to "CLOSE" following verification of no over current condition.

3.8 IF an RHR pump breaker trips on anti-pumping, THEN to reset the breaker anti-pumping device, the breaker control switch must be placed in "TRIP" and back to "CLOSE" following verification of no over current condition.

3.9 A modified LPCI Pump start (immediate pump start instead of the pump start after 2 or 8 seconds) may occur following a LOCA signal, with offsite power available and the EDG output breaker closed.

3.10 The Cooling Tower Lift Pumps should NOT be started while an EDG is running. This precaution will eliminate the potential for tripping of the 4KV bus feeder breaker, thus isolating the EDG, leaving it to supply the 4KV bus alone.

3.11 IF system grid problems are anticipated by System Operations, diesel generator testing should not be performed.

3.12 IF electrical transients or grid problems occur with the EDG in Test, diesel generator output current shall be monitored closely. The 4KV bus feeder breaker shall be opened if the current output increases above specified test values.

4.0 PERFORMANCE STEPS

NOTES

1. Communication should be available between the control room AND personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects control room instrumentation OR alarms.

2. The following sections may be performed individually without performing the entire procedure:

   - Section 4.1, Diesel Generator Slow Start
   - Section 4.2, Diesel Generator Synchronization and Loading
   - Section 4.3, Diesel Generator Fast Start
   - Section 4.4, 4KV Switchgear Manual Transfer
   - Section 4.5, Diesel Generator Shutdown

4.1 Diesel Generator Slow Start

4.1.1 Direct the operator to perform the following as a pre-start inspection:

CAUTION

Improper governor oil level may cause erratic engine operation and damage to the governor

4.1.1.1 Verify governor oil level LG-7575A(B)(C)(D) above the black line AND below the top of the sightglass. **CM-7**

4.1.1.2 Check the engine crankcase oil level +3" to -2" on the upper scribe mark on the dipstick.

4.1.1.3 Verify proper generator bearing oil level at LG-7568A(B)(C)(D). **CM-7**

4.1.1.4 Verify coolant expansion tank level LG-0610A(B)(C)(D) between the green and yellow rings on the sightglass. Notify the system manager if coolant is added.

4.1.1.5 Verify control rod pin is engaged with adjuster collar, on each fuel injection pump. (See Figure 1).

****
CAUTION

The DG will NOT start unless at least 1 minute has passed since the last attempt to start the diesel, OR since the diesel was shutdown, due to the governor shutdown solenoid being energized to stop.
****

4.1.2 Direct the operator to place the Voltage Shutdown Reset Selector Switch located on the Engine Generator Panel 0A(B,C,D)C097 to "OFF".

4.1.3 Verify "E1(E2)(E3)(E4) DIESEL NOT IN AUTO" alarms.

4.1.4 Direct the operator to verify the AS FOUND setpoint of the governor actuator speed knob as indicated in the window marked "SPEED" combined with the governor actuator speed knob pointer agrees approximately with the values below:

- E1 21.34
- E2 21.24
- E3 20.36
- E4 20.68

4.1.5 Direct the operator to set the governor actuator speed knob to between 2 and 3 as indicated in the window marked "SPEED".

4.1.6 Start the diesel generator by performing the following:

4.1.6.1 Turn AND hold the "Start Mode" selector switch to "MAN" AND turn the "Start-Stop" switch to "START".

4.1.7 Release the "Start-Stop" AND "Start Mode" switches.

4.1.8 Direct the operator to verify the "E1(E2)(E3)(E4) D/G Lube Oil Pre-Lube Pump" 0AP173 (0BP173) (0CP173)(0DP173) starts.

4.1.9 Check the diesel generator starts approximately 3 minutes after the start of the pre-lube sequence. **CM-2**

NOTE
On a diesel generator start, the A ESW, B ESW <u>AND</u> ECW Pumps receive an auto start signal.

****
CAUTION

Cooling Water is required for diesel generator operation.
****

4.1.10 Verify ESW Pumps A <u>AND</u> B started.

4.1.10.1 Check pump discharge pressure PI-0236A <u>AND</u> B, "DISCH PRESS", 25 to 64 psig.

4.1.10.2 Check pump motor current "AMPS" 22 to 32 amps.

4.1.11 Red Flag the ESW Pump selected to remain in service.

4.1.12 Shutdown the remaining ESW Pump.

4.1.13 Verify ECW Pump automatically shuts down.

4.1.14 Direct an operator to slowly raise engine speed by continually rotating the governor actuator speed knob until it is at the AS FOUND setpoint specified in step 4.1.4 of this procedure.

4.1.15 Verify "E1(E2)(E3)(E4) DIESEL RUNNING" alarms.

NOTE
The "GENERATOR LOSS OF FIELD" alarm may come in at the local control panel <u>AND</u> can not be reset until the field is flashed.

4.1.16 Direct the operator to return the Voltage Shutdown Reset Selector Switch to "ON" to cause field flashing.

4.1.17 Verify "E1(E2)(E3)(E4) DIESEL NOT IN AUTO" clears.

4.1.18 Verify diesel generator running at rated frequency (58.8 to 61.2 Hz) and voltage (4.16 to 4.40KV).

4.1.19 Direct an operator to verify ESW flow to the diesel by verifying AO-0-33-0241A(B)(C)(D), "ESW Outlet Block Valve From Diesel Gen E1(2)(3)(4)" OPEN.

4.1.20 Direct an operator to rotate "T" handle on BS-0570A(B)(C)(D), "E1(E2)(E3)(E4) D/G Fuel Oil Pumps Suction Strnr".

4.1.21 Direct an operator to verify proper generator bearing oil level at LG-7568A(B)(C)(D). **CM-7**

4.1.22 Adjust engine speed AND generator output voltage as required, using the applicable control switch(es) below.

- o Engine speed - "GOVERNOR" control switch
- o Generator output voltage - "AUTO VOLT REG" control switch

4.2 Diesel Generator Synchronization and Loading

CAUTION

Limit the amount of time the engine is operated at no-load or low load conditions. The engine should be loaded within 10 minutes of EDG start to minimize the accumulation of oil in the manifolds.

4.2.1 Verify diesel generator is running in accordance with Section 4.1 of this procedure.

4.2.2 Verify diesel generator running at rated frequency (58.8 to 61.2 Hz) and voltage (4.16 to 4.40KV).

NOTES

1. It is good practice to alternate use of the D/G output breakers from test to test.
2. Preferred Off-site Source for 2SUE is 2SU XFMR 00X003 with 3SU XFMR 00X005 as alternate. Preferred Off-site Source for 3SUE is 343SU XFMR 00X011 with 3SU XFMR 00X005 as alternate.

4.2.3 Place the applicable "BKR SYNC" switch in "ON".

° E12	° E22	° E32	° E42
° E13	° E23	° E33	° E43

4.2.4 Verify speed and voltage control of diesel generator as follows:

4.2.4.1 Operate the "GOVERNOR" control switch to:

- "RAISE" frequency to 0.5 Hz above the initial value.
- "LOWER" frequency to 0.5 Hz below the initial value.
- "RAISE" frequency to return to initial value.

4.2.4.2 Operate the "AUTO VOLT REG" control switch to:

- "RAISE" voltage to 50 volts above the initial value.
- "LOWER" voltage to 50 volts below the initial value.
- "RAISE" voltage to return to initial value.

4.2.5 Check both synchronizing lights for proper operation as follows:

- Both lights "ON" when synchroscope is at "Bottom Dead Center"
- Both lights "OFF" when synchroscope is at "Top Dead Center"

4.2.6 Adjust diesel generator speed, using the "GOVERNOR" control switch, to make the synchroscope rotate slowly in the "FAST" direction.

****

<u>CAUTION</u>

Diesel generator voltage should be slightly higher, about 50 volts, but no more than 100 volts higher than bus voltage while synchronizing to avoid damage to the generator.

****

4.2.7 Adjust diesel generator "INCOMING" voltage so that it is slightly higher than "RUNNING" bus voltage by using the "AUTO VOLT REG" control switch.

4.2.8 Verify the synchroscope is still rotating slowly in the "FAST" direction.

NOTE

The diesel generator is considered synchronized, when the following conditions are met:

- o Diesel generator "INCOMING" voltage slightly higher than "RUNNING" bus voltage. **CM-4**
- o Synchroscope rotating slowly in the "FAST" direction.
- o Synchroscope within 13 degrees of "Top Dead Center".

****

CAUTION

Perform step 4.2.10 immediately after completing step 4.2.9 to prevent "motoring" the diesel generator.

****

4.2.9 WHEN the diesel generator is synchronized with the 4KV emergency bus, THEN close breaker E12 (E13) (E22) (E23) (E32) (E33) (E42) (E43).

4.2.10 Pickup 200 to 300 KW of load on the diesel generator by turning the "GOVERNOR" control switch to "RAISE". Pickup 100 KVAR by turning the "AUTO VOLT REG" control switch to "RAISE".

4.2.11 Place the applicable "BKR SYNC" switch in "OFF".

o E12	o E22	o E32	o E42
o E13	o E23	o E33	o E43

NOTE

Loading the diesel generator shall proceed at a rate NOT to exceed 300 KW/min. **CM-3**

4.2.12 Check generator output voltage and generator amperage for all three phases.

4.2.13 Pickup the desired load to be carried by the diesel generator as follows:

4.2.13.1 Turn the "GOVERNOR" control switch to "RAISE".

****
CAUTION

Do NOT allow the KVAR value to exceed 75% of the KW value, to assure that the generator 0.8 power factor will NOT be exceeded.
****

4.2.13.2 Maintain the KW/KVAR ratio, by operating the "AUTO VOLT REG" control switch.

NOTES

1. IF the D/G is run above 2600 KW, THEN the Plant Reactor Operator shall log the load and duration of the run.

2. The maximum load to be carried by the diesel generator for continuous operations is 2600 KW. The diesel may be run at loads greater than 2600 KW, but less than 3250 KW in accordance with the following table: **CM-5, CM-6**

o 2600 KW	Continuous
o 2600 KW - 3000 KW	2000 hr/yr
o 3000 KW - 3100 KW	200 hr/yr
o 3100 KW - 3250 KW	30 min/yr

****
CAUTION

Any operation over 3250 KW will require an engine shutdown, declaration of inoperability AND performance of an internal inspection.
****

4.2.14 IF the diesel generator is operated at a load greater than 3250 KW, THEN do the following:

4.2.14.1 Immediately reduce the load to under 3000 KW.

4.2.14.2 Shutdown the diesel generator in accordance with Section 4.5 of this procedure.

4.2.14.3 Declare the diesel generator inoperable.

4.2.14.4 Notify Shift Management to have an internal inspection performed on the diesel generator because of the run in excess of 3250 KW.

4.2.15 For shutdown of the diesel generator, proceed to Section 4.5 of this procedure.

4.3 Diesel Generator Fast Start

4.3.1 Direct an operator to perform the following checks as a pre-start inspection:

CAUTION

Improper governor oil level may cause erratic engine operation and damage to the governor

4.3.1.1 Verify governor oil level LG-7575A(B)(C)(D) above the black line AND below the top of the sightglass. **CM-7**

4.3.1.2 Check the engine crankcase oil level +3" to -2" on the upper scribe mark on the dipstick.

4.3.1.3 Verify proper generator bearing oil level at LG-7568A(B)(C)(D). **CM-7**

4.3.1.4 Verify coolant expansion tank level LG-0610A(B)(C)(D) between the green and yellow rings on the sightglass.

4.3.1.5 Verify control rod pin is engaged with adjuster collar, on each fuel injection pump. (See Figure 1).

CAUTION

The DG will NOT start unless at least 1 minute has passed since the last attempt to start the diesel, OR since the diesel was shutdown, due to the governor shutdown solenoid being energized to stop.

4.3.2 Start the diesel generator by performing the following:

4.3.2.1 Turn AND hold the "Start Mode" selector switch to "MAN" AND turn the "Start-Stop" switch to "START".

4.3.3 Release the "Start-Stop" AND "Start Mode" switches.

4.3.4 Check the diesel generator starts after the 3 minute pre-lube sequence, <u>THEN</u> check the following: **CM-2**

- o Verify "E1(E2)(E3)(E4) DIESEL RUNNING" alarms.
- o Diesel generator running at rated frequency (58.8 to 61.2 Hz) and voltage (4.16 to 4.40KV).

<u>NOTE</u>

On a diesel generator start, the A ESW, B ESW <u>AND</u> ECW Pumps receive an auto start signal.

<u>CAUTION</u>

Cooling Water is required for diesel generator operation.

4.3.5 Verify ESW Pumps A <u>AND</u> B started.

4.3.5.1 Check pump discharge pressure PI-0236A <u>AND</u> B, "DISCH PRESS", 25 to 64 psig.

4.3.5.2 Check pump motor current "AMPS" 22 to 32 amps.

4.3.6 Red Flag the ESW Pump selected to remain in service.

4.3.7 Shutdown the remaining ESW Pump.

4.3.8 Verify ECW Pump automatically shuts down.

4.3.9 Verify diesel generator running at rated frequency (58.8 to 61.2 Hz) and voltage (4.16 to 4.40KV).

4.3.10 Direct an operator to verify ESW flow to the diesel by verifying AO-0-33-0241A(B)(C)(D), "ESW Outlet Block Valve From Diesel Gen E1(E2)(E3)(E4)" open.

4.3.11 Direct an operator to verify proper generator bearing oil level at LG-7568A(B)(C)(D). **CM-7**

4.3.12 Adjust engine speed <u>AND</u> generator output voltage as required, using the applicable control switch(es) below.

- o Engine speed - "GOVERNOR"
- o Generator output voltage - "AUTO VOLT REG"

NOTES

1. It is good practice to alternate use of the D/G output breakers from test to test.

2. Preferred Off-site Source for 2SUE is 2SU XFMR 00X003 with 3SU XFMR 00X005 as alternate. Preferred Off-site Source for 3SUE is 343SU XFMR 00X011 with 3SU XFMR 00X005 as alternate.

CAUTION

Limit the amount of time the engine is operated at no-load or low load conditions. The engine should be loaded within 10 minutes of EDG start to minimize the accumulation of oil in the manifolds.

4.3.13 Place the applicable "BKR SYNC" switch in "ON".

o E12	o E22	o E32	o E42
o E13	o E23	o E43	o E43

4.3.14 Verify speed and voltage control of diesel generator as follows:

4.3.14.1 Operate the "GOVERNOR" control switch to:

- o "RAISE" frequency to 0.5 Hz above the initial value.
- o "LOWER" frequency to 0.5 Hz below the initial value.
- o "RAISE" frequency to return to initial value.

4.3.14.2 Operate the "AUTO VOLT REG" control switch to:

- o "RAISE" voltage to 50 volts above the initial value.
- o "LOWER" voltage to 50 volts below the initial value.
- o "RAISE" voltage to return to initial value.

4.3.15 Check both synchronizing lights for proper operation as follows:

- o Both lights "ON" when synchroscope is at "Bottom Dead Center"
- o Both lights "OFF" when synchroscope is at "Top Dead Center"

4.3.16 Adjust diesel generator speed, using the "GOVERNOR" control switch, to make the synchroscope rotate slowly in the "FAST" direction.

CAUTION

Diesel generator voltage should be slightly higher, about 50 volts, but no more than 100 volts higher than bus voltage while synchronizing to avoid damage to the generator.

4.3.17 Adjust diesel generator "INCOMING" voltage so that it is slightly higher than "RUNNING" bus voltage by using the "AUTO VOLT REG" control switch.

4.3.18 Verify the synchroscope is still rotating slowly in the "FAST" direction.

NOTES

The diesel generator is considered synchronized, when the following conditions are met:

- o Diesel generator "INCOMING" voltage slightly higher than "RUNNING" bus voltage. **CM-4**
- o Synchroscope rotating slowly in the "FAST" direction.
- o Synchroscope within 13 degrees of "Top Dead Center".

CAUTION

Perform step 4.3.20 immediately after completing step 4.3.19 to prevent "motoring" the diesel generator.

4.3.19 <u>WHEN</u> the diesel generator is synchronized with the 4KV emergency bus, <u>THEN</u> close breaker E12 (E13) (E22) (E23) (E32) (E33) (E42) (E43).

4.3.20 Pickup 200 to 300 KW of load on the diesel generator by turning the "GOVERNOR" control switch to "RAISE". Pickup 100 KVAR by turning the "AUTO VOLT REG" control switch to "RAISE".

4.3.21 Place the applicable "BKR SYNC" switch in "OFF".

o E12	o E22	o E32	o E42
o E13	o E23	o E33	o E43

NOTE

Loading the diesel generator shall proceed at a rate NOT to exceed 300 KW/min. **CM-3**

4.3.22 Check generator output voltage and generator amperage for all three phases.

4.3.23 Pickup the desired load to be carried by the diesel generator as follows:

4.3.23.1 Turn the "GOVENOR" control switch to "RAISE".

CAUTION

Do NOT allow the KVAR value to exceed 75% of the KW value, to assure that the generator 0.8 power factor will NOT be exceeded.

4.3.23.2 Maintain the KW/KVAR ratio, by operating the "AUTO VOLT REG" control switch.

NOTES

1. IF the D/G is run above 2600 KW, THEN the Plant Reactor Operator shall log the load and duration of the run.

2. The maximum load to be carried by the diesel generator for continuous operations is 2600 KW. The diesel may be run at loads greater than 2600 KW, but less than 3250 KW in accordance with the following table: **CM-5, CM-6**

o 2600 KW	Continuous
o 2600 KW - 3000 KW	2000 hr/yr
o 3000 KW - 3100 KW	200 hr/yr
o 3100 KW - 3250 KW	30 min/yr

CAUTION

Any operation over 3250 KW will require an engine shutdown, declaration of inoperability AND performance of an internal inspection.

4.3.24 IF the diesel generator is operated at a load greater than 3250 KW, THEN do the following:

4.3.24.3 Immediately reduce the load to under 3000 KW.

4.3.24.4 Shutdown the diesel generator in accordance with Section 4.5 of this procedure.

4.3.24.5 Declare the diesel generator inoperable.

4.3.24.6 Notify Shift Management to have an internal inspection performed on the diesel generator because of the run in excess of 3250 KW.

4.3.25 For shutdown of the diesel generator, proceed to Section 4.5 of this procedure.

4.4 4KV Switchgear Manual Transfer

NOTES

1. 2 Emer Aux Xfmr normally supplies:
   - o E12 Emergency Aux Switchgear
   - o E32 Emergency Aux Switchgear
   - o E23 Emergency Aux Switchgear
   - o E43 Emergency Aux Switchgear
2. 3 Emer Aux Xfmr normally supplies:
   - o E22 Emergency Aux Switchgear
   - o E42 Emergency Aux Switchgear
   - o E13 Emergency Aux Switchgear
   - o E33 Emergency Aux Switchgear
3. E212 BKR & E312 BKR are interlocked preventing them from being closed at the same time. The other seven emergency buses are interlocked in a similar manner.
4. Cooling Towers should be the first loads shed during manual load shedding.

CAUTION

Manual load shedding should be initiated to restore 4 KV Bus Voltage to greater than 3.9 KV.

4.4.1 Verify the associated diesel for the bus that is to be transferred is running in accordance with Section 4.1 of this procedure.

NOTE

Preferred Off-site Source for 2SUE is 2SU XFMR 00X003 with 3SU XFMR 00X005 as alternate. Preferred Off-site Source for 3SUE is 343SU XFMR 00X011 with 3SU XFMR 00X005 as alternate.

CAUTION

Limit the amount of time the engine is operated at no-load or low load conditions. The engine should be loaded within 10 minutes of EDG start to minimize the accumulation of oil in the manifolds.

4.4.2 Place the applicable "BKR SYNC" switch in "ON".

o E12	o E22	o E32	o E42
o E13	o E23	o E33	o E43

4.4.3 Verify speed and voltage control of diesel generator as follows:

4.4.3.1 Operate the "GOVERNOR" control switch to:

- o "RAISE" frequency to 0.5 Hz above the initial value.
- o "LOWER" frequency to 0.5 Hz below the initial value.
- o "RAISE" frequency to return to initial value.

4.4.3.2 Operate the "AUTO VOLT REG" control switch to:

- o "RAISE" voltage to 50 volts above the initial value.
- o "LOWER" voltage to 50 volts below the initial value.
- o "RAISE" voltage to return to initial value.

4.4.4 Check both synchronizing lights for proper operation as follows:

- o Both lights "ON" when synchroscope is at "Bottom Dead Center"
- o Both lights "OFF" when synchroscope is at "Top Dead Center"

4.4.5 Adjust diesel generator speed, using the "GOVERNOR" control switch, to make the synchroscope rotate slowly in the "FAST" direction.

CAUTION

Diesel generator voltage should be slightly higher, about 50 volts, but no more than 100 volts higher than bus voltage while synchronizing to avoid damage to the generator.

4.4.6 Adjust diesel generator "INCOMING" voltage so that it is slightly higher than "RUNNING" bus voltage by using the "AUTO VOLT REG" control switch.

4.4.7 Verify the synchroscope is still rotating slowly in the "FAST" direction.

NOTE

The amount of load being carried on the 4KV emergency bus may be increased by placing equipment on the bus in service. Refer to Table 1 for equipment and associated current values.

4.4.8 Note the amount of load on the 4KV emergency bus, by one of the following methods:

- o Check how many amps are being supplied from "2(3) EM XFMR"
- o Sum load current values as indicated on individual load ammeters for loads being supplied by bus (e.g. RHR Pump, Core Spray Pump, Load Center, etc.)

NOTE

The diesel generator is considered synchronized, when the following conditions are met:

- Diesel generator "INCOMING" voltage slightly higher than "RUNNING" bus voltage. **CM-4**
- Synchroscope rotating slowly in the "FAST" direction.
- Synchroscope within 13 degrees of "Top Dead Center".

CAUTION

Perform step 4.4.10 immediately after completing step 4.4.9 to prevent "motoring" the diesel generator.

4.4.9 WHEN the diesel generator is synchronized with the 4KV emergency bus, THEN close breaker E12 (E13) (E22) (E23) (E32) (E33) (E42) (E43).

4.4.10 Pickup load on the diesel generator by turning the "GOVERNOR" control switch to "RAISE". Pickup KVAR by turning the "AUTO VOLT REG" control switch to "RAISE".

4.4.11 Place the applicable "BKR SYNC" switch in "OFF".

o E12	o E22	o E32	o E42
o E13	o E23	o E33	o E43

NOTE

Loading the diesel generator shall proceed at a rate NOT to exceed 300 KW/min. **CM-3**

4.4.12 Check generator output voltage and generator amperage for all three phases.

4.4.13 Pickup all bus loads as follows:

> **NOTE**
>
> Determination of when the D/G has picked up all bus loads can be made by either of the following methods:
>
> - o Diesel generator bus feed ammeter is near the value noted from step 4.4.8 and the emergency transformer bus feed ammeter has lowered to a minimum as close to 0 amps as can be achieved.
> - o Using the PMS Computer, access the analog parameters for the bus being transferred via "4KV Emergency Power" in "Operations Graphics" and verify the diesel generator current is near the value noted from step 4.4.8 and the emergency transformer bus feed current has lowered to a minimum as close to 0 amps as can be achieved.

4.4.13.1 Turn the "GOVERNOR" control switch to "RAISE".

4.4.13.2 IF necessary, THEN adjust the "AUTO VOLT REG" control switch.

> **NOTE**
>
> The following step will make the Emergency Bus INOPERABLE and Tech Spec Action 3.8.7 shall be entered with a safety determination made for the supported functions on BOTH Units.

CAUTION

IF an Emergency Start Signal (MCA or Dead Bus) trips the D/G Breaker while the D/G is the sole source of Power to the Bus, THEN the D/G Breaker will have to be closed manually.

4.4.14 Open the applicable startup source bkr.

o E212	o E222	o E232	o E242
o E312	o E322	o E332	o E342
o E213	o E223	o E233	o E243
o E313	o E323	o E333	o E343

4.4.15 Place the applicable "BKR SYNC" switch in "ON", to parallel the diesel generator with the selected startup source.

Bus	Supplying Startup Source	Breaker
E12	Normal 2SUE Alternate 3SUE	E212 E312
E13	Normal 3SUE Alternate 2SUE	E313 E213
E22	Normal 3SUE Alternate 2SUE	E322 E222
E23	Normal 2SUE Alternate 3SUE	E223 E323
E32	Normal 2SUE Alternate 3SUE	E232 E332
E33	Normal 3SUE Alternate 2SUE	E333 E233
E42	Normal 3SUE Alternate 2SUE	E342 E242
E43	Normal 2SUE Alternate 3SUE	E243 E343

4.4.16 Check both synchronizing lights for proper operation as follows:

- o Both lights "ON" when synchroscope is at "Bottom Dead Center"
- o Both lights "OFF" when synchroscope is at "Top Dead Center"

4.4.17 Adjust diesel generator speed, using the "GOVERNOR" control switch, to make the synchroscope rotate slowly in the "SLOW" direction.

****

CAUTION

Diesel generator voltage should be slightly higher, about 50 volts, but no more than 100 volts higher than bus voltage while synchronizing to avoid damage to the generator.

****

4.4.18 Adjust diesel generator "RUNNING" voltage so that it is slightly higher than "INCOMING" bus voltage by using the "AUTO VOLT REG" control switch.

4.4.19 Verify the synchroscope is still rotating slowly in the "SLOW" direction.

NOTE

The diesel generator is considered synchronized, when the following conditions are met:

- o Diesel generator "RUNNING" voltage slightly higher than "INCOMING" bus voltage. **CM-4**
- o Synchroscope rotating slowly in the "SLOW" direction.
- o Synchroscope within 13 degrees of "Top Dead Center".

4.4.20 WHEN the diesel generator is synchronized with the startup source, THEN close the selected breaker.

4.4.21 Place the applicable "BKR SYNC" switch to "OFF".

4.4.22 IF it is desired to manually transfer back to the original S/U source breaker, THEN return to step 4.4.14.

4.4.23 For shut down of the diesel generator, proceed to Section 4.5 of this procedure.

4.5 Diesel Generator Shutdown

CAUTION

Limit the amount of time the engine is operated at no-load or low load conditions.

4.5.1 Reduce diesel generator load as follows:

4.5.1.1 IF the D/G was operating near full load, THEN cool down the D/G by operating at 1500 KW for 5 minutes as follows:

- o Turn the "GOVERNOR" control switch to "LOWER".

CAUTION

Do NOT allow the KVAR value to exceed 75% of the KW value, to assure that the generator 0.8 power factor will NOT be exceeded.

- o Maintain the KW/KVAR ratio by operating the "AUTO VOLT REG" control switch.

4.5.1.2 Reduce D/G load to 100 to 150 KW and VARS to 50 KVAR as follows:

- o Turn the "GOVERNOR" control switch to "LOWER".
- o Maintain the KW/KVAR ratio by operating the "AUTO VOLT REG" control switch until VARS are reduced to 50 KVAR.

4.5.2 WHEN D/G load is reduced to 100 to 150 KW and VARS are 50 KVAR, THEN trip the applicable diesel generator output breaker.

o E12	o E22	o E32	o E42
o E13	o E23	o E33	o E43

CAUTION

IF the diesel generator breaker does NOT indicate open, THEN do NOT proceed with diesel generator shutdown, until the breaker is verified open.

4.5.3 Verify the diesel generator output breaker opened as follows:

4.5.3.1 Check the breaker "GREEN" open light lit.

4.5.3.2 Check D/G "WATTS" at 0.

4.5.3.3 Check D/G "VAR" at 0.

4.5.4 IF it is required to operate the opposite output breaker, THEN perform step 4.5.8 and the applicable steps in Section 4.2 or 4.4 of this procedure.

4.5.5 Shutdown the diesel generator by turning its control switch to "STOP".

4.5.6 IF the Emergency Service Water (ESW) was used AND is NOT required for any other evolution, THEN shutdown the running ESW pump in accordance with SO 33.2.A, "Emergency Service Water System Shutdown", AND return to step 4.5.7 of this procedure.

4.5.7 IF the Emergency Cooling Water (ECW) System was used AND is NOT required for any other evolution, THEN it may be shutdown in accordance with SO 48.2.A, "Emergency Cooling Water System Shutdown". Return to step 4.5.8 of this procedure.

4.5.8 IF equipment that was started for the sole purpose of loading the diesel generator is no longer required, THEN they may be shutdown in accordance with their system procedures.

4.5.9 IF the diesel generator was run for one hour OR more, THEN direct an operator to perform the following steps for the diesel generator that has just been shut down. Return to step 4.5.10 of this procedure. **CM-9**

4.5.9.1 Remove cap from HV-0-52D-10007A (B)(C)(D), "D/G Fuel Oil Day Tank 0AT040 (0BT040)(0CT040)(0DT040) Drain Valve".

4.5.9.2 Crack open HV-0-52D-10007A(B)(C)(D) AND collect a 1 liter sample of fuel oil in a sample bottle.

4.5.9.3 Close HV-0-52D-10007A (B)(C)(D).

4.5.9.4 Allow the sample to settle for 15 minutes.

NOTE

IF water is present, THEN the water may settle to the bottom of the bottle or the sample may be all water.

4.5.9.5 Visually examine the sample for accumulated water.

4.5.9.6 IF water is observed, THEN repeat steps 4.5.9.2 through 4.5.9.5 until no water settles to the bottom of the sample bottle.

4.5.9.7 IF accumulator water was removed from the day tank, THEN verify the total amount of water removed was less than 2 liters.

4.5.9.8 Verify all accumulated water has been removed from the day tank.

4.5.9.9 Verify HV-0-52D-10007A(B)(C)(D) is closed.

4.5.9.10 Install cap on HV-0-52D-10007A (B)(C)(D).

NOTE

Step 4.5.10 may be omitted if Shift Management decides that it is undesirable to "air roll" the engine.

4.5.10 Direct an operator to perform the following steps 20 to 30 minutes after shutting down the diesel generator <u>AND</u> return to step 4.5.11 of this procedure:

NOTE

Steps 4.5.10.1 and 4.5.10.2 will bring up the following alarms on the Local Diesel Panel: "ENGINE OVERSPEED" and "CONTROL AT ENGINE" <u>AND</u> the Control Room alarms: "DIESEL GENERATOR TROUBLE", "DIESEL NOT IN AUTO" and "DIESEL GENERATOR NOT RESET".

4.5.10.1 Manually trip the fuel racks for the engine to be rolled, by pushing the large emergency stop button located on the engine control side.

4.5.10.2 Place the Diesel Generator Control Selector Switch RS4 located on the E1(E2)(E3)(E4) Diesel Gage Panel (DGP) to "AT ENGINE".

4.5.10.3 Unlock <u>AND</u> close HV-0-52C-10154A(B)(C)(D), "E1(E2)(E3)(E4) D/G Lube Oil Booster Block Valve".

4.5.10.4 Listen for abnormal noises during air roll. **CM-8**

4.5.10.5 Depress the manual start pushbutton located on the DGP for 2 to 3 seconds, allowing several revolutions of the crankshafts.

NOTE

Independent Verification of the following 3 steps is accomplished by A-C-8 "Control of Locked Valves and Devices" for the Locked Valve and by the absence of Control Room alarms for the fuel racks and RS4.

4.5.10.6 Open <u>AND</u> lock open HV-0-52C-10154A(B)(C)(D).

4.5.10.7 Reset the fuel racks.

4.5.10.8 Place the Diesel Generator Control Selector Switch RS4 located on the E1(E2)(E3)(E4) Diesel Gage Panel (DGP) to "NORMAL".

4.5.10.9 Verify all alarms are reset.

4.5.11 Perform SO 52A.1.A, "Diesel Generator Lineup for Automatic Start" to prepare the diesel generator for automatic operation.

4.5.12 IF outside air temperature is in excess of 70 degrees fahrenheit, place the 0AV091 (0BV091) (0CV091) (0DV091) in service until compartment air temperatures stabilize; THEN return the running fan to the "AUTO" position.

5.0 CONTROL STATIONS

5.1 Main Control Room Panel 00C029A(B)(C)(D)

5.2 Main Control Room Panel 00C026A(B)(C)(D)

5.3 Main Control Room Panel 00C024

5.4 E1(E2)(E3)(E4) D/G Local Control Panel 0AC097(0BC097)(0CC097)(0DC097)

5.5 E1(E2)(E3)(E4) Diesel Gauge Panel

6.0 REFERENCES

6.1 E-1, Single Line Diagram Station

6.2 E-8, Standby Diesel Gens. & 4160 Volt Emer. Power System, Unit No. 2

6.3 E-12, Standby Diesel Gens. & 4160 Volt Emer. Power System, Unit No. 3

6.4 E-5-166, Fairbanks-Morse Vendor Manual

6.5 E-5-7, Standby Diesel Engine Generators

6.6 M-377, Diesel Generator Auxiliary Systems

6.7 TRMS 3.14

6.8 Peach Bottom Improved Tech Specs Open Items A/R A0828140 Eval 23

6.9 CM-1, EIR 2-91-197 (T01669)

6.10 CM-2, INPO Significant Operating Experience Report 83-1 (T00658)

6.11 CM-3, PBAPS TSCR 88-08 (T02425)

6.12 CM-4, PBAPS LER 3-87-06 (T00279)

6.13 CM-5, INPO Significant Event Report 44-80 (T00422)

6.14 CM-6, PBAPS Diesel Generator Load Profiles and System Voltage Regulation Study

6.15 CM-7, Response to Report No. 86-25 dated 4-24-87 (T00293)

6.16 CM-8, NRC Inspection Report 91-13 (T01067)

6.17 CM-9, Letter to NRC from G.A.Hunger, Jr. dated Sept. 29, 1994 transmitting TSCR 93-16 (T03778, A0905549 E61)

7.0 <u>TECHNICAL SPECIFICATION</u>

7.1 3.8.1

7.2 3.8.2

8.0 <u>INTERFACING PROCEDURES</u>

8.1 SO 52A.1.A, "Diesel Generator Lineup for Automatic Startup"

8.2 SO 33.2.A, "Emergency Service Water System Shutdown"

8.3 SO 48.2.A, "Emergency Cooling Water System Shutdown"

8.4 ST-O-52D-601(2)(3)(4)-2, "E1(2)(3)(4) Diesel Generator Fuel Oil Day Tank Water Removal"

8.5 A-C-8, "Control of Locked Valves and Devices"

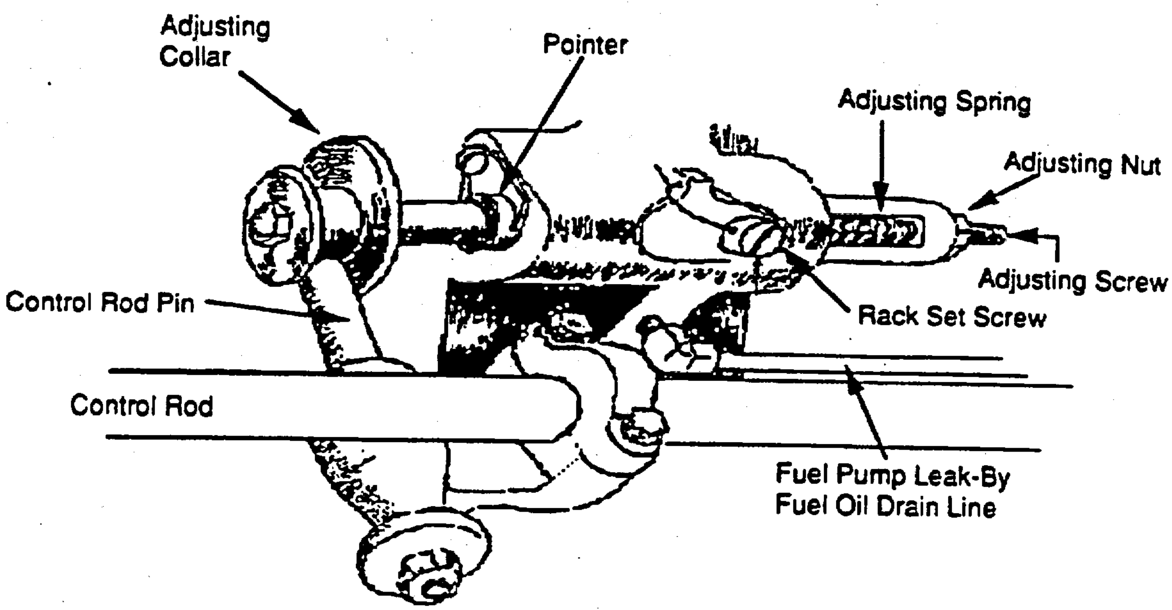
TABLE 1

AVAILABLE LOADS FOR THE DIESEL GENERATOR

Diesel	Bus	Equipment (In Preferred Loading Sequence)	Operating Mode	Approximate Current Draw in the Given Mode of Operation
E1	E12	2A RHR Pump 2A HPSW Pump 2A Core Spray Pump 2A CRD Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps
	E13	3A RHR Pump 3A HPSW Pump 3A Core Spray Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test	188 Amps 115 Amps 65 Amps
E2	E22	2B RHR Pump 2B HPSW Pump 2B Core Spray Pump A ESW Pump A ESW Booster Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps 24 Amps
	E23	3B RHR Pump 3B HPSW Pump 3B Core Spray Pump 3B CRD Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps
E3	E32	2C RHR Pump 2C HPSW Pump 2C Core Spray Pump B ESW Pump B ESW Booster Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps 24 Amps
	E33	3C RHR Pump 3C HPSW Pump 3C Core Spray Pump 3B CRD Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps
E4	E42	2D RHR Pump 2D HPSW Pump 2D Core Spray Pump 2B CRD Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation	188 Amps 115 Amps 65 Amps 24 Amps
	E43	3D RHR Pump 3D HPSW Pump 3D Core Spray Pump ECW Pump	RHR Full Flow Test Normal System Operation Core Spray Full Flow Test Normal System Operation	188 Amps 115 Amps 65 Amps 21 Amps

FIGURE 1

CONTROL ASSEMBLY



POSITION TITLE:	Reactor Operator/Senior Reactor Operator		
TASK-JPM DESIGNATOR:	2000330501 / NEW-PRO SCRAM (ALT)	K/A:	295006G10 RO: 4.1 SRO: 4.2
TASK DESCRIPTION:	Plant Reactor Operator Response to Reactor Scram (Alternate Path – SDV Fails to Isolate)		

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Synchronizing Switch Key

C. REFERENCES

1. RRC 53.1-2, Rev. 0, "Unit 2 House Loads Transfer During a Plant Event"
2. RRC 94.2-2, Rev. 0, "Plant Reactor Operator Scram Actions"
3. RRC 94.2-2:1, Rev. 0, "PRO Scram Reports"
4. GP-8B, Rev. 15, "PCIS Isolation Groups II and III".
5. GP-8E, Rev. 7, "Primary Containment Isolation Bypass"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the trainee has performed all steps required by RRC 53.1-2, "Unit 2 House Loads Transfer During a Plant Event", RRC 94.2-2, "Plant Reactor Operator Scram Actions", and RRC 94.2-2:1, "PRO Scram Reports".
2. Estimated time to complete: 5 minutes <u>Non-Time Critical</u>

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform Plant Reactor Operator scram actions in accordance with the Operations Manual. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

The plant is in a full power, steady state condition.

G. INITIATING CUE

When reactor scram occurs, the Control Room Supervisor directs you to perform the Plant Reactor Operator scram actions in accordance with the Rapid Response Procedures.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*1	Insert handle and place 225-0105, 11 BKR Sync Switch in ON. (Cue: Synchroscope is at approximately 12 o'clock, Sync Lights are off and Incoming and Running Voltmeters indicate approximately 120 VAC.)	P	Sync Switch Handle is inserted into control switch 225-0105 and switch is placed in the ON position at panel 20C009.
2	Verify phase angle difference less than 12 degrees. (Cue: Synchroscope reading is approximately 12 o'clock and Sync Lights are off.)	P	Phase angle difference is verified to be less than 12 degrees on the Synchroscope at panel 20C009.
*3	Close 252-0105, 11 BKR. (Cue: Acknowledge control switch operation.)	P	11 BKR control switch is momentarily placed in the "CLOSE" position at panel 20C009.
4	Verify 252-0105, 11 BKR is closed. (Cue: 252-0105 red light is on, green light is off.)	P	11 BKR red light is verified ON and #1 13.2 KV Aux Bus from SU FDRS ammeter rises on panel 20C009.
5	Verify 252-0101, 1 BKR is tripped. (Cue: 252-0101 green light is on, red light is off.)	P	1 BKR green light is verified ON at panel 20C009.
6	Place 225-0105, 11 BKR Sync switch in OFF and remove handle. (Cue: Incoming and Running Voltmeters indicate 0 VAC.)	P	225-0105 is placed in the "OFF" position and Sync Switch Handle is removed at panel 20C009.
*7	Insert handle and place 225-0202, 22 BKR Sync Switch in ON. (Cue: Synchroscope is at approximately 12 o'clock, Sync Lights are off and Incoming and Running Voltmeters at approximately 120 VAC.)	P	Sync Switch Handle is inserted into Control Switch 225-0202 and switch is placed in the "ON" position at panel 20C009.
8	Verify phase angle difference less than 12 degrees. (Cue: Synchroscope reading is approximately 12 o'clock and Sync Lights are off.)	P	Phase angle difference is verified to be less than 12 degrees on the Synchroscope at panel 20C009.

STEP NO	STEP	ACT	STANDARD
*9	Close 252-0202, 22 BKR. (Cue: Acknowledge control switch operation.)	P	22 BKR Control Switch is momentarily placed in the "CLOSE" position at panel 20C009.
10	Verify 252-0202, 22 BKR is closed. (Cue: 252-0202 red light is on, green light is off.)	P	22 BKR red light is verified ON and #2 13.2 KV Aux Bus from SU FDRS ammeter rises on panel 20C009.
11	Verify 252-0214, 2 BKR tripped. (Cue: 252-0214 green light is on, red light is off.)	P	2 BKR green light is verified ON at panel 20C009.
12	Place 225-0202, 22 BKR Sync Switch in OFF and remove handle. (Cue: Incoming and Running Voltmeters indicate 0 VAC.)	P	225-0202 is placed in the "OFF" position and Sync Switch Handle is removed at panel 20C009.
13	Green flag 252-0101, 1 BKR control switch. (Cue: Acknowledge control switch operation, "1 BKR TRIP" annunciator clears.)	P	1 BKR control switch is momentarily placed in the "TRIP" position at panel 20C009.
14	Green flag 252-0214, 2 BKR Control Switch. (Cue: Acknowledge Control switch operation, #2 BKR TRIP annunciator clears.)	P	2 BKR Control Switch is momentarily placed in the "TRIP" position at panel 20C009.
15	Remove "21 BKR 252-0113" control switch from "Pull to Lock" position and place it in "NORMAL". (Cue: 225-0113 control switch shows a green flag.)	P	21 BKR control switch is removed from "PTL" and placed in the "NORMAL" position at panel 20C009.
16	Remove "12 BKR 252-0210" control switch from "Pull to Lock" and place it in "NORMAL". (Cue: 252-0210 control switch shows a green flag.)	P	12 BKR Control Switch is removed from "PTL" and placed in the "NORMAL" position at panel 20C009.

STEP NO	STEP	ACT	STANDARD
*17	Manually trip the Main Turbine when load drops to approximately 50 MWe. (Cue: Tripped light is on, Reset light is out; Master Trip Solenoid Test Lights A and B are out.)	P	Main Turbine Trip pushbutton is momentarily DEPRESSED at panel 20C008A after generator load drops below 200 MWe on JR-2157 on panel 20C008B and before the Main Generator locks out on reverse power.
*18	Verify Main Generator lockout. (Cue: Main Generator output breakers and Alt Exc Fld Bkr green lights are on, red lights are off. Annunciators 220 B-1 and 220 B-2 are lit.)	P	Main Generator output breakers and Alt Exc Fld Bkr green lights are verified ON at Panel 00C009.
*19	Verify Group I, II, and III isolations and verify SBGT initiation as appropriate. (Cue: If Reactor level dropped to 1", then all Group II and III isolation valves' green lights are on, red lights are off. SBGT system is running correctly.)	P	PCIS Group II and III isolation status is verified at panel 20C003-01, SBGT system status is verified at panel 20C012.
*20	Verify scram discharge volume vents and drains are closed. (Cue: SDV vent and drain red valve position lights are lit, green valve position lights are NOT lit.)	P	Recognize that SDV vents and drains remain open as indicated on Panel 20C005A or 20C003-01.
*21	Manually close the inboard and outboard SDV vent and drain valves. (Cue: Acknowledge control switch operation for inboard and outboard SDV vents and drain valves.)	P	Control switch for AO-2-03-032A, 023B and 033 and control switch for AO-203-032B, 035B and 036 are rotated counterclockwise to the close position.
*22	Verify scram discharge volume vent and drains are closed. (Cue: SDV vent and drain green valve position lights are lit, red valve position light are NOT lit.)	P	SDV vents and drains are verified closed and indicated on panel 20C005A or 20C003-01.
*23	Verify Hydrogen Water Chemistry is isolated. (Cue: FR-8629 flow is 0 scfm.)	P	Hydrogen flow is verified to be at 0 scfm on FR-8629 on panel 20C006A.

STEP NO	STEP	ACT	STANDARD
*24	Verify Recirc pump speed has runback to 30%. (Cue: A and B Recirc MG Set generator speed is 30% on SPI-2-02-184-016A and B.)	P	A and B Recirc MG Set generator speed is verified to be 30% on SPI-2-02-184-016A and B on panel 20C004A.
25	Monitor Instrument Air header pressure and Drywell pressure. (Cue: Drywell pressure is .3 psig, instrument air header pressure is 105 psig.)	P	Instrument Air header pressure on PI-2425A(B) on panel 20C012 is verified to be greater than Drywell pressure on PR-2508 on Panel 20C003-03 or computer point M026.

** NOTE **

IF the examinee does NOT report scram actions, THEN inform the examinee that you (the CRS) are ready for his/her scram action report.

STEP NO	STEP	ACT	STANDARD
26	Report the following to the CRS: • House loads transferred. • Main Turbine is tripped. • Main Generator is locked out. • Group II and III isolations complete and SGTS is initiated. • SDV vent and drain valves did not initially close and had to be manually closed. • Hydrogen Water Chemistry is isolated. • Recirc pump speed is 30%. • Instrument Air header pressure is greater than Drywell pressure. (Cue: CRS is informed.)	P	CRS informed of that: • House loads transferred. • Main Turbine is tripped. • Main Generator is locked out. • Group II and III isolations complete with SGTS in service. • SDV vent and drain valves manually closed. • Hydrogen Water Chemistry is isolated. • Recirc pump speed is 30%. • Instrument Air header pressure is greater than Drywell pressure.

** NOTE **

'F requested by the examinee, THEN grant permission for the examinee to bypass and restore Drywell Instrument Nitrogen.

STEP NO	STEP	ACT	STANDARD
*** NOTE *** t is procedurally permissible for a candidate to perform steps 33-35 prior to steps 27-30.			
*27	Place AO-2969A "Drywell Instrument N_2 Supply Valve" in "CLOSE". (Cue: Acknowledge control switch operation.)	P	AO-2969A control switch is placed in the "CLOSE" position at panel 20C003-03.
28	Verify AO-2969A, "Drywell Instrument N_2 Supply Valve is closed.	P	AO-2969A green light is verified on at panel 20C003-03.
*29	Place AO-2969B "Drywell Instrument N_2 Supply Valve" in "CLOSE". (Cue: Acknowledge control switch operation.)	P	AO-2969B control switch is placed in the "CLOSE" position at panel 20C003-03.
30	Verify AO-2969B, "Drywell Instrument N_2 Supply Valve is closed.	P	AO-2969B green light is verified on at panel 20C003-03.
*33	Place AO-2969A "Drywell Inst N_2 Bypass" Switch in "BYPASS". (Cue: Acknowledge Bypass switch operation.)	P	AO-2969A Bypass switch is placed in the "BYPASS" position at panel 20C005A.
*34	Place AO-2969B "Drywell Inst N_2 Bypass" switch in "BYPASS". (Cue: Acknowledge Bypass switch operation.)	P	AO-2969B Bypass switch is placed in the "BYPASS" position at panel 20C005A.
35	Acknowledge the "DRYWELL INST N_2 VALVES ISOLATION BYPASS" annunciator. (Cue: Annunciator 219 G-1 stops flashing and clears.)	P	The annunciator "ACKNOWLEDGE" pushbutton is depressed at panel 00C024.
*36	Open AO-2969A Drywell Instrument N_2 Supply valve. (Cue: Acknowledge control switch operation.)	P	AO-2969A control switch is placed in the "OPEN" position at panel 20C003-03.
37	Verify AO-2969A Drywell Instrument N_2 supply valve is open. (Cue: AO-2969A red light is ON, green light is OFF.	P	AO-2969A red light is verified ON at panel 20C003-03.

STEP NO	STEP	ACT	STANDARD
*38	Open AO-2969B "Drywell Instrument N_2 Supply" valve. (Cue: Acknowledge control switch operation.)	P	AO-2969B control switch is placed in the "OPEN" position at panel 20C003-03 panel.
39	Verify AO-2969B "Drywell Instrument N_2 Supply" valve is open. (Cue: AO-2969B red light is ON, green light is OFF.)	P	AO-2969B red light is verified ON at panel 20C003-03.
40	Report to the Control Room Supervisor the status of Drywell Instrument Nitrogen. reported that Drywell Instrument Nitrogen is restored. (Cue: Control Room Supervisor acknowledges report.)	P	It is reported that Drywell Instrument Nitrogen is restored.
41	Notify Health Physics of changing plant conditions. (Cue: Health Physics acknowledges report.)	P	Health Physics is notified of the plant scram.
42	Inform Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report.)	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When all required steps required by RRC 53.1-2, "Unit 2 House Loads Transfer During a Plant Event", RRC 94.2-2, "Plant Reactor Operator Scram Actions", and RRC 94.2-2:1, "PRO Scram Reports" are complete, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

The plant is in a full power, steady state condition.

INITIATING CUE

When reactor scram occurs, the Control Room Supervisor directs you to perform the Plant Reactor Operator scram actions in accordance with the Rapid Response Procedures.

PECO Energy Company
Peach Bottom Unit 2

RRC 53.1-2 UNIT 2 HOUSE LOADS TRANSFER DURING A PLANT EVENT

ENTRY

This RRC provides instructions to transfer house loads during a Plant Event.

PERFORMANCE STEPS

1. INSERT AND place SYNC switch, in "ON" for the selected breaker. [___]
2. VERIFY phase angle difference is < 12 degrees on "Synchroscope". [___]
3. CLOSE the selected breaker. [___]
4. VERIFY the associated generator BKR is tripped. [___]
5. Place "BKR SYNC" switch in "OFF" AND remove. [___]
6. INSERT AND PLACE "BKR SYNC" switch in "ON". [___]
7. VERIFY phase angle difference is < 12 degrees on "Synchroscope". [___]
8. CLOSE selected BKR. [___]
9. VERIFY associated generator BKR is tripped. [___]
10. PLACE "BKR SYNC" switch in "OFF" AND remove. [___]
11. FLAG BKR control switches to correspond to actual position. [___]
12. REMOVE associated bus breakers from "PULL TO LOCK". [___]

AS CONDITIONS PERMIT, REFER TO THE APPROPRIATE SYSTEM OPERATING PROCEDURE.

REFERENCES

Note: When revising this RRC, all changes should coincide with changes made to these referenced procedures.

1. TRIP Procedures
2. SO 53.2.A-2, "Transferring Unit 2 Aux Loads from Unit Auxiliary Transformer to Startup Feed Buses"

PECO Energy Company
Peach Bottom Unit 2

RRC 94.2-2 PLANT REACTOR OPERATOR SCRAM ACTIONS

ENTRY

This RRC provides instructions for plant reactor operator scram actions during a Plant Event as directed by TRIP procedures.

PERFORMANCE STEPS

1. TRANSFER 13KV house loads. [___]
2. TRIP Main Turbine when Generator load drops to approximately 50 MWE. [___]
3. VERIFY Main Generator Lockout. [___]
4. VERIFY Group I, II, III Isolations and SGTS initiation, as applicable. [___]
5. VERIFY scram discharge volume vents and drains are closed. [___]
6. VERIFY Hydrogen Water Chemistry is isolated. [___]
7. VERIFY both Recirc Pumps speed have runback to 30%. [___]
8. MONITOR Instrument Air header pressure and Drywell pressure. [___]
9. WHEN the CRS is ready, THEN REPORT Scram actions. [___]
10. BYPASS AND RESTORE Instrument N_2 to the Drywell when directed by the CRS. [___]
11. REPORT to the CRS, that Drywell Instrument Nitrogen is restored. [___]
12. NOTIFY Health Physics of changing plant conditions. [___]

AS CONDITIONS PERMIT, REFER TO THE APPROPRIATE SYSTEM OPERATING PROCEDURE.

REFERENCES

Note: When revising this RRC, all changes should coincide with changes made to these referenced procedures.

1. TRIP Procedures

PRO SCRAM REPORTS

When the CRS is ready, report the following:

1. "House loads transferred"
2. "Main Turbine is tripped"
3. "Main Generator is locked out"

1. "Group I, II and III isolations are complete and SGTS is initiated"
2. "Scram Discharge Volume vents and drains are closed"
3. "Hydrogen Water Chemistry is isolated"

1. "Recirc pump speed is 30%"
2. "Instrument Air Header pressure is greater than Drywell pressure"

PECO Energy Company
Peach Bottom Units 2 and 3

GP-8.E PRIMARY CONTAINMENT ISOLATION BYPASS

1.0 PURPOSE

This procedure provides instructions for bypassing PCIS isolation signals.

2.0 OPERATOR ACTIONS

2.1 Valve isolations shall NOT be bypassed without Shift Management permission.

> **NOTE**
>
> Following a full Group II Isolation, it may be desirable to restore instrument N_2 system pressure inside the drywell to provide pressure to:
>
> a. Open (maintain open) MSIVs.
> b. Operate target rock relief valves.
> c. Operate Drywell cooler chilled water valves.

2.2 Isolation Signals for the following valves can be bypassed.

VALVE	VALVE NAME
SV-2(3)969A	Instrument N_2 Supply A Drywell
SV-2(3)969B	Instrument N_2 Supply B Drywell
AO-8(9)098 A to D	RHR Sample Inboard
AO-8(9)099 A to D	RHR Sample Outboard
AO-2(3)509	Drywell Vent Inbd 2" Vent
AO-2(3)510	Drywell Vent Outbd 2" Vent
AO-2(3)513	Torus Vent Inbd 2" Vent
AO-2(3)514	Torus Vent Outbd 2" Vent
AO-2(3)523	D/W & Torus N_2 Makeup Inlet
SV-4(5)966 A to F	Sample Valves
SV-8(9)101	Rad Gas Sample
SV-2(3)671 A to G	O_2 Anal Inbd
SV-2(3)978 A to G	O_2 Anal Outbd
SV-2(3)980	O_2 Anal Outbd
AO-2(3)506	Drywell Ventilation Inbd 18" Vent
AO-2(3)507	Drywell Ventilation Outbd 18" Vent
AO-2(3)511	Torus Ventilation Inbd 18" Vent
AO-2(3)512	Torus Ventilation Outbd 18" Vent

> **NOTE**
>
> The instrument N_2 isolation should NOT be bypassed if drywell pressure is greater than N_2 pressure. This may be accomplished by comparing D/W pressure with Instrument Air Header pressure (PI-2(3)425A or B) since instrument air backs up instrument N_2. IF Instrument Air Header pressure is less than D/W pressure, THEN N_2 pressure SHALL be obtained locally (PI-4(5)466A or B) before instrument N_2 is bypassed.

3.0 INSTRUMENT N2 SUPPLY

3.1 Place the control switch for "A" DRYWELL (AO 2(3)969A) AND "B" DRYWELL (AO 2(3)969B) in the closed position on the Containment Atmosphere Panel 20(30)C003-03.

3.2 Place the D/W Inst. N_2 bypass switches A(16A-S100) and B(16A-S99) on Panel 20(30)C005A in the bypass position.

3.3 The valves may now be opened without affecting the reset logic.

4.0 RHR SAMPLE

4.1 Place the control switches for Inboard (AO-8(9)098A through D) and Outboard (AO-8(9)099A through D) on Panels 20(30)C003-02 and 20(30)C003-04 in the closed position.

4.2 Place the RHR Sample Inboard (16A-S108) and Outboard (16A-S107) bypass switches on Panel 20(30)C005A in the bypass position.

4.3 The valves may now be opened without affecting the reset logic.

5.0 DRYWELL AND TORUS VENT/N2 SUPPLY

5.1 Place the control switches for the following valves in the close position.

a. AO-2(3)509 Drywell Vent Inbd 2" Vent at Panel 20(30)C484B

b. AO-2(3)510 Drywell Vent Outbd 2" Vent at Panel 20(30)C484B

c. AO-2(3)513 Torus Vent Inbd 2" Vent at Panel 20(30)C484A

d. AO-2(3)514 Torus Vent Outbd 2" Vent at Panel 20(30)C484A

e. AO-2(3)523 D/W & Torus N_2 Makeup Inlet At Panel 20(30)C003-03

5.2 To open the Drywell Vent Valves place the Drywell Vent Inboard (16A-S103) and Outboard (16A-S104) Isolation bypass switches on Panel 20(30)C005A in the bypass position.

5.2.1 The Drywell 2" vent valves may now be opened without affecting reset logic.

5.3 To open the Torus Vent Valves place the Torus Vent Inboard (16A-S102) and Outboard (16A-S101) Isolation bypass switches on Panel 20(30)C005A in the bypass position.

5.3.1 The Torus 2" vent valves may now be opened without affecting reset logic.

6.0 <u>CAD GAS SAMPLE VALVES</u>

6.1 Place the control switch for SV-4(5)966A-F on Panel 20(30)C484A in the normal position.

6.2 Place the control switch for SV-8(9)101 on Panel 20(30)C484B in the closed position.

6.3 Place the RAD Gas Sample Inboard (16A-S109) and Outboard (16A-S111) Isolation bypass switches on Panel 20(30)C005A in the bypass position.

6.4 Place the control switch for SV-8(9)0391 on Panel 20(30)C484B in the bypass position.

6.5 The valves may now be opened without affecting reset logic.

7.0 <u>CAC ANALYZER VALVES</u>

7.1 Place the control switch for SV-2(3)671A-G on Panel 20(30)C003-03 in the closed position.

7.2 Place the control switch for SV-2(3)978A-G/SV-2(3)980 on Panel 20(30)C003-03 in the closed position.

7.3 Place the H_2/O_2 Analyzer Inboard SV-2(3)671A-G (69-ISO-1) and Outboard SV-2(3)978A-G,SV-2(3)980 (69-ISO-2) Isolation Bypass switches on Panel 20(30)C003-03 in the bypass position.

7.4 The valves may now be opened without affecting reset logic.

8.0 DRYWELL/TORUS 18" VENT VALVES

8.1 Place the control switches for the following valves, on Panel 20(30)C003-03 in the closed position.

a. AO-2(3)506 Drywell Ventilation Inbd 18" Vent

b. AO-2(3)507 Drywell Ventilation Outbd 18" Vent

c. AO-2(3)511 Torus Ventilation Inbd 18" Vent

d. AO-2(3)512 Torus Ventilation Outbd 18" Vent

8.2 Place the D/W Torus Purge Exh Inboard (16A-S114A) and Outboard (16A-S114B) Isolation bypass key switches on Panel 20(30)C005A in the appropriate bypass (D/W OR Torus) position.

8.3 The valves may now be opened without affecting reset logic.

9.0 RETURN TO NORMAL

9.1 For any isolation bypassed

a. Place the appropriate isolation bypass switch(es) to normal.

b. Verify the "Isolation Bypass" alarm resets.

10.0 REFERENCES

10.1 M-1-S-23, Primary Containment Isolation System

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2450050101 / PLOR-017C K/A: 262001A4.04

RO: 3.6 SRO: 3.7

TASK DESCRIPTION: SYNCHRONIZE TURBINE GENERATOR OUTPUT WITH GRID AT MINIMUM LOAD

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

1. Synchroscope key for breaker operation (R)

2. Key for synchro-check relay bypass key switch (R)

C. REFERENCES

Procedure SO 50.1.A-2 Rev. 7, Main Generator Synchronizing and Loading (R)

D. TASK STANDARD

1. Satisfactory task completion is indicated when the generator is synchronized to the grid and initial load is placed on the generator.

2. Estimated time to complete: 12 minutes (A.5) Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to synchronize the main generator to the grid and pickup load using appropriate procedures. I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. Plant startup in progress; reactor power approximately 18%.

2. Turbine generator at 1800 rpm and ready for electrical loading IAW SO 1B.1.A-2.

3. Main Generator disconnects are closed.

4. Main Generator output breakers are open.

5. Generator terminal voltage at 22 KV; voltage regulator in automatic.

6. Generator ready to be synchronized to grid.

7. Power System Director has been notified.

8. Main generator hydrogen pressure is at 75 psig IAW SO 50C.5.A-2

9. Generator and alterrex cooler vent valves are properly positioned IAW SO 30.1.A-2.

G. INITIATING CUE

The Control Room Supervisor directs you to continue with procedure SO 50.1.A-2 from step 4.11 to 4.24, and sync the generator to the grid and pick up load.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
*1	Turn on synchroscope for breaker 215 or 225. (Cue: Synchroscope meter rotating and incoming voltmeters and sensing lights are activated.)	P	Synchroscope key obtained from panel 00C024 inserted into selected breaker sync switch and placed in the "ON" position at panel 00C024.
*2	Use turbine load selector pushbuttons to adjust generator speed. (Cue: Synchroscope is rotating slowly in clockwise direction.)	P	Load selector pushbuttons are momentarily depressed to get synchroscope rotating slowly in the "FAST" direction at panel 00C024.
3	Check both synchronizing lights for proper operations. (Cue: Both lights lit at the "6 o'clock position", both lights out at the "12 o'clock position".)	P	Sync lights verified ON at "6 o'clock position" OFF at "12 o'clock position" at panel 00C024.
*4	Use the auto voltage regulator rheostat to adjust generator voltage so that incoming voltage is slightly higher than running voltage. (Cue: Incoming voltage meter is reading 121 volts, running voltage meter is reading 120 volts.)	P	Auto voltage regulator rheostat adjusted to set incoming voltage slightly higher than running voltage while maintaining generator voltage between 20.9 and 23.1 KV at panel 00C024.
5	Verify the sync scope is rotating slowly in the "FAST" direction. (Cue: Sync scope is rotating slowly in the clockwise direction.)	P	Synchroscope verified for rotation - slowly in the "FAST" direction at panel 00C024.
*6	When the synchroscope is within five degrees (green lines) of the "12 o'clock" position then close the selected breaker. (Cue: Acknowledge control switch operation.)	P	215 (225) breaker control switch is taken to CLOSE when the synchroscope is within approximately 5 degrees of "12 o'clock" position at panel 00C024.
7	Verify selected breaker is closed. (Cue: Breaker closed - red light on/green light off, synchroscope steps rotating at the "12 o'clock" position.)	P	Selected breakers red indicating light is verified ON at panel 00C024.

STEP NO	STEP	ACT	STANDARD
8	Verify synchroscope pointer at "12 o'clock" position. (Cue: Synchroscope at "12 o'clock" position and lights off.)	P	Synchroscope pointer verified at "12 o'clock" position at panel 00C024.
9	Turn off synchroscope for breaker 215 or 225. (Cue: Acknowledge sync switch operation.)	P	Synchroscope placed in the "OFF" position for breaker 215 or 225 at panel 00C024.
*10	Pick up load on the generator until all nine bypass valves are closed. (Cue: All nine bypass valves red lights are off, green lights on, and generator kiloamps rising on all three phases.	P	The "RAISE" load selector pushbutton is depressed on panel 00C024 until all nine bypass valves red lights are OFF at panel 20C008B.
11	Place the remaining breakers sync switch to ON. (Cue: Synchroscope is at the 12 o'clock position and incoming and running voltage ≈120V.)	P	Synchroscope key obtained from panel 00C024 inserted into selected breaker sync switch and placed in the "ON" position at panel 00C024.
12	Place the SYNC CHK RELAY BYPASS KEY switch in BYPASS. (Cue: Acknowledge key switch operation.)	P	Key is obtained from SSV keybox, inserted into the SYNC CHK RELAY BYPASS switch and placed in the "BYPASS" position at panel 00C024.
13	Verify incoming and running voltage are matched. (Cue: Incoming and running voltage are both ≈ 120V.)	P	Incoming and running voltage are verified to be matched on the INCOMING and RUNNING voltage meters at panel 00C024.
14	Verify the synchroscope within five degrees (green lines) of the "12 o'clock position". (Cue: Synchroscope at "12 o'clock" positon.	P	The synchroscope is verified to be within 5 degrees of the "12 o'clock" position, inside the green lines on the meter face at panel 00C024.
15	Close the selected breaker. (Cue: Acknowledge breaker control switch operation.)	P	The selected breaker control switch is placed in the "CLOSED" position.

STEP NO	STEP	ACT	STANDARD
16	Verify breaker 225 or 215 is closed. (Cue: Breaker 225 or 215 red light on, green light off, the synchroscope needle is stopped at the 12 o'clock position and sync lights out.)	P	Breaker 225 or 215 red light on, sync scopes stopped at 12 o'clock position and sync lights "OFF" verified at panel 00C024.
17	Place the 225 or 215 breaker sync switch to OFF. (Cue: Breaker sync switch is placed in OFF and incoming and running voltage meters drop to 0 volts.)	P	Breaker 225 or 215 sync switch is placed in the OFF position at panel 00C024.
18	Place the SYNC CHK RELAY BYPASS KEYSWITCH in NORM. (Cue: Sync chk relay bypass keyswitch is in NORM.)	P	SYNC CHK RELAY BYPASS KEYSWITCH is placed in the NORMAL position at panel 00C024 and the key is returned to the SSV keybox.
19	Inform the Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report.)	P	Task completion reported.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When steps 4.11 through 4.24 of procedure SO 50.1.A-2 have been completed, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. Plant startup in progress; reactor power approximately 18%.

2. Turbine generator at 1800 rpm and ready for electrical loading IAW SO 1B.1.A-2.

3. Main Generator disconnects are closed.

4. Main Generator output breakers are open.

5. Generator terminal voltage at 22 KV; voltage regulator in automatic.

6. Generator ready to be synchronized to grid.

7. Power System Director has been notified.

8. Main generator hydrogen pressure is at 75 psig IAW SO 50C.5.A-2

9. Generator and alterrex cooler vent valves are properly positioned IAW SO 30.1.A-2.

INITIATING CUE

The Control Room Supervisor directs you to continue with procedure SO 50.1.A-2 from step 4.11 to 4.24, and sync the generator to the grid and pick up load.

PECO Energy Company
Peach Bottom Unit 2

SO 50.1.A-2 MAIN GENERATOR SYNCHRONIZING AND LOADING

1.0 PURPOSE

This procedure provides the instructions necessary to electrically startup the main generator and synchronize to the grid.

2.0 PREREQUISITES

2.1 Main turbine at 1800 rpm and ready for electrical loading in accordance with SO 1B.1.A-2, "Main Turbine Startup And Normal Operations".

2.2 All permits and clearances removed on the main generator disconnects AND the main generator disconnects are closed.

2.3 Main generator output breakers open.

2.4 Main generator hydrogen pressure is greater than 60 psig in accordance with SO 50C.5.A-2, "Generator Purging-Air to CO_2 and CO_2 H_2".

2.5 Generator and alterrex cooler vent valves are properly positioned in accordance with SO 30.1.A-2, "Unit 2 Service Water System Startup and Normal Operations".

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

4.0 PERFORMANCE STEPS

4.1 Verify L-2, "GENERATOR INSULATION OVER HEATING" alarm on 206(20C208R) is clear.

4.2 Verify the "Load Selector" pushbutton selected to "REMOTE/AUTO" on Panel 20C008A, "Main Turbine".

4.3 Verify "Reg/Transfer" switch (43-0601) in "MAN" on Panel 20C009, "Plant Electrical Distribution".

4.4 Verify the DC Manual regulator set at minimum as indicated by the green and amber lights lit.

CAUTIONS

- Main generator gas pressure will increase as the machine heats up.
- Generator gas pressures in excess of 80 psig can lead to generator end bell damage and loss of pressure boundary.
- Generator gas pressures of less than 60 psig can lead to stator water cooling intrusion into the main generator.

4.5 Perform the following during synchronization and power ascension:

4.5.1 Periodically monitor machine gas pressure at local indicator PI-4356.

4.5.2 Vent machine gas as required to maintain 72 to 78 psig as follows:

4.5.2.1 Verify HV-2-50C-47572 "CO_2 Purge or Fill Selector Valve for Main Gen (G-01)" in "H_2 Manifold" position (valve handle horizontal).

4.5.2.2 Slowly throttle open HV-2-50C-47574 "Outlet Block Valve for Gen H_2 & CO_2 Purge (G-03)" as required to maintain pressure at 72 to 78 psig.

4.5.2.3 <u>WHEN</u> pressure is reduced to the desired point, <u>THEN</u> close HV-2-50C-47574 (G-03).

4.5.3 <u>WHEN</u> generator H_2 cold gas temperature exceeds 30 degrees C as indicated on the indicator at Panel 20C008A <u>AND</u> machine gas pressure stabilizes at approximately 75 psig, <u>THEN</u> monitoring is no longer required.

4.6 Close the "Alt Exc Fld Bkr" and check the following:

- "Field" voltage and amperage
- "Gen" voltage
- Red "De-Excitation Backup" light is lit

4.7 Adjust generator output voltage, "Gen" to obtain 21.5 - 22.5 KV, using the DC manual voltage regulator.

4.8 Transfer the voltage regulator to the automatic mode by performing the following:

4.8.1 Obtain a "Reg Man/Auto Deviation" voltage of 0 VDC by adjusting the "Auto Voltage Reg Rheostat".

4.8.2 Verify C-3, "GEN VOLT REG AUTO TO MAN UNBALANCED", alarm on 220(20C209R) is clear.

CAUTION

Monitor generator output voltage when transferring the voltage regulator from manual to automatic to prevent over excitation of the generator. An over excitation condition will cause a "VOLT/HERTZ TROUBLE" alarm and overheating in the generator core. Be prepared to reduce voltage immediately.

4.8.3 Place the "Reg/Transfer" switch in "AUTO", and verify the "Reg/Transfer" lights indicate auto regulation.

4.9 Verify generator speed and voltage control as follows:

4.9.1 Operate the "Load Selector" pushbuttons to:

4.9.1.1 "RAISE" frequency to 0.5 hz above the initial value.

4.9.1.2 "LOWER" frequency to 0.5 hz below the initial value.

4.9.1.3 "RAISE" frequency to return to initial value.

4.9.2 Operate the "Auto Voltage Reg Rheostat" to:

4.9.2.1 "RAISE" voltage to 0.5 KV above the initial value.

4.9.2.2 "LOWER" voltage to 0.5 KV below the initial value.

4.9.2.3 "RAISE" voltage to return to initial value.

4.10 Direct the Unit Control Room Operator to select point G029 on the computer console display to monitor generator megawatt load.

4.11 Place the "215 BKR Sync" ("225 BKR Sync") switch in "ON".

4.12 Adjust generator speed, using the "Load Selector" pushbuttons, to make the synchroscope rotate slowly in the "FAST" direction.

4.13 Check both synchronizing lights for proper operation as follows:

- o Both lights lit when the synchroscope is at the "6 o'clock position".
- o Both lights out when the synchroscope is at the "12 o'clock position".

CAUTION

Observe the following generator voltage limits:

- o minimum - 20.9 KV
- o maximum - 23.1 KV

4.14 Adjust generator voltage, "Incoming", so that it is slightly higher than grid voltage, "Running", using the "Auto Voltage Reg Rheostat".

4.15 Verify synchroscope is still rotating slowly in the "FAST" direction.

4.16 WHEN the synchroscope is within five degrees (green lines) of the "12 o'clock position", THEN close "215 Bkr 500 KV" ("225 Bkr 500 KV") AND verify synchroscope at the "12 o'clock position".

CAUTION

Picking up load two quickly may cause a turbine trip due to high moisture separator level.

4.17 Place the "215 Bkr Sync" ("225 Bkr Sync") switch in "OFF".

4.18 Immediately pick-up load using the "Load Selector" pushbutton until all nine By-pass valves are closed as indicated on Panel 20C008B, "T/G".

4.19 Place the "225 Bkr Sync" ("215 Bkr Sync") switch in "ON".

4.20 Place the "Sync Chk Relay By-pass" key switch in "BYPASS" to bypass the Sync Check Relay.

4.21 Verify "Incoming", and "Running" voltage are matched and the synchroscope within five degrees (green lines) of the "12 o'clock position".

4.22 Close the "225 Bkr 500 KV" ("215 Bkr 500 KV").

4.23 Place the "225 Bkr Sync" ("215 Bkr Sync") switch in "OFF".

4.24 Place the "Sync Chk Relay Bypass" keyswitch in "NORM".

4.25 Verify generator load is within limits specified on Figure 1.

4.26 Direct the Unit Control Room Operator to select the "Load Selector" pushbutton to "MANUAL" to return turbine control to 20C008A.

4.26.1 Increase load set to 105% by depressing the load selector "Raise" pushbutton.

4.27 Monitor alterrex exciter air temperatures in accordance with SO 50G.1.A-2, "Operation of Alterrex Exciter Air Coolers", data sheet until stable temperatures are maintained between 59 - 104 Degrees F (15 - 40 Degrees C). **CM-1**

4.28 Monitor generator H_2 cold gas temperature at the indicator on Panel 20C008A AND adjust HCS-2485 on Panel 20C009 as needed to maintain gas temperature between 30-45 degrees C.

4.29 WHEN turbine control has been returned to Panel 20C008A, THEN verify the following systems are operating properly:

- o Alterrex Exciter Air Coolers (50G) **CM-1**
- o Stator Cooling Water (50A)
- o Hydrogen Seal Oil (50B)
- o Hydrogen and Carbon Dioxide (50C)
- o Isophase Bus Cooling (50D)
- o Electrohydraulic Control, EHC (1D)
- o Turbine Lube Oil (1F)

CAUTION

To carry house loads the generator voltage should be maintained between 20.9KV - 22.5KV.

5.0 CONTROL STATIONS

5.1 MCR 20C009, Plant Electrical Distribution

6.0 REFERENCES

6.1 GEK 5595 Vol IIB, Generator

6.2 M-2-355-C, Alterrex Excitation System with SCR Regulator

6.3 E-1, Single Line Diagram Station

6.4 E-40, "Main Generator Unit 2

6.5 E-91, Generator Excitation and Regulation

6.6 E-98, Generator Bus Cooler

6.7 E-247, Annunciators, Main Turbine (Unit 2)

6.8 E-248, Annunciators, Generator Aux Bypass, & CH-II D.C. Unit 2

6.9 C-201754, D.C. Control & L&P 500KV BKR 215 & Disc. SW 213 & 217

6.10 C-201755, D.C. Control & L&P 500KV BKR 225 & Disc. SW 223 & 227

6.11 Voltage Study, 1988

6.12 Event Investigation Report No. 2-90-015

6.13 Alterrex Low Air Temperature Limit (A0922705)

7.0 TECHNICAL SPECIFICATIONS

None

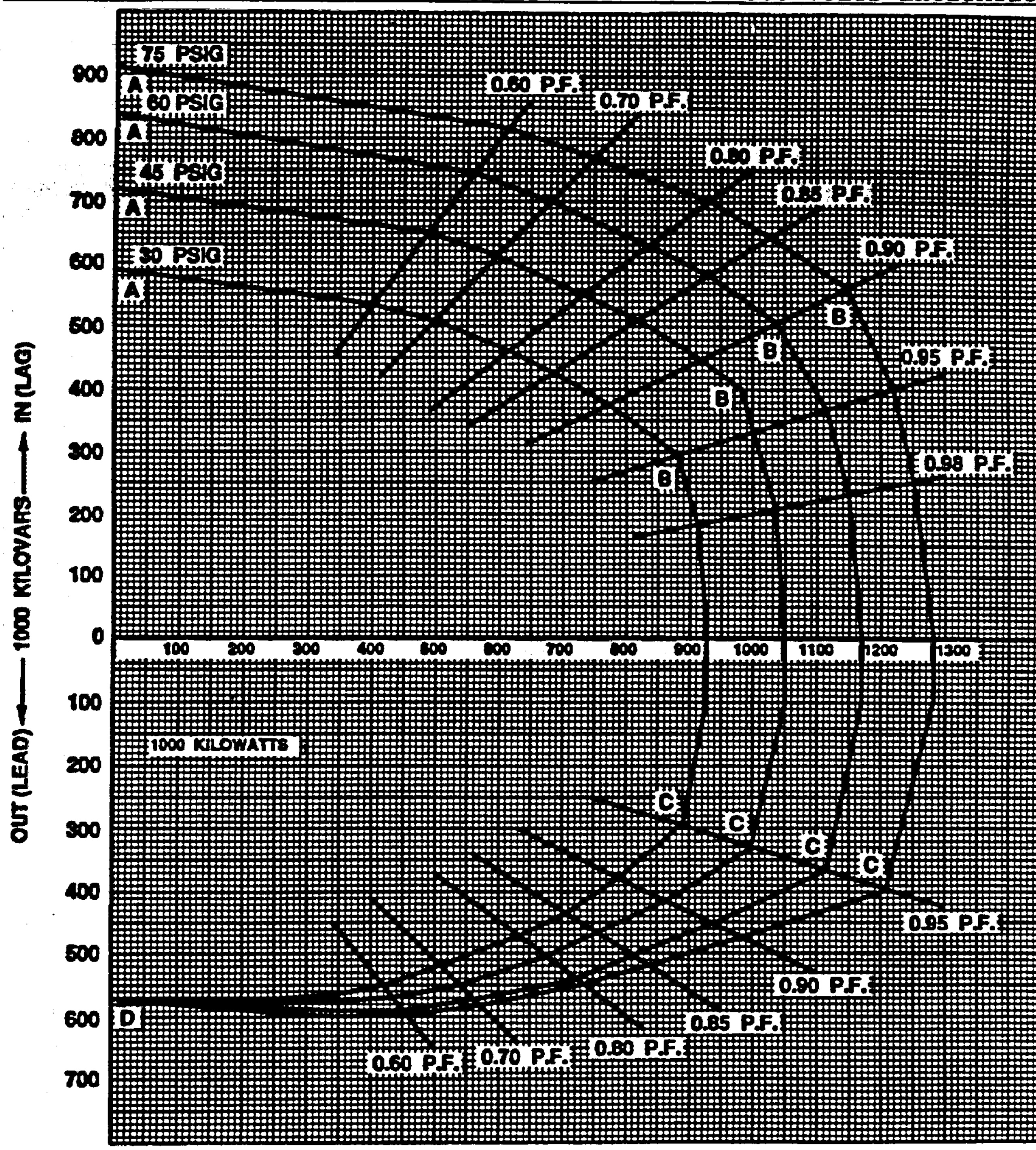
8.0 INTERFACING PROCEDURES

8.1 SO 1B.1.A-2, "Main Turbine Startup and Normal Operations"

8.2 SO 50G.1.A-2, "Operation of Alterrex Exciter Air Coolers"

FIGURE 1

ATB 4 POLE 1,280,000 KVA 1800 RPM 22,000 VOLTS
0.90 P.F. 0.60 SCR 75 PSIG HYDROGEN PRESSURE 500 VOLTS EXCITATION



CURVE AB LIMITED BY FIELD HEATING
CURVE BC LIMITED BY ARMATURE HEATING
CURVE CD LIMITED BY ARMATURE CORE END HEATING

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 0201710040/ PLOR-054P K/A: 218000A2.03

URO: 3.4 SRO: 3.6

TASK DESCRIPTION: Backup Instrument Nitrogen to ADS System Startup and Operation

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When-performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

Procedure SO 16A.1.A-2 Rev. 4, "Backup Instrument Nitrogen to ADS Startup and Operation".

D. TASK STANDARD

1. Satisfactory task completion is indicated when backup Instrument Nitrogen to ADS has been lined up locally.

2. Estimated time to complete: 23 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to line up Backup Instrument Nitrogen to the ADS relief valves using SO 16A.1.A-2, "Backup Instrument Nitrogen to ADS Startup and Operation". I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. The Prerequisites listed in SO 16A.1.A-2, "Backup Instrument Nitrogen to ADS Startup and Operation" are met.

2. COL 16A.1.A-2. "Backup Instrument Nitrogen to ADS System" has been performed.

G. INITIATING CUE

The Control Room Supervisor directs you, the Equipment Operator, to perform SO 16A.1.A-2. "Backup Instrument Nitrogen to ADS Startup and Operation" in order to lineup Backup Instrument Nitrogen to the Unit 2 ADS relief valves.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure SO 16A.1.A-2.	P	A copy of procedure SO 16A.1.A-2 is obtained.
****NOTE**** **Inform the examinee the individual bottle PCV outlet pressure indicators and header pressure indicator (PI-8130) read zero psig. Individual bottle pressures indicate 2200 psig.**			
*2	Slowly open the nitrogen bottle isolation valves for 2AS377, 2BS377 and 2CS377. (Cue: Acknowledge isolation valve operation.)	S	Nitrogen bottle isolation valves 16A-23331A, 16A-23331B and 16A-23331C are slowly turned in the counterclockwise direction.
*3	Adjust nitrogen bottle 2AS377 pressure control valve to obtain ≥ 85 psig. (Cue: Acknowledge PCV operation, pressure indicator for bottle 2AS377 indicates 85 psig.)	S	PCV-2-16A-8917A handle is turned clockwise until ≥ 85 psig is obtained on bottle 2AS377 pressure indicator.
*4	Adjust nitrogen bottle 2BS377 pressure control valve to obtain ≥ 85 psig. (Cue: Acknowledge PCV operation, pressure indicator for bottle 2BS377 indicates 85 psig.)	S	PCV-2-16A-8917B handle is turned clockwise until ≥ 85 psig is obtained on bottle 2BS377 pressure indicator.
*5	Adjust nitrogen bottle 2CS377 pressure control valve to obtain ≥ 85 psig. (Cue: Acknowledge PCV operation, pressure indicator for bottle 2CS377 indicates 85 psig.)	S	PCV-2-16A-8917B handle is turned clockwise until ≥ 85 psig is obtained on bottle 2CS377 pressure indicator.
6	Request URO to verify Backup Nitrogen is ≥ 85 psig on PI-8142. (Cue: Unit Reactor Operator acknowledges request and reports that PI-8142 indicates 85 psig.)	S	Control Room is requested via telephone, radio, or GAI-TRONICS page system to verify that backup nitrogen pressure is ≥ 85 psig on PI-8142.

STEP NO	STEP	ACT	STANDARD
7	Inform Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report.)	S	Task completion reported using telephone, hand held radio, or GAI-TRONICS page system.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the Backup Instrument Nitrogen to ADS System has been lined up locally and the URO verifies $\geq$ 85 psig Backup Instrument Nitrogen pressure indication, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. The Prerequisites listed in SO 16A.1.A-2, “Backup Instrument Nitrogen to ADS Startup and Operation” are met.

2. COL 16A.1.A-2, “Backup Instrument Nitrogen to ADS System” has been performed.

INITIATING CUE

The Control Room Supervisor directs you, the Equipment Operator, to perform SO 16A.1.A-2, “Backup Instrument Nitrogen to ADS Startup and Operation” in order to lineup Backup Instrument Nitrogen to the Unit 2 ADS relief valves.

PECO Energy Company
Peach Bottom Unit 2

SO 16A.1.A-2 BACKUP INSTRUMENT NITROGEN TO ADS STARTUP AND OPERATION

1.0 PURPOSE

This procedure provides the instructions necessary to align the Backup Instrument Nitrogen To ADS System to provide a backup supply of nitrogen for operation of the ADS relief valves.

2.0 PREREQUISITES

2.1 Vital 120 VAC System available in accordance with SO 58A.1.A-2, "Vital 120 VAC System Normal Operation".

3.0 PRECAUTIONS

3.1 WHEN operating equipment, IF it does NOT perform as expected, THEN place the equipment in a safe condition AND inform Shift Management.

3.2 Nitrogen bottle pressure shall be maintained greater than 1300 psig.

3.3 Opening a nitrogen bottle valve without its respective pressure control valve fully counterclockwise, could result in pressure control valve failure.

4.0 PERFORMANCE STEPS

> **NOTE**
>
> Communications shall be available between the Control Room AND Personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation OR alarms.

4.1 Perform COL 16A.1.A-2, "Backup Instrument Nitrogen to ADS System", as directed by Shift Management.

4.2 Slowly open the applicable nitrogen bottle 2A(B,C)S377 isolation valve.

4.3 Adjust the following nitrogen bottle pressure control valves to obtain $\geq$ 85 psig on the individual nitrogen bottle pressure indicators:

N2 Bottle	Pressure Control Valve
2AS377	PCV 2-16A-8917A, "Nitrogen Pressure Control Valve for Backup Supply to ADS"

2BS377 PCV 2-16A-8917B, "Nitrogen Pressure Control Valve for Backup Supply to ADS"

2CS377 PCV 2-16A-8917C, "Nitrogen Pressure Control Valve for Backup Supply to ADS"

4.4 Request the RO to verify ≥ 85 psig as indicated on PI-8142, "Backup N2", at Panel 20C003-03, "Containment Atmosphere".

NOTE

IF piping downstream of SV-8130A & B is depressurized, THEN SV-8130A & B will close on a high nitrogen flow isolation upon opening.

4.5 Place SV-8130A, "A Supply", AND SV-8130B, "B Supply", control switches on Panel 20C003-03 in "OPEN", AND verify the valves remain open.

4.6 IF SV-8130A & B do NOT remain open, THEN place SV-8130A & B control switches in "CLOSE" AND proceed to AO 16A.1-2, "Post Maintenance Filling of the Backup Instrument Nitrogen to ADS System".

4.7 Place SV-8130A & B control switches in "CLOSE".

5.0 CONTROL STATIONS

5.1 MCR 20C003-03, Containment Atmosphere panel

6.0 REFERENCES

6.1 P&ID M-333, Instrument Nitrogen

6.2 E-2357, Post Accident Monitoring System

6.3 M-1-S-23, Primary Containment Isolation System

6.4 E-28, Instrumentation & Uninterruptible AC System Unit 2 & Common

6.5 SO 58A.1.A-2, "Vital 120 VAC System Normal Operation"

7.0 TECHNICAL SPECIFICATIONS

7.1 Section 3.5.1

8.0 INTERFACING PROCEDURES

8.1 COL 16A.1.A-2, "Backup Instrument Nitrogen to ADS System"

8.2 AO 16A.1-2, "Post Maintenance Filling of the Backup Instrument Nitrogen to ADS System"

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2010010501 / PLOR-123P K/A. 295031EA1.10
URO: 3.6 SRO: 3.7

TASK DESCRIPTION: Maximize CRD Flow to Reactor Vessel – Unit 3

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM. though listed in the task standard. is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

None

C. REFERENCES

Procedure T-246-3, Rev. 2, "Maximizing CRD Flow to the Reactor Vessel"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the Unit 3 CRD System is lined up to deliver maximum flow to the reactor vessel with:

   a. Both CRD pumps are running.

   b. The CRD suction filter is bypassed.

   c. Both CRD drive water filters are in service.

2. Estimated time to complete: 24 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to maximize CRD flow to the Reactor Vessel using T-246, "Maximizing CRD Flow to the Reactor Vessel". I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. T-111, "Level Restoration" directs that CRD flow to the Reactor vessel be maximized.

2. Unit 3 has scrammed.

3. Scram is NOT reset.

4. The 3A CRD pump is operating.

5. The 3A Drive Water Filter is in service.

6. All prerequisites in Section 2.0 of T-246-3, "Maximizing CRD Flow to the Reactor Vessel" are met.

G. INITIATING CUE

The Control Room Supervisor directs you, the Equipment Operator, to perform steps 4.3 through 4.8 of T-246-3, "Maximizing CRD Flow to the Reactor Vessel" on Unit 3.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure T-246-3.	P	A copy of procedure T-246-3 is obtained.
*2	Open HV-3-3-129, CRDHS Bypass Valve for Pump Suction Filter 30F101. (Cue: Valve handwheel is turned [COUNTERCLOCKWISE] until stem length above valve yoke rises 4 inches then will not turn.)	S	HV-3-3-129 handwheel is turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
3	Verify HV-3-3-35B, Suction Block Valve to CRD Water Pump 3BP039, is open. (Cue: Valve handwheel turned [CLOCKWISE] until stem length above valve yoke begins to lower then handwheel turned [COUNTER-CLOCKWISE] to original position then will not turn further.)	S	HV-3-3-35B handwheel is turned CLOCKWISE until stem movement is observed, then COUNTERCLOCKWISE until resistance of valve backseat is felt.
4	Verify HV-3-3-36B, Inner Disch Block Vv from CRD Drive Water Pump 3BP039, is closed. (Cue: [CLOCKWISE] Valve handwheel does not move, stem length above valve yoke does not change.)	S	HV-3-3-36B handwheel movement is attempted in the CLOCKWISE direction.
5	Verify HV-3-3-37B, CRD Wtr. Pp 3BP039 Recirc to Cond Storage Tank Valve, is locked open. (Cue: Valve handwheel is turned [CLOCKWISE] 1/4 turn then is stopped by locking device then the handwheel turned [COUNTERCLOCKWISE] to original position and will not turn further.)	S	HV-3-3-37B locking device is verified installed, handwheel is turned CLOCKWISE to determine that the locking device will prevent the valve from being closed then turned COUNTERCLOCK-WISE until resistance of valve backseat is felt.
6	Verify oil level in Speed Increaser. (Cue: Oil level is 1 1/2 inches.)	P	Speed Increaser oil level verified $\geq$ 1 inch.
7	Verify oil level in motor bearing sightglass. (Cue: Oil level is 3/4 full.)	P	Motor bearing sightglass verified $\geq$ 1/2 full.

STEP NO	STEP	ACT	STANDARD
8	Verify proper oil level in pump bearing sightglasses. (Cue: Oil level in all sighglasses are 3/4 full.)	P	Sightglasses on pump bearings verified ≥ 1/2 full.
9	Verify TBCW flow from Gear Box and pump bearings oil cooler. (Cue: Flapper in flowglass is lifted up.)	P	TBCW flow verified from gearbox and pump bearing oil cooler by observing flowglass flapper.
10	Verify HV-3-3-39, CRD Pump 3AP039 Seal Flood Cross Connection Valve, is open. (Cue: Valve handwheel turned [CLOCKWISE] until stem length above valve yoke begins to lower then handwheel turned [COUNTER-CLOCKWISE] to original position then will not turn further.]	S	HV-3-3-39 handwheel is turned CLOCKWISE until stem movement is observed, then COUNTERCLOCKWISE until resistance of valve backseat is felt.
*11	Report to the Main Control Room that procedure steps 4.1 through 4.4 are complete. Request the Main Control Room start "3B" CRD pump. (Cue: MCR acknowledges report, CRD pump start announcement is heard over PA system, noise of motor start is heard from "3B" CRD pump.)	S	Procedure Step 4.1 to 4.4 completion reported to Main Control Room and request to start "3B" CRD pump using hand held radio or GAI-TRONICS page system.
	*** NOTE *** Direct examinee to complete Steps 4.6 through 4.8.		
*12	Slowly open HV-3-3-36B, Inner Disch Block Vv from CRD Drive Water Pump 3BP039, after Control Room starts the "3B" CRD pump. (Cue: Valve handwheel turned [COUNTERCLOCKWISE] until stem length above valve yoke rises 4 inches then will not turn, flow noise can be heard as valve is opened.)	S	HV-3-3-36B handwheel is slowly turned COUNTERCLOCKWISE until resistance of valve backseat is felt.

STEP NO	STEP	ACT	STANDARD
*13	Fully open HV-3-3-170, Inlet Valve to Drive Water Filters. (Cue: Valve handwheel turned [COUNTERCLOCKWISE] until it will not turn.)	S	HV-3-3-170 handwheel is turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
14	Verify HV-3-3-45B, Drain Valve for Drive Water Filter 3BF013, is closed. (Cue: [CLOCKWISE] Valve handwheel does not move, stem length above valve yoke does not change.)	S	HV-3-3-45B handwheel movement is attempted in the CLOCKWISE direction.
15	Open HV-3-3-44B, Vent Valve for the Drive Water Filter 3BF013. (Cue: Valve handwheel turned [COUNTERCLOCKWISE] until stem length above valve yoke rises 2 inches then will not turn.)	S	HV-3-3-44B handwheel is turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
16	Crack open HV-3-3-42B, CRDHS Inlet Block Valve to Drive Water Filter 3BF013. (Cue: Valve handwheel turned [COUNTERCLOCKWISE], stem length above valve yoke rises, flow noise is heard, steady stream of water is seen in flow glass FG-9047B downstream of HV-3-3-44B.)	S	HV-3-3-42B handwheel is turned COUNTERCLOCKWISE until flow is heard or felt.
17	Close HV-3-3-44B, Vent Valve for the Drive Water Filter 3BF013. (Cue: Valve handwheel turned [CLOCKWISE], stem length above valve yoke lowers, flow noise stops, water stream in flow glass stops, then handwheel will not turn further.)	S	When a steady stream of water is seen in FG-9047B, HV-3-3-44B handwheel is turned CLOCKWISE until resistance of valve seat is felt.

STEP NO	STEP	ACT	STANDARD
*18	Fully open HV-3-3-42B, CRDHS Inlet Block Valve to Drive Water Filter 3BF013. (Cue: Valve handwheel turned [COUNTERCLOCKWISE] until stem length above valve yoke rises 4 inches then will not turn.)	S	HV-3-3-42B handwheel is turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
*19	Slowly open HV-3-3-43B, CRDHS Outlet Block Valve from Drive Water Filter 3BF013. (Cue: Valve handwheel is turned [COUNTERCLOCKWISE] until stem length above valve yoke rises 4 inches then will not turn, flow noise can be heard as valve is opened.)	S	HV-3-3-43B handwheel is turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
20	Inform Control Room of task completion. (Cue: Control Room acknowledges report.)	S	Task completion reported using hand held radio or GAI-TRONICS page system.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When CRD flow has been maximized to the Reactor vessel with both CRD pumps running. The CRD suction filter bypassed, and both drive water filter in service, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. T-111, “Level Restoration” directs that CRD flow to the Reactor vessel be maximized.

2. Unit 3 has scrammed.

3. Scram is NOT reset.

4. The 3A CRD pump is operating.

5. The 3A Drive Water Filter is in service.

6. All prerequisites in Section 2.0 of T-246-3, “Maximizing CRD Flow to the Reactor Vessel” are met.

INITIATING CUE

The Control Room Supervisor directs you, the Equipment Operator, to perform steps 4.3 through 4.8 of T-246-3, “Maximizing CRD Flow to the Reactor Vessel” on Unit 3.

PECO Energy Company
Peach Bottom Unit 3

T-246-3 MAXIMIZING CRD FLOW TO THE REACTOR VESSEL

1.0 PURPOSE

This procedure provides the instructions necessary to maximize CRD System flow. Maximizing CRD flow is performed for either of the following reasons:

- o Raising flow to the RPV serves as an alternate means of RPV injection.
- o Raising flow will raise the CRD cooling water differential pressure, and, especially at lower than normal RPV pressure, could cause any control rods not fully inserted to drift into the core.

This procedure CANNOT be performed concurrently with procedure T-220-3, "Driving Control Rods During Failure to Scram."

2.0 PREREQUISITES

2.1 Use of this procedure has been directed by the TRIP or SAMP procedures.

2.2 CRD pump(s) available.

2.3 Turbine Building Cooling Water or Reactor Building Cooling Water supplying the CRD Pump Lube Oil Coolers.

2.4 Instrument Air supplying the CRDH System.

2.5 CST level above 5 ft.

2.6 Shift Management has directed that this procedure is to be performed with higher priority than T-220-3, "Driving Control Rods During Failure to Scram."

3.0 AREA ACCESS/PERSONNEL REQUIREMENTS

3.1 Area Access

3.1.1 Main Control Room

3.1.2 Turbine Building 116'

3.1.3 Reactor Building 135'

3.2 Personnel Requirements

3.2.1 Required: 1 MCR Operator, 1 Equipment Operator

3.2.2 Preferred: 1 MCR Operator, 1 Equipment Operator

4.0 PERFORMANCE STEPS

4.1 Unless directed by a TRIP or SAMP procedure to reset the scram, verify the scram is NOT reset.

4.2 IF no CRD pump is operating, THEN start a CRD pump by performing the following:

4.2.1 Direct an Operator to the CRD pump area to perform the following for the selected CRD pump:

4.2.1.1 Verify oil level in Speed Increaser 1 inch OR greater.

4.2.1.2 Verify oil level in motor bearings sight glass at least 1/2 full.

4.2.1.3 Verify proper oil level in pump bearing sight glasses.

4.2.1.4 Verify TBCCW flow from gear box and pump bearing oil cooler visible in flow glass.

4.2.1.5 Verify HV-3-3-36A(B), "Inner Disch Block Valve from CRD Drive Water Pump 3AP039 (3BP039)" is closed.

4.2.1.6 Verify open HV-3-3-35A(B), "Suction Block Valve to CRD Water Pump 3AP039 (3BP039)."

4.2.2 In the MCR, perform the following at Panel 30C005A:

4.2.2.1 Verify CRD flow valve controller FIC-3-03-301 in "MAN".

4.2.2.2 Verify AO-3-3-19A(B), "Flow Control" is closed.

4.2.2.3 Verify MO-3-03-020, "Drive Wtr Press" fully open.

4.2.3 Start the selected CRD pump AND observe the running current on the ammeter is below 34 amps and remains below 34 amps during initial system flow changes.

4.2.4 Direct the operator to slowly open HV-3-3-36A(B), "Inner Disch Block VV from CRD Drive Water Pump 3AP039 (3BP039)" for the running pump.

NOTE

An orifice in the charging header limits charging flow to below 180 gpm at 0 psig RPV pressure.

4.3 Direct an operator to open HV-3-3-129, "CRDHS Bypass Valve for Pump Suction Filter 30F101."

4.4 Direct an operator to check the standby CRD pump for starting as follows:

4.4.1 Verify open HV-3-3-35A(B) "Suction Block Valve to CRD Water Pump 3AP039 (3BP039)."

4.4.2 Verify closed HV-3-3-36A(B), "Inner Disch Block Vv from CRD Drive Water Pump 3AP039 (3BP039)."

4.4.3 Verify locked open HV-3-3-37A(B), "CRD Wtr Pp 3AP039(3BP039) Recirc to Cond Storage Tank Valve."

4.4.4 Verify oil level in Speed Increaser 1 in. or greater.

4.4.5 Verify oil level in motor bearing sight glass at least 1/2 full.

4.4.6 Verify proper oil level in pump bearing sight glasses.

4.4.7 Verify TBCCW flow from Gear Box and pump bearings oil cooler visible in flow glass.

4.4.8 Verify open HV-3-3-39, "CRD Pp 3AP039 Seal Flood Cross Connection Valve."

4.5 In the MCR, start the standby CRD pump and observe the running current for the CRD pumps do NOT exceed 34 amps following pump start.

4.6 Direct the Operator to slowly open HV-3-3-36A(B), "Inner Disch Block Vv from CRD Drive Water Pump 3AP039 (3BP039)."

4.7 Direct an operator to the Reactor Building 135' CRD Valve Nest to fully open HV-3-3-170, "Inlet Valve to Drive Water Filters."

4.8 Direct an operator to place the Standby Drive Water Filter in service by performing the following:

4.8.1 Verify HV-3-3-45A(B), "Drain Valve for Drive Water Filter 3AF013 (3BF013)", is closed for the out of service filter.

4.8.2 Open HV-3-3-44A(B), "Vent Valve For Drive Water Filter 3AF013 (3BF013)", for the out of service filter.

4.8.3 Slowly crack open HV-3-3-42A(B), "CRDHS Inlet Block Valve to Drive Water Filter 3AF013 (3BF013)", for the out of service filter.

4.8.4 WHEN a steady flow of water is observed through the vent,
THEN close HV-3-3-44A(B).

4.8.5 Fully open HV-3-3-42A(B) for the out of service filter.

4.8.6 Slowly open HV-3-3-43A(B), "CRDHS Outlet Block Valve from Drive Water Filter 3AF013 (3BF013)", for the out of service filter.

4.9 In the MCR, verify MO-3-03-020, "Drive Wtr Press" fully open.

4.10 Close the following valves at Panel 30C004A to isolate the Reactor Recirc pumps seal purge:
- o MO-3-2A-9029A, "Seal Purge"
- o MO-3-2A-9029B, "Seal Purge"

4.11 Verify the CRD flow valve controller FIC-3-03-301 in "MAN."

CAUTION

Operating a CRD pump with motor current above 41 amps may cause damage.

4.12 While monitoring CRD pump amps, open AO-3-3-19A(B), "Flow Control" using FIC-3-03-301.

CAUTION

Closing HV-3-3-56, which is done to maximize CRD Cooling Water Header dP during an ATWS, prevents recharging HCU accumulators. IF the accumulators are NOT charged, THEN control rod insertion using T-216-3, "Control Rod Insertion by Manual Scram or Individual Scram Test Switches" may be limited.

4.13 IF an ATWS is in progress,
THEN direct an operator to close HV-3-3-56, "Charging Wtr Hdr Blk Vv to Hydraulic Control Units", located at Reactor Building 135'.

NOTES

1. The CRD System is now delivering maximum flow to the RPV. The expected flow is:

   - 212 gpm at 1000 psig RPV pressure
   - 300 gpm at 0 psig RPV pressure

2. With high flow through the CRD system, all CRDs may be driven to the insert overtravel position. Therefore, a green double dash (--) indication on the Full Core Display should be considered normal during execution of this procedure.

3. Any rods not fully inserted may drift into the core.

5.0 RETURN TO NORMAL

5.1 IF HV-3-3-56 was closed in Step 4.13
AND
HV-3-3-56 is not required to be closed by a TRIP or SAMP procedure,
THEN direct a floor operator to open HV-3-3-56, located at Reactor Building 135'.
Otherwise, mark this step N/A.

Performer Initials/Date   I.V. Initials/Date

5.2 IF BOTH CRD pumps are operating,
THEN shut down one CRD pump and close HV-3-3-36A(B), "Inner Disch Block Vv from CRD Drive Water Pump 3AP039 (3BP039)".

Performer Initials/Date   I.V. Initials/Date

5.3 Adjust the CRD flow valve controller FIC-3-03-301 to obtain 55 - 65 gpm CRD System Flow on FI-3-03-310 or as required to maintain the desired RPV level.

Performer Initials/Date   I.V. Initials/Date

5.4 Direct an operator to remove one Drive Water Filter from service by performing the following:

5.4.1 Close HV-3-3-43A(B), "CRDHS Outlet Block Valve from Drive Water Filter 3AF013 (3BF013)."

Performer Initials/Date   I.V. Initials/Date

5.4.2 Close HV-3-3-42A(B), "CRDHS Inlet Block Valve to Drive Water Filter 3AF013 (3BF013)."

Performer Initials/Date I.V. Initials/Date

5.5 Direct an operator to close HV-3-3-129, "CRDHS Bypass Valve for Pump Suction Filter."

Performer Initials/Date I.V. Initials/Date

5.6 In the MCR, adjust the CRD flow controller to a null deviation and transfer to "AUTO."

Performer Initials/Date I.V. Initials/Date

5.7 Throttle MO-3-03-020, "Drive Wtr Press" to obtain 260 - 280 psid on DPI-3-03-303.

Performer Initials/Date I.V. Initials/Date

5.8 Check Cooling Water Header dP is 15 - 25 psid on DPI-3-03-304, or as required to maintain the desired RPV level.

Performer Initials/Date I.V. Initials/Date

5.9 Throttle HV-3-3-170, "Inlet Valve to Drive Water Filters" as necessary to reduce Charging Water pressure to below 1510 psig on PI-3-03-302.

Performer Initials/Date I.V. Initials/Date

5.10 Check drive water flow is 0 gpm on FI-3-03-305.

Performer Initials/Date I.V. Initials/Date

5.11 Check that Cooling Water Flow is 55 - 65 gpm on FI-3-03-306 or as required to maintain the desired RPV level.

Performer Initials/Date I.V. Initials/Date

5.12 <u>IF</u> desired,
<u>THEN</u> restore Reactor Recirc Pumps seal purge using SO 2A.1.C-3, "Operation of the Recirculation Pump Seal Purge System".

Performer Initials/Date I.V. Initials/Date

5.13 Inform Shift Management upon completion of this procedure.

_________________________ _________________________
Performer Initials/Date I.V. Initials/Date

6.0 REFERENCES

6.1 P&ID M-356, "Control Rod Drive Hydraulic System - Part A"

6.2 P&ID M-357, "Control Rod Drive Hydraulic System - Part B"

6.3 P&ID M-309, "Condensate & Refueling Water Storage & Transfer Systems"

6.4 E-186, "Control Rod Drive Wtr Pp 4.16KV Ckt Bkr"

6.5 GEK-9684, "Control Rod Drive System"

6.6 SIL-200, "Increasing CRD System Flow to the RPV After Shutdown During Emergency Situations"

POSITION TITLE: Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2390110401 / PLOR-313PA K/A: 239001G.09

RO: SRO:

TASK DESCRIPTION: CLOSING A STUCK OPEN MSIV - ALTERNATE PATH (UNIT 3)

A. NOTES TO EVALUATOR:

1. An asterisk (*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.

2. System cues included in the performance checklist are to be provided to the examinee when no system response is available.

3. JPM Performance

   a. "Control Room" JPMs are designed to be performed in the simulator. If a "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).

   b. When performing "In-Plant" JPMs, no equipment will be operated without Shift Management approval.

4. Satisfactory performance of this JPM is accomplished if:

   a. The task standard is met.

   b. JPM completion time requirement is met.

      1) For non-time critical JPMs, completion within double the estimated time (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.

      2) For time critical JPMs, completion within the estimated time (listed in paragraph D.2) is required.

5. The estimated time to complete this JPM, though listed in the task standard, is not to be given to the examinee.

B. TOOLS AND EQUIPMENT

Fuse Pullers

C. REFERENCES

AO 1A.2-3, Rev. 4, "Closing a Stuck Open Outboard Main Steam Isolation Valve"

D. TASK STANDARD

1. Satisfactory task completion is indicated when the Unit 3 Reactor Building 135' Elevation Instrument Air headers have been vented.

2. Estimated time to complete: 22 minutes Non-Time Critical

E. DIRECTIONS TO EXAMINEE

When given the initiating cue, perform necessary steps to close the stuck open outboard MSIVs using AO 1A.2-3, "Closing a Stuck Open Outboard Main Steam Isolation Valve". I will describe initial plant conditions and provide you access to the materials required to complete this task.

F. TASK CONDITIONS/PREREQUISITES

1. Unit 3 has just been manually scrammed.

2. RPV level is -175 inches.

3. All outboard MSIVs failed to isolate.

4. Proper operation of SGIG system has been verified in accordance with SO 16B.8.A-3, "Backup Seismic Instrument Nitrogen System Routine Inspection".

5. Radiological conditions do NOT allow entry into the Outboard MSIV Room.

G. INITIATING CUE

The Control Room Supervisor directs you to close the Unit 3 outboard MSIVs in accordance with AO 1A.2-3, "Closing a Stuck Open Outboard Main Steam Isolation Valve", beginning with step 4.1.

H. PERFORMANCE CHECKLIST

STEP NO	STEP	ACT	STANDARD
1	Obtain a copy of procedure AO 1A.2-3.	P	A copy of procedure AO 1A.2-3 is obtained.
	**** NOTE **** Examinee should utilize sections 4.1 AND 4.3 of AO 1A.2-3.		
2	Open panel 30C042 front panel doors. (Cue: Panel 30C042 doors are open.)	P	Door handle turned, doors pulled outward to gain access to the outboard MSIV AC and DC solenoid valve fuses at the front of panel 30C042 in the Cable Spreading Room.
3	Pull the outboard MSIV AC solenoid valve fuse 16A-F12B. (Cue: Fuse is removed.)	S	Fuse puller is attached to outboard MSIV AC solenoid valve fuse 16A-F12B fuse if pulled outward until fuse is free of fuse holder.
4	Direct the Unit Reactor Operator to monitor outboard MSIV position indication. (Cue: Outboard MSIVs are open.)	S	Unit Reactor Operator is contacted to monitor outboard MSIV position indication.
5	Pull the outboard MSIV DC solenoid valve fuse 16A-F11B. (Cue: Fuse is removed.)	S	Fuse puller is attached to outboard MSIV DC solenoid valve fuse 16A-F11B. Fuse is pulled outward until fuse is free of fuse holder.
6	Direct the Unit Reactor Operator to monitor Main Steam line flow using FI-3-06-088A,B,C,D on panel 30C008A. (Cue: Main Steam line FI-3-06-088A,B,C,D are NOT reading downscale. Position indication for all outboard MSIVs has been lost.)	S	Unit Reactor Operator is contacted to monitor Main Steam line flow on FI-3-06-088A,B,C,D at panel 30C008A.
7	Install fuse 16A-F11B. (Cue: Fuse is installed.)	S	Fuse puller is attached to outboard MSIV DC solenoid valve fuse 16A-F11B. Fuse is inserted until fuse is installed in fuse holder.
8	Close panel 30C042 front panel doors. (Cue: Panel 30C042 doors are closed.)	P	Door closed and relatched using handle.
9	Direct the Unit Reactor Operator to verify RWCU isolation. (Cue: RWCU is isolated.)	S	Unit Reactor Operator is contacted to verify RWCU isolation.

STEP NO	STEP	ACT	STANDARD
10	Direct the Unit Reactor Operator to open Backup N_2 to ADS valves SV-9130A(B) in accordance with SO 16A.7.A-3. (Cue: SV-9130A(B) are open.)	S	Unit Reactor Operator is contacted to verify Backup N_2 to ADS valves SV-9130A(B) in accordance with SO 16A.7.A-3.
*11	Close Instrument Air A(B) Header Isolation valves HV-3-36B-56981A AND HV-3-36B-56981B. (Cue: The valve handwheels have been turned clockwise until they will turn no further.)	S	HV-3-36B-56981A and HV-3-36B-56981B handwheels turned clockwise until the resistance of the valve seats are felt at the 3B Recirc MG Set area.
12	Verify open Instrument Air Supply to DT-5695 Inlet Block valve HV-3-36B-54642. (Cue: The valve handwheel is turned slightly in the clockwise direction and then turned counterclockwise to the original position.	S	An attempt is made to turn HV-3-36B-54642 handwheel is turned slightly in the clockwise direction and then turned counterclockwise to the original position at the 3B Recirc MG Set area.
13	Verify open Instrument Air Supply to DT-5696 inlet block valve HV-3-36B-54643. (Cue: The valve handwheel is turned slightly in the clockwise direction and then turned counterclockwise to the original position.	S	An attempt is made to turn HV-3-363-54643 handwheel is turned slightly in the clockwise direction and then turned counterclockwise to the original position at the 3B Recirc MG Set area.
14	Notify the Control Room that venting is commencing and to perform more frequent monitoring of MSIV position. (Cue: Control Room acknowledges notification.)	S	Unit Reactor Operator is contacted and notified of venting and MSIV position monitoring.
*15	Simultaneously press and hold Drain Trap Bypass switches HS-3-36B-5695 AND HS-3-36B-5696. (Cue: HS-3-36B-5695 AND HS-3-36B-5696 are simultaneously depressed and held.)	S	Drain Trap Bypass pushbuttons HS-3-36B-5695 AND HS-3-36B-5696 are simultaneously depressed and held at the 3B Recirc MG Set area.
18	Inform Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report. Outboard MSIVs are closed.)	S	Task completion reported using telephone, hand held radio or GAI-TRONICS page system.

Under "ACT" P - must perform
S - must simulate

I. TERMINATING CUE

When the Unit 3 outboard MSIVs are closed, the Control Room Supervisor should be informed. The evaluator will then terminate the exercise.

TASK CONDITIONS/PREREQUISITES

1. Unit 3 has just been manually scrammed.

2. RPV level is -175 inches.

3. All outboard MSIVs failed to isolate.

4. Proper operation of SGIG system has been verified in accordance with SO 16B.8.A-3, "Backup Seismic Instrument Nitrogen System Routine Inspection".

5. Radiological conditions do NOT allow entry into the Outboard MSIV Room.

INITIATING CUE

The Control Room Supervisor directs you to close the Unit 3 outboard MSIVs in accordance with AO 1A.2-3, "Closing a Stuck Open Outboard Main Steam Isolation Valve", beginning with step 4.1.

PECO Energy Company
Peach Bottom Unit 3

AO 1A.2-3 CLOSING A STUCK OPEN OUTBOARD MAIN STEAM ISOLATION VALVE

1.0 PURPOSE

This procedure provides the instructions necessary for closing a stuck open outboard Main Steam Isolation Valve (MSIV) following a Group I isolation.

2.0 PREREQUISITES

2.1 Shift Management's permission to perform this procedure.

2.2 Group I isolation signal OR plant conditions warranting isolation of the main steam lines present.

2.3 Mode switch in shutdown.

3.0 PRECAUTIONS

3.1 During performance of this procedure, the Instrument Air Header for Unit 3 Reactor Building elevation 135' may be vented. Attachment 1 provides a list of equipment that will be effected. Reference ON-119, "Loss of Instrument Air for effect on plant and operator response.

3.2 IF stuck open MSIV CLOSES during performance of this procedure, THEN place equipment in a safe condition AND inform Shift Management.

4.0 PERFORMANCE STEPS

NOTES

1. Communication should be established between the Control Room AND personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation OR alarms.
2. Section 4.1: Attempts to close the stuck open MSIV by removing power to the control logic. This section is preferred to section 4.2 or 4.3.
3. Section 4.2: Attempts to close the stuck open MSIV by removing air to the Outboard MSIV header. This section is only used as radiological conditions permit.
4. Section 4.3: Attempts to close the stuck open MSIV by removing air to the 135' Rx Bldg header.

4.1 Perform steps 4.1.1 through 4.1.5 to remove power to the outboard MSIV (AO-3-01A-086A(B,C,D) AC and DC solenoid valves.

4.1.1 Direct an operator to remove power to the outboard MSIV AC solenoid valves by removing fuse 16A-F12B in panel 30C042.

4.1.2 Monitor outboard MSIV position indication to determine if stuck open MSIV has closed.

NOTE

Removing DC power from the MSIV control logic will result in loss of position indication for all outboard MSIVs. MSIV closure shall be verified by observing main steam line flow.

4.1.3 Direct an operator to remove power to the outboard MSIV DC solenoid valves by removing fuse 16A-F11B in panel 30C042.

4.1.4 Monitor main steam line flow using FI-3-06-088A(B,C,D) on 30C008A to determine if stuck open MSIV has closed.

4.1.5 IF MSIV does not indicate closed THEN direct an operator to restore power to the outboard MSIV DC solenoid valves and valve indication lights by installing fuse 16A-F11B in panel 30C042.

NOTE

Section 4.2 shall only be used if radiological conditions permit access to the Unit 3 OBMSIV room.

4.2 IF radiological conditions permit access to the Unit 3 OBMSIV room, THEN perform steps 4.2.1 through 4.2.4 to remove instrument air to the Outboard MSIV header, otherwise go to section 4.3.

<AT R3-81, RX BLDG NE GEN AREA - 135' ELEV>

4.2.1 Close HV-3-36B-56913A, "Instr Air A Hdr Isol Valve for Outboard MSIV Room".

4.2.2 Close HV-3-36B-56913B, "Instr Air B Hdr Isol Valve for Outboard MSIV Room".

<AT R3-30, OUTBOARD MSIV ROOM>

4.2.3 Uncap and Open HV-3-36B-56919A, "Instr Air A Hdr Isol Valve for Future Header Extension".

4.2.4 Uncap and Open HV-3-36B-56919B, "Instr Air B Hdr Isol Valve for Future Header Extension".

****
CAUTION

Venting the MSIV headers will impact the ability to reset the Scram per T-216-3.
****

4.3 Perform steps 4.3.1 through 4.3.6 to remove instrument air to the Unit 3 Reactor Building elevation 135' header.

NOTE

The following major equipment will be lost due to isolation and venting of the Instrument Air Header for Unit 3 Reactor Building elevation 135':

- Instrument Air Backup to Instrument Nitrogen
- Drywell Instrument Nitrogen supply header
- RBCCW to RWCU Non-Regen Hx and Pump Seal Coolers
- Instrument Air supply to the large Primary Containment Ventilation Isolation Valves
- Control Rod Drive Hydraulic System Flow

Attachment 1 contains more detail on effected equipment

4.3.1 Isolate/Verify Isolation of Reactor Water Cleanup System.

4.3.2 Open SV-3-16A-9130A(B), "Backup Nitrogen to ADS A(B) Supply" in accordance with SO 16A.7.A-3, "Backup Instrument Nitrogen to ADS System Manual Actuation".

4.3.3 Verify proper operation of SGIG system in accordance with SO 16B.8.A-3, "Backup Seismic Instrument Nitrogen System Routine Inspection".

4.3.4 Direct an operator to vent the Instrument Air Header to Unit 3 Reactor Building elevation 135.

<AT T3-68, B RECIRC PUMP MG SET>

4.3.4.1 Close HV-3-36B-56981A, "Instr Air A Hdr Isol Valve for U/3 Rx Bldg El 135".

4.3.4.2 Close HV-3-36B-56981B, "Instr Air B Hdr Isol Valve for U/3 Rx Bldg El 135".

4.3.4.3 Verify open HV-3-36B-54642, "I/A Supply to Rx Bldg 135 DT-5695 Inlet Block Valve".

4.3.4.4 Verify open HV-3-36B-54643, "I/A Supply to Rx Bldg 135 DT-5696 Inlet Block Valve".

4.3.4.5 Notify Control Room that venting is commencing AND to perform more frequent monitoring of MSIV position.

CAUTION

Venting the MSIV headers will take a considerable amount of time due to check valves downstream of the vent path being used.

4.3.4.6 Simultaneously Press and Hold HS-3-36B-5695, "By-Pass Hand Switch for Drain Trap DT-5695" and HS-3-36B-5696, "By-Pass Hand Switch for Drain Trap DT-5696".

4.3.5 Monitor outboard MSIV position indication and Main Steam Line Flow to determine if stuck open MSIV has closed.

4.3.6 WHEN all outboard MSIVs indicate closed, THEN direct operator to release HS-3-36B-5695 and HS-3-36B-5696.

NOTE

All restoration steps require Double/Independent Verification. Signoffs for restoration steps are in Attachment 2.

4.4 WHEN restoration is desired, THEN perform the following in conjunction with Attachment 2:

4.4.1 Obtain Shift Management permission to perform restoration.

4.4.2 Obtain Unit 3 Reactor Operator permission to perform restoration.

4.4.3 IF Section 4.3 was performed, THEN perform steps 4.4.3.1 through 4.4.3.4 to restore instrument air to the Unit 3 Reactor Building elevation 135' header, OTHERWISE proceed to step 4.4.4.

<AT T3-68, B RECIRC PUMP MG SET>

4.4.3.1 Open HV-3-36B-56981A, "Inst Air A Hdr Isol Valve for U/3 Rx Bldg El 135".

4.4.3.2 Open HV-3-36B-56981B, "Inst Air B Hdr Isol Valve for U/3 Rx Bldg El 135".

4.4.3.3 Restore the Instrument Nitrogen system in accordance with SO 16.7.A-3 as directed by Shift Management.

4.4.3.4 Place Reactor Water Cleanup System in service in accordance with SO 12.1.A-3 as directed by Shift Management.

4.4.4 <u>IF</u> Section 4.2 was performed, <u>THEN</u> perform steps 4.4.4.1 through 4.4.4.4 to restore instrument air to the Outboard MSIV header, <u>OTHERWISE</u> proceed to step 4.4.5.

<AT R3-30, OUTBOARD MSIV ROOM>

4.4.4.1 Close <u>AND</u> Cap HV-3-36B-56919A, "Instr Air A Hdr Isol Valve for Future Header Extension".

4.4.4.2 Close <u>AND</u> Cap HV-3-36B-56919B, "Instr Air B Hdr Isol Valve for Future Header Extension".

<AT R3-81, RX BLDG NE GEN AREA - 135' ELEV>

4.4.4.3 Open HV-3-36B-56913A, "Instr Air A Hdr Isol Valve for Outboard MSIV Room".

4.4.4.4 Open HV-3-36B-56913B, "Instr Air B Hdr Isol Valve for Outboard MSIV Room ".

4.4.5 <u>IF</u> Section 4.1 was performed, <u>THEN</u> perform steps 4.4.5.1 <u>AND</u> 4.4.5.2 to restore power to the Outboard MSIV (AO-3-01A-086A(B,C,D) AC and DC solenoid valves.

4.4.5.1 Install (<u>OR</u> Verify installed) fuse 16A-F11B in panel 30C042.

4.4.5.2 Install fuse 16A-F12B in panel 30C042.

5.0 <u>CONTROL STATIONS</u>

5.1 30C003-01

5.2 30C005A

5.3 30C008

6.0 REFERENCES

6.1 M-351, Sheet 3 and 4

6.2 M-320, Sheet 35

6.3 M-1-S-23, Sheet 45

7.0 TECHNICAL SPECIFICATION

7.1 Section 3.6.1.3, 3.6.1.5, 3.6.3.1

8.0 INTERFACING PROCEDURES

8.1 ON-119, "Loss of Instrument Air"

8.2 SO 12.1.A-3, "Reactor Water Cleanup System Startup For Normal Operations Or Reactor Vessel Level Control"

8.3 SO 16.7.A-3, "Instrument Nitrogen System Restoration Following Primary Containment Isolation"

8.4 SO 16A.7.A-3, "Backup Instrument Nitrogen to ADS System Manual Actuation"

8.5 SO 16B.8.A-3, "Backup Seismic Instrument Nitrogen System Routine Inspection"

ATTACHMENT 1

EQUIPMENT EFFECTED BY LOSS OF INSTRUMENT AIR HEADER 135 RX BLDG

VALVE	DESCRIPTION	NORMAL POSITION	FAILURE MODE
AO-3-01A-086A	A Main Steam Line Outboard Isolation Valve	OPEN	CLOSED
AO-3-01A-086B	B Main Steam Line Outboard Isolation Valve	OPEN	CLOSED
AO-3-01A-086C	C Main Steam Line Outboard Isolation Valve	OPEN	CLOSED
AO-3-01A-086D	D Main Steam Line Outboard Isolation Valve	OPEN	CLOSED
TIC-3535A(B)	M/G Lube Oil Cooler Outlet Temp	THROTTLED	OPEN
AO-3-03-019A	Control Rod Drive Hydraulic System Flow Control A	OPEN	CLOSED
AO-3-03-019B	Control Rod Drive Hydraulic System Flow Control B	OPEN	CLOSED
CV-3-07B-3515	N2 Purge to Drywell and Torus	CLOSED	CLOSED
AO-3-07B-3519	Drywell and Torus Inlet N2 Purge Isol Valve	CLOSED	CLOSED
AO-3-07B-3523	Drywell + Torus N2 Make-up Inlet Isol Valve	CLOSED	CLOSED
AO-3-07B-3521A	Torus Air Purge Outboard Isolation Valve	CLOSED	CLOSED
AO-3-07B-3521B	Torus Air and N2 Purge Outboard Isol Valve	CLOSED	CLOSED
AO-3-07B-3520	Drywell Air and Nitrogen Purge Isol Valve	CLOSED	CLOSED
AO-3-07B-3505	Drywell Air Purge Inlet Isolation Valve	CLOSED	CLOSED
AO-3-13-022	RCIC Discharge Check Valve	N/A	N/A
AO-3-16-3969A(B)	A(B) DW Inst N2 Hdr Isol Valve to A(B) Hdr	OPEN	CLOSED
AO-3-23-018	HPCI Discharge Check Valve	N/A	N/A
AO-3-35-9154A	RBCW Backup to DWCW Clrs Inlet Vv B Loop	CLOSED	OPEN
AO-3-35-9154B	RBCW Backup from DWCW Clrs Outlet Vv B Loop	CLOSED	OPEN
AO-3-35-9155A	RBCW Backup to DWCW Clrs Inlet Vv A Loop	CLOSED	OPEN
AO-3-35-9155B	RBCW Backup from DWCW Clrs Outlet Vv A Loop	CLOSED	OPEN
AO-3-35-3253	RBCW Isol to Non Regen Hx + Pp Seal Clrs	OPEN	CLOSED
AO-3-36B-5230A(B)	Instrument Air Backup to A(B) Inst N2 Hdr	CLOSED	CLOSED
	Backup Inst Air to DW Inst N2 Hdr A(B)	N/A	N/A
	TIP Drive Mechanisms	N/A	N/A

ATTACHMENT 2

RESTORATION VERIFICATION

This attachment provides signoffs of procedure steps AND shall be forwarded to Nuclear Records Management System at the completion of this procedure.

4.4.1 Shift Management permission to perform restoration.

____
Shift Management/Date/Time

4.4.2 Unit 2 Reactor Operator permission to perform restoration.

____
Unit 2 Reactor Operator/Date/Time

4.4.3.1 Open HV-3-36B-56981A. ________

________ IV

4.4.3.2 Open HV-3-36B-56981B. ________

________ IV

4.4.3.3 Instrument Nitrogen system restored in accordance with SO 16.7.A-3 as directed by Shift Management (N/A if NOT performed). ________

________ IV

4.4.3.4 Reactor Water Cleanup system restored in accordance with SO 12.1.A-3 as directed by Shift Management (N/A if NOT performed). ________

________ IV

4.4.4.1 Close AND Cap HV-3-36B-56919A. ________

________ IV

4.4.4.2 Close AND Cap HV-3-36B-56919B. ________

________ IV

4.4.4.3 Open HV-3-36B-56913A. ________

________ IV

ATTACHMENT 2 (Continued)

4.4.4.4 Open HV-3-36B-56913B. ________

____
IV

4.4.5.1 Install (OR Verify installed) fuse 16A-F11B in panel 30C042. ________

____
IV

4.4.5.2 Install fuse 16A-F12B in panel 30C042. ________

____
IV