# 12/31/99

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

FROM:  $\sqrt{\frac{1}{12}} \frac{\sqrt{12}}{100} \frac{\sqrt{10}}{100} \frac{\sqrt{10}}{1$ 

SUBJECT: OPERATOR LICENSING EXAMINATION ADMINISTERED ON Sep 13, 14-16, 1898, AT Perch Botton Units 2+3 DOCKET NO. 50-277 +278

ON  $S_{20}$  13, 14-16, 1955 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.
  - 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 O.T. Dines

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ES-301		Administrative Topics Outline	Form ES-301-1					
A	y: <u>Peach Bottom U</u> ination Level (circle							
Topic/Subject		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-maintenar component.	nce testing of a					
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     Direct an evacuation for a declared emergency.       Communica-     tions –       Evacuation JPM     Evacuation JPM							

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Administrative Topics Outline

Form ES-301-1

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 recommenda- tions – PAR JPM	Given General Emergency plant conditions, make a protective action recommendation (PAR).					

# ES-301 Control Room Systems and Facility Walk-Through Test Outline

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Facility: Peach Bottom Units 2 & 3       Date of Examination: Sep. 13, 1999         Exam Level (circle one): ROY 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 <sub>2</sub> /Backup Instrument Nitrogen to ADS	D, P, R 054P	8					
<ul> <li>Injection Systems/Maximizing CRD Flow to the Vessel (Unit 3)</li> </ul>	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)Iternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA							

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<b>B</b> .1	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	2 Facility Walk-Through		
a.	Instrument N <sub>2</sub> /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

Scenario Outline

ES-D-1							
Simulat	ion Facility Peach	Bottom	1	Scenario No.	#1	Op Test No.	
Examin	ers				Operators		CRS
							PRO
							URO
Objectiv	ves Evaluate the	ability o	f the cre	w to swap Steam	Jet Air Ejecto	ors while maintaining vacuu	m requiring
Initial Co Turnove	control rod wi Tech Spec de response to t procedure dir will result in a Procedure to manual SCR/ ATWS. Six ro the break will continue to di use of contain must termina 281 F, due to	ithdraw etermina he "F" S rected e rise in attemp AM. Two ods will cause egrade nment s te and p the AT 100% p	block du ation. Fo SRV failir fforts to drywell p t to ident velve cor be able the leak requiring prays who prevent a WS. ower wit	te to an INOP fail blowing the Tech ing open. The cre close the SRV pressure. The cre ify and isolate the atrol rods will fail to to be inserted usi to increase result use of containm hen they are atter all injection per T-	ure of the "B" Spec determ w will perform A small leak ti ew will take ac e leak but will o insert when ng T-220 but ing in contain ent sprays. P mpted. As co 240 prior to p	d recognize and respond to Rod Block Monitor (RBM) r ination, the crew will be evan a Rapid Power Reduction hat develops on the SRV m ction per the Drywell High P eventually be required to in a the scram is initiated result an ATWS will still exist. Ste ment pressure and temperat ressure instrument failures ontainment temperature rise erforming the Emergency B	equiring a luated in their as part of their ounting boss ressure itiate a ting in an eam cutting at ature to will prevent s the crew
Event No.	Malfunction No.	1	/ent /pe*			Event Description	
1	<u></u>	N	PRO CRS	Place "B" SJAE	in service, re	move "A" SJAE from servic	е.
2	RBM03B	1	URO CRS	"B" Rod Block N	Aonitor failure	(Tech Spec)	
3	MSS08F	с	URO PRO CRS	"F" Safety Relie	f Valve fails c	ppen	
4		R	URO PRO CRS	Rapid power re	duction.		
5	MSS01	М	URO PRO CRS		•	(small progressing to large l	
6	Pre-inserted Control Rod Malfunctions	с	URO PRO CRS	Twelve control (ATWS)	rods will fail to	o insert or will insert slowly o	Juring SCRAM
7	Pre-inserted Instrument Failure		URO PRO CRS	Pressure instru	ment failure p	prevents using containment	sprays.

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

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	Outline	

ES-D-1							
Simulat	ion Facility Peach	Bottom		Scenario No.	#2	Op Test No.	
Examin	ers				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 inoperability. 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. When ARI is initiated in an attempt to insert control ords, 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 controling 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 C	ondition IC-14 1	00% p	ower				
Turnov	er: See Attached '	"Shift T	urnover"	Sheet			
Event No.	Malfunction No.	1	vent ype*	· · · · · · · · · · · · · · · · · · ·		Event Description	
1		N	URO CRS	Swap CRD Pu	mps	·····	
2	CRH041847	с	URO CRS	Control Rod 1	3-47 Drifts into	the Core	
3		R	URO PRO CRS	Fast Power Re	eduction		
4	BATCH FILE RCIC_ISOLATION	1	PRO CRS	RCIC Isolation			
5	CAR01 50	м	URO PRO CRS	Main Condens	er Air Inleakaç	je	

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

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

# Scenario Outline

Simula	tion Facility Peac	h Bottom		Scenario No.	#3	Op Test No.	· · · · · · · · · · · · · · · · · · ·
Examin	iers				Operators		CRS
	<u></u>						PRO
							URO
ObjectivesEvaluate 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 shur 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 TurnoverIC-14, reduced to 85% power with the "A" RBCCW Pump Blocked For Motor Replacement See Attached "Shift Turnover" Sheet							
Event	Malfunction	Eve				Event	
No.	No.	Тур	e*	Description			
1		N	URO PRO CRS			the Alternate Power Supply	
2	Override		URO PRO CRS	Drywell Pressur Without Giving t		r Failure RPS Trip (Tech Spec)	
3	MSS06G	CI	URO PRO CRS	Inboard MSIV F	ails Closed		
4		RI	URO PRO CRS	Fast Power Red	luction with C	Control Rods	
5	MSS03	M	URO PRO CRS	Steam Leak In T	նիe Steam Tւ	unnel (Inside Secondary Co	ntainment)
6	Override		URO PRO CRS	Group I Fails To	Auto Isolate	Due to Failed Temperature	e Instruments
7	Override		URO PRO CRS	Failure Of The I	nboard "C" M	ISIV To Manually Isolate	
8	MSS08C		PRO CRS	"C" ADS SRV F	ails to Open I	During Manual Blowdown	

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

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Scenario Outline

ES-D-	1							
Simula	tion Facili	y Peacl	n Bottom	1	Scenario No.	#4	Op Test No.	<u> </u>
Examin	iers					Operators		CRS
		. <u></u>						PRO
								URO
Objecti Initial C Turnov	Turk Fee crev crev mag failu term crev RP\	bine Stop dwater H v should v should nitude, ti re will re- inate the v should v via alter	Valve F leaters r recogniz diagnos he crew quire the ATWS utilize th rnate de reduced	Routine <sup>-</sup> requiring ze and re e a stea should r e crew to A man re TRIP pressuri	Test while at pow the crew to ente espond to the fail m leak in the Tur recognize the new o use the manual ual Group I isolat procedures to de zation methods.	rer. Evaluate f r and execute ure of an RPS bine Building a ed to shutdow pushbuttons of tion will be req termine the ne	g power changes and to per the crew's response to the l the positive reactivity proce S Low Vacuum Pressure Tra and when the steam leak gr n the plant. A Reactor Mod or Alternate Rod Insertion (/ juired due to the isolation fa eed for an Emergency Blow p Blocked For Motor Replace	oss of edure. The ansmitter. The rows in e Switch ARI) to ilure. The down of the
Event	Malfur	ction	Ev	vent			Event	·····
No.	N	<b>D.</b>	Ту	pe*			Description	
1			N	URO PRO CRS	Perform the Ma	ain Turbine Sto	op Valve Routine Test	
2			R	URO PRO CRS	Raise Power w	ith Control Ro	ds	
3	Over	ride	с	URO PRO CRS	Loss Of Extrac	tion Steam To	Feedwater Heaters	
4	Over	ride	I	URO PRO CRS	Failure of a Vac	cuum Transmi	tter (Tech Spec)	
5	MSS		М	URO PRO CRS	Steam Leak In			
6	PCI Over		С	URO PRO CRS	Group I Failure MSL To Manua		te (Manual works)/Failure C	Of The "D"
7	Over		I	URO PRO CRS			ode Switch/B RPS Auto Ch	,
8	Ovei MSS		С	URO PRO CRS			litrogen/Only 2 SRVs Opera ssurization Via Alternate M	

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

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		<u> </u>	<u></u>	Scenario	Outline		
Simulat Facility:		n Bottor	n	Scenario No.:	#5	Op Test No.:	
Examin	ers				Operators	CRS	
						URO	
				<u> </u>		PRO	
During the power ascension reactivity addition. Evaluate Pump Speed. The crew sh a manual trip. The recirc pu drywell. The main generate				a recirc pump wil ne crew's respon- uld recognize the np discharge valv will fail to lockout y to spray the dry	I runaway red se to the Tecl Recirc Pump re will fail to c when the tur well with the	d perform a normal power ascension. quiring the crew to take action for positive h Spec implications of mismatched Recirc high vibration and seal failures requiring lose resulting in an unisolable leak in the bine is tripped requiring manual operator other loop when the first is not available.	
Initial	IC-20	75% pc	wer with	the "B" RHR Pur	np Blocked F	or Motor Replacement	
Conditio	ons						
Turnove	er See Attached	"Shift T	urnover"	Sheet			
Event No.	Malf. No.		vent /pe*	Event Description			
INU.	ino.	· · · · · ·	URO			Description	
1		N	PRO CRS	Place the "A" R	eactor Feed F	Pump in service	
2		R	URO PRO CRS	Continue Powe	r Ascension I	AW GP-2	
3	RFC01A	1	URO PRO CRS	Recirc Pump R	unaway (inclu	ides Tech Spec for mismatched flows)	
4	RRS11A	С	URO PRO CRS	Recirc Pump Hi	gh Vibration I	Requiring Manual Trip	
5	RRS13A/ RRS14A	С	URO PRO	"A" Recirc Pum	o Seals both	fail	
			CRS URO				
6	VED01_74	С	PRO CRS	Recirc Pump Di	scharge Valv	e Trips on Overcurrent	
7	RRS20	м	URO PRO CRS	Small Recirc Lir To Drywell Spra		CA Inside Primary Containment Leading	
8	MGA01		PRO CRS	Main Generator	Fails to Lock	Cout Automatically	
9	Override	с	PRO CRS	CTMT Spray O	verride 2/3 Co	ore Coverage Switch failure (one loop)	

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#### **ES-401**

12.24

# **BWR RO Examination Outline**

#### Facility: Peach Bottom Atomic Power Station

Form ES-401-2

Exam Date:	09/13/1999					

Exam Level: RO

					K	K/A Ca	itegory	Points					-
Tier	Group	K1	K2	К3	K4	K5	K6	Al	A2	A3	A4	G	Point Total
1.	1	2	3	2				3	1			2	13
Emergency &	2	3	4	3	d series and			4	3			2	19
Abnormal Plant Evolutions	3	1	0	0				0	1			2	4
	Totals Tier	6	7	5				7	5			6	36
	1	3	2	1	4	3	3	1	3	3	4	1	28
2. Plant	2	1	2	2	2	2	2	2	2	2	1	1	19
Systems	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. Generi	ic Knowl	edge Ar	ıd Abiliti	ies	Ca	t 1	Ca	t 2	Ca	t 3	C	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.

Printed:	96/24 פראיייי

ES - 401	Emer	gency	/ and	Abn	orm	al Pla	nt ]	Evolutions - Tier 1 / Group 1	Form	ES-401-2
E/APE #	E/APE Name / Safety Function	KI	К2	К3	A1	A2	G	КА Торіс	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

Facility: Peal Bottom Atomic Power Stat

ES - 401	Em	ergency	and	Abn	orm	al Pl	ant	Evolutions - Tier 1 / Group 2	Form	ES-401-2
E/APE #	E/APE Name / Safety Function	КІ	К2	КЗ	A1	A2	G	КА Торіс	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
29500 <b>8</b>	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	Emer	gency	and	Abn	orm	al Pla	ant	Evolutions - Tier 1 / Group 2	Form	ES-401-2
E/APE #	E/APE Name / Safety Function	кі	К2	КЗ	AI	A2	G	КА Торіс	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

ES - 401	Eme	rgency	and	Abn	orm	al Pla	ant	Evolutions - Tier 1 / Group 3	Form	ES-401-2
E/APE #	E/APE Name / Safety Function	кі	К2	КЗ	A1	A2	G	КА Торіс	Imp.	Points
295021	Loss of Shutdown Cooling / 4	x						AK1.01 - Decay heat	3.6	l
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	T		<b>.</b>	<b>.</b>		·• · · · -	F	lant	Syst	ems -	Tier	r 2 /	Group 1	Form	ES-401-2
Sys/Ev #	System / Evolution Name	КІ	К2	КЗ	К4	К5	K6	Al	A2	A3	A4	G	КА Торіс	Imp.	Points
201001	Control Rod Drive Hydraulic System /		x										K2.03 - Backup SCRAM valve solenoids	3.5*	1
201001	Control Rod Drive Hydraulic System /											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					ļ						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/LPC1: 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

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ES - 401	T	- <b>r</b>			<b>1</b>	· · · · · ·	F	Plant	Syste	ems -	Tier	2 /	Group 1	Form	ES-401-2
Sys/Ev #	System / Evolution Name	кі	К2	КЗ	К4	К5	K6	Al	A2	A3	A4	G	КА Торіс	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

ES - 401						-	P	lant	Syste	ems -	Tier	- 2 /	Group 1	Form	ES-401-2
Sys/Ev #	System / Evolution Name	кі	К2	КЗ	К4	К5	<b>K</b> 6	A1	A2	A3	A4	G	КА Торіс	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

ES - 401	······································	,			,      .	<b>.</b>	F	lant	Syst	ems -	Tier	2/	Group 2	Form	ES-401-2
Sys/Ev #	System / Evolution Name	кі	К2	КЗ	К4	К5	К6	A1	A2	A3	A4	G	КА Торіс	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

ES - 401	· · · · · · · · · · · · · · · · · · ·				. <u>.</u>		F	lant	Syste	ems -	Tier	2 /	Group 2	Form	ES-401-2
Sys/Ev #	System / Evolution Name	<u>кı</u>	К2	кз	К4	К5	К6	Al	A2	A3	A4	G	КА Торіс	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

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ES - 401	·····	. <u>.</u>	<b>.</b>	,	<u>_</u>		F	Plant	Syste	ems -	Tier	2 /	Group 3	Form	ES-401-2
Sys/Ev #	System / Evolution Name	К1	К2	КЗ	К4	К5	K6	AI	A2	A3	A4	G	КА Торіс	Imp.	Points
215001	Traversing In-Core Probe / 7				x								K4.01 - Primary containment isolation: Mark-1&11(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	КА Торіс	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
		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	
		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	2.9	1
		personnel exposure.		
	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

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### **ES-401**

# **BWR SRO Examination Outline**

Printed: 06/24/1999

#### Facility: Peach Bottom Atomic Power Station

Form ES-401-1

#### **Exam Date:** 09/13/1999

Exam Level: SRO

Tier	Group				K	C/A Ca	tegory	Points					Point
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Total
1.	1	3	5	3				5	3			7	26
Emergency & Abnormal	2	3	2	3				2	4			3	17
Plant Evolutions	Tier Totals	6	7	6				7	7			10	43
	]	2	]	2	2	2	3	1	3	3	2	2	23
2. Plant	2	1	2	1	1	1	0	1	l	1	0	4	13
Systems	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. Gener	ic Know	ledge At	nd Abilit	ies	Ca	t 1	Ca	it 2	Ca	t 3	C	Cat 4	
					2	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	E	mergency	and	Abn	orm	al Pla	ant	Evolutions - Tier 1 / Group 1	Form	ES-401-1
E/APE #	E/APE Name / Safety Function	К1	К2	КЗ	Al	A2	G	КА Торіс	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	Emer	gency	and	Abn	orm	al Pl	ant	Evolutions - Tier 1 / Group 1	Form ES-	
E/APE #	E/APE Name / Safety Function	кі	К2	КЗ	A1	A2	G	КА Торіс	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	 			ļ		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						$ _{\mathbf{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	Emer	gency	and	Evolutions - Tier 1 / Group 2	Form ES-					
E/APE #	E/APE Name / Safety Function	кі	К2	КЗ	A1	A2	G	KA Topic	Imp.	Points
295002	Loss of Main Condenser Vacuum / 3			<u> </u>	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	2	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													
E/APE #	E/APE Name / Safety Function	<u>K1</u>	К2	кз	Al	A2	G	КА Торіс	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

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## Facility: Peach Bottom Atomic Power Stat

ES - 401	<b>W</b>		<b>.</b>	•			P	lant	Syst	ems -	Tier	2/	Group 1	Form	ES-401-1
Sys/Ev #	System / Evolution Name	К1	К2	КЗ	К4	К5	K6	A1	A2	A3	A4	G	КА Торіс	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

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# Facility: Peach Bottom Atomic Power Stat

ES - 401				•			F	lant	Syste	ems -	Tier	• 2 /	Group 1	Form	ES-401-1
Sys/Ev #	System / Evolution Name	КІ	К2	К3	К4	К5	К6	Al	A2	A3	A4	G	КА Торіс	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					Group 1	Form ES-401-1									
Sys/Ev #	System / Evolution Name	к1	К2	КЗ	К4	К5	K6	Al	A2	A3	A4	G	КА Торіс	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 Pe	oint Total	: 23

# BWR SRO F<sup>++</sup> mination Outline

# Facility: Peach Bottom Atomic Power Stat

ES - 401	01 Plant Systems - Tier 2 / Group 2									Form ES-401-					
Sys/Ev #	System / Evolution Name	К1	К2	КЗ	К4	К5	К6	Al	A2	A3	A4	G	КА Торіс	Imp.	Points
201001	Control Rod Drive Hydraulic System /		x										K2.03 - Backup SCRAM valve solenoids	3.6*	1
201001	Control Rod Drive Hydraulic System /											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*	l
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	К1	К2	КЗ	К4	К5	K6	A1	A2	A3	A4	G	КА Торіс	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

ES - 401	Plant Systems - Tier 2 / Group 3												Form ES-401-1		
Sys/Ev #	System / Evolution Name	К1	К2	КЗ	К4	К5	K6	A1	A2	A3	A4	G	КА Торіс	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

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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. Knowledge of operator responsibilities during all modes of plant operation.	4.3 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

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
	2.2.13 2.2.29	<ul><li>2.2.13 Knowledge of tagging and clearance procedures.</li><li>2.2.29 Knowledge of SRO fuel handling responsibilities.</li></ul>	2.2.13Knowledge of tagging and clearance procedures.3.82.2.29Knowledge of SRO fuel handling responsibilities.3.8

#### 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

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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:	4.3	1
		1.Reactivity control		
		2.Core cooling and heat removal 3.Reactor coolant system integrity		
		4.Containment conditions		
		5.Radioactivity release control.		
	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

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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

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#### 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

		D	-	0 + - + -	م يد		
Simulati	ion Facility Peach	Botton	1	Scenario No.	#1	Op Test No.	
Examine	ers				Operators		CRS
	···						PRO
						······	URO
Objectiv	the manipul control rod w Tech Spec de response to t procedure dir will result in a Procedure to manual SCR, ATWS. Six m the break will continue to d use of contai	ation of ithdraw etermin he "F" s rected e a rise in attemp AM. Tw ods will cause egrade nment s te and	several a block du ation. Fo SRV failir efforts to drywell p ot to ident velve cor be able the leak requiring sprays wil prevent a	components. The le to an INOP fai ollowing the Tech og open. The cre close the SRV. pressure. The cr ify and isolate the strol rods will fail to be inserted us to increase resul g use of containment hen they are atte	e crew should lure of the "B" Spec determi ew will perform A small leak th rew will take ac e leak but will to insert when ing T-220 but a lting in contain nent sprays. Pr empted. As col	rs while maintaining va recognize and respon Rod Block Monitor (RE nation, the crew will be a Rapid Power Reduc nat develops on the SR tion per the Drywell Hi eventually be required the scram is initiated r an ATWS will still exist ment pressure and tem essure instrument failu- ntainment temperature erforming the Emerger	d to receipt of a BM) requiring a e evaluated in their ction as part of thei RV mounting boss gh Pressure to initiate a resulting in an . Steam cutting at nperature to ures will prevent e rises the crew
Initial Co	ondition IC-14,	100% p	ower wit	h the "A" RHR L	oop Blocked F	or MO-154A valve wo	rk.
Initial Co Turnove					oop Blocked F	or MO-154A valve wo	rk.
Turnove Event	er: See Attached Malfunction	"Shift T	urnover" vent		<u> </u>	Event	rk.
Turnove	er: See Attached	"Shift T	urnover"	Sheet			
Turnove Event No.	er: See Attached Malfunction	"Shift T E T	<sup>-</sup> urnover" vent ype* PRO	Sheet	E in service, re	Event Description move "A" SJAE from s	
Turnove Event No. 1	er: See Attached Malfunction No.	"Shift T E T	urnover" vent ype* PRO CRS URO	Sheet Place "B" SJAE	E in service, re Monitor failure	Event Description move "A" SJAE from so (Tech Spec)	
Turnove Event No. 1 2	er: See Attached Malfunction No. RBM03B	"Shift T E' T N	vent ype* PRO CRS URO CRS URO PRO	Sheet Place "B" SJAE "B" Rod Block	E in service, re Monitor failure ef Valve fails o	Event Description move "A" SJAE from so (Tech Spec)	
Turnove Event No. 1 2 3	er: See Attached Malfunction No. RBM03B	"Shift T E T N I C	urnover" vent ype* PRO CRS URO CRS URO PRO CRS URO PRO	Sheet Place "B" SJAE "B" Rod Block "F" Safety Relia Rapid power re Steam Leak In	E in service, re Monitor failure ef Valve fails o eduction. The Drywell, (	Event Description move "A" SJAE from so (Tech Spec) pen small progressing to la	ervice. arge leak).
Turnove Event No. 1 2 3 4	er: See Attached Malfunction No. RBM03B MSS08F	"Shift T E T N I C R	vent ype* PRO CRS URO CRS URO PRO CRS URO PRO CRS URO PRO CRS URO PRO	Sheet Place "B" SJAE "B" Rod Block "F" Safety Relia Rapid power re Steam Leak In	E in service, re Monitor failure ef Valve fails o eduction. The Drywell, (	Event Description move "A" SJAE from s (Tech Spec) pen	ervice. arge leak).

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ES-D-2

Op Test No.:Scenario No.:#1Event No.:1Page1 of 9

#### Event Description: SJAE Swap

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#### 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

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Op Test No	.: Scei	nario No.: #1 Event No.: 2 Page 2 of 9
Event Desci	ri <b>ption:</b> RBM	I 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"** Loss of Generator load, steam/feedwater mismatch, heat input to Effects: primary containment. Position **Applicant's Actions Or Behavior** Time URO Recognize/take action IAW 210 D-2 "SAFETY RELIEF VALVE PRO 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 è Direct attempts to close the open SRV Confirm that SRV "F" is open IAW OT-114 URO PRO 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) Coordinate removal of fuses by Equipment Operators and monitor URO valve status during attempts to close the SRV when directed by the PRO CRS. Recognize/take action IAW 226 A4 "TORUS WATER LEVEL OUT PRO OF NORMAL RANGE" Recognize entry condition to T-102 "Primary Containment Control". CRS Enter/direct actions IAW T-102 for Torus water level high.

ES-D-2

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**Op Test No.:** Scenario No.: #1 Event No.: 4 Page 4 of 9 **Event Description:** Fast Power Reduction Directed from OT-114, Inadvertent Opening of a Relief Valve Cause: **Automatic Actions:** None Time **Applicant's Actions Or Behavior** Position Direct a Fast Power Reduction until recirculation flow is reduced to CRS approximately 51.25 Mlbs/hr. Perform a Fast Power Reduction until recirculation flow is reduced URO 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.

#### ES-D-2

ES-D-2

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Op Test No	o.: Scer	nario No.: #1 Event No.: 5 Page 5 of 9
Event Desc	ription:	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"
<u>Effects</u> :		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	<ul> <li>Enter/direct follow up actions IAW OT-101:</li> <li>Direct Fast Power Reduction IAW GP-9-2 and transfer of house loads at drywell pressure of 1.5 psig and rising.</li> <li>Direct manual scram at drywell pressure of 1.7 psig and rising.</li> <li>Direct investigation into source of drywell leakage.</li> <li>Direct drywell venting.</li> <li>Direct isolation of potential leak sources.</li> </ul>
	URO	<ul> <li>Take Scram Actions when directed:</li> <li>Reduce reactor power IAW GP-9-2.</li> <li>Place the Mode Switch to Shutdown</li> <li>Verify Rods inserting</li> <li>Manually control the Reactor Feed Water System to control Reactor Level</li> <li>Verify APRMs are downscale</li> <li>Recognize that all rods did not insert, ATWS, (See Event 6)</li> <li>Report to the CRS</li> </ul>
СТ	URO	Recognize and report ATWS.

#### **Operator Actions** Scenario NO.: #1 Event No.: 5(cont.)

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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.
- Recognize drywell pressure/temperature are continuing to rise, URO
- PRO inform CRS.
- Recognize and report 2# Drywell T-101, T-102 entry conditions. URO PRO
- Verify and take action for 2# automatic initiations and isolations. URO
- (HPCI initiation, Diesel Generator auto start, Group II/III isolations) PRO

Enter/direct actions for T-101, RPV Control CRS 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

Enter/direct actions for T-102, Primary Containment Control CRS

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

**Operator Actions** 

ES-D-2

Op Test No.: Scenario No.: #1

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

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

#### Time Position Applicant's Actions Or Behavior

CRS

- Initiation of ARI
- Entry into T-117 "Level/Power Control"

Direct T-101 RC/Q ATWS actions:

- 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 Direct an EO to perform T-221.

PRO

**Op Test No.:** Page 8 of 9 Scenario No.: #1 Event No.: 7

Event Description: Inability to spray Continiment

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

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

#### Prevents containment spray. cts:

AL DECK

<u>Time</u>	Position	Applicant's Actions Or Behavior
СТ	PRO	<ul> <li>Initiate torus sprays when directed (crew may go directly to DW sprays)</li> <li>Place CTMT Spray Override 2/3 Core Coverage switch in "Manual Override"</li> <li>Place CTMT Spray Valve Control switch in "Manual" momentarily</li> <li>Secure one running RHR Pump (if two were running)</li> <li>Open MO-39B (if not open for torus cooling already)</li> <li>Throttle MO-34B to obtain 8000 gpm for Torus sprays, 9000 gpm for Drywell sprays.</li> <li>Recognize the inability to throttle MO-38B to obtain 9000 gpm or simultaneously throttle MO-26B and MO-31B.</li> <li>Recognize the lack of alarm 225 B-3 "SYSTEM II DRYWELL PRESSURE PERMIT CONTAINMENT SPRAY"</li> </ul>
	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	<ul> <li>Perform T-240 Termination and Prevention of Injection into the RPV for the following systems:</li> <li>HPCI</li> <li>Feedwater/Condensate</li> <li>Core Spray</li> <li>RHR</li> <li>ECCS Stayfull</li> <li>Inform the CRS when T-240 is completed.</li> </ul>

**Operator Actions** 

ES-D-2

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

E3-D-	I						
Simulat	ion Facility Peach	Bottom	1	Scenario No.	#2	Op Test No.	
Examin	ers				Operators		CRS
							PRO
					·		URO
Objecti	removing the action for a ca perform a Far Tech Spec de the system un for the RCIC begin to degr additional Far The crew is e that vacuum inserted an e entered to ad will blow disa Prevention of operators will placed in serv operators to a pump should suppression p	operation ontrol re- st Powe etermin navailal inoper- ade du- st Powe xpecter cannot electric dress t bling th injection contro vice priod a trip th be star pool ter Ventin	ng CRD od drift in er Reduct ation. Ar oble for lev abiity. Fo e to air in er Reduct d to inser be maint ATWS wi ne ATWS e system on into the reactor for to Toru e SBLC p ted and v nperature g the Sci	pump from service IAW ON-121 "Co tion. The crew we instrument malf vel control during llowing the Tech leakage. The crea- tion and initiating t a manual scram ained above 24" Il occur. T-101 "I S. When ARI is i . Level will be lo e RPV". When the pressure manual is temperature re- boump after it has will run. The crew e reaches 110 °F	ce. Following ontrol Rod Dri ill determine to unction will ca the ATWS. A Spec determine we will attemp a leak search n, prior to the Hg vac. Whe RPV Control" nitiated in an a wered to below the main turbin by using SRVs eaching 110 °F run for approxi- will further low When the ca will be succes	e standby CRD pump in sen the CRD pump swap the co ft". The ON will require the hat the control rod is INOP use a spurious RCIC isolat a Tech Spec determination of nation, main condenser vac t to maintain vacuum by pe IAW OT-106 "Condenser L automatic signal, when they n the manual or automatic and T-117 "Level/Power Co attempt to insert control rod w -60" IAW T-240 "Termina e trips due to loss of vacuu Standby Liquid Control (S Panel awareness will ale kimately one minute. The o wer level to control power v rew is controlling level in its sful in inserting control rods	rew will take crew to and make a ion making will be made cuum will rforming an low Vacuum". y determine scram is ontrol" will be s, an ARI fuse tion and m, the SBLC) will be ert the ther SBLC when band, T-214,
Initial C	ondition IC-14 1	00% po	ower				
Turnov	er: See Attached	"Shift T	urnover"	Sheet			
Event No.	Malfunction No.		/ent /pe*			Event Description	
1		N	URO CRS	Swap CRD Pur	nps		
2	CRH041847	с	URO CRS	Control Rod 18	-47 Drifts into	the Core	
. 3		R	URO PRO CRS	Fast Power Red	duction		
4	BATCH FILE RCIC_ISOLATION	1	PRO CRS	RCIC Isolation			
5	CAR01 50	м	URO PRO CRS	Main Condense	er Air Inleakag	e	

6	RPS01 RPS02 RPS05	м	URO PRO CRS	Electrical ATWS
7	ARIF2A ARI01TO	1	URO CRS	ARI Fuse Failure
8	SLC01A(B)	С	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.

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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"

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Op Test N	o.: Sce	nario No.: #2 Event No.: 2 Page 2 of 11
Event Des	cription: Con	trol Rod 18-47 drifts into the core
Cause:	Scram outle	et valve leaks
Automatic		211 D4, "ROD DRIFT ALARM" Ill core display rod drift light illuminates
Effects:	Small powe	rreduction
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.
	URO	<ul> <li>Enter/direct actions IAW ON-121 "Drifting Control Rod"</li> <li>Select the drifting rod</li> <li>Monitor: Reactor power, Generator load, Reactor water level, Reactor pressure</li> <li>Insert the drifting control rod to full-in using Emergency in and hold for 30 sec.</li> <li>Determine if the rod settles at full-in</li> <li>Reset "Rod Drift" alarm</li> <li>Reduce power IAW GP-9 "Fast Reactor Power Reduction" to 950 Mwe (see Event 3)</li> <li>Demand Official 3D P1 and determine status of thermal limits</li> <li>Request Reactor Engineering and work week manager support</li> <li>Declare the rod inop and reference Tech Spec 3.1.3</li> <li>Notify the Operations Manager</li> <li>Execute ON-121 actions:</li> <li>Select the drifting control rod to full-in using Emergency in and hold for 30 sec.</li> <li>Insert the drifting control rod to full-in using Emergency in and hold for 30 sec.</li> <li>Report that the rod settled at full-in</li> <li>Reset "Rod Drift" alarm</li> <li>Reduce power IAW GP-9 to 950 Mwe (see Event 3)</li> <li>Demand Official 3D P1 and determine status of thermal limits</li> </ul>

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Op Test No.:	Scenario No.: #2	Event No.:	3	Page 3 of 11
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**Event Description:** Fast Power Reduction

Cause: Directed from ON-121, Drifting Control Rod

Automatic Actions: None

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#### 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.

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Scenario No.: #2 Event No.: 4 **Op Test No.:** Page 4 of 11 **Event Description: RCIC ISOLATION** Cause: **RCIC Logic Failure** 222 A1 "RCIC TURB TRIP" and 227 E3 "RCIC RELAYS NOT RESET" **Automatic Actions:** ALARMS Effects: RCIC turbine trip, steam isolation, min flow, Torus suction, and injection valves close Position Time **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

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Scenario No.: #2 **Op Test No.:** Event No.: 5 Page 5 of 11 **Event Description:** Condenser Air Inleakage Cause: Crack in Condenser weld joint **Automatic Actions:** Reactor scram @23" Ho vac Main Turbine and RFP turbines trip @ 20" Hg vac Effects: Vacuum drops, Offgas flow rises, generator load reduction **Applicant's Actions Or Behavior** Time Position URO Recognize, report, and take actions IAW ARC 206 D-2 "Condenser PRO 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 Enter/direct actions IAW OT-106 "Condenser Low Vacuum" CRS 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. Attempt to scram the reactor and report the ATWS and entry into T-CT URO 101, "RPV Control". (see event 6 for ATWS details) Monitor and report main condenser vacuum approaching 7" Hg vac URO PRO

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Op Test No.:	Scei	nario No.: #2	Event No.:	5 (cont.)	Page 6	of 11
Time	Position CRS	Anticipate lock	ctions Or Behavior cout of the Main Tur ctor pressure be sta /s.	bine Bypass Val		
	URO PRO	Recognize and Bypass Valves	<i>l</i> ain Turbin/	Ie		
	PRO	O Stabilize reactor pressure below 1050 psig using addition to compensate for the Bypass valve lockout.				
	PRO	Monitor and re rise.	port the increasing	rate of Torus wa	ater temper	ature
	CRS		reaches 5 inches, ain valves to be clo		ISIVs and	Main
	CRS	Direct Chemis Injection from	try personnel to ren service.	nove Condensat	e System (	Dxygen
	URO PRO	Close the MSI	Vs and Main Steam	ו Line Drain valv	es when di	rected.

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Op Test No.: S	cenario No.: #2 Event No.: 6 Page 7 of 11					
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 Positic	on 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	<ul> <li>Direct T-101 "RPV Control", RC/Q ATWS actions:</li> <li>Initiation of ARI</li> <li>Entry into T-117 "Level/Power Control"</li> <li>T-220 "Driving Control Rods During a Failure to SCRAM"</li> <li>T-213 "SCRAM Solenoid Deenergization"</li> <li>T-214 "Isolating and Venting the Scram Air Header"</li> </ul>					
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	<ul> <li>Enter and execute T-117 concurrently with T-101:</li> <li>Direct Inhibit ADS</li> <li>Direct monitoring of parameters requiring performance of T-240 "Termination and Prevention of Injection into the RPV"</li> <li>Direct level be lowered to below -60" using T-240</li> </ul>					
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.					

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Op Test No.	:Scenario N	lo.: #2 Event No.: 6 (cont.) Page 8 of 11
Time	Position	Applicant's Actions Or Behavior
	URO	Perform T-220, direct an EO to close the HV-2-3-56, CRD
	PRO	Charging Header Block valve 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
СТ	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	<ul> <li>Direct performance of T-240 IAW T-117 until any of the following:</li> <li>RPV level reaches -172"</li> <li>Reactor power drops below 4%</li> <li>All SRVs remain closed</li> </ul>

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PRO

Scenario NO.: #2 Event No.: 6(cont.)

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#### Time Position **Applicant's Actions Or Behavior**

- 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.
- Restore and maintain level between -200" and the level to which it PRO was intentionally lowered.
- Recognize and report receipt of 211 D-2 "SCRAM VALVE PILOT URO AIR HEADER PRESS HI-LO" and monitor scram air header pressure.
- Recognize and report inward control rod motion. URO
- URO Take Scram Actions:
  - Verify Rods inserting
  - Verify APRMs are downscale
  - Verity that all control rods have inserted
  - Report to the CRS •
- Recognize termination of the ATWS CRS 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".

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Op Test No.: Scenario No.: #2 Event No.: 7 Page 10 of 11

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.:	Scei	nario No.:	#2	Event N	o.: 8	Page	11 of 11		
Event Description:		Trip of Running Standby Liquid Control Pump							
<u>Cause</u> :		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							
СТ	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)

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- **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:**

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- 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

Simulat	tion Facility Peach	Bottom		Scenario No.	#3	Op Test No.					
Examin	ers				Operators		CRS				
							PRO				
							- URO				
							-				
ObjectivesEvaluate 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 											
Event	Malfunction	Eve	ent			Event					
No.	No.		Type* Description								
1		N	URO PRO CRS			he Alternate Power Supply	, ,				
2	Override	I	URO PRO CRS	Drywell Pressu Without Giving		Failure RPS Trip (Tech Spec)					
3	MSS06G	с	URO PRO CRS	Inboard MSIV F	ails Closed						
4		R	URO PRO CRS	Fast Power Re	duction with C	ontrol Rods					
5	MSS03	м	URO PRO CRS	Steam Leak In	The Steam Tu	nnel (Inside Secondary Co	ontainment)				
6	Override	I	URO PRO CRS	Group I Fails T	o Auto Isolate	Due to Failed Temperature	e Instruments				
7	Override	с	URO PRO CRS	Failure Of The	Inboard "C" M	SIV To Manually Isolate					
8	MSS08C	с	PRO CRS	"C" ADS SRV F	ails to Open E	During Manual Blowdown					

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

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

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Op Test No.:	Scen	ario No.:	#3	Event No.:	2	Page	2 of 9	
Event Description: <u>Cause</u> :		Drywell Pressure Indicating Switch Fails Upscale Without Sending the Expected RPS Trip Spurious Failure of the PIS-12B Drywell Pressure Transmitter Trip Unit						
Automatic Actions				ell Pressure Tr Calibration or			n and the 0 D-4) alarm.	
Effects:	Ex	pected hal	f scram fai	s to occur.				
Time Pos	ition	Applican	t's Actions	Or Behavior				
UF	20	Trip (210 Recogniz	F-1) and G	iross Failure ( rt the failure o	210 D-4).		well Pressure be initiated	
CF	RS	Use Tech have been GP-25. Use GP-2 using App	Specs to on impacted 5, Table 1 pendix 2.	determine that and that the o to direct the tr	t both RPS channels r ripping of t	S and P nust be the B1 F	tripped using	
PF	२०	-	•	pressure is n nnel using GF		endix 2.		
NO	TE			be completed e the operator			o the scenario achieve this.	

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Op Test No.	: S	cenario No.: #3	Event No.:	3	Page	3 of 9
Event Descri	iption:	Inboard Main Steam	Isolation Valve (	MSIV) fail	s closed	i
Cause:		Equipment Failure				
Automatic A	ctions:	None.				
Effects:		The closure of the M and pressure spike b				
Time	Positic	on Applicant's Action	ons Or Behavior	•		
	URO	Recognize rising entry into the Hig				and announce
	CRS	Enter/direct actio - Lead crew in de shut MSIV - Direct reactor p that 10.5 Mlbs/hr Direct troublesho	ower to be dropp (See Event #4 f	ed until to or details)	tal stear	
	URO PRO		•			

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Op Test No.	.: So	cenario No.: #3 Event No.: 4 Page 4 of 9				
Event Descr	iption:	Fast Power Reduction				
Cause:		Directed from OT-102, High Reactor Pressure				
Automatic A	ctions:	None				
Effects: Power is dropped first with Control Rods and then with Red Flow						
Time	Positio	on 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.

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Op Test No.:	Scenario No.:	#3	Event No.:	5	Page	5 of 9
Event Description:	Steam Leak	In The Ste	am Tunnel (In	side Seco	ondary (	Containment)
<u>Cause</u> :		reated due t	to the hydraulid			Outboard MSIVs curred when the
Automatic Actions:	received, hig	gh tempera	g High Differer tures will be re the reactor bu	eceived fir		erms will be steam tunnel
Effects:	Steam Tunn	el temperat	ures will even	tually rea	ch the C	Group I setpoint.
Time Positi	on Applicar	nt's Actions	or Behavior	•		
URO	D HI-LO I Take act ● M	DIFF PRES ion IAW the onitor FR-2	SURE (217 K ARCs	-5 & L-1) iine that v	rent stad	FUEL FLOOR
URC PRC		•			-	igh Temperature firm T-103 Entry
CRS			-103, Second al Evacuation,			
PRO	) Perform	a GP-15, Lo	ocal Evacuatio	on, of the	Reactor	r Building
CRS	Building. Direct a (	GP-4, Rapie	mary system i d Plant Shutdo ontrol, from T-	own.	ging into	o the Reactor

Scenario No.: #3 Event No.: 5 (cont.) Page 6 of 9

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.

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.

PRO

Bypass and restore Drywell Instrument Nitrogen.

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Op Test No.:	: Scei	nario No.:	#3	Event No.:	6	Page	7 of 9
Event Descri	•	roup I Failu emperature		Isolate (Manu ts	ual works)	due to	failed
Cause:	Te	emperature	instrument	s which input i	nto the "B'	" Group	l logic are failed
Automatic A	ctions: No	one, no ala	rms will be	received for i	nitiation of	f the "B'	' Group I logic.
Effects:				e, manual isol Inboard MSI\			
Time	Position	Applican	t's Actions	or Behavior			
СТ	URO PRO	System	•	mperature ins	-	•	ation (due to the ng a proper high
	CRS			of the MSIVs ( ms discharging			Group I isolation AW T-103).

- Section

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Op Test No	.: So	enario No.:	#3	Event No.:	7	Page	8 of 9
Event Descr	ription:	Failure Of Th	ne Inboard	"C" MSIV To N	Anually I	solate	
<u>Cause:</u> The "C" Inboard MSIV was damaged by the hydraulic s occurred when the "C" Outboard MSIV failed closed.							ock which
Automatic A	ctions:	None					
Effects: The leak which is located between the "C" Main Steam Line Inb and Outboard MSIVs can not be isolated							Line Inboard
Time	Positio	n <u>Applican</u>	t's Action	s Or Behavior			
	PRO			nandswitches, r lure to manuall	-	and rep	ort the "C"
	URO PRO	Recogniz Building.	e and rep	ort additional te	emperatur	e alarms	s in the Reactor
СТ	CRS	Action Le Enter and	evel. d execute `	second area h T-112, Emerge Dpen all 5 ADS	ncy Blow	-	greater that the
	PRO	Place the	switches	for all 5 ADS S	RVs to th	e open j	oosition.

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Op Test No.:	: Sce	nario No.:	#3	Event No.:	8	Page	9 of 9
Event Descri	ption: "C	" ADS SR\	/ Fails to Open D	ouring Manual	Blowdown		
Cause:	S	RV is mecha	anically failed in t	he closed posit	tion		
Automatic A	ctions: N	one					
Effects:			ADS SRV fails t n-ADS SRV.	to open, the op	erator mu	st open	one
Time	Position	Applicant	t's Actions Or B	ehavior			
СТ	PRO	-	e and report that mergency blowdo			o open v	when the
	CRS	Direct an	additional SRV to	o be opened to	o achieve 5	5 SRVs	open.
	PRO	Open an a	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-2

## 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 values to OFF.
  - AO-8711A,B, & C (All 3<sup>rd</sup> String FW Heater Extraction Steam Isolations)
  - AO-8712A,B, & C (All 4<sup>th</sup> 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

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ES-D-1	<u> </u>								
Simulat	ion Facility Pea	ch Bottom		Scenario No.	#4	Op Test No.			
Examin	ers				Operators	CRS			
						PRO			
						URO			
<ul> <li>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.</li> <li>Initial Condition IC-20, reduced to 65% power with the "B" RHR Pump Blocked For Motor Replacement</li> <li>Turnover: See Attached "Shift Turnover" Sheet</li> </ul>									
Event	Malfunction	Eve	ent			Event			
No.	No.	Туј	pe*	Description					
1		N	URO PRO CRS	Perform the M	ain Turbine St	op Valve Routine Test			
2		R	URO PRO CRS	Raise Power w	vith Control Ro	ods			
3	Override	С	URO PRO CRS	Loss Of Extrac	tion Steam To	Feedwater Heaters			
4	Override	I ·	URO PRO CRS	Failure of a Va	cuum Transm	itter (Tech Spec)			
5	MSS10	M	URO PRO CRS	Steam Leak In					
6	PCI01 Override	с	URO PRO CRS	Group I Failure MSL To Manua		ate (Manual works)/Failure Of The "D"			
7	Override	I	URO PRO CRS			Iode Switch/B RPS Auto Channel Failure)			
8	Override MSS08	с	URO PRO CRS			Nitrogen/Only 2 SRVs Operate On essurization Via Alternate Methods			

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

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

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Page 1 of 8

Event Descr	iption: M	ain 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	<ul> <li>Perform RT-O-001-400-2, the Main Turbine Stop Valve Individual Full Closure Routine Test:</li> <li>Review RT</li> <li>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)</li> <li>Place the CV/SV Test Selector to SV TEST</li> <li>Verify all four MSV test button lights are ON</li> <li>Place the backup EHC Pump in Run and document in RT</li> <li>For Each Main Turbine Stop Valve <ul> <li>Depress and Hold the Test pushbutton</li> <li>Verify the position indicator moves smoothly at low speed to less then 10% open and then fast closes</li> <li>After 2-3 seconds at full close, release the pushbutton</li> <li>Verify that the indicator moves smoothly from 0-100%</li> </ul> </li> <li>Place the CV/SV Test switch to OFF</li> <li>Verify the lights on all four MSV test buttons are OFF</li> </ul>
		<ul> <li>Place the backup EHC Pump in STOP and then AUTO</li> </ul>
	URO	Monitor plant parameters/assist as directed

ES-D-2	2
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**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.

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Op Test No.:	Sce	enario No.: #4 Event No.: 3 Page 3 of 8
Event Descrij	p <b>tion</b> : l	Loss Of Extraction Steam To Feedwater Heaters
Cause:		AO Valves supplying various heaters fail closed due to a common airline preak
Automatic Ac	tions: 1	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

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Op Test No.	: Sce	enario No.: #4 Event No.: 4 Page 4 of 8				
Event Descr	iption: F	ailure of a Vacuum Transmitter (Tech Spec)				
Cause:	F	PT-2-5-11C fails resulting in an RPS Trip				
Automatic A		10 B-1 "CONDENSER LO VACUUM TRIP" Alarm A" RPS Channel Half Scram				
Effects:	14 1	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				

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4

Op Test No.:	Scer	nario No.: #4 Event No.: 5 Page 5 of 8					
Event Description:	St	team Leak In The Turbine Building					
Cause:	"D	0" MSL weld cracks					
Automatic Actions:		nitially alarms will be received indicating vent stack problems and hen will progress to Group 1 conditions					
Effects:		ligh steam line flow Group 1 isolation condition and resultant reactor cram signal on MSIV closure					
<u>Time</u> Posit	ion	Applicant's Actions Or Behavior					
UR( PR(		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					
CR	S	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					
PR	PRO Monitor Area Temperatures and determine that the leak is in th turbine building and NOT a T-103 entry Recognize the Group 1 alarms and failure of the Group 1 to oc - Report Group 1 Failure to the CRS						
CR	S	Direct a Reactor Scram and closure of the MSIVs					
UR	0	Attempt to scram the reactor and report the ATWS and entry into T- 101, "RPV Control" SEE EVENT #7 FOR FAILURE TO SCRAM DETAILS					
PR	0	- 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.:	S	cena	rio No.:	#4	Event No.:	6	Page	6 of 8
Event Descrip	otion:		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 Ac	tions:	Non	e, no ala	rms				
Effects:		the	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	Positic	<u>on</u>	Applican	t's Actions	s Or Behavior			
СТ	PRO	i	nform CF - Close M	RS ISIVs with	•			failing to close, " Main Steam
CRS PRO					nce of AO 1A. cuation of the			k Open MSIVs
					form AO 1A.2- /acuation of th			g
	URO PRO				larms 218 B-4 I04 "Radiation			ck Exhaust Hi Hi
	CRS		- Initiate I - Continu - Continu depressu When the Emergen "Emerger	Dose Asse e to attempe to take a rize the pla release c cy Level b ncy Blowdo	ant (SEE EVE an not be mai y Dose Asses	ence ERP e MSIVs , "RPV Co NT #7) ntained be	101 as ontrol" to elow the	appropriate o shutdown and

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**Op Test No.:** Scenario No.: #4 Event No.: Page 7 of 8 7 **Event Description:** Failure to scram (Reactor Mode Switch/B RPS Auto Scram Channel failure) Mode Selector Switch (MSS) contacts do not make up, MSS remains in Cause: "Run", B RPS Channel does not trip Alarms 211 D-1 & E-1 are NOT received **Automatic Actions:** Manual pushbuttons or ARI will scram the reactor Effects: **Applicant's Actions Or Behavior** Time Position 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)

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		•					
Op Test No.:	Scer	nario No.:	#4	Event No.:	8	Page	8 of 8
Event Description:		nly 2 SRVs ternate Me	Operate On Eme thods	ergency Blowc	lown/Depr	essuriza	ation Via
<u>Cause</u> :	Dr	ywell nitrog	gen not available a	ind some SRV	s with me	chanical	failures
Automatic Action	<u>is</u> : No	one					
Effects:		•	open 2 of the requ equired to depress				ý
Time Pos	sition	Applican	t's Actions Or Be	havior			
Р	RO		o restore DW inst open, report to th		en, discov	er that t	he valves
C	RS	Determin Emergen Emergen Blowdow - Direct U	cy depressurize th	es are going to ne reactor usin idensate injec	o reach G ng T-112,	eneral	
U	RO	Prevent u	incontrolled conde	ensate injectio	n		
Р	RO		switches to open te that 5 ADS valv			CRS	
С	RS	Direct ad	ditional SRVs to b	e opened unt	il 5 are op	en	
Р	RO		o open SRVs unti e only 2 SRVs ca		inform CF	RS	
С	RS	Direct de	pressurization usi	ng alternate n	neans		
TERMINATION -	Scenar	io may be	terminated when	alternate dep	ressurizati	ion is di	rected.

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<sup>\*</sup>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	o Outline			
Simulat Facility		h Bottor	n .	Scenario No.:	#5	Op Test No.:		
Examin	iers				Operators	CRS		
	·					URO		
		,				PRO		
Objecti	<b>Objectives</b> 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 Conditio	ons				np Blocked Fo	or Motor Replacement		
					· · · ·			
Event No.	Malf. No.	1	vent /pe*			Event Description		
1		N	URO PRO CRS	Place the "A" Re	eactor Feed F			
2		R	URO PRO CRS	Continue Power	Ascension I/	AW GP-2		
3	RFC01A		URO PRO CRS	Recirc Pump R	unaway (inclu	des Tech Spec for mismatched flows)		
4	RRS11A	с	URO PRO CRS	Recirc Pump Hi	gh Vibration F	Requiring Manual Trip		
5	RRS13A/ RRS14A	с	URO PRO CRS	"A" Recirc Pum	Seals both	fail		
6	VED01_74	с	URO PRO CRS	Recirc Pump Di	scharge Valve	e Trips on Overcurrent		
7	RRS20	м	URO PRO CRS	Small Recirc Lir To Drywell Spra		A Inside Primary Containment Leading		
8	MGA01		PRO CRS	Main Generator	Fails to Lock	Out Automatically		
9	Override	с	PRO CRS	CTMT Spray Ov	verride 2/3 Co	re Coverage Switch failure (one loop)		

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ES-D-2

Op Test No.: Scenario No.: #5 Event No.: 1 Page 1 of 10

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	<ul> <li>Place the "A" Reactor Feed Pump (RFP) in service using the normal system operating procedure.</li> <li>Raise "A" RFP Discharge Pressure to greater than reactor pressure.</li> <li>Slowly stroke open the RFP Discharge Valve while monitoring RPV Level</li> <li>Place the "A" RFP in Automatic</li> <li>Close the "A" RFP Min Flow Valve</li> </ul>
	URO PRO	Monitor plant parameters/assist as directed

ES-D-2

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
		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

ES-D-2

Op Test No.: Scenario No.: #5 Event No.: 3 Page 3 of 10

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
- URO Recognize rising "A" Recirc Pump speed, inform CRS PRO
- CRS Directs scoop tube lockup

PRO

- URO 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 Lower Core Flow to or below initial level using the "B" Recirc Pump PRO 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

СТ

ES-D-2

Op Test No.:Scenario No.:#5Event No.:4Page4of10

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

ES-D-2

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

Event Description: "A" Recirc Pump Seals both Fail

<u>Cause</u>: 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	<ul> <li>Enter/direct actions in accordance with OT-101, High Drywell Pressure</li> <li>Verify that the URO/PRO have taken their Immediate Operator Actions</li> <li>Direct the "A" Recirc Pump to be isolated</li> <li>Direct the following if the rate of rise of DW Pressure permits: <ul> <li>At or before 1.5# DW Pressure direct house loads to be transferred and a GP-9 Shutdown to be commenced</li> <li>At or before 1.7# DW Pressure, direct a manual scram (continued on event #7)</li> </ul> </li> </ul>				

Op Test No.: Scenario No.: #5 Event No.: 6 Page 6 of 10

Event Description: Recirc Pump Discharge Valve Trips on Overcurrent

Cause: Recirc Discharge Valve trips on magnetic overcurrent

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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 Recognize the MO-53A, "A" Recirc Pump Discharge Valve has PRO 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

ES-D-2

Op Test No.: Scenario No.: #5 Event No.: 7 Page 7 of 10

Event Description: Small Recirc Line Break/LOCA

1.18.10

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 Recognize/take Immediate Operator Actions for rising drywell (DW)
- PRO 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 Recognize drywell pressure/temperature are continuing to rise, PRO inform CRS
- CRS When or before drywell pressure reaches 1.7#, direct a manual scram

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 ac - 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 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 Wate Reactor Level - Verify APRMs are downscale -Report to the CRS	er System to control
	CRS	At 2# Drywell Pressure enter/direct actions - Verify URO/PRO Scram Actions - Direct Level to be restored and maintaine - Direct DW Instrument Nitrogen to be rest - Direct the reactor to be depressurized no per hour	ed +5 to 35 inches tored
	CRS	At 2# Drywell Pressure enter/direct actions Containment Control - Monitor Primary Containment Conditions - Direct restoration of DW Cooling - Direct torus sprays - Direct DW sprays after verifying that con- Initiation Curve	3
		Note: Refer to Event #9 for continuing a	ctions

## **Operator Actions**

Op Test No.: Scenario No.: #5 Event No.: 8 Page 9 of 10

Event Description: Main Generator Lockout fails when turbine is tripped

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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

**Operator Actions** 

#5

Event No.: 9 Page 10 of 10

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

Scenario No.:

Op Test No.:

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"
СТ		Recognize CTMT Spray Override 2/3 Core Coverage switch failure,
CT .		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
		<ul> <li>Throttle open MO-26A(B) and MO-31A(B) to raise flow to 10,000 gpm</li> </ul>
		- Throttle closed MO-34A(B) to reduce RHR flow
		<ul> <li>Throttle open MO-26A(B) and MO-31A(B) restore flow to 10,000 gpm</li> </ul>
		- Repeat as necessary to control DW Pressure
		- Monitor DW pressure
TERMINATI	<u>ON</u> After	control of primary containment is established

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

ES-301

Administrative Topics Outline

Form ES-301-1

11	y: <u>Peach Bottom U</u> ination Level (circle o	
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 recommenda- tions – PAR JPM	Given General Emergency plant conditions, make a protective action recommendation (PAR).

## 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-Control Rod Verif	K/A:	201003A3.01	
			URO: 3.7	SRO: 3.6

A. NOTES TO EVALUATOR:

TASK DESCRIPTION:

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.

Control Rod Position Verification – (Alternate Path)

- 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 4<sup>th</sup> RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

## H. PERFORMANCE CHECKLIST

STEP	STEP	ACT	STANDARD
NO			
1	Obtain the recent official 3D P1 or control rod position log. (Cue: Provide a copy of the P1 or control rod position log.)	Р	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.)	Р	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.)	Ρ	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, <u>DIRECT</u> the operator to take appropriate ON-122 actions.	Р	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.)	Р	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.)	Ρ	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.

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

# INITIATING CUE

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

GP-9-2 Rev. 26 Page 1 of 3 MGW:rww

#### PECO Energy Company Peach Bottom Unit 2

#### GP-9-2 FAST REACTOR POWER REDUCTION

#### 1.0 <u>PURPOSE</u>

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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 <u>ANY</u> of the following conditions exist:
  - APRM oscillations of greater than <u>OR</u> equal to 10 percent peak-to-peak,
  - LPRM <u>OR</u> APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, <u>OR</u>
  - WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.
- 3.1 <u>IF</u> evidence of core thermal hydraulic instability exists, <u>THEN</u> place the reactor mode switch in "SHUTDOWN" <u>AND</u> enter T-100, "Scram", <u>AND</u> exit this procedure. **CM-1, CM-2**
- 3.2 Lower recirculation flow until <u>ANY</u> 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

<u>OR</u>

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

o FLLLP exceeds 0.995.

GP-9-2 Rev. 26 Page 2 of 3

- 3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch <u>OR</u> 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 <u>OR</u> 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 <u>WHEN</u> plant conditions permit, <u>THEN</u> 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 <u>AND</u> 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 <u>IF</u> any thermal limit value is equal to or greater than 1.000, <u>THEN</u> 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 <u>IF</u> further power reduction is required, <u>THEN</u> exit this procedure <u>AND</u> enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure <u>AND</u> enter GP-5, "Power Operations".

#### 4.0 <u>REFERENCES</u>

- 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)

ON-122, Rev. 5 Page 1 of 2 NHN:nhn 04/13/98

#### PECO Energy Company Peach Bottom Units 2 and 3

### ON-122 MISPOSITIONED CONTROL ROD - PROCEDÜRE

#### 1.0 <u>SYMPTOMS</u>

- 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 <u>AND</u> 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 <u>IF</u> the mispositioned control rod is caused by a Rod Drift <u>THEN</u>:

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

2.3.2 Exit this procedure.

- 2.4 <u>IF</u> thermal power is below the RWM low power setpoint <u>AND</u> control rods are positioned such that more than two insert errors <u>OR</u> more than one withdraw error exists, <u>THEN</u> manually scram in accordance with GP-4, "Manual Reactor Scram".
- 2.5 <u>IF</u> the control rod had been mispositioned less than two minutes <u>THEN</u>:
  - 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 <u>IF</u> the control rod has been mispositioned for longer than two minutes <u>AND</u> PCIOMR surveillance is required, <u>THEN</u>:
  - 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 <u>IF</u> the control rod has been mispositioned for longer than two minutes <u>AND</u> PCIOMR surveillance is <u>NOT</u> required, <u>THEN</u>:
  - 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 Rea	actor Ope	rator	
TASK-JPM DESIGNATOR:	New-Partial Proc	K/A:	<u>2.2.11</u> URO: 2.5	SRO: 34
TASK DESCRIPTION:	Prepare a Partial Procedure		0110. 2.0	01(0: 0.4

- 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

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- 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.

## 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

1

STEP	STEP	ACT	STANDARD
NO			
*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.	Р	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.	Ρ	<ul> <li>Steps which do not support the testing of the "B" SBLC pump are changed or crossed out.</li> <li>Step 6.1.1 should be made to apply to the "B" SBLC Pump Only.</li> <li>Steps 6.1.2 –6.1.5 should be crossed out.</li> <li>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).</li> </ul>
4	Submit the partial for approval. (Cue: Accept partial for approval.)	Р	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

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- 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.

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	Re	ev	18
Page	1	of	E 8
-	FU	J:p	bab
03			<b>′99</b>

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 <u>SCOPE</u>

- 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 preimplementation 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 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 <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 **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.

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#### 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 <u>NOT</u> 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 <u>NOT</u> 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 <u>more limited in</u> <u>scope</u> 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 <u>entire scope</u> 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.
  - 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"

P U:	ECO Energy Company each Bottom nit 2 urveillance Test		0-011-301-2 Rev. 12 Page 1 of 25 MRR:cah
S'	<b>F-O-011-301-2 STANDBY LIQUID CONTROL</b>	PUMP FUNCTIONAL TH	ST FOR IST
T	EST FREQUENCY: Once/92 days (See Section ECH SPEC: SR 3.1.7.5, SR 3.1.7.8, PPLICABILITY: Modes 1 and 2		ion 5.5.6
·	1 CHECK why this procedure is being per	formed:	
ſ		t Due To Unsat Tes	t
	Other Reason:		
	Approved By SMgt: Printed Name		Initials
	A: All */I steps are SA	ults: TISFACTORY	
	B: One or More <b>*/I</b> steps are <b>UNSA</b> Refer to Section 9.0 for Tech Sp		
	Performed By: Printed Name		Initials
	RO/PRO Informed of Test Completion:		·
	Reviewed By SMgt:	////	
	UNSAT Notification: SMgt Discretion:	Plant Mgr or Oth	ers
-	Notified By:	<u> </u>	
	If other portions of the test did NO Or other discrepancies were noted The	I function proper n <b>COMPLETE</b> the fol	ly, lowing:
	IST Step(s) in ALERT range: DESCRIBE discrepancies/actions take	en: A/R or ETT #:_	
	·		
4	Reviewed/Approved Plant Staff: Printed Name	// 	Initials

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#### 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

f

2.1	Description		Req Min Accuracy	M&TE No.	Cal Due Date
	Stopwatch		None		//
	Vibration me Raw Signa Single Ir (Min. Req. H Range 2.8-10	al ntegration Freq.			//
	Vibration p (Min. Req. H Range 2.8-10	Freq.	± 4.0%		//
	Test Gauge ( psig	0-1500	± 5.0%		//
	Test Gauge ( psig (N/A in rig is to be	f one test	± 5.0%		//
2.2	(1 or 2) - 5	Test rig(s	) with Schrad	er fitting	(see Figure 1)
2.3	SBLC Measur:	ing Stick			
2.4	Non-contamin quick discon		for flushing	test tank	20T017 (with
2.5	Locked Valve	e Key For:			
	NUMBER	DESCRIPTI	ON		NORMAL POS
	HV-2-11-11		0T018 Outlet 2AP040 + 2BP0		LOCKED OPEN
	HV-2-11-15		h Header To R Isolation Val		LOCKED OPEN
	HV-2-11-26	SBLC Pump Block To	s Disch Recir Tks 20T017 +	C HDR 20T018	LOCKED CLOSED

2.0	TEST	EQUIPME	NT (Continued)		
		NUMBER	DESCRIPTION	NORMAL	POS
		HV-2-11	-41 SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR	LOCKED	CLOSED
3.0	PRER	EQUISITE	S		<u>Initia</u>
	3.1	Test In:	itiation		
		3.1.1	COMPLETE Section 1 of cover page.		
	3.2	Document	t Review		
		3.2.1	ENSURE procedure is current revision.		
	3.3	Equipmen	nt Configuration		
		None			
	3.4	Required	d Redundant Safety Related Equipment		
		None	·		
	3.5	Other P	rerequisite Activities		
		3.5.1	<b>VERIFY</b> at least two operators are ava to perform this test.	ilable	
		3.5.2	<b>VERIFY</b> SBLC Test Tank empty and <b>NO</b> fo objects in tank.	reign	
		3.5.3	<b>VERIFY</b> one 55 gallon drum which is empty or near empty available at Rx Bldg 165' by SBLC system drain lines.		
		3.5.4	<b>VERIFY</b> that qualified personnel are available for vibration data collecti and lube oil sampling. Operators may view the training video for Operation Role in Predictive Maintenance to refresh on proper technique.		
		3.5.5	<b>OBTAIN</b> oil sampling equipment from th Oil Sample Drop-off Box located on Turbine Bldg 116' outside the ferrography lab.	e	

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#### 3.0 **PREREQUISITES** (Continued)

- 3.6 Approval to Start Test
  - 3.6.1 **OBTAIN** RO Permission to begin.

<u>\_\_\_\_</u>\_\_\_\_ Time

#### 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 values.
- 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  $\geq$  43 gpm at a discharge pressure  $\geq$ 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.

*********	<u>-</u>		2	ST-O-011-301-2 Rev. 12 Page 6 of 25
6.0	PERF	ORMANCE	STEPS	Initial Sat <u>UnSat</u>
	6.1	Test Pr	eparation and Valve Lineup	
		< At St R2-49	andby Liquid Control Tank Area 195',	
		6.1.1	<b>VERIFY</b> both SBLC Pump oil levels are between the min static and max static level on pump oil sightglasses.	
		6.1.2	<b>REMOVE</b> cap <b>AND INSTALL</b> 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	<b>VERIFY</b> accumulator 2AT076 pressure is from 325 to 450 psig <b>AND CHARGE</b> 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	<b>REMOVE</b> cap <b>AND INSTALL</b> 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	<b>VERIFY</b> accumulator 2BT076 pressure is from 325 to 450 psig <b>AND CHARGE</b> accumulator if necessary.	
		6.1.9	<b>REMOVE</b> cover on 20T017 "Standby Liquid Control Test Tank" <b>AND INSTALL</b> SBLC measuring stick inside of tank.	
		6.1.10	<b>VERIFY</b> HV-2-11-11 "SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040 LOCKED OPEN.	11
		6.1.11	<b>UNLOCK AND CLOSE</b> HV-2-11-15 "SBLC Disc Header To RPV Outboard Isolation Valve".	h
		6.1.12	UNLOCK AND OPEN HV-2-11-26 "SBLC Pumps Disch Recirc Hdr Block to Tks 20T017 + 20T018".	
		6.1.13	<b>OPEN</b> HV-2-11-30 "SBLC Pumps Disch Recirc Blk to SBLC Tank 20T018".	

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ST-0-011-301-2 Rev. 12 Page 7 of 25 Initial 6.0 **PERFORMANCE STEPS** (Continued) 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. NOTIFY Reactor Operator 2AP040 "Standby 6.2.2 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. IF Surveillance Test is being performed 6.2.4 to satisfy pump post maintenance testing, THEN PERFORM this step, OTHERWISE N/A AND PROCEED to step 6.2.5. RUN pump for 5 minutes unloaded THEN 1. 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.

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### 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u><u>UnSat</u>

#### 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.

***	* * * * * * * * * * * * * * * * * * * *	r 🛪
*	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.
- 6.2.9 **RUN** 2AP040 for at least 2 minutes to ensure accurate vibration data.

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### 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u><u>UnSat</u>

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

	RED VIBRATION KED 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.

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### 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u><u>UnSat</u>

- 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.
  - 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.

## Rev. 12 Page 11 of 25 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. CALCULATE 2AP040 flow rate as follows 6.2.20 AND RECORD flow rate on Data Sheet 2: 52.8 qal x 60 sec/min = Flow Rate Step 6.2.16 3168 / \_\_\_\_\_ sec = \_\_\_\_ gpm ĪV 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	ACCEPTABLE	ALERT	ACTION	
	VALUE	RANGE	RANGE	RANGE	
TIME (Seconds)		N/A	N/A	N/A	
FLOW RATE (gpm)		50.2 to	< 50.2 to	< 49.1 or	
(3168/Time)		58.1	49.1	> 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. \*

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				Pa	Re ge 12	ev. 12 of 25
6.0	PERF	ORMANCE	STEPS (Continued)		Init <u>Sat</u>	ial <u>UnSat</u>
			NOTE			
		"SBLC	ext step verifies CHK-2-11-43A Pump 2AP040 Discharge Check Valve" e OPEN direction.			
		6.2.22	<b>VERIFY</b> pump test data on Data Sheets 1 and 2 do <b>NOT</b> fall within Action Range.	I,		
		6.2.23	<b>CLOSE</b> HV-2-11-27.			
		6.2.24	<b>OPEN</b> HV-2-11-26.			
		6.2.25	<b>OPEN</b> HV-2-11-30.			
		6.2.26	UNLOCK AND OPEN HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR".	n		
		6.2.27	IF test tank level reaches top of suction line on side of tank by gravit draining, THEN N/A the next 3 sign-offs. OTHERWISE, PERFORM the following:	гу		
			1. UNLOCK AND CLOSE HV-2-11-11.			
		*	**************************************			
		* is	not run SBLC Pump when Test Tank * empty. *			
		* * * * * * * * *	***************************************			
			2. LOCALLY <b>START</b> 2AP040 <b>THEN STOP</b> pur when Test Tank level reaches top of suction line on side of test tank	of	<u></u>	
			3. <b>OPEN</b> HV-2-11-11.			
		6.2.28	CLOSE HV-2-11-41.			<u></u>
	6.3	SBLC Pu	mp B Test <b>CM-1</b>			
		6.3.1	IF one test rig is being used, THEN			

100

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**REMOVE** test rig at 2BT076 AND INSTALL cap. OTHERWISE, N/A this step.

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PERFORMANCE	STEPS (Continued)	Initial <u>Sat UnSat</u>
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	
* * * * * * * * *	**************************************	
* DO 1	NOT START SBLC Pumps from the Control *	

ST-0-011-301-2

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

6.3.5 LOCALLY START 2BP040.

6.0

#### 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.
  - 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.
  - 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.

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### 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u><u>UnSat</u>

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	e *
* 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	g *
* is stopped.	*
*	*
* * * * * * * * * * * * * * * * * * * *	* * * *
6.3.8 SLOWLY <b>THROTTLE</b> HV-2-11-26 to a	
pressure of 1255 (1255-1280) psig	as

6.3.9 **RECORD** 2AT076 pressure.

\_\_\_\_ psig

#### NOTE

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

indicated on PI-2-11-053.

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.

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### 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u><u>UnSat</u>

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- 6.3.11 **RUN** 2BP040 for at least 2 minutes to ensure accurate vibration data.
- 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			
¥1	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)

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> Initial <u>Sat</u><u>UnSat</u>

#### 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.

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# 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u><u>UnSat</u>

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- 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:

> <u>52.8 gal x 60 sec/min</u> = Flow rate Step 6.3.18

3168 / \_\_\_\_\_ sec = \_\_\_\_ gpm

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# 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u><u>UnSat</u>

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

6.3.23 **VERIFY** flow recorded in Data Sheet 4 is  $\geq$  43 gpm **AND** pressure is  $\geq$  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.
- 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.

ST-0-011-301-2 Rev. 12 Page 19 of 25 6.0 **PERFORMANCE STEPS** (Continued) Initial Sat UnSat IF test tank level reaches top of 6.3.30 suction line on side of tank by gravity draining, THEN N/A the next 3 sign-offs. OTHERWISE, PERFORM the following: UNLOCK AND CLOSE HV-2-11-11. 1. CAUTION \* Do not run SBLC Pump when Test Tank × × is empty. LOCALLY START 2BP040 THEN STOP pump 2. 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. Restoring SBLC System to Operable Status 6.4 LOCK closed HV-2-11-41. 6.4.1 VERIFY OR LOCK OPEN HV-2-11-11. 6.4.2 CLOSE OR VERIFY CLOSED HV-2-11-30. 6.4.3 CLOSE AND LOCK HV-2-11-26. 6.4.4 6.4.5 OPEN AND LOCK HV-2-11-15. NOTIFY Reactor Operator SBLC System has 6.4.6 been returned to service.

			2	ST-O-011-301-2 Rev. 12 Page 20 of 25
6.0	PERF	ORMANCE	STEPS (Continued)	Initial <u>Sat</u> UnSat
	6.5	Flushin	g Test Tank 20T017	
		* * * DO * 16	**************************************	
		******	* * * * * * * * * * * * * * * * * * * *	
		< At Rx	Bldg 165', West Wall>	
		6.5.1	<b>OPEN</b> HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve".	·
		< At Sta	andby Liquid Control Tank Area, 195',	R2-49 >
		6.5.2	<b>REMOVE</b> SBLC measuring stick from Test Tank.	
		6.5.3	<b>INSTALL</b> hose at a demin water supply valve HV-2-38D-29 "Demin Wtr Hose Blk Vv for SBLC Test Tank 20T017.	
		6.5.4	<b>OPEN</b> HV-2-11-28 "SBLC Test Tank 20T01 Inner Drain Valve".	7
		6.5.5	<b>OPEN</b> HV-2-38D-29 <b>AND FLUSH</b> Test Tank with demineralized water.	
		6.5.6	CLOSE HV-2-38D-29.	······
		6.5.7	<b>CLOSE</b> HV-2-11-28.	
		6.5.8	<b>VERIFY</b> Test Tank empty.	
		6.5.9	INSTALL cover on Test Tank.	
		6.5.10	<b>REMOVE</b> hose from demin water supply valve HV-2-38D-29.	
		< At Rx	Bldg 165', West Wall>	
		6.5.11	<b>CLOSE</b> HV-2-11-23143.	
·		6.5.12	<b>PLACE</b> oil sample bottles in the drop- off box located on Turbine Bldg 116' outside the ferrography lab.	

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			2	ST-O-( Page		. 12
6.0	PERF	ORMANCE	STEPS (Continued)		Initi at U	
	6.6	SBLC Sy	stem Operability Verification			
		6.6.1	<b>RECORD</b> lowest SBLC Pump flow rate from Data Sheet 2 or 4.	n 		
		6.6.2	<b>OBTAIN</b> most recent figures for SBLC Concentration and Enrichment from Chemistry Unit 2 SBLC Sample Log.			
			Concentration Enrichment		<del></del>	
		6.6.3	<b>PROVIDE</b> lowest SBLC pump flow rate dat to Shift Chemist for entry into Unit SBLC Sample Log.		<del></del>	
		6.6.4	<b>PERFORM</b> the following calculation for determination of SBLC System operability:			
		C 13% WT	x = 0   x = E = 0 86 gpm   19.8%			
		13% WT	x x =			
			<pre>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</pre>			
		6.6.5	<b>VERIFY</b> Operability Factor calculated in previous step is greater than or equal to 1.	*		
7.0	PROCE	DURE COM	PLETION		<u>Ini</u>	<u>tial</u>
	7.1	Indepen	dent Verification			
		7.1.1	<b>VERIFY</b> calculation in Step 6.6.4 is c	orrect	•	IV
		< At St	andby Liquid Control Tank Area 195', R	2-49 >		
		7.1.2	<b>VERIFY</b> HV-2-11-15 "SBLC Disch Header RPV Outboard Isolation Valve" is LOCK	To ED		

OPEN.

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				2		011-301-2 Rev. 12 22 of 25
7.0	PROCEI	OURE COMP	LETION	(Continued)		Initial
		7.1.3	Outlet	HV-2-11-11 "SBLC Tk 20T018 Block To Pumps 2AP040 + 2BP040 KED OPEN.	1	IV
		7.1.4	Recirc	HV-2-11-26 "SBLC Pumps Disch HDR Block To Tks 20T017 + ' is LOCKED CLOSED.		IV
		7.1.5	Outlet	HV-2-11-41 "SBLC Test Tk 20T01" To SBLC Pumps Suction HDR" is CLOSED.	7	
		7.1.6	<b>VERIFY</b> Recirc CLOSED.	HV-2-11-27 "SBLC Pumps Disch Blk To SBLC Test Tank 20T017" :	ls <sup>.</sup>	
		7.1.7	<b>VERIFY</b> Disch/H is CLOS	HV-2-11-30 "SBLC Pumps Recirc Blk To SBLC Tank 20T018" SED.		IV IV
		7.1.8		HV-2-11-28 "SBLC Test Tank Drain Valve" is CLOSED.		IV
		7.1.9	Contro	test rig at 2AT076 "Stby Liqui l N2 Accumulator A" REMOVED <b>AND</b> STALLED.	đ	IV
		7.1.10	Contro	test rig at 2BT076 "Stby Liqui l N2 Accumulator B" REMOVED <b>AND</b> STALLED.	d	
		7.1.11	VERIFY SBLC PI	IIV-2-11-053 "PI-2-11-053 Inst Ps Disch Header Press" is OPEN.	r Isol	IV
		< At Rx	Bldg 1	65', West Wall>		
		7.1.12	<b>VERIFY</b> Outer	HV-2-11-23143 "SBLC Test Tank Drain Valve" is CLOSED.	20T017	IV
	7.2	Records	Comple	tion		
		7.2.1	COMPLE Section	<b>TE</b> Section 2 of Cover Page (and n 3 if applicable).		
8.0	REFE	RENCES				
	8.1	Governi	ng			
			- 1 -			

- 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)

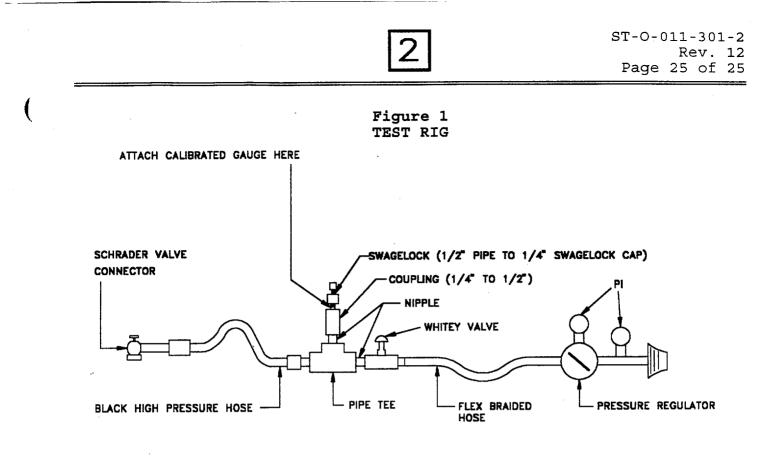
Section 3.1.7

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# 10.0 PARTICIPANTS RECORD

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Printed Name	Initials



# PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

SRO EQUIP CONTROL

POSITION TITLE:	Unit Reactor Operator/Senior Reac	tor Ope	rator	
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.)	Р	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.)	Р	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.)	Р	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.)	Р	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.

long as	ong 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:	Ρ	The following data is entered in the fields listed below on Exhibit 1 OM-P-12.1:1 "Technical Specification Action Log".					
	<ul> <li>Unit – "unit experiencing inoperability" Entry # - sequential number consisting of year, unit and sequential TSA #</li> </ul>		<ul> <li>Unit – "Unit 2" Entry # - "99-2 – next TSA number"</li> </ul>					
	<ul> <li>Tech Spec Number – "Tech Spec number for inoperability"</li> </ul>		• Tech Spec number – "3.1.8"					
	<ul> <li>Discovery Date/Time – "date and time inoperability discovered"</li> </ul>		<ul> <li>Discovery Date/Time – "today's date/0800"</li> </ul>					
	<ul> <li>Equipment ID – "alpha-numeric designator for inop equipment"</li> </ul>		• Equipment ID – "AO-2-03-032A"					
	<ul> <li>System Number – "system number for equipment inop"</li> </ul>		• System # - "3"					

1-1

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

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

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

# I. TERMINATING CUE

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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

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

	CONDITION		REQUIRED ACTION	COMPLETION TIME	
Α.	One or more SDV vent or drain lines with one valve inoperable.	A.1	Restore valve to OPERABLE status.	7 days	
Β.	One or more SDV vent or drain lines with both valves inoperable.	B.1	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

		FREQUENCY	
SR	3.1.8.1		
		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 $\leq$ 15 seconds after receipt of an actual or simulated scram signal.	24 months

REVIEW	PB
 PORC SQR QR 50.59	YES YES YES YES

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## 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**

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- 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 <u>TS Action</u> 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 <u>TRM Log</u> 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.

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- 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 <u>AND</u> 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.

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- 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.

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- 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 <u>AND</u> 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 <u>OR</u> 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.

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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 <u>NOT</u> support features for the associated 4 kV bus or load center. The OPERABILITY of these timers does <u>NOT</u> 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

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 <u>NOT</u> 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.

5.

load center.)

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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 <u>AND</u> combinations of the Inoperable feature and other currently Inoperable features. Some examples are listed below.

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- 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 <u>required</u> 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 <u>OR</u> 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.

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- 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), cr 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.

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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.

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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.

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- 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.

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- 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 <u>AND</u> 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 <u>AND</u> the testing is <u>NOT</u> completed during the current shift, then make a Narrative Log entry prior to turnover to alert the oncoming 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	TECHNICAL SPECIFICATION ACTION LOG	RXHIBIT OM-P-12.1:1, Rev. 1 Page 1 of 1
SQR YES QR NO 50.59 NO	UNIT (2 or 3) (This revision is a complete rewrite.)	CONTROLLED BY

Batry #	TSŞ	Siscovery Date/Time	Equipment ID System #		System #	Reference #		
		•						
Condition			Reason			Requi	Required Action 1	
	٠.						· •	
							letion Time Date/Time	
Is a SPD required?	VES / NO						anter the second second	
		es / no						
(IE YES, verify SP Required Action 2	Are any other SPDs currently active? YES / NO (If YES, verify SPD is still valid.) Required Action 2 Required Action 3			Required Action 6		Requ	Required Action 5	
							Completion Time Date/Time	
Completion Time Date/Time Completion Time Date/Ti		e Completion Time Date/Time			rembeneration to me rater and			
Exit Justification			Exit Date/Time			Exit Entries Made By		
					I			

## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

SRO RAD CONTROL

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 (Instrume				

- 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	STEP	ACT	STANDARD				
NO							
8	** NOTE ***						
Instrum	ent checks may be conducted in any order.						
*1	Perform a calibration check of the RO-2A.	P	The candidate locates the Calibration Sticker on the RO-2A and verifies that the				
	(Cue: Calibration is not due until October 1999)		instrument is in calibration.				
*2	Verify that the RO-2A has been Source Checked.	Р	The candidate locates the Source Check Sticker and observes that the RO-2A was source checked today.				
	(Cue: The source check was conducted 4 hours ago)						
*3	Perform a check of the physical condition of the RO-2A.	P	The candidate performs a careful physical inspection of the RO-2A for any damage.				
	(Cue: Acknowledge physical check completed)						
*4	Perform a battery check of the RO-2A. (Cue: Positions BAT 1 and BAT 2	P	Candidate places the function switch to BOTH positions BAT 1 and BAT 2 and verifies that voltage is indicated in the				
	indicate that battery voltage is in the Batt OK range)		'Batt OK" range				
*5	Perform a Zero check of the RO-2A.	P	Candidate places the function switch to the Zero position and observes that the				
	(Cue: Needle is indicating above the Zero indication)		indication is greater than Zero.				
*6	Zero the RO-2A	P	Candidate adjusts the Zero Knob to obtain a Zero indication.				
	(Cue: acknowledge adjustment of knob to obtain a Zero indication)						
*7	Take a Closed Window Gamma reading on the selected object.	P	Candidate holds meter with the beta window closed at approximately one inch and takes readings, shifting scales until				
	(Cue: Depending on selected scale indicate that the reading is upscale or downscale until the appropriate scale is		an appropriate reading is obtained.				
	reached. Then indicate that the meter is reading 10 mR/hr)						

STEP	STEP	ACT	STANDARD
NO			
*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)	Ρ	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.	Ρ	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. $(12 - 10) \times 4 = 8 \text{ mR/hr Beta}$
10	Candidate reports Gamma and Beta Radiation levels on the object.	Р	Candidate reports that the object is reading 10 mR/hr gamma and 8 mR/hr Beta.
	(Cue: Acknowledge report)		

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

# TERMINATING CUE

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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.

HP-CG-400, Rev. 2 Page 1 of 5 RH/rah

PORC	NO
SQR	YES
NQA	NO
50.59	NO
RESP MGR	YES
	ļ

PECO Energy Company Nuclear Generation Group

# HEALTH PHYSICS INSTRUMENTATION OPERATIONS GUIDELINE

### 1.0 <u>PURPOSE</u>

This guideline establishes the standard technique for the operation and use of the instrumentation described herein.

#### 2.0 <u>SCOPE</u>

This guideline applies to the operation of Health Physics instrumentation described herein (excludes whole body contamination monitors) at PECO Energy nuclear facilities.

#### 3.0 <u>REFERENCES</u>

- 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 <u>PREREQUISITES</u>

- 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.

#### HP-CG-400, Rev. 2 Page 4 of 5

7.3.3 Completed Non-Conformance Reports should be returned to the Instrument Physicist/Supervisor for final review <u>AND</u> approval. Approved reports should be filed in HP department files.

#### 8.0 <u>EXHIBITS</u>

- 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

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- 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

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- 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	m <b>R</b> /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 <u>all</u> 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.

# PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

SRO EMERGENCY PLAN

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator			
TASK-JPM DESIGNATOR:	NEW-PRO ACT		<u>2.4.44</u> URO: 2.1	SRO: 4.0
TASK DESCRIPTION:	Protective Action Recommendation Determination			

A. NOTES TO EVALUATOR:

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- 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 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.

### 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	STEP	ACT	STANDARD			
NO	*** NOT	· · · ****	L			
	NOT					
Provide	the candidate with a partially completed ER	P-200 A	Appendix 4.			
1	Distriction of EDD 404					
*2	<ul> <li>Evaluate plant conditions and determine that Table 2 "Fuel Damage" General</li> <li>Emergency requires:</li> <li>Evacuate a full 360 degrees for 5 miles</li> <li>Evacuate affected and 2 adjacent sectors for 5-10 miles.</li> </ul>	Ρ	Table 2 "Fuel Damage" General Emergency.			
3	<ul> <li>Sectors for 5-10 miles.</li> <li>Complete the ERP-200, Appendix 4 PAR worksheet portions.</li> <li>Wind speed <u>10</u> mph.</li> <li>Wind direction "from" instrumentation <u>270</u> degrees.</li> <li>Wind direction "to" +/- 180 = <u>90</u> degrees.</li> <li>(Cue: Wind speed <u>10</u> mph, wind direction from 270 degrees.)</li> </ul>	Ρ	Determine wind speed to be 10 mph determine wind direction "from" to be <u>270</u> degrees and subtract 180 to determine wind direction "to" of 90 degrees.			
*4	<ul> <li>Determine:</li> <li>Evacuate all sectors 360 degrees 5 miles.</li> </ul>	Р	Evacuate all sectors 360 degrees, 5 miles determined from ERP-101 Table 2, General Emergency "2" direction.			
*5	Determine: • Evacuate sectors <u>E</u> , <u>ENE</u> , and <u>ESE</u> , 5 to 10 miles.	Р	Evacuate affected sector <u>E</u> from wind direction "to" and adjacent 2 sectors <u>ENE</u> and <u>ESE</u> 5 to 10 miles from ERP-101 Table 2, General Emergency "2" directions.			
· · ·	*** NO	TE ***				
When the state ac	he candidate attempts to contact Maryland N gencies to receive the PAR notification.		d Pennsylvania BRP role play as these			
*6	<ul> <li>Notify Maryland MDE and Pennsylvania BRP of the following PAR:</li> <li>Evacuate all sectors 360 degrees 5 miles.</li> <li>Evacuate Sectors <u>E</u>, <u>ENE</u>, <u>ESE</u> 5 to 10 miles.</li> </ul>	Р	Maryland MDE and Pennsylvania BRP are contacted by OMNI phone using the numbers in ERP-200 Appendix 4 "PAR Worksheet".			
	(Cue: Acknowledge receipt of report.)					

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

# TERMINATING CUE

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1

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". 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
- "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

ERP-200, Appendix 4 Page 1 of 6, Rev. 3 NDY:jar 11/16/98

#### APPENDIX 4

### GENERAL EMERGENCY INITIAL ACTIONS

- 1. \_\_\_\_ Complete the General Emergency Notification Form and provide to the ED Communicator.
  - \_\_\_\_\_ 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.

2.

ERP-200, Appendix 4 Page 2 of 6, Rev. 3

# 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 be 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: <u>Vait Z Shutdaun, Level + 10" reactor pressure ZOO psig</u> <u>Fiel Failure with stean leaks into primary containment</u>
	Fiel Failure with stran 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 ismph.
	This is a Drill I This is not a Drill
APPF	ROVED: <u>E. Director</u> <u>XXXX</u> <u>9/XX/99</u> (Emergency Director) Time Date

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#### 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.

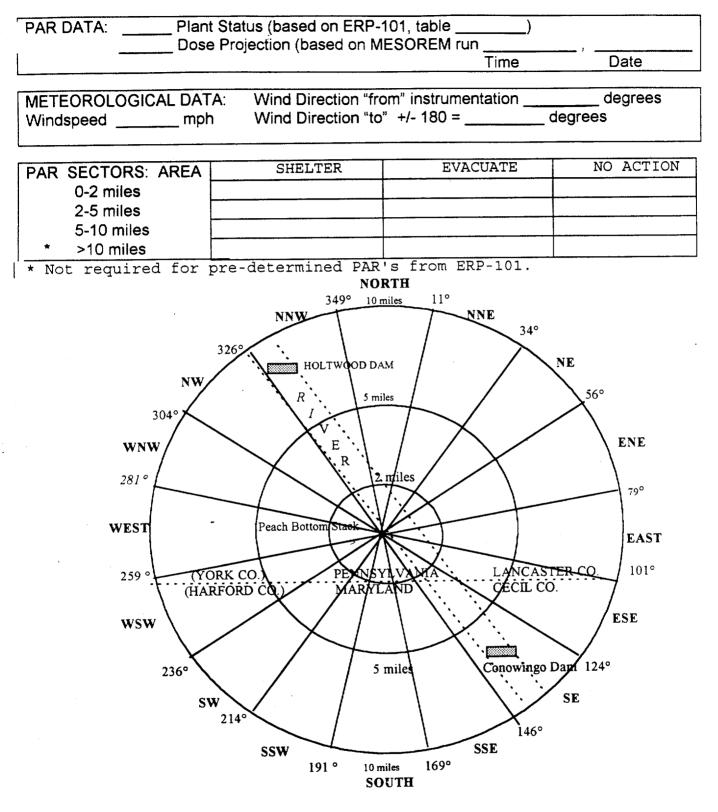
ALL NON-ESSENTIAL PERSONNEL AWAIT FURTHER PUBLIC ADDRESS INSTRUCTIONS.

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.

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### PAR WORKSHEET



Γ	PERSON NOTIFIED	TIME	DATE
PENNSYLVANIA BRP (Ext. 236 or 239)			
MARYLAND MDE (Ext. 235 or 292)			

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# TURNOVER / BRIEFING FORM

CURRENT EMERGENCY	CLASSIFICATION:	Time:	
	EAL TABLE:	Date:	
CURRENT PLANT CON	DITIONS:		
PERSONNEL INJURIE	5:		
EVACUATION STATUS	:		
ACCOUNTABILITY ST.	ATUS :		<u> </u>
OFF SITE ELECTRIC.	AL POWER STATUS:	·	
EMERGENCY DIESEL	STATUS:		
RADIOLOGICAL COND	ITIONS IN PLANT:		<u></u>
OFF SITE RELEASE	CONDITIONS:		
	•	· ·	
PRIORITIES:			
Control Room Shif	t Manager:		
OSC Director:			
Emergency Directo	r:	EOF ERM:	
NRC contacted:	ERDS data	link activated:	

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# TURNOVER/BRIEFING FORM

	Reactor Level	.:	_ Reactor	Pressure:	
	System Availa	ability:		Comments:	
	HPCI	Yes	No		
	•·• • = -	Yes	No		
	-	Yes	No		
	/		No	-	
	<u>_</u> ,	Yes	No	-	
		Yes	NO NO	-	
	A LOOP RHR B LOOP RHR	Yes Yes	NO		
	HPSW	Yes	NO		
	ESW	Yes	No	-	
	SBLC	Yes	No	-	
	CRD	Yes	No		
	SBGTS	Yes	No		
	RPV Intact	Yes	No		
	Cont. Intact	Voc	No		
NIT 3 STATUS:	Reactor Powe	er Level	or Mode: _		
NIT 3 STATUS:	Reactor Powe	er Level	or Mode: _	eactor Pressure:	
NIT 3 STATUS:	Reactor Powe Reactor Leve	er Level	or Mode: _ Re		
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai	er Level el: lability:	or Mode: _ Re	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI	er Level el: lability: Yes	or Mode: _ Re No	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC	er Level el: lability: Yes Yes	or Mode: _ Re No No	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS	er Level el: lability: Yes Yes Yes	or Mode: _ Re No No	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS CONF/FEED	er Level el: lability: Yes Yes Yes Yes	or Mode: _ Re No No No	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS CONF/FEED A Loop C/S	er Level el: lability: Yes Yes Yes Yes Yes	or Mode: _ Re No No	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS CONF/FEED A Loop C/S B Loop C/S	er Level el: lability: Yes Yes Yes Yes	or Mode: _ Re No No No No	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS CONF/FEED A Loop C/S	er Level el: lability: Yes Yes Yes Yes Yes Yes Yes	or Mode: _ Re No No No No	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS CONF/FEED A Loop C/S B Loop C/S A Loop RHR	er Level el: lability: Yes Yes Yes Yes Yes Yes Yes Yes Yes	or Mode: _ Re No No No No No	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS CONF/FEED A Loop C/S B Loop C/S A Loop RHR B Loop RHR	er Level el: lability: Yes Yes Yes Yes Yes Yes Yes Yes Yes	or Mode: _ Re No No No No No No No No No No No No	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS CONF/FEED A Loop C/S B Loop C/S A Loop RHR B Loop RHR HPSW ESW SBLC	er Level el: lability: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	or Mode: _ Re No No No No No No No No No	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS CONF/FEED A Loop C/S B Loop C/S B Loop RHR B Loop RHR HPSW ESW SBLC CRD	er Level el: lability: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	or Mode: _ 	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS CONF/FEED A Loop C/S B Loop C/S B Loop RHR B Loop RHR B Loop RHR HPSW ESW SBLC CRD SBGTS	er Level el: lability: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	or Mode:	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS CONF/FEED A Loop C/S B Loop C/S B Loop RHR B Loop RHR B Loop RHR HPSW ESW SBLC CRD SBGTS RPV Intact	er Level el: lability: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	or Mode:	eactor Pressure: Comments:	
NIT 3 STATUS:	Reactor Powe Reactor Leve System Avai HPCI RCIC ADS CONF/FEED A Loop C/S B Loop C/S B Loop RHR B Loop RHR B Loop RHR HPSW ESW SBLC CRD SBGTS	er Level el: lability: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	or Mode:	eactor Pressure: Comments:	

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TABLE 1 GENERAL CONDITIONS

<u>NOTE</u>: This table is to be used as a guide for "big picture" emergency classification. <u>IF</u> conditions listed are met <u>AND</u> specific EALs of other tables <u>do not</u> address current emergency conditions, <u>THEN</u> classify using this table.

UNUSUAL EVENT	<ol> <li>Situation threatens normal level of plant safety. No releases of radioactive material off-site are expected.</li> </ol>
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
	<pre>2) Conditions exist that warrant: (a) Activation of EOF/ENC <u>AND</u> (b) Activation of off-site monitoring teams <u>OR</u> Protective measures recommendations to public near the site</pre>
	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 <u>AND</u> loss of, or high potential for loss of primary Containment integrity.
	<ol> <li>Conditions exist that warrant all on-site and off-site emergency facilities being activated to aid in implementation of protective actions.</li> </ol>
	3) A significant release of radioactive material has occurred or could take place offsite in a short period of time.
	<ol> <li>Protective Actions Recommendations for off-site areas are made for PBAPS.</li> </ol>
	* PAR evacuate a full 360 degrees for 2 miles evacuate affected and 2 adjacent sectors for 2-5 miles

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TABLE 2 FUEL DAMAGE

UNUSUAL EVENT	1) Off-gas radiation rise of 500 mR/hr within 30 minutes
	2) Off-gas radiation >2.5E+03 mR/hr {RR-2(3)-17-152}
CM-5	<ol> <li>Reactor coolant activity &gt;4 uCi/gm dose equivalent I-131 per Tech. Spec. 3.4.6.</li> </ol>
ALERT	1) Containment radiation {RI-8(9)103 A/C} >4.0E+02 R/hr {RI-8(9)103 B/D}
	2) Off-gas radiation >2.5E+04 mR/hr {RR-2(3)-17-152}
	3) Reactor coolant activity >300 uCi/gm dose equivalent I-131 with a Rx scram due to main steam line high radiation.
	<pre>4) Spent fuel damage resulting in refuel floor high radiation <u>OR</u> refuel floor ventilation exhaust high radiation</pre> {RIS-2(3)-17-458(A,B,C,D)}
SITE AREA EMERGENCY	1) Containment radiation {RI-8(9)103 A/C} >4.0E+03 R/hr {RI-8(9)103 B/D}
	<pre>2) Major spent fuel damage or uncovering of spent fuel confirmed by high fuel floor radiation levels AND (a) observation OR (b) refuel floor high radiation OR (c) refuel floor ventilation exhaust high radiation</pre> {U/2 ARM 3-7,3-8,3-9,3-10} {U/3 ARM7-9,7-10,7-11,7-12} {U/3 ARM7-9,7-10,7-11,7-12} {RIS-2(3)-17-458(A,B,C,D)}
GENERAL EMERGENCY	<pre>1) Containment radiation &gt;4.0E+04 R/hr {RI-8(9)103 A/C} with Containment pressure &gt;10 psig {RI-8(9)103 B/D} {PR-2(3)508} (for a known or probable failure of Primary Containment, see Table 4)</pre>
	* PAR - evacuate a full 360 degrees for 2 miles - evacuate affected and 2 adjacent sectors for 2-5 miles
	<pre>2) Containment radiation &gt;3.0E+05 R/hr {RI-8(9)103 A/C} with Containment pressure &gt;10 psig {RI-8(9)103 B/D} {PR-2(3)508} (for a known or probable failure of Primary Containment, see Table 4)</pre>
	<pre>* PAR - evacuate a full 360 degrees for 5 miles - evacuate affected and 2 adjacent sectors for 5-10 miles</pre>

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TABLE 3 REACTOR COOLANT SYSTEM (RCS)

UNUSUAL EVENT	1)	RCS leakage exceeding Tech. Spec. LCO 3	.4.4 limits.
EVENI		<ul> <li>a. No pressure boundary leakage</li> <li>b. greater than 5 gpm unidentified lea</li> <li>c. greater than 25 gpm total leakage of 24 hour period</li> <li>d. greater than 2 gpm increase in union within the previous 24 hour period</li> </ul>	dentified leakage
	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.	{LI-2(3)-02-3-091} {LI-2(3)-02-3-091} {PR/LR-2(3)-02-3-113} * {LR-2(3)-02-3-10A} * {LR-2(3)-02-3-110A} * (Blue Pen Only) {PR-2(3)-508}
		* PAR evacuate a full 360 degree fo evacuate affected and 2 adjac	r 2 miles ent sectors for 2-5 miles

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### 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.
	<pre>3) Torus room flood (6 inches) with a corresponding level drop in the Torus. </pre> {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 $RI-8(9)103A/C$ AND $RI-8(9)103B/D$
	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} AND {RI-8(9)103B/D} Vent Stack >1.0E-3 uCi/cc {RR-2(3)979}
	3) Primary Containment radiation >4.0E+3 R/hr {RI-8(9)103A/C} with a <u>known or probable</u> failure of {RI-8(9)103B/D} Primary Containment Integrity.
GENERAL EMERGENCY	<pre>1) Primary Containment Radiation &gt;4.0E+4 R/hr with a <u>known or probable</u> failure of {RI-8(9)103A/C} Primary Containment Integrity. {RI-8(9)103B/D} (for Primary Containment Intact, see Table 2)</pre>
	* PAR evacuate a full 360 degree for 2 miles evacuate affected and 2 adjacent sectors for 2-5 miles
	<pre>2) Primary Containment radiation &gt;3.0E+5 R/hr with a <u>known or probable</u> failure of {RI-8(9)103A/C} Primary Containment Integrity. {RI-8(9)103B/D} (for Primary Containment Intact, see Table 2)</pre>
	* PAR evacuate a full 360 degree for 5 miles evacuate affected and 2 adjacent sectors for 5-10 miles

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## TABLE 5 RADIOACTIVE RELEASE

	NOTE :
TEDE = TO	MMITTED DOSE EQUIVALENT DTAL EFFECTIVE DOSE EQUIVALENT DTAL PROTECTIVE ACTION RECOMMENDATION DOSE 0, "MANUAL OF PROTECTIVE ACTION GUIDES AND PROTECTIVE ACTIONS FOR NUCLEAR INCIDENTS.
UNUSUAL EVENT	<ol> <li>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.</li> <li>Liquid release exceeding ODCMS 3.8.B.1</li> <li>Jodine Release exceeding ODCMS 3.8.C.1.b</li> </ol>
ALERT	<ol> <li>Calculated offsite dose rate &gt;0.57 mRem/hr TPARD using 15 min. avg. release data.</li> <li>Calculated offsite dose rate &gt;1.7 mRem/hr child thyroid CDE using 15 min. avg. release data.</li> </ol>
SITE AREA EMERGENCY	<ol> <li>Projected offsite total dose &gt;100 mRem TPARD.</li> <li>Projected offsite thyroid dose &gt;500 mRem child thyroid CDE.</li> <li>Projected offsite skin dose &gt;5,000 mRem.</li> <li>Actual offsite dose rate &gt;25 mRem/hr TEDE.</li> <li>Measured offsite air concentration &gt;6.5N8 uCI/cc iodine.</li> </ol>
GENERAL EMERGENCY	<ol> <li>Projected offsite total dose &gt;1000 mRem TPARD.</li> <li>Projected offsite thyroid dose &gt;5000 mRem child thyroid CDE.</li> <li>Projected offsite skin dose &gt;50,000 mRem.</li> <li>Actual offsite dose rate &gt;250 mRem/hr TEDE.</li> <li>Measured offsite air concentration &gt;6.5N7 uCi/cc iodine.</li> <li>* PAR evacuate 360 degrees for 5 miles evacuate affected and 2 adjacent sectors for 5-10 miles</li> </ol>

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### TABLE 6 FIRE

UNUSUAL EVENT	1)	Fire in protected area las attempts to extinguish it.	ting 10 minutes or more after initial
ALERT	1)	Fire which has lasted over extinguish it and which <u>co</u> systems INOPERABLE:	20 minutes after initial attempts to uld make any of the following safety
		- ADS	- RHR
		- ECW	- RPS
		- ESW	- Core Spray
		- HPCI	- Control Rod Drive HCU's
		- HPSW	- Control Room Ventilation
		- PCIS	- 2 Emergency Diesel Generators
		- RCIC	- Loss of Emergency Switchgear
		- SBGTS	- Primary Containment
		- SLC	- 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	

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TABLE 7 SEVERE NATURAL PHENOMENA

UNUSUAL EVENT	<ol> <li>Earthquake felt in plant or detected and confirmed on station seismic instrumentation per SO 67.7.A.</li> </ol>
	<pre>2) Conowingo Pond level &lt;104 feet without prior notification by the Power System Director. {LI-2(3)278A,B,C}</pre>
	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	<ol> <li>"OPERATING BASIS EARTHQUAKE" exceeded per SE-5 and felt in the plant.</li> </ol>
	<ol> <li>An uncontrollable loss of Conowingo Pond level as confirmed by the Power System Director.</li> </ol>
	3) Conowingo Pond level >112 feet.
	<ol> <li>Hurricane or tornado which strikes the power block with identifiable plant damage.</li> </ol>
SITE AREA EMERGENCY	<ol> <li>"MAXIMUM CREDIBLE EARTHQUAKE" detected on station seismic instrumentation (0.12g) per UFSAR Sec. 2.5.3, Sec.12.2 and Appendix C.</li> </ol>
	2) Conowingo Pond level <87 feet as confirmed by the Power System Director.
	3) Conowingo Pond level >113 feet.
GENERAL EMERGENCY	N/A

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### TABLE 8 LOSS OF POWER

UNUSUAL EVENT	<ol> <li>All offsite power to the emergency buses unavailable for &gt;60 seconds.</li> </ol>
	<ol> <li>No diesel generators available when required for &gt;60 seconds.</li> </ol>
ALERT	1) Loss of all offsite power <u>AND</u> <u>NO</u> diesel generators energize their associated buses.
	2) Loss of DC power as evidenced by verifying <105 volts on {panel 2(3)09, alarms C-3 & C-4} all four 125 V distribution {panel 2(3)20, alarms H-3 & H-4} panels.
SITE AREA EMERGENCY	<ol> <li>Loss of all offsite power for &gt;15 minutes <u>AND NO</u> diesel generators energize their associated buses for &gt;15 minutes.</li> </ol>
	2) Loss of DC power for longer than 15 minutes as evidenced by verifying <105 V on all four 125 V distribution panels. 2) Loss of DC power for longer {panel 2(3)09, alarms C-3 & C-4} {panel 2(3)20, alarms H-3 & H-4}
GENERAL EMERGENCY	N/A

<u>NOTE</u>:

DIESEL GENERATORS SHUTDOWN DUE TO LACK OF COOLING WATER ARE CONSIDERED "UNAVAILABLE".

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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 <u>AND</u> Loss of the OMNI Network <u>AND</u> Loss of the GTE System
	2) Unplanned loss of most or all safety system annunciators <u>OR</u> indicators for >15 minutes requiring increased surveillance to safely operate the unit(s).
ALERT	1) Unplanned loss of most or all safety system annunciators <u>OR</u> indicators for 15 minutes requiring increased surveillance to safely operate the unit(s) <u>AND EITHER</u> a significant plant transient is in progress <u>OR</u> the plant monitoring system (PMS) is unavailable.
SITE AREA EMERGENCY	<ol> <li>Loss of safety system annunciators         <u>AND</u> indicators         <u>AND</u> PMS         <u>AND</u> a significant plant transient is in progress.         </li> </ol>
GENERAL EMERGENCY	N/A

<u>NOTE</u> :

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.

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# TABLE 10 HAZARDS TO STATION OPERATION

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UNUSUAL EVENT	<ol> <li>Aircraft crash on <u>OR</u> near site <u>OR</u> unusual aircraft activity over facility</li> </ol>
	2) Significant explosion on <u>OR</u> near site
	3) Significant toxic gas <u>OR</u> flammable gas release on <u>OR</u> near site.
ALERT	1) Aircraft crash OR missile impact within the protected area.
	<ol> <li>Significant explosion within the protected area affecting plant operation.</li> </ol>
	<ol> <li>Uncontrolled significant release of toxic <u>OR</u> flammable gas within the protected area.</li> </ol>
SITE AREA	HAZARDS WITH EITHER UNIT NOT IN MODE 4
EMERGENCY	1) Aircraft crash <u>OR</u> missile impact with major damage in any vital area.
	2) Explosion causing severe damage to 2 <u>OR</u> more diesel generators <u>OR</u> 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 <u>OR</u> flammable gas detected in the Control Room (e.g. Chlorine, Cardox).
GENERAL EMERGENCY	N/A

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# TABLE 11 CONTROL ROOM EVACUATION

UNUSUAL EVENT	N/A
ALERT	<ol> <li>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.</li> </ol>
SITE AREA EMERGENCY	<ol> <li>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.</li> </ol>
GENERAL EMERGENCY	N/A
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### TABLE 12 THREAT TO SECURITY

Credible sabotage or bomb threat
Credible intrusion and attack threat
Attempted intrusion and attack
Attempted sabotage discovered
Hostage situation or extortion threat.
Actual attack and intrusion into a protected area
Suspected bomb or sabotage device discovered.
Imminent loss of physical control of the facility with imminent occupation of the Control Room or other vital areas.
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
Act the * P

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.

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# 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 <u>AND</u> via Rx mode switch <u>AND</u> via manual scram pushbuttons <u>AND</u> via alternate rod insertion (ARI).
	3) Scram condition AND the Rx is NOT shutdown.
	4) Turbine failure causing casing penetration.
SITE AREA	1) Hot shutdown unattainable.
EMERGENCY	<ol> <li>Scram condition, Rx <u>NOT</u> shutdown <u>AND</u> torus temperature above 110 degrees F.</li> </ol>
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%.

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# **RO ADMIN OUTLINE**

Administrative Topics Outline

Form ES-301-1

	y: <u>Peach Bottom Ur</u> nation Level (circle c					
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.				

# PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

RO CONDUCT OF OPS

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator			
TASK-JPM DESIGNATOR:	ASK-JPM DESIGNATOR: New-Control Rod Verif		201003A3.01	
			URO: 3.7	SRO: 3.6

TASK DESCRIPTION: Contr

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 4<sup>th</sup> RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

# H. PERFORMANCE CHECKLIST

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

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.

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# 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 4<sup>th</sup> RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

GP-9-2 Rev. 26 Page 1 of 3 MGW:rww

## 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:
  - APRM oscillations of greater than <u>OR</u> equal to 10 percent peak-to-peak,
  - O LPRM <u>OR</u> APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, <u>OR</u>
    - WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.
- 3.1 <u>IF</u> evidence of core thermal hydraulic instability exists, <u>THEN</u> place the reactor mode switch in "SHUTDOWN" <u>AND</u> enter T-100, "Scram", <u>AND</u> exit this procedure. **CM-1, CM-2**
- 3.2 Lower recirculation flow until <u>ANY</u> 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

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

<u>OR</u>

o FLLLP exceeds 0.995.

GP-9-2 Rev. 26 Page 2 of 3

- 3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch <u>OR</u> 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 <u>OR</u> 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 <u>WHEN</u> plant conditions permit, <u>THEN</u> 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 <u>AND</u> 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 <u>IF</u> any thermal limit value is equal to or greater than 1.000, <u>THEN</u> 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 <u>IF</u> further power reduction is required, <u>THEN</u> exit this procedure <u>AND</u> enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure <u>AND</u> enter GP-5, "Power Operations".

### 4.0 <u>REFERENCES</u>

- 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)

ON-122, Rev. 5 Page 1 of 2 NHN:nhn 04/13/98

### PECO Energy Company Péach Bottom Units 2 and 3

### ON-122 MISPOSITIONED CONTROL ROD - PROCEDURE

### 1.0 <u>SYMPTOMS</u>

- 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 <u>AND</u> 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 <u>IF</u> the mispositioned control rod is caused by a Rod Drift <u>THEN</u>:

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

2.3.2 Exit this procedure.

- 2.4 <u>IF</u> thermal power is below the RWM low power setpoint <u>AND</u> control rods are positioned such that more than two insert errors <u>OR</u> more than one withdraw error exists, <u>THEN</u> manually scram in accordance with GP-4, "Manual Reactor Scram".
- 2.5 <u>IF</u> the control rod had been mispositioned less than two minutes <u>THEN</u>:

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

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

ON-122, Rev. 5 Page 2 of 2

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 <u>IF</u> the control rod has been mispositioned for longer than two minutes <u>AND</u> PCIOMR surveillance is <u>NOT</u> required, <u>THEN</u>:
  - 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

**RO CONDUCT OF OPS** 

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator					
TASK-JPM DESIGNATOR:	New-Partial Proc	K/A:	<u>2.2.11</u> 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

- 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.

# 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

Ξ.

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.	Р	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.	Ρ	<ul> <li>Steps which do not support the testing of the "B" SBLC pump are changed or crossed out.</li> <li>Step 6.1.1 should be made to apply to the "B" SBLC Pump Only.</li> <li>Steps 6.1.2 –6.1.5 should be crossed out.</li> <li>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).</li> </ul>
	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

# **TERMINATING CUE**

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Ι.

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.

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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 <u>SCOPE</u>
- 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 preimplementation 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

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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 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 <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 **PREREQUISITES**

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None

### 7.0 PROCEDURE

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#### 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:
  - 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.

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### 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 <u>NOT</u> 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 <u>NOT</u> 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 <u>more limited in</u> <u>scope</u> 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 <u>entire scope</u> 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.
  - 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"

PECO Energy Company Peach Bottom Unit 2 Surveillance Test	2	05/31/99	ST-O-011-301-2 Rev. 12 Page 1 of 25 MRR:cah
ST-0-011-301-2 STANDBY	LIQUID CONTROL PUM	P FUNCTIONAL	TEST FOR IST
TEST FREQUENCY: Once/92 TECH SPEC: SR 3.1. APPLICABILITY: Modes 1	2 days (See Section 7.5, SR 3.1.7.8, SR L and 2	1.0) 3.1.7.10, S	ection 5.5.6
1 CHECK why this procee	lure is being perfor	med:	
Schedule	OVF 🗌 Retest D	ue To Unsat	Test
Other Reason:			
Approved By SMgt:	Printed Name		/ The Initials
2 INITIAL one of the fo	ollowing Test Result	S:	
A: All */I steps a	are SATIS	FACTORY	
B: One or More */ Refer to Section	I steps are UNSATIS on 9.0 for Tech Spec	FACTORY LCO's	
Performed By:	Printed Name	/	/ Te
RO/PRO Informed of Test Completion:		/	_/
Reviewed By SMgt:		/	_/
UNSAT Notification:	SMgt Discretion: F	Plant Mgr or	Others
Notified By:		/	_/
3 If other portions of Or other discrepancie IST Step(s) in AL DESCRIBE discrepa	es were noted Then C	COMPLETE CHE	Iorrowing:
4 Reviewed/Approved Plant Staff:	Printed Name		_/ te Initials

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### 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	<u></u>	//
	Vibration mo Raw Sign Single In (Min. Req. Range 2.8-1	al ntegration Freq.			//
	Vibration p (Min. Req. Range 2.8-1	Freq.	± 4.0%		//
	Test Gauge psig	0-1500	± 5.0%		//
· ·	Test Gauge psig (N/A i rig is to b	f one test	± 5.0%		//
2.2	(1 or 2) -	Test rig(s	) with Schra	der fitting	(see Figure 1)
2.3	SBLC Measur	ing Stick			
2.4	Non-contami quick disco	nated hose nnect).	e for flushin	g test tank	20T017 (with
2.5	Locked Valv	e Key For:	:		
	NUMBER	DESCRIPTI	LON		NORMAL POS
	HV-2-11-11	SBLC Tk 2 To Pumps	20T018 Outlet 2AP040 + 2BP	Block 2040	LOCKED OPEN
	HV-2-11-15	SBLC Disc Outboard	ch Header To Isolation Va	RPV alve	LOCKED OPEN
	HV-2-11-26	SBLC Pum Block To	os Disch Reci Tks 20T017 4	Lrc HDR + 20T018	LOCKED CLOSED

			Page	3 of 25
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	PRER	EQUISITES		<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 <b>VERIFY</b> at least two operators are ava to perform this test.	ilable	
		3.5.2 • VERIFY SBLC Test Tank empty and NO fo objects in tank.	reign	
		3.5.3 <b>VERIFY</b> one 55 gallon drum which is empty or near empty available at Rx Bldg 165' by SBLC system drain lines.		
		3.5.4 <b>VERIFY</b> that qualified personnel are available for vibration data collecti and lube oil sampling. Operators may view the training video for Operation Role in Predictive Maintenance to refresh on proper technique.		
		3.5.5 <b>OBTAIN</b> oil sampling equipment from th Oil Sample Drop-off Box located on Turbine Bldg 116' outside the ferrography lab.	e	

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### 3.0 **PREREQUISITES** (Continued)

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- 3.6 Approval to Start Test
  - 3.6.1 **OBTAIN** RO Permission to begin.

	1 1	
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

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- 5.1 Each SBLC Pump develops a flow rate of  $\geq$  43 gpm at a discharge pressure  $\geq$ 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.

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### 6.0 PERFORMANCE STEPS

Initial <u>Sat</u><u>UnSat</u>

- 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".

					2				-301-2 ev. 12 of 25
6.0	PERF	ORMANCE &	STEPS	(Continue	: <b>d</b> )	<u> </u>			tial <u>UnSat</u>
	6.2	SBLC Pun	A qu	Test CM-1					
		6.2.1	RECC	RD 2BT076	press	ure.			
				psig				. <u> </u>	
	•	* Room * Cont: * valve * 6.2.2 6.2.3 Manufe 30 mit	. Starol Fes. ***** NOT: Liqu LOC2	TART SBLC F arting SBLC Room will f tttttt TFY Reactor add Control ALLY START N cer recomme	C Pump fire t ****** r Oper l Pump 2AP04 OTE ends r g pump	ator 2AP04 A" will be 0. cunning pump maintenand	ve * * ******** 0 "Standk e started	ру 1	
		6.2.4	to tes	satisfy pu ting, THEN ERWISE N/A	mp pos PERFO	st is being st maintena DRM this st PROCEED to	nce ep,	ed	
			1.	SLOWLY TH	ROTTLI 50 to	minutes un E HV-2-11-2 350 psig a RUN pump f	s indica	ted on	
			2.	pressure indicated	betwe	E HV-2-11-2 en 550 to 6 I-2-11-053 ditional mi	AND RUN	as 	
			3.	pressure	betwe 1 on P	E HV-2-11-2 en 850 to 9 I-2-11-053 ditional m:	AND RUN	as 	

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### 6.0 PERFORMANCE STEPS (Continued)

### Initial <u>Sat</u><u>UnSat</u>

### 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.

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*	DO NOT EXCEED a pump discharge pressure	<b>*</b> `
*	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.	*
*	The profiles.	*
* * *	************	*

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.
- 6.2.9 RUN 2AP040 for at least 2 minutes to ensure accurate vibration data.

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# 6.0 **PERFORMANCE STEPS** (Continued)

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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

	RED VIBRATION KED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE			
INBOARD							
X1	IN/SEC PK	≤ 0.716	0.716 to 1.719	> 1.719			
¥1	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.

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### 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u> <u>UnSat</u>

- 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.
  - 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.

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6.0 PERFORMANCE STEPS (Continued)

Initial <u>Sat</u><u>UnSat</u>

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:

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

3168 / \_\_\_\_\_ sec = \_\_\_\_\_ gpm

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### 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	ACCEPTABLE	ALERT	ACTION
	VALUE	RANGE	RANGE	RANGE
TIME (Seconds)		N/A	N/A	N/A
FLOW RATE (gpm)		50.2 to	< 50.2 to	< 49.1 or
(3168/Time)		58.1	49.1	> 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. \*

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### 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u><u>UnSat</u>

#### 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.

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.

\* 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.

# ST-0-011-301-2

6.0	PERFORMANCE	STEPS (Continued)		Init <u>Sat</u>	ial <u>UnSat</u>
	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	-		
	*****	**************************************			
	* Roo	NOT START SBLC Pumps from the Control * m. Starting SBLC Pumps from the * trol Room will fire the explosive * ves.			
	* ****	************************************			
	6.3.4	<b>NOTIFY</b> Reactor Operator 2BP040 "Standb Liquid Control Pump B" will be started	y i		. <u></u>
	6.3.5	LOCALLY START 2BP040.	-		. <u></u>
		NOTE			
	30 m	facturer recommends running pump for inutes following pump maintenance re operating at full load.			

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- IF Surveillance Test is being performed 6.3.6 to satisfy pump post maintenance testing, THEN PERFORM this step, OTHERWISE N/A this step AND PROCEED to step 6.3.7.
  - RUN pump for 5 minutes unloaded THEN 1. 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.
  - SLOWLY THROTTLE HV-2-11-26 to a 2. pressure between 550 to 650 psig as indicated on PI-2-11-053 AND RUN pump for 10 additional minutes.

# 2

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#### 6.0 **PERFORMANCE STEPS** (Continued)

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.

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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. Initial Sat UnSat

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#### 6.0 PERFORMANCE STEPS (Continued)

Initial Sat UnSat

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- 6.3.11 RUN 2BP040 for at least 2 minutes to ensure accurate vibration data.
- 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

	RED VIBRATION KED 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		
¥1	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.

# 2

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# 6.0 PERFORMANCE STEPS (Continued)

#### Initial <u>Sat</u><u>UnSat</u>

#### 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.

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6.0	PERFORMANCE	STEP	S (Continued)	Init <u>Sat</u>	ial <u>UnSat</u>
		2.	<b>RECORD</b> equipment number, equipment serial number (if available), sample point, sample date, AND "Sampled by" name on labels.		
		3.	<b>OBTAIN</b> oil sample from each reservoir by removing oil sample fitting cap, inserting plastic probe, and drawing vacuum on sample bottle with sampling pump.	、	
		4.	<b>DISCONNECT</b> sample probe <b>AND REPLACE</b> sampling fitting cap hand tight.		
		5.	<b>REMOVE</b> sample bottle from sampling pump <b>AND REPLACE</b> 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		CULATE 2BP040 flow rate as follows RECORD Flow rate on Data Sheet 4:		
			<u>52.8 gal x 60 sec/min</u> = Flow rate Step 6.3.18		
			3168 / sec = gpm	<u></u>	
				]	

# 2

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### 6.0 PERFORMANCE STEPS (Continued)

Initial <u>Sat UnSat</u>

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

6.3.23 VERIFY flow recorded in Data Sheet 4 is  $\geq$  43 gpm AND pressure is  $\geq$  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.
- 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.

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6.0	PERF	ORMANCE	STEPS (Continued)	Initial <u>Sat</u> <u>UnSat</u>
		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 *	
			not run SBLC Pump when Test Tank * empty. *	
		*	*	
		*****		
			2. LOCALLY <b>START</b> 2BP040 <b>THEN STOP</b> pump when Test Tank level reaches top of suction line on side of test tank.	
			3. OPEN HV-2-11-11.	<u></u>
		6.3.31	CLOSE HV-2-11-41.	<u></u>
	6.4	Restori	ng SBLC System to Operable Status	
		6.4.1	LOCK closed HV-2-11-41.	<u> </u>
		6.4.2	VERIFY OR LOCK OPEN HV-2-11-11.	<u> </u>
		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	<b>NOTIFY</b> Reactor Operator SBLC System has been returned to service.	

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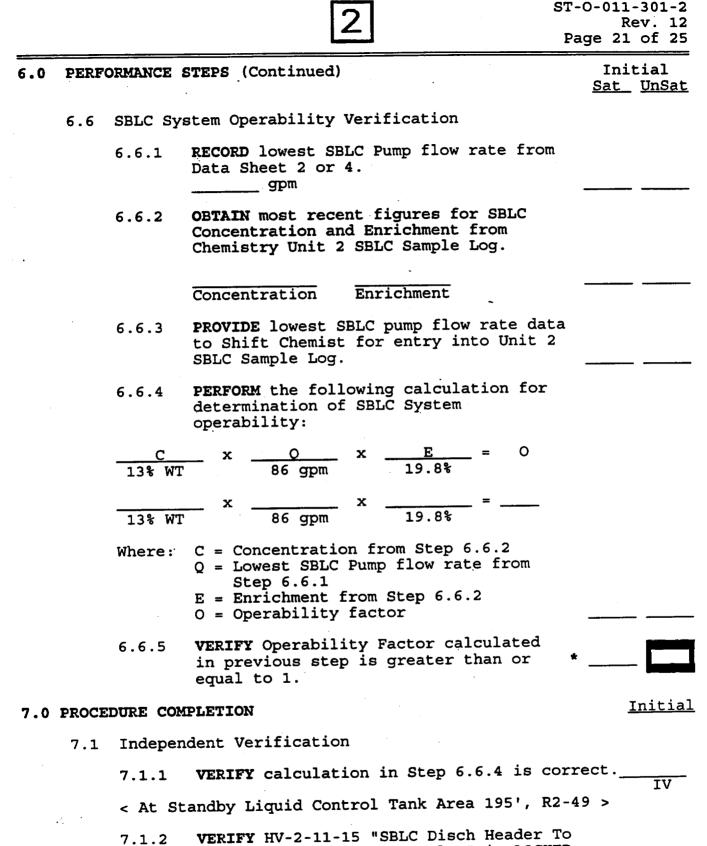
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				2			-011-301-2 Rev. 12 20 of 25
6.0	PERF	ORMANCE :	STEPS (Cont	inued)		<u> </u>	Initial Sat <u>UnSat</u>
	6.5	Flushing	g Test Tank	20T017			
		* 16	5'. If nec	essary, I	Water Drum on HV-2-11-23143 hanging drums.	*** * * * *	•
		******	*****	******	**********	****	
		< At Rx	Bldg 165',	West Wa	11>		
		6.5.1	<b>OPEN</b> HV-2- 20T017 Out		"SBLC Test Tar Valve".	1k	
		< At St	andby Liqui	d Contro	l Tank Area, 19	95', R2-49	>
		6.5.2	<b>REMOVE</b> SBI Tank.	C measur	ing stick from	Test -	
		6.5.3	valve HV-2	2-38D-29	demin water sur "Demin Wtr Hose ank 20T017.	oply Blk -	
		6.5.4	<b>OPEN</b> HV-2- Inner Drai		BLC Test Tank 2 •	20T017 -	
		6.5.5	OPEN HV-2- with demin		ND FLUSH Test ' water.	Fank -	
•		6.5.6	CLOSE HV-2	2-38D-29.		_	
		6.5.7	CLOSE HV-2	2-11-28.		-	
		6.5.8	VERIFY Tes	st Tank e	mpty.	-	<u> </u>
		6.5.9	INSTALL CO	over on T	est Tank.	-	
		6.5.10	<b>REMOVE</b> hos valve HV-2		lemin water sup	ply -	
		< At Rx	: Bldg 165'	, West Wa	11>		
	•	6.5.11	CLOSE HV-:	2-11-2314	3.	-	
		6.5.12	off box le	ocated on	ottles in the Turbine Bldg graphy lab.	drop- 116' -	

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.2 VERIFY HV-2-11-15 "SBLC Disch Header TO RPV Outboard Isolation Valve" is LOCKED OPEN.

IV

### ST-O-011-301-2 Rev. 12 Page 22 of 25

<ul> <li>7.0 PROCEDURE COMPLETION (Continued)</li> <li>7.1.3 VERIFY HV-2-11-11 "SBLC Tk 207018 Outlet Block To Pumps 2AP040 + 2BP040" is LOCKED OPEN.</li> <li>7.1.4 VERIFY HV-2-11-26 "SBLC Pumps Disch Recirc HDR Block To Tks 207017 + 207018" is LOCKED CLOSED.</li> <li>7.1.5 VERIFY HV-2-11-41 "SBLC Test Tk 207017 Outlet To SBLC Pumps Suction HDR" is LOCKED CLOSED.</li> <li>7.1.6 VERIFY HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 207017" is CLOSED.</li> <li>7.1.7 VERIFY HV-2-11-30 "SBLC Pumps Disch/Recirc Blk To SBLC Test Tank 207018" is CLOSED.</li> <li>7.1.8 VERIFY HV-2-11-28 "SBLC Test Tank 207017 Drain Valve" is CLOSED.</li> <li>7.1.9 VERIFY test rig at 2AT076 "Stby Liquid Control N2 Accumulator A" REMOVED AND cap INSTALLED.</li> <li>7.1.10 VERIFY test rig at 2BT076 "Stby Liquid Control N2 Accumulator B" REMOVED AND cap INSTALLED.</li> <li>7.1.11 VERIFY HV-2-11-053 "PI-2-11-053 Instr Isol SBLC PFs Disch Header Press" is OPEN.</li> <li>At Rx Bldg 165', West Wall&gt;</li> <li>7.1.12 VERIFY HV-2-11-23143 "SBLC Test Tank 207017 Outer Drain Valve" is CLOSED.</li> <li>7.2.1 COMPLETE Section 2 of Cover Page (and Section 3 if applicable).</li> <li>8.1 Governing</li> </ul>						Page	22 of 25
Outlet Block To Pumps 2AP040 + 2BP040" is LOCKED OPEN. 7.1.4 VERIFY HV-2-11-26 "SBLC Pumps Disch Recirc HDR Block To Tks 20T017 + 20T018" is LOCKED CLOSED. 7.1.5 VERIFY HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR" is LOCKED CLOSED. 7.1.6 VERIFY HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 20T017" is CLOSED. 7.1.7 VERIFY HV-2-11-30 "SBLC Pumps Disch/Recirc Blk To SBLC Test Tank 20T018" is CLOSED. 7.1.8 VERIFY HV-2-11-28 "SBLC Test Tank 20T017 Drain Valve" is CLOSED. 7.1.9 VERIFY test rig at 2AT076 "Stby Liquid Control N2 Accumulator A" REMOVED AND cap INSTALLED. 7.1.10 VERIFY test rig at 2BT076 "Stby Liquid Control N2 Accumulator B" REMOVED AND cap INSTALLED. 7.1.11 VERIFY INV-2-11-053 "PI-2-11-053 Instr Isol SBLC FPS Disch Header Press" is OPEN. 7.1.12 VERIFY HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve" is CLOSED. 7.2.1 COMPLETE Section 2 of Cover Page (and Section 3 if applicable). 8.0 REFERENCES	7.0 1	PROCED	URE COMP	LETION	(Continued)		Initial
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<ul> <li>7.1.8 VERIFY HV-2-11-28 "SBLC Test Tank 20T017 Drain Valve" is CLOSED.</li> <li>7.1.9 VERIFY test rig at 2AT076 "Stby Liquid Control N2 Accumulator A" REMOVED AND cap INSTALLED.</li> <li>7.1.10 VERIFY test rig at 2BT076 "Stby Liquid Control N2 Accumulator B" REMOVED AND cap INSTALLED.</li> <li>7.1.11 VERIFY IIV-2-11-053 "PI-2-11-053 Instr Isol SBLC PPs Disch Header Press" is OPEN.</li> <li>7.1.12 VERIFY HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve" is CLOSED.</li> <li>7.2 Records Completion</li> <li>7.2.1 COMPLETE Section 2 of Cover Page (and Section 3 if applicable).</li> <li>8.0 REFERENCES</li> </ul>			7.1.7	Disch/H	Recirc Blk To SBLC Tank 20T018"		
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Outer Drain Valve" is CLOSED. 7.2 Records Completion 7.2.1 COMPLETE Section 2 of Cover Page (and Section 3 if applicable). 8.0 REFERENCES			< At Rx	Bldg 10	65', West Wall>		
<ul> <li>7.2 Records Completion</li> <li>7.2.1 COMPLETE Section 2 of Cover Page (and Section 3 if applicable).</li> <li>8.0 REFERENCES</li> </ul>			7.1.12			OT017	
Section 3 if applicable) 8.0 REFERENCES		7.2	Records	Complet	tion		
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8.1.1 Tech Spec SR 3.1.7.5

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- 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

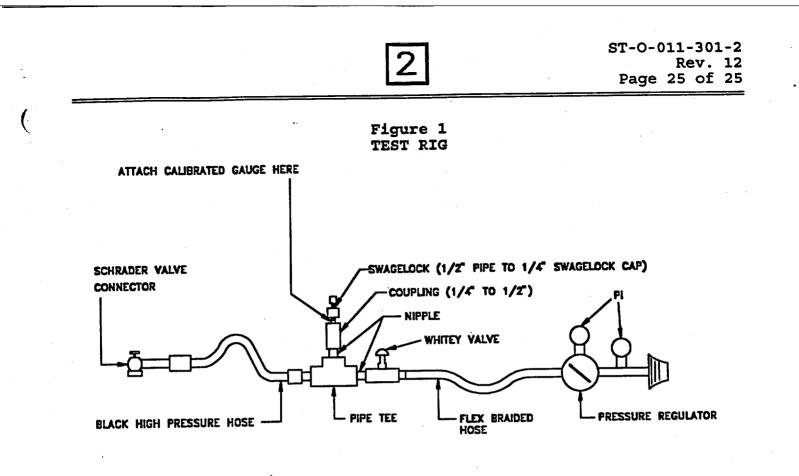
# 10.0 PARTICIPANTS RECORD

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Printed Name	Initials
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# PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator					
TASK-JPM DESIGNATOR:	NEW-P&ID USE	<b>K/A:</b>	<u>2.1.24</u>			
			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

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STEP	STEP	ACT	STANDARD
NO			
	Obtain M-315 Sh. 4, "P&I Diagram	Ρ	M-315 for ESW is located using the M-300 index. Sheet 4 is located as
	Emergency Service Water and High Pressure Service Water Sys's".		featuring the "B" ESW pump.
2	Locate the "B" ESW pump on M-315 Sh.	Р	"B" ESW is located at coordinates A-5 on
	4.		M-315 Sh. 4.
3.	Locate PS-0246B on the discharge pipe of the "B" ESW pump.	Ρ	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.	Ρ	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.	Ρ	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.	Р	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.	Ρ	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.	Р	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.

NEW-PID USE Rev000

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. Determine that the ECW pump will trip 45	Ρ	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.
seconds after an ECW auto start signal on Diesel Generator start.	<b>P</b> .	Logic line from "AND" is traced to ECW "TRIP" when auto start signal has existed for 45 seconds.
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.	Ρ	Logic lines are traced to "AND" logic on M-330 Sh. 1 coordinates H-3.
Control Room Supervisor informed of plant impact of damaged PS-0246B on cooling water should a Diesel Generator start occur.	Ρ	<ul> <li>Inform the Control Room Supervisor that on a Diesel Generator start, the:</li> <li>A and B ESW pumps will automatically start and continue to run normally.</li> <li>ECW pump will automatically start and shutdown after 45 sec.</li> <li>ECW discharge valve (MO-0841) will remain closed.</li> </ul>
bdEfCpcs	e satisfied since ESW A <u>AND</u> B ischarge pressure is <u>NOT</u> low. The CW discharge valve will remain closed blowing an ECW auto start signal. Control Room Supervisor informed of lant impact of damaged PS-0246B on ooling water should a Diesel Generator	e satisfied since ESW A <u>AND</u> B ischarge pressure is <u>NOT</u> low. The CW discharge valve will remain closed blowing an ECW auto start signal. Control Room Supervisor informed of P lant impact of damaged PS-0246B on ooling water should a Diesel Generator tart occur.

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

# I. TERMINATING CUE

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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.

### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

RO RAD CONTROL

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator						
TASK-JPM DESIGNATOR:	NEW-RAD INST	K/A:	<u>2.3.5</u>	· .			
	•		URO: 2.3	SRO: 2.5			
TASK DESCRIPTION:	Use A Portable Radiation I	nstrument – Alte	ernate Path (I	nstrument Zero)			

NOTES TO EVALUATOR: Α.

TASK DESCRIPTION:

- An asterisk (\*) before the step number denotes a CRITICAL STEP. CRITICAL STEPS 1. are those steps which when not performed correctly will prevent the system from functioning properly or prevent successful task completion.
- System cues included in the performance checklist are to be provided to the examinee 2. when no system response is available.
- JPM Performance 3.
  - "Control Room" JPMs are designed to be performed in the simulator. If a a. "Control Room" JPM is to be performed in the Control Room all perform steps (P) shall be simulated (S).
  - When performing "In-Plant" JPMs, no equipment will be operated without Shift b. Management approval.
- Satisfactory performance of this JPM is accomplished if: 4.
  - The task standard is met. а.
  - JPM completion time requirement is met. b.
    - For non-time critical JPMs, completion within double the estimated time 1) (listed in paragraph D.2) is acceptable provided the evaluator determines that the progress to completion is acceptable.
    - For time critical JPMs, completion within the estimated time (listed in 2) paragraph D.2) is required.
- The estimated time to complete this JPM, though listed in the task standard, is not to be 5. 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	STEP	ACT	STANDARD				
NO							
1	** NOTE ***						
Instrum	ent checks may be conducted in any order.						
*1	Perform a calibration check of the RO-2A.	Р	The candidate locates the Calibration Sticker on the RO-2A and verifies that the instrument is in calibration.				
	(Cue: Calibration is not due until October 1999)						
*2	Verify that the RO-2A has been Source Checked.	Р	The candidate locates the Source Check Sticker and observes that the RO-2A was source checked today.				
	(Cue: The source check was conducted 4 hours ago)						
*3	Perform a check of the physical condition of the RO-2A.	P	The candidate performs a careful physical inspection of the RO-2A for any damage.				
	(Cue: Acknowledge physical check completed)						
*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)	Ρ	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)	Р	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	P	Candidate holds meter with the beta window closed at approximately one inch and takes readings, shifting scales until an appropriate reading is obtained.				
	indicate that the reading is upscale or downscale until the appropriate scale is reached. Then indicate that the meter is reading 10 mR/hr)						

STEP		STANDARD
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)	Р	Candidate holds meter with the beta window open at approximately one inch and takes readings, shifting scales until an appropriate reading is obtained.
Candidate calculates the Beta Radiation Reading.	Ρ	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. $(12 - 10) \times 4 = 8 \text{ mR/hr Beta}$
Candidate reports Gamma and Beta Radiation levels on the object.	P	Candidate reports that the object is reading 10 mR/hr gamma and 8 mR/hr Beta.
	(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) Candidate calculates the Beta Radiation Reading.	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)Candidate calculates the Beta Radiation Reading.PCandidate reports Gamma and Beta Radiation levels on the object.P

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/h
2)	0 - 50	mR/h

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
51	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 <u>all</u> 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.

#### Effective Date:

HP-CG-400, Rev. 2 Page 1 of 5 RH/rah

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 <u>SCOPE</u>

This guideline applies to the operation of Health Physics instrumentation described herein (excludes whole body contamination monitors) at PECO Energy nuclear facilities.

#### 3.0 <u>REFERENCES</u>

- 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 <u>RESPONSIBILITIES</u>

- 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 <u>PREREQUISITES</u>

- 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.

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- 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.
  - 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 PROCEDUŘE
  - 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.

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- 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.

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7.3.3 Completed Non-Conformance Reports should be returned to the Instrument Physicist/Supervisor for final review <u>AND</u> 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

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8.24 Exhib	t HP-CG-400-24	, GILIAN HFS
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- 8.25 Exhibit HP-CG-400-25, GAS TECH GX-4000
- 8.26 Exhibit HP-CG-400-26, NMC-PC5

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- 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)

## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

RO EMERGENCY PLAN

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.)	Ρ	Station Alert Tone system pushbutton is momentarily depressed at the Plant Reactor Operator's desk.
*3	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.)	Ρ	Depress and hold pushbutton on GAI- Tronics handset while making evacuation announcement <u>twice</u> 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 <u>IN</u> . (Cue: Acknowledge control switch operation.)	Ρ	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)	Ρ	Depress the pushbutton on the radio system microphone while making evacuation announcement <u>twice</u> over the PLANT RADIO SYSTEM.
ç	*8	Rotate the "Evacuation Alarm/Mic selector" switch, (while in the IN mode) to position 2, (microphone river speakers). Activate microphone by pulling handle <u>OUT</u> . (Cue: Acknowledge control switch operation.)	Ρ	Mic/Siren Selector, Switch 43, is placed in "POSITION 2", THEN handle is PULLED OUT at panel 00C026B.
¥	*9	Make evacuation announcement <u>twice</u> 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 <u>twice</u> over Pond Paging System.
	10	Push switch #43 selector switch on Diesel Generator Panel <u>IN</u> . (Cue: Acknowledge control switch operation.)	Ρ	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.)	Ρ	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.)	Р	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	STEP	ACT	STANDARD
NO			
*16	Make evacuation announcement <u>twice</u> over the PLANT RADIO SYSTEM.	Ρ	Depress the pushbutton on the radio system microphone while making evacuation announcement twice over the
	"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".		PLANT RADIO SYSTEM.
	(Cue: Acknowledge announcement)		
*17	Rotate the "Evacuation Alarm/Mic selector" switch, (while in the IN mode) to position 2, (microphone river speakers). Activate microphone by pulling handle <u>OUT</u> .	Ρ	Mic/Siren Selector, Switch 43, is placed in "POSITION 2", THEN handle is PULLED OUT at panel 00C026B.
	(Cue: Acknowledge control switch operation.)		
*18	Make evacuation announcement <u>twice</u> over the Pond Paging system.	Р	Key microphone at panel OOC026B while making evacuation announcement twice over 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.)	· ·	
19	Push switch #43 selector switch on Diesel Generator Panel IN.	Р	Mic/Siren Selector, Switch 43 is PUSHED IN at panel 00C026B.
	(Cue: Acknowledge control switch operation.)		

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	STEP NO	STEP	ACT	STANDARD
(	20	Inform Emergency Director of task completion.	P	Task completion reported.
		(Cue: Emergency Director acknowledges report.)		

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.

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## 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.

ERP-130, Rev. 13 Page 1 of 6 NDY:dlk

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 <u>OR</u> 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.

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- 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 IN.
- 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:

Page 3 of 6 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).

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- 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 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.

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#### 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

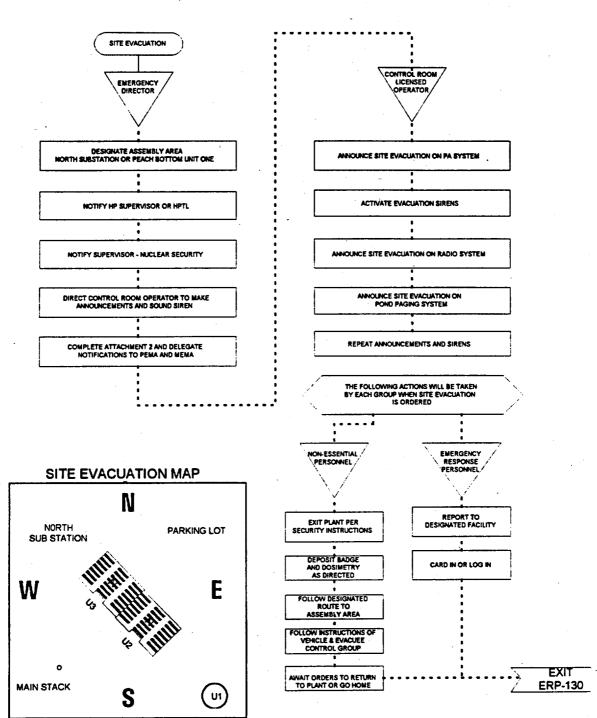
b. Conditions such as smoke, fire, uncontrolled toxic materials, or flooding preclude habitation of large portions of the site,

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



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## ATTACHMENT 2

## SITE EVACUATION NOTIFICATION FORM

<u>NOTE</u> :	
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	t.
2.) Pennsylvania Emergency Management Agency (PEMA) 9-1-800-424-7362 or Emergency ext. 216	Y
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 On (time) (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)	

## ES-301 Control Room Systems and Facility Walk-Through Test Outline

Form ES-301-2

B.1	Control Room Systems SRC	)/RO JPM OUTLI	NE
	System / JPM Title	Type Code*	Safety Function
<b>a</b> .	Recirculation/Recirc Pump Trip – Alternate Path (THI)	D, A, S 304CA	1
b.	Feedwater/Transfer RFPs to Master Level Control	D,S 155C	2
Ċ.	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	2 Facility Walk-Through		
a.	Instrument N <sub>2</sub> /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	Emergenc 2
С.	Main Steam/Closing a Stuck Open MSIV (Unit 3)	D, A, P, R 313CA	Abnorma 3

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## ES-301 Control Room Systems and Facility Walk-Through Test Outline

Form ES-301-2

B.1	Control Room Systems		
	System / JPM Title	Type Code⁺	Safety Function
<b>a</b> .	Recirculation/Recirc Pump-Trip - Alternate Path (THI)	D, A, S 304CA	1
b.	Feedwater/Transfer RFPs to Master Level Control	D,S 155C	2
<b>C.</b>	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	· .	
а.	Instrument N <sub>2</sub> /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	Emergenc 2
C.	Main Steam/Closing a Stuck Open MSIV (Unit 3)	D, A, P, R 313CA	Abnorma 3

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## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 1 - RECIRC

POSITION TITLE:	Unit Reactor Operator/Senior Re	eactor Ope	rator
TASK-JPM DESIGNATOR:	2000010501 / PLOR-304CA	K/A:	<u>295001.10</u>
			RO 38 SRO 37

## 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.

- 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

1	STEP	STEP	ACT	T STANDARD		
ſ	NO	Ŭ Î LI				
	*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.)	Ρ	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%.)	Ρ	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.)	Ρ	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".

GP-9-2 Rev. 26 Page 1 of 3 MGW:rww

PECO Energy Company Peach Bottom Unit 2

### GP-9-2 FAST REACTOR POWER REDUCTION

#### 1.0 <u>PURPOSE</u>

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 <u>PERFORMANCE STEPS</u>

#### 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 <u>ANY</u> of the following conditions exist:
  - APRM oscillations of greater than <u>OR</u> equal to 10 percent peak-to-peak,
  - LPRM <u>OR</u> APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, <u>OR</u>
  - WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.
- 3.1 <u>IF</u> evidence of core thermal hydraulic instability exists, <u>THEN</u> place the reactor mode switch in "SHUTDOWN" <u>AND</u> enter T-100, "Scram", <u>AND</u> exit this procedure. **CM-1, CM-2**
- 3.2 Lower recirculation flow until <u>ANY</u> 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

<u>OR</u>

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

<u>OR</u>

o FLLLP exceeds 0.995.

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Andread indexes in the

- 3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch <u>OR</u> 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 <u>OR</u> on Reactor Total Core Flow Indicator, DPFR-2-02-3-095, on Panel 20C005A. CM-5

 	 بسروا بالتعلي		_
		NO	ΓE

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 <u>WHEN</u> plant conditions permit, <u>THEN</u> 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 <u>AND</u> 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 <u>IF</u> any thermal limit value is equal to or greater than 1.000, <u>THEN</u> 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 <u>IF</u> further power reduction is required, <u>THEN</u> exit this procedure <u>AND</u> enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure <u>AND</u> enter GP-5, "Power Operations".

### 4.0 <u>REFERENCES</u>

- 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)

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### PECO Energy Company Peach Bottom Units 2 and 3

<u>OT-112 - UNEXPECTED/UNEXPLAINED CHANGE IN CORE FLOW - PROCEDURE</u> (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 <u>IF NO</u> Recirc Pumps are operating, <u>THEN</u> SCRAM <u>AND</u> ENTER T-100, "Scram", <u>AND</u> EXIT this procedure.
- 2.2 **DETERMINE** position on Exhibit GP-5-1, "PBAPS Power Flow Operation Map" (Power to Flow Map).
- 2.3 <u>IF IN</u> Region 1 of the Power to Flow Map, <u>THEN</u> SCRAM <u>AND</u> ENTER T-100, "Scram", <u>AND</u> EXIT this procedure.
- 2.4 <u>IF</u> a Recirc Pump has tripped, <u>THEN</u> **INSERT** <u>ALL</u> GP-9-2(3) Appendix 1, Table 1 rods.
- 2.5 MONITOR for the following indications of Thermal Hydraulic Instability (THI):
  - Any LPRM <u>OR</u> APRM noise level grows by two <u>OR</u> more times its initial noise level, <u>OR</u>
  - APRM noise level of greater than <u>OR</u> equal to 10 percent (peak to peak), <u>OR</u>
  - LPRM <u>OR</u> APRM oscillations change from random to regular (with approximately 1 to 2 second oscillation period).
- 2.6 <u>IF</u> THI is present, <u>THEN</u> SCRAM <u>AND</u> ENTER T-100, "Scram", <u>AND</u> EXIT this procedure.

### 3.0 FOLLOW-UP ACTIONS

- 3.1 <u>IF IN</u> Region 2 of the Power to Flow Map, <u>THEN</u> **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.
    - <u>IF ALL</u> GP-9-2(3) Appendix 1, Table 1 rods have been inserted, <u>THEN</u> 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 <u>IF</u> Region 2 cannot be exited within one hour, <u>THEN</u> SCRAM <u>AND</u> ENTER T-100, "Scram", <u>AND</u> EXIT this procedure.
  - 3.1.3 <u>WHEN</u> an acceptable operating point outside of Region 2 has been established, <u>THEN</u> 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 <u>IF</u> Recirc Pump speed was rising <u>AND</u> continues to rise, <u>THEN</u> **TRIP** the affected Recirc Pump <u>AND</u> **RETURN** to step 2.0 of this procedure.
  - 3.2.3 <u>IF</u> pump speed was rising, <u>THEN</u> 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.

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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 <u>OR</u> MO-2(3)-02-043A(B), "SUCTION" valve associated with the tripped Recirc Pump at Panel 2(3)0C004A.
  - 3.3.2 <u>IF</u> the tripped Recirc Pump is <u>NOT</u> required to be isolated, <u>THEN</u> 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 <u>OR</u> equal to 71.75 Mlbm/hr.
- 3.4.2 IF recirculation jet pump loop flow limits are <u>NOT</u> met, <u>THEN</u>:
  - 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.

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#### 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. <u>IF</u> the mismatch is restored in the next step, <u>THEN</u> the 12 hour time clock started in the previous step is no longer required.
  - 3. Within <u>ONE</u> 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. <u>IF</u> recirculation jet pump loop flow limits can <u>NOT</u> be restored within one hour, <u>THEN</u>:
  - INSERT ALL GP-9-2(3) Appendix 1, Table 1 rods.
  - <u>IF ALL</u> Table 1 rods are inserted <u>AND</u> operation is above the 66.7% Rod Line, <u>THEN</u> **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 <u>AND</u> RETURN to step 2.0 of this procedure.

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OT-112 PROCEDURE Rev. 30 Page 5 of 5

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 VERIFICATION OF AUTOMATIC ACTIONS

None

## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 2 - FEEDWATER

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator					
TASK-JPM DESIGNATOR:	2590060101 / PLOR-155C K/A	A: <u>259001A402</u> 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.

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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	STEP	ACT	STANDARD
L.	NO	ULL .		
ŀ	1	Obtain a copy of procedure SO 6C.1.D-2.	Ρ	A copy of SO-6C.1.D-2 is obtained.
ŀ	2	Verify "M/A SELECT" is lit for each	Ρ	Verify "M/A SELECT" is lit for each
	-	operating RFP at Panel 20C005A.		operating RFP at Panel 20C005A.
		(Cue: "M/A SELECT" is lit for all three		
		RFPs.)		
Ī	3	Verify RFP M/A Station, "RFP A(B)(C)", in	Ρ	Verify the RFP M/A Stations are in "MANUAL" for all three RFPs at Panel
		"MANUAL" for each operating RFP.	•	20C005A.
		10 The 1814 Chatiens are in		2000000
		(Cue: The M/A Stations are in "MANUAL" for all three RFPs.)		
ŀ		Verify a Balanced flow condition exists on	P	Verify a balanced flow condition exists on
	<b>-</b>	FR-2565, "Feed Water F (flow)".	-	FR-2565, "Feed Water F (flow)" for all
				three RFPs at Panel 20C005A.
		(Cue: A balanced flow condition exists		
		on FR-2565.)		
	5	Verify the Master Level Controller (MLC)	Р	Verify the Master Level Controller (MLC) is in "MANUAL" at Panel 20C005A.
		is in "Manual".)		IS IN MANUAL at Panel 20000A.
		(Cue: The Master Level Controller (MLC)		
	:	is in "MANUAL".)		
	6	Verify the "MLC" setpoint ("S" readout)	P	Verify that the "MLC" setpoint ("S"
1		and process ("P" readout-reactor water		readout) and process ("P" readout-
1		level) are matched.	-	readout water level) values are matched
				at Panel 20C005A.
		(Cue: The "MLC" setpoint ("S" readout	ан. 1945 - С.	
		and process ("P" readout-readout water		
		level) are matched.)	P	Verify the "V" readout (output) is
	7	Verify the "V" readout (Output) is displayed on the A(B)(C) RFP M/A	ľ	displayed on the A(B)(C) RFP M/A
		Station (first RFP to be placed in AUTO).		Station at Panel 20C005A.
			1	
		(Cue: The "V" readout (Output) is		
		displayed on the A(B)(C) RFP M/A		
		Station.)	<u> </u>	I de l'estre de la forstaria in
	8	Verify the "V" readout (output) is	Ρ	Verify the "V" readout (output) is displayed on the "MLC" at Panel
		displayed on the "MLC".)		20C005A.

ŝ,

STEP	STEP	ACT	STANDARD
NO			
*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.)	Ρ	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".	Ρ	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".)	Р	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".	Р	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	STEP	ACT	STANDARD
NO	SILF 1		
16	Select the "V" readout (output) display on the A(B)(C) RFP M/A Station (final RFP). (Cue: The "V" readout (output) is	Р	Select the "V" readout (output) display on the A(B)(C) RFP M/A Station at Panel 20C005A.
· .	displayed on the A(B)(C) RFP M/A Station.)	-	
17	Select the "V" readout (output) display on the "MLC".	Р	Select the "V" readout (output) display on the "MLC" at Panel 20C005A.
	(Cue: The "V" readout (output) is displayed on the "MLC".)		
*18	Adjust the output ("V" display) on the A(B)(C) RFP M/A Station to match the output ("V" display) on the "MLC".	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
	(Cue: The "MLC" "V" readout is matched to the A(B)(C) RFP M/A Station "V" readout.)		Panel 20C005A.
*19	Place the A(B)(C) RFP M/A Station in "AUTO".	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.
	(Cue: The A(B)(C) RFP M/A green light is "ON", red light is "OFF".		200005A.
20	Inform Control Room Supervisor of task completion.	Р	Task completion reported.
	(Cue: The Control Room Supervisor acknowledges the report).		

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.

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### 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 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> 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 <u>IF</u> the RFP is being controlled manually from the MSC <u>AND</u> operation from the RFP M/A Station is desired, <u>THEN</u> 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.

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## 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 <u>IF</u> the operating RFP(s) is(are) being controlled manually from the RFP M/A Station(s) <u>AND</u> automatic operation from the Master Level Controller is desired, <u>THEN</u> 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, <u>THEN</u> 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".

### NOTES

- 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.
- 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.

#### NOTE

 $\frac{WHEN}{that}$  the RFP M/A control station is placed in "AUTO",  $\frac{THEN}{that}$  RFPT is being controlled from the Master Level Controller.

4.2.6.4 Place the RFP M/A Station in "AUTO".

#### NOTE

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:

#### NOTE

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".

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## 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				
	ow should be carefully monitored while ster 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:			
	o SPI-2621A(B)(C), "Feed Pump Speed"			
	○ FR-2565, "Feed Water F (flow)"			
	<pre>O LI-2-06-094A, B, &amp; C, "Reactor Level L(NR)"</pre>			
4.2.8.3	Verify reactor water level responds to the change in desired level.			
4.2.9 Balance such tha follows:	such that each RFP is carrying equal load, as			
4.2.9.1	Check feedwater flow from each RFP on FR-2565, "Feed Water F (flow)", located on Panel 20C005A.			

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## 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, <u>THEN</u> 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".

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.

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4.4 <u>IF</u> the operating RFP(s) is(are) being controlled manually from the Master Level Controller <u>AND</u> automatic operation from the Master Level Controller is desired, <u>THEN</u> 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.	
*****	****
* <u>CAUTION</u>	*
<ul> <li>* Reactor water level must be closely monitored while</li> <li>* operating in manual to ensure proper water level is</li> </ul>	* *
* maintained. ************************************	****
4.5.1 Place the RFP M/A Station for the selected RFP "MANUAL".	in

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- 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 <u>IF</u> the mode of control of the Feedwater Level Control System is to be changed, <u>THEN</u> perform steps 4.7.1 through 4.7.3.
  - 4.7.1 Verify the following on Panel 20C005A:
    - Feedwater Master Level Controller is in "AUTO".
    - RFP M/A Station is in "AUTO" for each RFP being used to provide feedwater to the reactor.
    - Reactor water level LI-2-06-094A, B, AND C, "Reactor Level L(NR)", steady.

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- Reactor Steam flow AND Feed flow FR-2-06-098, "Total Steam Total F/W F/F", steady.
- Reactor Power at 30% <u>OR</u> greater, if going to three element control.

#### NOTES

- 1. The Digital feedwater system will automatically select single element <u>OR</u> three element control.
  - single element control approximately < 30% power.
  - o three element control approximately > 30% power.
- 2. <u>IF</u> a failure of a steam flow <u>OR</u> feed flow signal has occurred, <u>THEN</u> the computer will <u>NOT</u> allow three element control to be selected <u>AND</u> 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.

0

- 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 <u>NOT</u> 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".

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### 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 <u>NOT</u> 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

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7.0 TECHNICAL SPECIFICATIONS

None

8.0 INTERFACING PROCEDURES

None

### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 3 – HPCI

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator			
TASK-JPM DESIGNATOR:	2060050101 / NEW-HPCI	<b>K/A:</b>	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	STEP	ACT	STANDARD
NO	0121	//01	
1	Obtain a copy of procedure SO 23.2.A-2, "HPCI SYSTEM SHUTDOWN".	Р	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.	P	"HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on panel 221 A-2 is verified clear.
	(Cue: Annunciator 221 A-2 is not lit.)		
4	Verify "HPCI DC MOTOR POWER LOSS" alarm on panel 221 A-1 is clear.	Р	"HPCI DC MOTOR POWER LOSS" alarm on panel 221 A-1 is verified clear.
	(Cue: Annunciator 221 A-1 is not lit.)		
5	Place the gland seal condenser "Vac Pump" control switch, in "START".	Ρ	The gland seal condenser "Vac Pump" control switch, is placed in "START".
	(Cue: Acknowledge switch operation. The "Vac Pump" switch is in the "START" position.)		
*6	Depress AND hold the HPCI System "Remote Trip" pushbutton.	P	The HPCI System "Remote Trip" pushbutton is being depressed and held.
	(Cue: Acknowledge switch operation. The HPCI System "Remote Trip" pushbutton is depressed and being held.)	~~	
*7	WHEN 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".	P	WHEN 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".
	(Cue: Acknowledge control switch operation. The HPCI "Aux Oil Pump" control switch is in the "Pull to Lock" position.)		
8	Release the "Remote Trip" pushbutton.	Р	The "Remote Trip" pushbutton has been released.
	(Cue: Acknowledge pushbutton operation. The "Remote Trip" pushbutton has been released.)		
9	Inform Control Room Supervisor of task completion.	P	Task completion reported.
1	(Cue: Control Room Supervisor acknowledges report.)		

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".

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### PECO Energy Company Peach Bottom Unit 2

#### SO 23.2.A-2 HPCI SYSTEM SHUTDOWN

#### 1.0 <u>PURPOSE</u>

This procedure provides instructions to shutdown the HPCI System when system operation is no longer required. Sections are provided for HPCI shutdown with <u>OR</u> without an initiation condition present.

#### 2.0 PREREQUISITES

- 2.1 HPCI System operation is no longer required <u>OR</u> 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 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> inform Shift Management.
- 3.2 Monitor Reactor water level <u>AND</u> pressure, <u>AND</u> primary containment temperatures <u>AND</u> pressure from multiple indications.
- 3.3 <u>IF</u> the Aux Oil Pump, 20P026, is left running after the turbine is shutdown <u>AND</u> the HPCI System subsequently initiates, <u>THEN</u> a high steam flow isolation may occur. **CM-1**
- 3.4 Do <u>NOT</u> secure <u>OR</u> place an ECCS in MANUAL Mode unless, by at least two independent indications, (1) misoperation in AUTOMATIC Mode is confirmed, <u>OR</u> (2) adequate core cooling is assured. <u>IF</u> an ECCS is placed in MANUAL Mode, <u>THEN</u> it will <u>NOT</u> initiate automatically. Make frequent checks of the initiating <u>OR</u> controlling parameter. <u>WHEN</u> manual operation is no longer required, <u>THEN</u> restore the system to AUTOMATIC/STANDBY Mode if possible.
- 3.5 Do <u>NOT</u> 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 <u>AND</u> water hammer in the exhaust line. During extended low speed operation, the resulting forces could damage the turbine exhaust line check valves.

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#### 4.0 <u>PERFORMANCE STEPS</u>

#### <u>NOTES</u>

- 1. Communications shall be available between the control room <u>AND</u> personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects control room instrumentation <u>OR</u> alarms.
- 2. Section 4.1 provides for HPCI shutdown when an initiation condition is <u>NOT</u> present.
- 3. Section 4.2 provides for short term HPCI shutdown when an initiation condition <u>IS</u> 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 <u>IS</u> 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 <u>NOT</u> anticipated.
- 4.1 HPCI System Shutdown when an Initiation Condition is <u>NOT</u> present. **CM-3**

4.1.1 Verify 23A-S105, "HPCI Manual Initiation" collar in "DISARM".

During HPCI System shutdown, the Aux Oil Pump, 20P026, \* will <u>NOT</u> automatically start on lowering bearing oil \* pressure unless an initiation signal is present <u>OR</u> \* sealed-in. The HPCI "Aux Oil control switch shall be \* in "START" prior to tripping the turbine. \*

CAUTION

- 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 <u>AND</u> hold the HPCI System "Remote Trip" pushbutton.
- 4.1.7 Verify "Aux Oil Pump" starts as turbine slows down (1200 1500 rpm).

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- 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 HPCI is in CST to CST mode</u>, <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 IF 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 HPCI</u> 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

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".

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- 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.
- Verify HPCI flow controller in "AUTO" AND set for 4.1.19 5000 gpm.
- WHEN torus water temperature is less than 95°F AND 4.1.20 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.
- WHEN the HPCI gland seal condenser "Vac Pump" has 4.1.21 run for 15 minutes, <u>THEN</u> place the HPCI gland seal condenser "Vac Pump" control switch in "STOP".
- IF the Standby Gas Treatment System is NOT 4.1.22 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.
- Verify HPCI System aligned in accordance with 4.1.23 SO 23.1.A-2, "HPCI System Alignment for Automatic or Manual Operation".
- Short Term HPCI System Shutdown when an Initiation 4.2 Condition IS Present. CM-3

\* \*

\*

\*

\*\*\*\*\* CAUTION

During HPCI System shutdown, the Aux Oil Pump, 20P026, will <u>NOT</u> 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
- Verify "HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm 4.2.2 on Panel 221 A-2 is clear.
- Verify "HPCI DC MOTOR POWER LOSS" alarm on Panel 4.2.3 221 A-1 is clear.
- Place the gland seal condenser "Vac Pump" control 4.2.4 switch, in "START". CM-2

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****	*******	******	*****
*			CAUTION *
*	4		*
*			low", opens with an initiation signal *
*			CI turbine shutdown. This will result *
*		ned to the	f the CST to the Torus if HPCI suction *
****	*******	******	***************************************
	4.2.5	Depress <u>AN</u> pushbutton	<u>D</u> hold the HPCI System "Remote Trip" •
	4.2.6	at least 9	Remote Trip" pushbutton has been held for 0 seconds, <u>THEN</u> place the HPCI "Aux Oil rol switch in "Pull To Lock".
•	4.2.7	Release th	e "Remote Trip" pushbutton.
	4.2.8		ent HPCI injection is desired, <u>THEN</u> e following substeps. Otherwise, proceed 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	<u>WHEN</u> HPCI operation is no longer required, <u>THEN</u> perform section 4.2 or 4.3 of this procedure as directed by Shift Management.
	4.2.9	<u>AND</u> as dir SO 23.1.A-	PCI Initiation condition(s) have cleared ected by Shift Management, <u>THEN</u> perform 2, "High Pressure Coolant Injection up for Automatic or Manual Operation".
4.3		rm HPCI Sys ent. <b>CM-3</b>	tem Shutdown when an Initiation Condition
****	******	*******	*****
*			CAUTION *
*	- '		$\star$
*	During	HPCI System T automatic	shutdown, the Aux Oil Pump, 20P026, * ally start on lowering bearing oil *
*	pressur	e unless an	initiation signal is present <u>OR</u> *
*	sealed-	in. The HP	CI "Aux Oil control switch shall be *
*			o lowering turbine speed. *
****	****	********	***************************************
	4.3.1	Verify the in "START"	"Aux Oil Pump", 20P026, control switch . CM-2

4.3.2 Verify "HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on Panel 221 A-2 clear.

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- 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			
3.5 will ca	use a HPCI System isolation.		
	he "HPCI Isolation" pushbutton (23A-S27) 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 <u>AND</u> 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".		
	Depress th AND verify 4.3.5.1 4.3.5.2 4.3.5.3 4.3.5.4 4.3.5.5 4.3.5.6 4.3.5.7		

#### 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 <u>IF</u> subsequent HPCI operation is required, <u>THEN</u> perform SO 23.7.C-2, "HPCI System Recovery from System Isolation or Turbine Trip". Do <u>NOT</u> return to this procedure.

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- 4.3.9 <u>IF</u> long term isolation of the HPCI System is necessary, <u>AND</u> sufficient time has passed to allow cooling of the turbine steam exhaust lines, <u>THEN</u> close MO-4245, "Vac Breaker".
- 4.3.10 Shutdown the turbine vibration instrumentation, VBI and VBR 4506, <u>AND</u> 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 <u>WHEN</u> torus water temperature is less than 95°F <u>AND</u> Torus Cooling is <u>NOT</u> required to support other plant operations, <u>THEN</u> remove Torus Cooling from service in accordance with SO 10.1.D-2, "RHR System Torus Cooling" <u>AND</u> return to step 4.3.13 of this procedure.
- 4.3.13 <u>WHEN</u> the HPCI gland seal condenser "Vac Pump" has run for 15 minutes, <u>THEN</u> stop the pump by placing it's control switch in "PULL TO LOCK".
- 4.3.14 <u>IF</u> the Standby Gas Treatment System is <u>NOT</u> operating in support of other plant conditions, <u>THEN</u> Shutdown the Standby Gas Treatment System in accordance with SO 9A.2.A-2, "Standby Gas Treatment System Shutdown Following automatic Initiation" <u>AND</u> return to step 4.3.15 of this procedure.
- 4.3.15 <u>WHEN</u> the HPCI initiation condition(s) have cleared <u>AND</u> as directed by Shift Management, <u>THEN</u> perform SO 23.7.C-2, "HPCI System Recovery From System Isolation or Turbine Trip".

#### 5.0 <u>CONTROL STATIONS</u>

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)

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6.7 CM-3, ISEG ER-34, (CT T00014)

6.8 TRMS 3.11

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### 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"

### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 4 - CONTAINMENT

SRO: 4.3

URO: 4.2

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator			
TASK-JPM DESIGNATOR:	2230020101 / NEW-DWVENT	K/A:	<u>223001</u>	

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	STEP	ACT	STANDARD
NO			
1	Obtain a copy of procedure SO 7B.3.A-2.	Р	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)	Ρ	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.)	Р	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)	Р	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	Р	Task completion reported.
	acknowledges report.)		

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.

SO 7B.3.A-2 Rev. 9 Page 1 of 8 RWW:rww 12/02/98

#### 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<sub>2</sub>/O<sub>2</sub> 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 <u>IF</u> venting of the containment is required, <u>THEN</u>:
  - 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 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> inform Shift Management.
- 3.2 Monitor drywell radiation levels and Main Stack radiation levels while venting the primary containment. <u>IF</u> any rise in radiation levels is observed, <u>THEN</u> stop venting <u>AND</u> 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 <u>AND</u> Personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation <u>OR</u> 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<sup>-3</sup> 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", <u>AND</u> 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 <u>WHEN</u> pressure at PR-2508, Drywell "P", on Panel 20C003-03 is between 0.25 to 0.75 psig, <u>THEN</u> 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", <u>AND</u> 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".

### NOTE Maximum flowrate for Water Bath Vaporizer 00S216 is 1. 3200 scfm. 2. Maximum flowrate for Ambient Vaporizers 00S492 & 00S493 is 100 scfm Open AO-2523, "D/W & Torus N2 Make-up Inlet", on 4.3.2 Panel 20C003-03. WHEN flow is started, THEN perform SO 7B.8.B, 4.3.3 "CAC Nitrogen Storage System Routine Inspection", concurrently with this procedure. Verify makeup flow on FR-2522, N2 Makeup "F" on 4.3.4 Panel 20C003-03. WHEN pressure at PR-2508, Drywell "P", is between 4.3.5 0.25 to 0.75 psig, THEN close AO-2523 on Panel 20C003-03. IF nitrogen addition to containment is required to reduce drywell O2 concentration to less than 3%, THEN perform the following: Verify the Containment Atmosphere Control (CAC) 4.4.1 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<sub>2</sub>/O<sub>2</sub> Sampling System in Standby Mode and Removing From Standby Mode" <u>AND</u> return to step 4.4.3 of this procedure.

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- 4.4.3 Verify PR/RR-2-02-3-404B, "Reactor Pressure/ Drywell Rad Gas Recorder", < 3.45 X 10<sup>-3</sup> 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	<u>ANALYZER</u>
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.

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- 4.4.13 <u>WHEN</u> drywell O<sub>2</sub> concentration at XIC-80411A <u>AND</u> B are between 1.5% to 3.0%, <u>THEN</u> 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", <u>AND</u> 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, <u>THEN</u> 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 <u>IF</u> nitrogen addition to containment is required to reduce torus O<sub>2</sub> concentration to less than 1%, <u>THEN</u> 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", <u>OR</u> SO 7B.1.C, "CAC Nitrogen Storage System Startup/Operation Low Flow Mode".

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### 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  $10^{-3} \mu$ Ci/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" <u>AND</u> return to step 4.5.5 of this procedure.
- 4.5.5 Direct an operator to close HV-2-7B-40123A, "N<sub>2</sub> Makeup Isolation to Drywell Purge Valve".
- 4.5.6 Monitor Torus 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 10	Middle Torus	XIC-80411A
SV 4	Upper Torus	XIC-80411B
SV 5	Torus Exhaust	XIC-80411B

#### NOTE

- Maximum flowrate for Water Bath Vaporizer 00S216 is 3200 scfm.
- 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 <u>WHEN</u> flow is started, <u>THEN</u> perform SO 7B.8.B, "CAC Nitrogen Storage System Routine Inspection", concurrently with this procedure.
- 4.5.9 Verify makeup flow on FR-2522, N<sub>2</sub> Makeup "F", on Panel 20C003-03.

- 4.5.10 Open AO-2513, "Torus Vent Inbd 2" Vent", <u>AND</u> 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 <u>WHEN</u> torus O<sub>2</sub> concentration at XIC-80411A <u>AND</u> B are less than 1%, <u>THEN</u> 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<sub>2</sub> 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 <u>IF XIC-80411A(B)</u> is to be placed in standby, <u>THEN</u> 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 <u>REFERENCES</u>

- 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<sub>2</sub>/O<sub>2</sub> Sampling System in Standby Mode and Removing From Standby Mode"
- 8.9 OT-101, "High Drywell Pressure"

### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 5 – DIESEL GEN

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator			
TASK-JPM DESIGNATOR:	2640020101 / PLOR-318CA	K/A:	264000A4.0	<u>)4</u>
•			URO: 3.7	SRO: 3.7

# Diesel Generator Fast Start from the Control Room – (Alternate Path ESW Pumps Fail to Start)

A. NOTES TO EVALUATOR:

TASK DESCRIPTION:

- 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

		1	
STEP NO	STEP	АСТ	STANDARD
1	Obtain a copy of procedure SO 52A.1.B.	Р	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	Р	Equipment Operator is contacted to perform pre-start inspection for E-4 D/G per SO 52A.1.B, step 4.3.1.
	are complete 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".	Ρ	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.
	(Cue: Acknowledge control switch operation.)		
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.)	Ρ	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.)	Ρ	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.)	Ρ	'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 <u>NOT</u> 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.)	Ρ	'B' ESW pump red light <u>NOT</u> 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 <u>NOT</u> lit, green light on; motor amps are 0 amps on the EM CLG WTR PP ammeter, and annunciator 212 B-2 is not alarming.)	Ρ	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.)	Ρ	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.)	Ρ	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).	
The EC	***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.)	Ρ	Control Room Supervisor informed that cooling water has been established to the E-4 Diesel Generator.	

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

## TERMINATING CUE

Ι.

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".

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### PECO Energy Company Peach Bottom Units 2 and 3

## SO 52A.1.B DIESEL GENERATOR OPERATIONS

#### 1.0 <u>PURPOSE</u>

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 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> inform Shift Management.
- 3.2 Notify the main control room if the CARDOX System for the diesel generator building is to be disabled. Do <u>NOT</u> disable the CARDOX System for greater than 15 minutes, without the approval from Shift Management.
- 3.3 <u>IF</u> the activity for which the CARDOX System was defeated is still in progress 15 minutes after the defeat switch was placed in defeat, <u>THEN</u> 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 <u>IF</u> severe engine vibrations <u>OR</u> unusual noises occur, <u>THEN</u> the diesel should be immediately unloaded <u>AND</u> shutdown, until the cause can be determined <u>AND</u> corrected.

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- 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 <u>IF</u> an emergency condition exists (MCA or dead bus), <u>THEN</u> 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 <u>IF</u> a Dead Bus condition exists, <u>THEN</u> 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 <u>IF</u> an RHR pump breaker trips on anti-pumping, <u>THEN</u> 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 <u>NOT</u> 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 <u>IF</u> system grid problems are anticipated by System Operations, diesel generator testing should not be performed.
- 3.12 <u>IF</u> 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 <u>PERFORMANCE STEPS</u>

		NOTES
1.	room <u>AND</u> personnel plant to coordinate	ld be available between the control performing procedures elsewhere in the e the operation of equipment that om instrumentation <u>OR</u> alarms.
2.		ions may be performed individually 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	<u>Diesel Generator S</u>	low Start
		operator to perform the following as a inspection:
****	*****	****
*		<u>CAUTION</u> * *
* * ****	operation and dama	oil level may cause erratic engine * ge to the governor * ***********************************
	4.1.1.1	Verify governor oil level LG-7575A(B)(C)(D) above the black line <u>AND</u> 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). <b>CM-7</b>
	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.

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4.1.1.5 Verify control rod pin is engaged with adjuster collar, on each fuel injection pump. (See Figure 1).

*****	*****	*****	******
*			CAUTION *
*			*
*			art unless at least 1 minute has *
*			ast attempt to start the diesel, <u>OR</u> *
*			as shutdown, due to the governor *
*	shutdown	n solenoid b	being energized to stop. *
*****	*******	*********	******************************
	4.1.2	Reset Seled	operator to place the Voltage Shutdown ctor Switch located on the Engine Panel 0A(B,C,D)C097 to "OFF".
	4.1.3	Verify "El	(E2)(E3)(E4) DIESEL NOT IN AUTO" alarms.
	4.1.4	of the gove the window governor ac	operator to verify the AS FOUND setpoint ernor actuator speed knob as indicated in marked "SPEED" combined with the ctuator speed knob pointer agrees ely with the values below:
- 		0 E1 0 E2 0 E3 0 E4	21.34 21.24 20.36 20.68
	4.1.5	speed knob	operator to set the governor actuator to between 2 and 3 as indicated in the ked "SPEED".
	4.1.6	Start the of following:	diesel generator by performing the
		4.1.6.1	Turn <u>AND</u> hold the "Start Mode" selector switch to "MAN" <u>AND</u> turn the "Start- Stop" switch to "START".
	4.1.7	Release the	e "Start-Stop" <u>AND</u> "Start Mode" switches.
	4.1.8	Direct the D/G Lube Of	operator to verify the "E1(E2)(E3)(E4) il Pre-Lube Pump" 0AP173 (0BP173)

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

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## 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 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.

#### <u>NOTE</u> ·

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 <u>AND</u> 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 <u>Diesel Generator Synchronization and Loading</u>

- 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".

o	E12	0	E22	0	E32	0	E42
o	E13	o	E23	0	E33	0	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:

o

- <sup>o</sup> 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.

*****	* * * * * * * * * * * * * * * * * * * *	r <del>*</del> *
*	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.	*
*****	***************************************	r <b>* *</b> '

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.

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T

4.2.8 Verify the synchroscope is still rotating slowly in the "FAST" direction.

## NOTE

		<b>ITOTIO</b>
	The die followi	sel generator is considered synchronized, when the ng conditions are met:
	o Dies than	el generator "INCOMING" voltage slightly higher "RUNNING" bus voltage. <b>CM-4</b>
	o Sync	hroscope rotating slowly in the "FAST" direction.
	o Sync	hroscope within 13 degrees of "Top Dead Center".
**** *	*****	**************************************
* * ***	4.2.9 t	<pre>step 4.2.10 immediately after completing step * o prevent "motoring" the diesel generator. * ***********************************</pre>
	4.2.9	<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).
	4.2.10	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".
		0 E12 0 E22 0 E32 0 E42
		<u>0 E13 0 E23 0 E33 0 E43</u>
		NOTE
	Loading to excee	the diesel generator shall proceed at a rate <u>NOT</u> ed 300 KW/min. <b>CM-3</b>
	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

4.2.13.1 Turn the "GOVERNOR" control switch to "RAISE".

generator as follows:

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			raye 9 01 29
*****			
****	*******	********	
*			<u>CAUTION</u> *
*	-		
*			WAR value to exceed 75% of the KW *
*			hat the generator 0.8 power factor will*
*	<u>NOT</u> be	exceeded.	. *
****	******	******	******
F		4.2.13.2	Maintain the KW/KVAR ratio, by operating the "AUTO VOLT REG" control switch.
			NOTES
1.			above 2600 KW, <u>THEN</u> the Plant Reactor the load and duration of the run.
2.	for con run at	tinuous oper loads greate	o be carried by the diesel generator rations is 2600 KW. The diesel may be er than 2600 KW, but less than 3250 KW the following table: <b>CM-5, CM-6</b>
1	o 2600	VW	Continuous
		KW - 3000 I	
		KW - 3100 I	
	o 3100	KW - 3250 I	KW 30 min/yr
****	******	*****	****
*			CAUTION *
*	•		
*			3250 KW will require an engine *
*			ion of inoperability <u>AND</u> performance *
*		nternal insp	
* * * * *	******	********	*****
	4.2.14		esel generator is operated at a load Man 3250 KW, <u>THEN</u> 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.

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## 4.3 <u>Diesel Generator Fast Start</u>

4.3.1 Direct an operator to perform the following checks as a pre-start inspection:

* operation and dam	CAUTION     *       CAUTION     *       'oil level may cause erratic engine     *       age to the governor     *       ************************************
4.3.1.1	Verify governor oil level LG-7575A(B)(C)(D) above the black line <u>AND</u> below the top of the sightglass. <b>CM-7</b>
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). <b>CM-7</b>
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).
*****	*****
*	<u>CAUTION</u> *
<ul> <li>* passed since the</li> <li>* since the diesel</li> <li>* shutdown solenoid</li> </ul>	tart unless at least 1 minute has * last attempt to start the diesel, <u>OR</u> * was shutdown, due to the governor * l being energized to stop. *
4.3.2 Start the following	e diesel generator by performing the g:
4.3.2.1	Turn <u>AND</u> hold the "Start Mode" selector switch to "MAN" <u>AND</u> turn the "Start- Stop" switch to "START".

4.3.3 Release the "Start-Stop" AND "Start Mode" switches.

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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.

Diesel generator running at rated frequency
 (58.8 to 61.2 Hz) and voltage (4.16 to 4.40KV).

		NOTE
	On a di Pumps r	esel generator start, the A ESW, B ESW <u>AND</u> ECW eceive an auto start signal.
**	******	**************************************
**	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 AND B, "DISCH PRESS", 25 to 64 psig.
		4.3.5.2 Check pump motor current "AMPS" 22 to 3 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 frequence (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 dies 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). <b>CM-7</b>
	4.3.12	Adjust engine speed <u>AND</u> generator output voltage required, using the applicable control switch(es) below.
		o Engine speed - "GOVERNOR"
		o Generator output voltage - "AUTO VOLT REG"

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### <u>NOTES</u>

- 1. It is good practice to alternate use of the D/G output breakers from test to test.
- 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.

***************************************	k
CAUTION	k

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".

0	E12	ο	E22	0	E32	ο	E42
<b>o</b> `	E13	0	E23	0	· E43	0	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:
  - 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.

#### 

- 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

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).

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o E42

~

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".

E32

0

E22

0

E12

0

E13 E23 E33 E43 0 0 0 0 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. Pickup the desired load to be carried by the diesel 4.3.23 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.

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#### NOTES

- 1. <u>IF</u> the D/G is run above 2600 KW, <u>THEN</u> 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

ο	2600	KW				Continuous
ο	2600	KW	-	3000	KW	2000 hr/yr
0	3000	KW	-	3100	KW	200 hr/yr
ο	3100	KW	-	3250	KW	30 min/yr

# 

Any operation over 3250 KW will require an engine
 shutdown, declaration of inoperability <u>AND</u> 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.

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## 4.4 <u>4KV Switchgear Manual Transfer</u>

·····	
	NOTES
1. 2 Em	ner Aux Xfmr normally supplies:
0 E1	12 Emergency Aux Switchgear
0 E3	32 Emergency Aux Switchgear
0 E2	23 Emergency Aux Switchgear
0 E4	13 Emergency Aux Switchgear
2. 3 Em	ner Aux Xfmr normally supplies:
o E2	22 Emergency Aux Switchgear
0 E4	2 Emergency Aux Switchgear
0 E1	3 Emergency Aux Switchgear
0 E3	33 Emergency Aux Switchgear
bein	BKR & E312 BKR are interlocked preventing them from g closed at the same time. The other seven emergency as are interlocked in a similar manner.
	ing Towers should be the first loads shed during al load shedding.
<i>, , , , , , , , , , , , , , , , , </i>	
********* *	<u>CAUTION</u>
	* al load shedding should be initiated to restore 4 KV * 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.

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## <u>NOTE</u>

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".

0	E12	0	E22	0	E32	0	E42
0	E13	0	E23	0	E33	0	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:
  - Both lights "ON" when synchroscope is at "Bottom Dead Center"

\*\*\*\*\*\*\*\*

- 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"
  - 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.)

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							<u>NO</u>	TE					
	The fo:	e die: llowin	sel ng (	gen cond	erato	or : ns a	is co are m	nsider et:	ed syn	nchron	ized,	when t	:he
	<b>O</b>							ING" v age.		e slig	htly h	igher	
	0	Syncl	nro	scop	e roi	tat	ing s	lowly	in the	e "FAS	T" dir	ection	1.
	ο	Syncl	nroi	scop	e wit	thir	n 13	degree	s of	"Top D	ead Ce	nter".	,
* * * * * * *	***	*****	***	****	****	***	***** <u>CAUT</u>		*****	******	*****	*****	****
* * 		4.9 to	o p	reve	nt "	mot	oring		diese	compl l gene			* *
	4.4	4.9	<u>WH</u> 4 K	<u>EN</u> ti Vemo	he di ergei	ies ncy	el ge bus,	nerato <u>THEN</u>	or is close	synchr break (E43)	er E12		
	4.4	4.10	"G by	OVERI	NOR" ning	CO	ntrol	swite	h to	erator "RAISE " cont	". Pi	.ckup 1	KVAR
	4.4	4.11	Pla	ace	the a	app:	licab	le "BF	R SYN	C" swi	tch in	"OFF	<sup>n</sup> .
			0	E12		0	E22	o	E32	0	E42		
			0	E13		0	E23	0	E33	0	E43		
							NO	TE					
		ading excee							ll pro	oceed	at a r	ate <u>N</u>	T
	4.4	4.12	Che	eck g	gene:	rato	or ou	tput v	oltag	e and	genera	tor	

amperage for all three phases.

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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 <u>IF</u> necessary, <u>THEN</u> 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.

# 

<u>IF</u> 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, <u>THEN</u> the D/G Breaker will have to be \* closed manually. \*

4.4.14 Open the applicable startup source bkr.

0	E212 O	E222	0	E232	0	E242	
0	E312 O	E322	0	E332	ο	E342	
0	E213 O	E223	0	E233	ο	E243	
0	E313 O	E323	0	E333	0	E343	

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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 2SU Alternate 3SU	
E13	Normal 3SU Alternate 2SU	
E22	Normal 3SU Alternate 2SU	
E23	Normal 2SU Alternate 3SU	
E32	Normal 2SU Alternate 3SU	
E33	Normal 3SU Alternate 2SU	
E42	Normal 3SU Alternate 2SU	
E43	Normal 2SU Alternate 3SU	

4.4.16 Check both synchronizing lights for proper operation as follows:

- o Both lights "ON" when synchroscope is at "Bottom Dead Center"
- 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. Verify the synchroscope is still rotating slowly in 4.4.19 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 <u>WHEN</u> the diesel generator is synchronized with the startup source, <u>THEN</u> close the selected breaker.
- 4.4.21 Place the applicable "BKR SYNC" switch to "OFF".
- 4.4.22 <u>IF</u> it is desired to manually transfer back to the original S/U source breaker, <u>THEN</u> 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

- 4.5.1 Reduce diesel generator load as follows:
  - 4.5.1.1 <u>IF</u> the D/G was operating near full load, <u>THEN</u> cool down the D/G by operating at 1500 KW for 5 minutes as follows:
    - o Turn the "GOVERNOR" control switch to "LOWER".

0

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:

 Turn the "GOVERNOR" control switch to "LOWER".

 Maintain the KW/KVAR ratio by operating the "AUTO VOLT REG" control switch until VARS are reduced to 50 KVAR.

4.5.2 <u>WHEN</u> D/G load is reduced to 100 to 150 KW and VARS are 50 KVAR, <u>THEN</u> trip the applicable diesel generator output breaker.

0	E12	0	E22	0	E32	0	E42
0	E13	0	E23	0	E33	0	E43

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 <u>IF</u> it is required to operate the opposite output breaker, <u>THEN</u> 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 <u>IF</u> the Emergency Service Water (ESW) was used <u>AND</u> is <u>NOT</u> required for any other evolution, <u>THEN</u> shutdown the running ESW pump in accordance with SO 33.2.A, "Emergency Service Water System Shutdown", <u>AND</u> return to step 4.5.7 of this procedure.
- 4.5.7 <u>IF</u> the Emergency Cooling Water (ECW) System was used <u>AND</u> is <u>NOT</u> required for any other evolution, <u>THEN</u> 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.

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- 4.5.8 <u>IF</u> equipment that was started for the sole purpose of loading the diesel generator is no longer required, <u>THEN</u> they may be shutdown in accordance with their system procedures.
- 4.5.9 <u>IF</u> the diesel generator was run for one hour <u>OR</u> more, <u>THEN</u> 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) <u>AND</u> 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

<u>IF</u> water is present, <u>THEN</u> 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.

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- 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 <u>IF</u> outside air temperature is in excess of 70 degrees fahrenheit, place the 0AV091 (0BV091) (0CV091) (0DV091) in service until compartment air temperatures stabilize; <u>THEN</u> return the running fan to the "AUTO" position.

#### 5.0 <u>CONTROL STATIONS</u>

- 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 <u>REFERENCES</u>

- 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)

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- 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"

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# TABLE 1

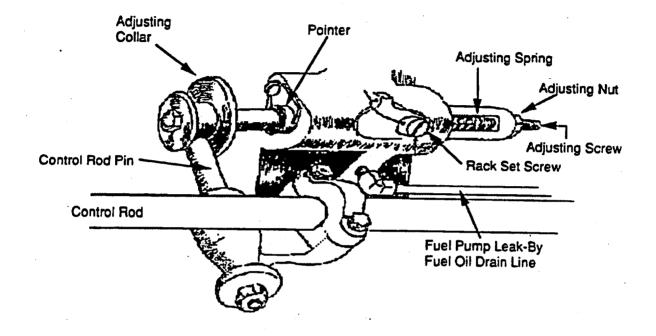
# AVAILABLE LOADS FOR THE DIESEL GENERATOR

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

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## FIGURE 1





## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 6 - SCRAM ACTION

POSITION TITLE:

Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR:

2000330501 / NEW-PRO SCRAM K/A: 295006G10 (ALT) 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	STEP	ACT	STANDARD
NO			
*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.)	Ρ	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.)	Ρ	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.)	Ρ	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.)	Р	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.)	Ρ	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.)	Ρ	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.)	Ρ	Phase angle difference is verified to be less than 12 degrees on the Synchroscope at panel 20C009.

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· · ·

STEP	STEP	ACT	STANDARD
NO			
*9	Close 252-0202, 22 BKR. (Cue: Acknowledge control switch operation.)	Р	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.)	Р	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.)	Р	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.)	Ρ	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.)	Ρ	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.)	Ρ	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	STEP	ACT	STANDARD
NO	SIEF		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.)	Р	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.)	Ρ	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.)	Ρ	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.)	Ρ	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.)	Р	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.)	Р	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.)	Р	Hydrogen flow is verified to be at 0 scfm on FR-8629 on panel 20C006A.

		STEP	ACT	STANDARD
NO			-	
*24	30%. (Cue:	Recirc pump speed has runback to A and B Recirc MG Set generator is 30% on SPI-2-02-184-016A and	Ρ	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	Monito and D (Cue:	or Instrument Air header pressure rywell pressure. Drywell pressure is .3 psig, ment air header pressure is 105	Ρ	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.
	· ·	** NO	TE **	· · · · · · · · · · · · · · · · · · ·
ready fo	or his/h	er scram action report.	· · ·	orm the examinee that you (the CRS) are
26	Repor	t the following to the CRS:	Р	CRS informed of that:
	•.	House loads transferred.		House loads transferred.
	•	Main Turbine is tripped.		Main Turbine is tripped.
	•	Main Generator is locked out.		Main Generator is locked out.
	•	Main Generator is locked out. Group II and III isolations complete and SGTS is initiated.		
	•	Group II and III isolations complete		Group II and III isolations complete
	•	Group II and III isolations complete and SGTS is initiated. SDV vent and drain valves did not initially close and had to be		<ul> <li>Group II and III isolations complete with SGTS in service.</li> <li>SDV vent and drain valves</li> </ul>
	•	Group II and III isolations complete and SGTS is initiated. SDV vent and drain valves did not initially close and had to be <u>manually</u> closed. Hydrogen Water Chemistry is		<ul> <li>Group II and III isolations complete with SGTS in service.</li> <li>SDV vent and drain valves <u>manually</u> closed.</li> <li>Hydrogen Water Chemistry is</li> </ul>
	•	Group II and III isolations complete and SGTS is initiated. SDV vent and drain valves did not initially close and had to be <u>manually</u> closed. Hydrogen Water Chemistry is isolated.		<ul> <li>Group II and III isolations complete with SGTS in service.</li> <li>SDV vent and drain valves <u>manually</u> closed.</li> <li>Hydrogen Water Chemistry is isolated.</li> </ul>
	•	Group II and III isolations complete and SGTS is initiated. SDV vent and drain valves did not initially close and had to be <u>manually</u> closed. Hydrogen Water Chemistry is isolated. Recirc pump speed is 30%. Instrument Air header pressure is		<ul> <li>Group II and III isolations complete with SGTS in service.</li> <li>SDV vent and drain valves manually closed.</li> <li>Hydrogen Water Chemistry is isolated.</li> <li>Recirc pump speed is 30%.</li> <li>Instrument Air header pressure is</li> </ul>

IF requested by the examinee, THEN grant permission for the examinee to bypass and restore Drywell Instrument Nitrogen.

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0700	0720					
STEP	STEP	ACT	STANDARD			
NO	*** NO					
t is prov			ns 33-35 prior to steps 27-30			
*27	procedurally permissible for a candidate to perform steps 33-35 prior to steps 27-30. 7 Place AO-2969A "Drywell Instrument N <sub>2</sub> P AO-2969A control switch is placed in th					
21	Supply Valve" in "CLOSE".	ł	"CLOSE" position at panel 20C003-03.			
	Supply value in SECCE .					
	(Cue: Acknowledge control switch					
	operation.)					
28	Verify AO-2969A, "Drywell Instrument N <sub>2</sub>	Р	AO-2969A green light is verified on at			
	Supply Valve is closed.		panel 20C003-03.			
*29	Place AO-2969B "Drywell Instrument N <sub>2</sub>	Р	AO-2969B control switch is placed in the			
	Supply Valve" in "CLOSE".		"CLOSE" position at panel 20C003-03.			
	(Cue: Acknowledge control switch					
	operation.)		-			
30	Verify AO-2969B, "Drywell Instrument $N_2$	P	AO-2969B green light is verified on at			
	Supply Valve is closed.		panel 20C003-03.			
*33	Place AO-2969A "Drywell Inst N <sub>2</sub> Bypass"	Ρ	AO-2969A Bypass switch is placed in the			
	Switch in "BYPASS".		"BYPASS" position at panel 20C005A.			
l						
	(Cue: Acknowledge Bypass switch					
*24	operation.) Place AO-2969B "Drywell Inst N <sub>2</sub> Bypass"	Р	AO-2969B Bypass switch is placed in the			
*34	switch in "BYPASS".	Г	"BYPASS" position at panel 20C005A.			
1	SWIGHTIN DIVAGO.					
	(Cue: Acknowledge Bypass switch					
	operation.)					
35	Acknowledge the "DRYWELL INST N <sub>2</sub>	Р	The annunciator "ACKNOWLEDGE"			
	VALVES ISOLATION BYPASS"		pushbutton is depressed at panel			
	annunciator.		00C024.			
		н 1				
	(Cue: Annunciator 219 G-1 stops flashing					
	and clears.)	<u>-</u>	AQ 2000A control quitab is placed in the			
*36	Open AO-2969A Drywell Instrument N <sub>2</sub>	P	AO-2969A control switch is placed in the			
· •	Supply valve.		"OPEN" position at panel 20C003-03.			
	(Cue: Asknowledge control switch					
	(Cue: Acknowledge control switch operation.)					
37	Verify AO-2969A Drywell Instrument N <sub>2</sub>	P	AO-2969A red light is verified ON at			
51	supply value is open.		panel 20C003-03.			
	(Cue: AO-2969A red light is ON, green					
	light is OFF.					

STEP	STEP	ACT	STANDARD
NO			
*38	Open AO-2969B "Drywell Instrument N <sub>2</sub> Supply" valve. (Cue: Acknowledge control switch operation.)	Ρ	AO-2969B control switch is placed in the "OPEN" position at panel 20C003-03 panel.
39	Verify AO-2969B "Drywell Instrument N <sub>2</sub> Supply" valve is open. (Cue: AO-2969B red light is ON, green light is OFF.)	Ρ	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.)	Ρ	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.	P	Task completion reported.
	(Cue: Control Room Supervisor acknowledges report.)		

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

.

I.

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.

RRC 53.1-2 Rev. 0 Page 1 of 1 MTJ:rww

#### PECO Energy Company Peach Bottom Unit 2

# RRC 53.1-2 UNIT 2 HOUSE LOADS TRANSFER DURING A PLANT\_EVENT

### <u>ENTRY</u>

This RRC provides instructions to transfer house loads during a Plant Event.

#### PERFORMANCE STEPS

1.	INSERT <u>AND</u> 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" <u>AND</u> 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"

RRC 94.2-2 Rev. 0 Page 1 of 1 MTJ:rww

#### 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.	<u>WHEN</u> the CRS is ready, <u>THEN</u> 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

Exhibit RRC 94.2-2:1 Rev 0 Page 1 of 1 MRG:mrg 07/27/99

# **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"

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#### 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 <u>NOT</u> be bypassed without Shift Management permission.

NOTE Following a full Group II Isolation, it may be desirable to restore instrument N<sub>2</sub> 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 <sub>2</sub> Supply A Drywell
SV-2(3)969B	Instrument N <sub>2</sub> 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 <sub>2</sub> 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 <sub>2</sub> Anal Inbd
SV-2(3)978 A to G	O <sub>2</sub> Anal Outbd
SV-2(3)980	O <sub>2</sub> 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

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#### <u>NOTE</u>

The instrument  $N_2$  isolation should <u>NOT</u> 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  $N_2$ . <u>IF</u> Instrument Air Header pressure is less than D/W pressure, <u>THEN</u>  $N_2$  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) <u>AND</u> "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<sub>2</sub> 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<sub>2</sub> 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 CAD GAS SAMPLE VALVES

- 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 CAC ANALYZER VALVES

- 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.

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#### 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 <u>OR</u> 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

# PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 7 – MAIN GEN

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator			
TASK-JPM DESIGNATOR:	2450050101 / PLOR-017C	K/A:	<u>262001A</u>	<u>4.04</u>
			RO: 3.6	SRO: 3.7

# SYNCHRONIZE TURBINE GENERATOR OUTPUT WITH GRID AT MINIMUM LOAD

# A. NOTES TO EVALUATOR:

TASK DESCRIPTION:

- 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.

- 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.

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# H. PERFORMANCE CHECKLIST

STEP	STEP	ACT	STANDARD
NO			
*1	Turn on synchroscope for breaker 215 or 225. (Cue: Synchroscope meter rotating and incoming voltmeters and sensing lights are activated.)	Ρ	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.)	Ρ	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".)	Ρ	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.)	Ρ	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.)	Ρ	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.)	Ρ	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.

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STEP NO	STEP	ACT	STANDARD
8	Verify synchroscope pointer at "12 o'clock" position. (Cue: Synchroscope at "12 o'clock" position and lights off.)	Ρ	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.)	Ρ	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.	Ρ	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.)	Ρ	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.)	Р	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.)	Ρ	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.	Ρ	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.)	Р	The selected breaker control switch is placed in the "CLOSED" position.

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STEP	STEP	ACT	STANDARD
g - · - ·	SIEP		STANDARD
NO			
16	Verify breaker 225 or 215 is closed.	P	Breaker 225 or 215 red light on, sync
		•	scopes stopped at 12 o'clock position and
	(Cue: Breaker 225 or 215 red light on,		sync lights "OFF" verified at panel 00C024.
	green light off, the synchroscope needle is		
	stopped at the 12 o'clock position and		
	sync lights out.)		
17	Place the 225 or 215 breaker sync switch	Р	Breaker 225 or 215 sync switch is placed
	to OFF.		in the OFF position at panel 00C024.
	(Cue: Breaker sync switch is placed in		
	OFF and incoming and running voltage		
	meters drop to 0 volts.)		
18	Place the SYNC CHK RELAY BYPASS	Р	SYNC CHK RELAY BYPASS
	KEYSWITCH in NORM.		KEYSWITCH is placed in the NORMAL
			position at panel 00C024 and the key is
	(Cue: Sync chk relay bypass keyswitch is		returned to the SSV keybox.
	in NORM.)	· · ·	
19	Inform the Control Room Supervisor of	P	Task completion reported.
10	task completion.	•	
	(Cue: Control Room Supervisor		
	acknowledges report.)	l	

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

# I. TERMINATING CUE

1

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.

SO 50.1.A-2 Rev. 7 Page 1 of 7 GLS:tjb 12/30/97

#### PECO Energy Company Peach Bottom Unit 2

#### SO 50.1.A-2 MAIN GENERATOR SYNCHRONIZING AND LOADING

#### 1.0 <u>PURPOSE</u>

This procedure provides the instructions necessary to electrically startup the main generator and synchronize to the grid.

#### 2.0 PREREOUISITES

- 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 <u>AND</u> 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<sub>2</sub>".
- 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

5

3.1 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> 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.

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*		<u>CAUTIONS</u> *			
0		<pre>* * nerator gas pressure will increase as the * heats up. * *</pre>			
0	lead to	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. *				
.5	Perform ascensie	the following during synchronization and power on:			
	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 <sub>2</sub> Purge or Fill Selector Valve for Main Gen (G-01)" in "H <sub>2</sub> Manifold" position (valve handle horizontal).			
		4.5.2.2 Slowly throttle open HV-2-50C-47574 "Outlet Block Valve for Gen $H_2$ & CO <sub>2</sub> 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.			
.6	Close t	he "Alt Exc Fld Bkr" and check the following:			
	o "Fi	eld" voltage and amperage			
	o "Gei	n" 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.

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- 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.

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".

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4.12	Adjust generator speed, using	the "Load Selector"
	pushbuttons, to make the synch	hroscope rotate slowly in the
	"FAST" direction.	

- 4.13 Check both synchronizing lights for proper operation as follows:
  - Both lights lit when the synchroscope is at the "6 o'clock position".
  - Both lights out when the synchroscope is at the "12 o'clock position".

\* 0 minimum - 20.9 KV \* 0 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".

4.21 Verify "Incoming", and "Running" voltage are matched and the synchroscope within five degrees (green lines) of the "12 o'clock position".

to bypass the Sync Check Relay.

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- 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 <u>AND</u> adjust HCS-2485 on Panel 20C009 as needed to maintain gas temperature between 30-45 degrees C.
- 4.29 <u>WHEN</u> turbine control has been returned to Panel 20C008A, <u>THEN</u> 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)

#### 5.0 <u>CONTROL STATIONS</u>

5.1 MCR 20C009, Plant Electrical Distribution

#### 6.0 <u>REFERENCES</u>

- 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

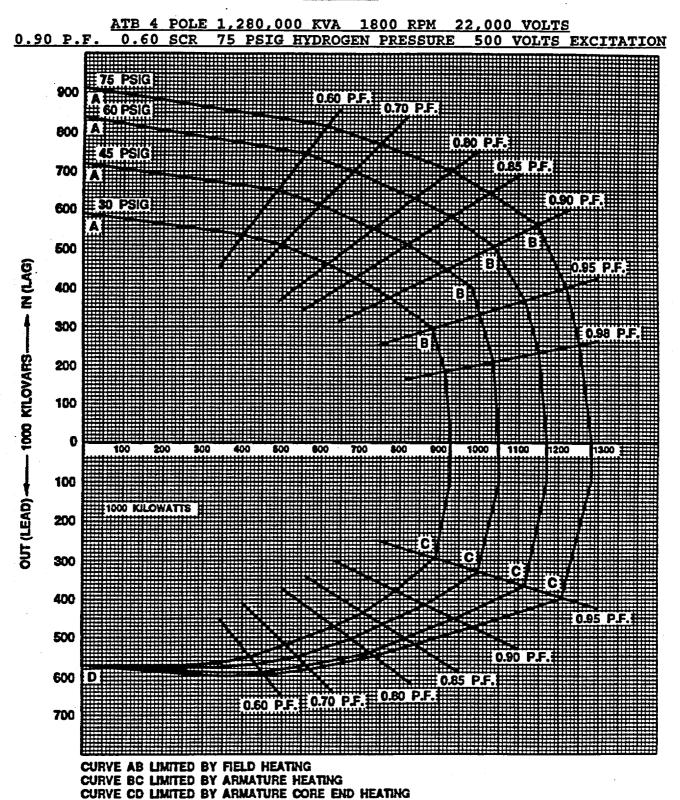
#### 8.0 INTERFACING PROCEDURES

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"

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FIGURE 1



# PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 8 – INST N<sub>2</sub>

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator			
TASK-JPM DESIGNATOR:	0201710040/ PLOR-054P	K/A:	218000A2.03	
	•		URO: 3.4	SRO: 3.6

A. NOTES TO EVALUATOR:

TASK DESCRIPTION:

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.

Backup Instrument Nitrogen to ADS System Startup and Operation

- 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

\*14\*

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I STEP NO	STEP	ACT	STANDARD	
1	Obtain a copy of procedure SO 16A.1.A-2.	Ρ	A copy of procedure SO 16A.1.A-2 is obtained.	
pre	****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.	

 $\geq$ 

STEP NO	STEP	АСТ	STANDARD
7	Inform Control Room Supervisor of task completion.	S	Task completion reported using telephone, hand held radio, or GAI-TRONICS page system.
	(Cue: Control Room Supervisor acknowledges report.)		

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 > 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 <u>PURPOSE</u>

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 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> 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 <u>PERFORMANCE STEPS</u>

#### NOTE

Communications shall be available between the Control Room <u>AND</u> Personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation <u>OR</u> 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:

#### <u>N2 Bottle</u> <u>Pressure Control Valve</u>

2AS377 PCV 2-16A-8917A, "Nitrogen Pressure Control Valve for Backup Supply to ADS"

SO 16A.1.A-2 Rev. 4 Page 2 of 2

- 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  $\geq$  85 psig as indicated on PI-8142, "Backup N2", at Panel 20C003-03, "Containment Atmosphere".

#### NOTE

<u>IF</u> piping downstream of SV-8130A & B is depressurized, <u>THEN</u> SV-8130A & B will close on a high nitrogen flow isolation upon opening.

- 4.5 Place SV-8130A, "A Supply", <u>AND</u> SV-8130B, "B Supply", control switches on Panel 20C003-03 in "OPEN", <u>AND</u> verify the valves remain open.
- 4.6 <u>IF</u> SV-8130A & B do <u>NOT</u> remain open, <u>THEN</u> place SV-8130A & B control switches in "CLOSE" <u>AND</u> 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 <u>CONTROL STATIONS</u>

5.1 MCR 20C003-03, Containment Atmosphere panel

- 6.0 <u>REFERENCES</u>
  - 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"

# PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 9 – CRD

POSITION TITLE:

### Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR:

2010010501 / PLOR-123P

K/A: <u>295031EA1.10</u> 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	STEP	ACT	STANDARD
in the second	NO			
	_1	Obtain a copy of procedure T-246-3.	Р	A copy of procedure T-246-3 is obtained.
	*2	Open HV-3-3-129, CRDHS Bypass Valve for Pump Suction Filter 30F101.	S	HV-3-3-129 handwheel is turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
	•	(Cue: Valve handwheel is turned [COUNTERCLOCKWISE] until stem length above valve yoke rises 4 inches then will not turn.)		
	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	S	HV-3-3-35B handwheel is turned CLOCKWISE until stem movement is observed, then COUNTERCLOCKWISE until resistance of valve backseat is felt.
	29	valve yoke begins to lower then handwheel turned [COUNTER- CLOCKWISE] to original position then will not turn further.)		
	4	Verify HV-3-3-36B, Inner Disch Block Vv from CRD Drive Water Pump 3BP039, is closed.	S	HV-3-3-36B handwheel movement is attempted in the CLOCKWISE direction.
		(Cue: [CLOCKWISE] Valve handwheel does not move, stem length above valve yoke does not change.)		
-	5	Verify HV-3-3-37B, CRD Wtr. Pp 3BP039 Recirc to Cond Storage Tank Valve, is locked open.	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
		(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.)		closed then turned COUNTERCLOCK- WISE until resistance of valve backseat is felt.
	6	Verify oil level in Speed Increaser.	Р	Speed Increaser oil level verified $\geq$ 1 inch.
		(Cue: Oil level is 1 1/2 inches.)		
	7	Verify oil level in motor bearing sightglass.	Р	Motor bearing sightglass verified $\geq$ 1/2 full.
	L	(Cue: Oil level is 3/4 full.)		

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STEP NO	STEP	ACT	STANDARD	
8	Verify proper oil level in pump bearing sightglasses. (Cue: Oil level in all sighglasses are 3/4 full.)	Р	Sightglasses on pump bearings verified <u>&gt;</u> 1/2 full.	
9	Verify TBCW flow from Gear Box and pump bearings oil cooler. (Cue: Flapper in flowglass is lifted up.)	Р	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 '	) k##		
	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	S	HV-3-3-36B handwheel is slowly turned COUNTERCLOCKWISE until resistance of valve backseat is felt.	
	[COUNTERCLOCKWISE] until stem length above valve yoke rises 4 inches then will not turn, flow noise can be heard as valve is opened.)			

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.

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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 hele 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.
- 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.

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#### PECO Energy Company Peach Bottom Unit 3

## T-246-3 MAXIMIZING CRD FLOW TO THE REACTOR VESSEL

#### 1.0 <u>PURPOSE</u>

This procedure provides the instructions necessary to maximize CRD System flow. Maximizing CRD flow is performed for either of the following reasons:

- Raising flow to the RPV serves as an alternate means of RPV injection.
- 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 <u>CANNOT</u> 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 <u>PERFORMANCE STEPS</u>

- 4.1 Unless directed by a TRIP or SAMP procedure to reset the scram, verify the scram is <u>NOT</u> reset.
- 4.2 <u>IF</u> no CRD pump is operating, <u>THEN</u> 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 <u>OR</u> 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 <u>AND</u> 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.

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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.

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- Open HV-3-3-44A(B), "Vent Valve For Drive Water 4.8.2 Filter 3AF013 (3BF013)", for the out of service filter.
- Slowly crack open HV-3-3-42A(B), "CRDHS Inlet 4.8.3 Block Valve to Drive Water Filter 3AF013 (3BF013)", for the out of service filter.
- WHEN a steady flow of water is observed through 4.8.4 the vent, THEN close HV-3-3-44A(B).
- Fully open HV-3-3-42A(B) for the out of service 4.8.5 filter.
- Slowly open HV-3-3-43A(B), "CRDHS Outlet Block 4.8.6 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. 

an ATWS is in progress, 4.13 <u>IF</u>

THEN direct an operator to close HV-3-3-56, "Charging Wtr Hdr Blk Vv to Hydraulic Control Units", located at Reactor Building 135'.

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#### <u>NOTES</u>

1. The CRD System is now delivering maximum flow to the RPV. The expected flow is:

o 212 gpm at 1000 psig RPV pressureo 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 <u>RETURN TO NORMAL</u>

5.1 IF HV-3-3-56 was closed in Step 4.13

<u>AND</u>

HV-3-3-56 is <u>not</u> 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 <u>IF</u> <u>BOTH</u> CRD pumps are operating, <u>THEN</u> 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

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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 <u>REFERENCES</u>

- 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"

## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 10 - MAIN STEAM

POSITION TITLE:	Unit Reactor Operator/Senior Re	actor Ope	rator	·	
TASK-JPM DESIGNATOR:	2390110401 / PLOR-313PA	K/A:	23900	<u>1G.09</u>	
			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.	Ρ	A copy of procedure AO 1A.2-3 is obtained.
	** NO	TE **	
	Examinee should utilize section	ns 4.1 <u>/</u>	AND 4.3 of AO 1A.2-3.
2	Open panel 30C042 front panel doors.	Ρ	Door handle turned, doors pulled outward
			to gain access to the outboard MSIV AC
	(Cue: Panel 30C042 doors are open.)		and DC solenoid valve fuses at the front of
			panel 30C042 in the Cable Spreading
			Room.
- 3	Pull the outboard MSIV AC solenoid valve	S	Fuse puller is attached to outboard MSIV
	fuse 16A-F12B.	н. 1911 - 1913 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914	AC solenoid valve fuse 16A-F12B fuse if
			pulled outward until fuse is free of fuse
<u> </u>	(Cue: Fuse is removed.)	S	holder. Unit Reactor Operator is contacted to
4	Direct the Unit Reactor Operator to	3	monitor outboard MSIV position indication.
	monitor outboard MSIV position indication.		monitor outboard more position indication.
	(Cue: Outboard MSIVs are open.)		
5	Pull the outboard MSIV DC solenoid valve	S	Fuse puller is attached to outboard MSIV
Ŭ	fuse 16A-F11B.		DC solenoid valve fuse 16A-F11B. Fuse
			is pulled outward until fuse is free of fuse
	(Cue: Fuse is removed.)		holder.
6	Direct the Unit Reactor Operator to	S	Unit Reactor Operator is contacted to
	monitor Main Steam line flow using FI-3-		monitor Main Steam line flow on FI-3-06-
	06-088A,B,C,D on panel 30C008A.		088A,B,C,D at panel 30C008A.
	(Cue: Main Steam line FI-3-06-		
	088A,B,C,D are <u>NOT</u> reading downscale.		
	Position indication for all outboard MSIVs		•
	has been lost.) Install fuse 16A-F11B.	S	Fuse puller is attached to outboard MSIV
7		3	DC solenoid valve fuse 16A-F11B. Fuse
	(Cue: Fuse is installed.)		is inserted until fuse is installed in fuse
			holder.
8	Close panel 30C042 front panel doors.	P	Door closed and relatched using handle.
	(Cue: Panel 30C042 doors are closed.)		
9	Direct the Unit Reactor Operator to verify	S	Unit Reactor Operator is contacted to
1	RWCU isolation.		verify RWCU isolation.
1	(Cue: RWCU is isolated.)		

STEP	STEP	ACT	STANDARD
NO 10	Direct the Unit Reactor Operator to open	S	Unit Reactor Operator is contacted to
	Backup N₂ to ADS valves SV-9130A(B) in accordance with SO 16A.7.A-3.		verify Backup N₂ to ADS valves SV- 9130A(B) in accordance with SO 16A.7.A- 3.
+11	(Cue: SV-9130A(B) are open.) Close Instrument Air A(B) Header Isolation	S	HV-3-36B-56981A and HV-3-36B-56981B
	valves HV-3-36B-56981A <u>AND</u> HV-3-36B- 56981B. (Cue: The valve handwheels have been turned clockwise until they will turn no	0	handwheels turned clockwise until the resistance of the valve seats are felt at the 3B Recirc MG Set area.
	further.)	_	
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	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.
	position.	S	Linit Reporter Operator is contacted and
14	Notify the Control Room that venting is commencing and to perform more frequent monitoring of MSIV position.	5	Unit Reactor Operator is contacted and notified of venting and MSIV position monitoring.
	(Cue: Control Room acknowledges notification.)		
*15	Simultaneously press and hold Drain Trap Bypass switches HS-3-36B-5695 <u>AND</u> HS-3-36B-5696. (Cue: HS-3-36B-5695 <u>AND</u> HS-3-36B-	S	Drain Trap Bypass pushbuttons HS-3- 36B-5695 <u>AND</u> HS-3-36B-5696 are simultaneously depressed and held at the 3B Recirc MG Set area.
	5696 are simultaneously depressed and held.)		
18	Inform Control Room Supervisor of task completion.	S	Task completion reported using telephone, hand held radio or GAI-TRONICS page system.
	(Cue: Control Room Supervisor acknow- ledges report. Outboard MSIVs are closed.)		

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

## **TERMINATING CUE**

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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."

AO 1A.2-3 Rev. 4 Page 1 of 10 RWW:rww 10/14/98

#### 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 <u>OR</u> plant conditions warranting isolation of the main steam lines present.
- 2.3 Mode switch in shutdown.

#### 3.0 PRECAUTIONS

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- 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 <u>IF</u> stuck open MSIV <u>CLOSES</u> during performance of this procedure, <u>THEN</u> place equipment in a safe condition <u>AND</u> inform Shift Management.

#### 4.0 PERFORMANCE STEPS

#### NOTES

- 1. Communication should be established between the Control Room <u>AND</u> personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation <u>OR</u> 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 <u>IF MSIV</u> does not indicate closed <u>THEN</u> 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.

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#### NOTE

Section 4.2 shall only be used if radiological conditions permit access to the Unit 3 OBMSIV room.

4.2 <u>IF</u> radiological conditions permit access to the Unit 3 OBMSIV room, <u>THEN</u> 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".

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	**************************************
	* <u>CAUTION</u> * *
, ,	<pre>* Venting the MSIV headers will impact the ability to * * reset the Scram per T-216-3. * ***********************************</pre>
4	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
	• 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 b="" mg="" pump="" recirc="" set="" t3-68,=""></at>
	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".

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## 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". Monitor outboard MSIV position indication and Main 4.3.5 Steam Line Flow to determine if stuck open MSIV has closed. WHEN all outboard MSIVs indicate closed, THEN 4.3.6

#### .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".

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- 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

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#### 6.0 <u>REFERENCES</u>

- 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"

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## ATTACHMENT 1

# EQUIPMENT EFFECTED BY LOSS OF INSTRUMENT AIR HEADER 135 RX BLDG

		NORMAL	FAILURE
VALVE	DESCRIPTION	FOSTITON	HODE
AO-3-07B-3520 AO-3-07B-3505 AO-3-13-022 AO-3-16-3969A AO-3-23-018 AO-3-35-9154A	B Main Steam Line Outboard Isolation Valve C Main Steam Line Outboard Isolation Valve D Main Steam Line Outboard Isolation Valve M/G Lube Oil Cooler Outlet Temp Control Rod Drive Hydraulic System Flow Control A Control Rod Drive Hydraulic System Flow Control B N2 Purge to Drywell and Torus Drywell and Torus Inlet N2 Purge Isol Valve Drywell + Torus N2 Make-up Inlet Isol Valve Torus Air Purge Outboard Isolation Valve 3 Torus Air and N2 Purge Outboard Isol Valve Drywell Air and Nitrogen Purge Isol Valve Drywell Air Purge Inlet Isolation Valve (B) A(B) DW Inst N2 Hdr Isol Valve to A(B) Hdr HPCI Discharge Check Valve RBCW Backup to DWCW Clrs Inlet Vv B Loop	NORMAL <u>POSITION</u> OPEN OPEN OPEN THROTTLED OPEN CLOSED CLOSED CLOSED CLOSED CLOSED CLOSED CLOSED CLOSED N/A OPEN N/A CLOSED CLOSED CLOSED CLOSED	FAILURE MODE CLOSED CLOSED CLOSED CLOSED CLOSED CLOSED CLOSED CLOSED CLOSED CLOSED CLOSED CLOSED CLOSED N/A CLOSED N/A OPEN OPEN
AO-3-35-9154B AO-3-35-9155A AO-3-35-9155B AO-3-35-3253 AO-3-36 <u>B</u> -5230	RBCW Backup from DWCW Clrs Outlet Vv A Loop RBCW Isol to Non Regen Hx + Pp Seal Clrs A(B) Instrument Air Backup to A(B) Inst N2 Hdr Backup Inst Air to DW Inst N2 Hdr A(B)	CLOSED CLOSED OPEN CLOSED N/A	OPEN OPEN CLOSED CLOSED N/A
	TIP Drive Mechanisms	N/A	N/A

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IV

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#### ATTACHMENT 2

#### RESTORATION VERIFICATION

This attachment provides signoffs of procedure steps <u>AND</u> 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.
- 4.4.3.2 Open HV-3-36B-56981B.
- 4.4.3.3 Instrument Nitrogen system restored in accordance with SO 16.7.A-3 as directed by Shift Management (N/A if <u>NOT</u> performed).
- 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 <u>NOT</u> performed).

4.4.4.1 Close AND Cap HV-3-36B-56919A.

4.4.4.2 Close <u>AND</u> Cap HV-3-36B-56919B.

4.4.4.3 Open HV-3-36B-56913A.

IV

## ATTACHMENT 2 (Continued)

4.4.4.4 Open HV-3-36B-56913B.

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		IV
4.4.5.1	Install ( <u>OR</u> Verify installed) fuse 16A-F11B in panel 30C042.	
	<b>\</b>	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:	Vir in Curley, LICENSING ASSISTANT OPERATING LICENSING BRANCH _ REGION I
SUBJECT:	OPERATOR LICENSING EXAMINATION ADMINISTERED ON Sep 13, 14-16, 1999, AT Perch Botton Unit 2 +3 DOCKET NO. <u>50-277 3</u> 278

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.



AS GIVEN OPERATING EXAMINATION, DESIGNATED FOR DISTRIBUTION UNDER RIDS CODE A070. in chains out ing

Item #2

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

# PECO NUCLEAR A Unit of PECO Energy

As Grien?

# WRITTEN EXAM Senior Reactor Operator Reactor Operator

Peach Bottom Atomic Power Station Initial License Examination September 1999

.A010

#### ES-401

## **BWR SRO Examination Outline**

Printed: 06/24/1999

Form ES-401-1

1

#### Peach Bottom Atomic Power Station Facility:

#### Exam Date: 09/13/1999

Exam Level: SRO

Tier	Group	K/A Category Points													
		KI	К2	К3	K4	K5	K6	A1	A2	A3	<b>A</b> 4		Total		
1.	1	3	5	. 3				5	3			7	26		
Emergency & Abnormal	2	3	2	. 3				2	4			3	17		
Plant Evolutions	Tier Totals	6	7	6				7	7			10	43		
	1	2	1	2	2	2	3	_ 1	<b>.</b> 3	3	2	2	23		
2. Plant	2	1	· 2	1	1	1	0	1	1	1	0	4	13		
Systems	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			Ca	t 1	Ca	ut 2	Ca	ut 3	0	Cat 4					
		•				4		4	·	4		5	17		

Note:

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- 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.

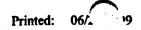
BWR SR amination Outline

Facility: Peu... Bottom Atomic Power Stat

ES - 401		Emergency	and	Abn	orm	al Pla	ant l	Evolutions - Tier 1 / Group 1	Form	ES-401-1
E/APE #	E/APE Name / Safety Function	КІ	К2	кз	<u>A1</u>	A2	G	КА Торіс	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			ŀ		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

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BWR SR camination Outline



Facility: Pean Bottom Atomic Power Stat

ES - 401 Emer			ergency and Abnormal Plant Evolutions - Tier 1 / Group 1											
E/APE #	E/APE Name / Safety Function	К1	К2	кз	<u>A1</u>	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		ŀ				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					ŀ	EK1.01 - Adequate core cooling.	4.7*					
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	<u> </u>				
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

BWR SR amination Outline

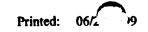
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Facility: Pean Bottom Atomic Power Stat

ES - 401		Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2											
E/APE #	E/APE Name / Safety Function	<u>к1</u>	К2	кз	Al	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	i			
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 hydrautics	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			



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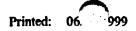
Facility: Pearl Bottom Atomic Power Stat

ES - 401	Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2														
E/APE #	E/APE Name / Safety Function	KI	К2	кз	<u>A1</u>	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



## Facility: Peach Bottom Atomic Power Stat

ES - 401				Plant Systems - Tier 2 / Group 1													
Sys/Ev #	System / Evolution Name	<u>K1</u>	К2	кз	К4	К5	K6	AI	A2	A3	A4	G	КА Торіс	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	ала 1				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 mination Outline

Printed: 06 **b999** 

## Facility: Peach Bottom Atomic Power Stat

ES - 401		Plant Systems - Tier 2 / Group 1 vstem / Evolution Name K1 K2 K3 K4 K5 K6 A1 A2 A3 A4 G KA Topic													
Sys/Ev #	System / Evolution Name	К1	К2	кз	<u>K4</u>	К5	K6	A1	A2	A3	<u>A4</u>	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

# BWR SRO mination Outline

Printed: 06 .)99

Facility: Peach Bottom Atomic Power Stat

ES - 401	-	Plant Systems - Tier 2 / Group 1												Form ES-401-1	
Sys/Ev #	System / Evolution Name	K1	К2	кз	K4	К5	K6	A1	A2	A3	<u>A4</u>	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

BWR SRO mination Outline

Printed: 0 999

## Facility: Peach Bottom Atomic Power Stat

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ES - 401		Plant Systems - Tier 2 / Group 2													
Sys/Ev #	System / Evolution Name	кі	К2	кз	K4	К5	<b>K</b> 6	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							<b>x</b> <sup>.</sup>					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

BWR SRO mination Outline

Printed: 0 999

#### Facility: Peach Bottom Atomic Power Stat

ES - 401				Plant Systems - Tier 2 / Group 2									Form ES-401-		
Sys/Ev #	System / Evolution Name	<u>K1</u>	К2	КЗ	<u>K4</u>	К5	<u>K6</u>	<u>A1</u>	A2	A3	<u>A4</u>	G	КА Торіс	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 mination Outline

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### Facility: Peach Bottom Atomic Power Stat

ES - 401			Plant Systems - Tier 2 / Group 3										Form ES-401-		
Sys/Ev #	System / Evolution Name	к1	К2	кз	K4	К5_	K6	<u>A1</u>	A2	A3	<u>A4</u>	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 Abilities Outline (Tier 3)

Printed: 06/24/19>

### **BWR SRO Examination Outline**

Form ES-401-5

Generic Category	КА	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

Peach Bottom Atomic Power Stat

Facility:

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

1-1

Generic Knowledge d Abilities Outline (Tier 3)

Printed: 06/24/19.

### **BWR SRO Examination Outline**

Form ES-401-5

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:	4.3	. 1
		1.Reactivity control		
		2.Core cooling and heat removal 3.Reactor coolant system integrity	1	
		4. Containment conditions		
5		5.Radioactivity release control.		
	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	

#### Category Total: 5

Generic Total: 17

2

Facility: Peach Bottom Atomic Power Stat

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# NRC Report

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# Question Data for Test: 1999 SRO

Question:	Given the followi										
1		Room Supervisor (CRS) has delegated completion of GP-3, hutdown" for Unit 3 to a fully qualified Senior Reactor Operator									
	(SRO)	L'ORIGIONALI DE ORICO LO A MILY QUARRES OFINOL REACTOR OPERATOR									
•	- This has been	en logged in the Unified Control Room Log									
	- During the Un	nit 3 shutdown a problem requires entry into T-103, "Secondary									
	Containment Co										
	- Unit 2 is opera	ating at 75% power during this time									
	Which of the foli	lowing delineates the responsibility for command and control									
	authority on eac	th of the two Units for these conditions?									
ri		retain command and control over both Units at all times									
× A	The CRS shall h	etain command and control over both onns at an unco									
В	The Unit 3 SRO	retains command and control over Unit 3 until an emergency no									
<sup>B</sup> longer exists. The CRS retains command and control over Unit 2.											
The Senior Manager - Operations shall assume command and control over b											
C	Units upon his a	arrival.									
_	The Unit 3 SRO	) immediately transfers Unit 3 command and control to the Shift									
D	Manager and pr	rovides support and backup to the CRS on both Units.									
Explanation											
of Answer											
	Le vie de la sériese	Materials									
Exam Leve		evel Facility None									
SRO	Memory	PBAPS									
A Informati											
Tier PWGs	ROO	Grp: 1 SRO Grp: 1 RO Val: 2.1 SRO Val: 4.3 55.43 🗸									
System:	Generic										
KA Group Nur	n:2.1 C	Conduct of Operations									
		Ability to supervise and assume a management role during plant									
KA Detail Nun		ransients and upset conditions									
	J										
Question So	urce Informati	ion									
	1997 PBAPS N										
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Ques Mod Met											

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### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
OM - Senior Licensed Operators	- · · OM-P-3.2	4.1.10	12	11	
				-	
Deference Title	Eacility Ref. No.	Section	Po #	Dev	10

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
LP OM Chapters 0-5	LOT-0006			0	3
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Question:	A Reactor Operator has just begun night work following his long break (seven										
5	days).										
• • • • •	David ha wada 1945 - 0045										
	- 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:										
r											
A	Return to work immediately, but can only work 8 hours.										
¥•в	Return to work at 1745, but can only work 9 hours.										
- 0											
	Return to work at 1845, and work a regular 12 hour shift.										
C											
	Return to work at 2145, and work up to 16 hours.										
_ D											
[]											
Explanation of Answer	<ul> <li>A. Should not return to work until after 8 hour rest period.</li> <li>B. Correct answer, 8 hour rest then 9 hours maximum 24/48.</li> </ul>										
	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.										
	Materials										
Exam Level											
Both	Application PBAPS										
KA Informati											
Tier PWGs	RO Grp: 1 SRO Grp: 1 RO Val: 3.0 SRO Val: 4.0 55.43										
System:	Generic										
KA Group Nur	n:2.1 Conduct of Operations										
KA Detail Num	n: 2.1.2 Knowledge of operator responsibilities during all modes of plant operations.										
Question So	urce Information										
Ques Source:	New Question										
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Ques Mod Me	t										

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### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Unit 2 Tech Specs		5.2.2.c	-3 & 5.0	the come of a state	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Working Hour Limitations	AC-40	3.1.2 & 5.2	1&3		and the set of the second s
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Administrative Practices Lesson PI	PLOT-1570			12	1.j

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## Question Data for Test: 1999 SRO

Question:	It full power with no Surveillance Testing or ft Manger receives a call indicating that one		
1 0	of the licensed opera	tors has been se	elected for a random substance screening. Unit 2 Reactor Operator (URO). The testing
	would require the ope	erator to leave th	e main control room for approximately 45 hift response to this condition.
<b>A</b> –	A temporary relief of	the URO by the	on-shift Plant Reactor Operator (PRO).
🖉 в	A temporary relief of	the URO by the	fourth Reactor Operator (4th RO).
c	A complete turnover	of the URO posi	tion to the Plant Reactor Operator (PRO).
D	No relief is required s testing while holding		perators are exempt from random substance on.
Explanation of Answer	a CRS and 3 Ros in		) to leave the main control room. Must have m.
	PRO cannot formally	hold two shift p	ed since it will be less than 1 hour. Also, the ositons.
	D. Licensed operato	irs may be excu	sed from random substance exams only on a nine that conditions do not support the
Exam Leve	Cognitive Level	Facility	Materials
EXAIL LEVE	Memory	PBAPS	N/A

Tier · PWGs	f	RO Grp: 1 SRO Grp: 1 RO Val: 3.0 SRO Val: 3.4 55.43
System:	Generic	
KA Group Nur	n: 2.1	Conduct of Operations
KA Detail Nun	n: 2.1.3	Knowledge of Shift Turnover Practices
	a su su na na su su su su su su	

### **Question Source Information**

**(**<sup>1</sup> )

Ques Source:	New	Question Source	
Ques Mod Met			
A REAL PROPERTY AND ADDRESS OF TAXABLE PROPERTY.			

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### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Temporary Relief	- OM-C-6.2		2-3	2	an yan adam a sadd an di Salis I. Salis (1995) - s
Reference Title	Facility Ref. No.	Section	Pg#	Rev.	<b>L.O</b> .
Operations Manual Chapters 6-9	PLOT-0007	II.A.2	5	0	1

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Question Data for Test: 1999 SRO

Question:	Unit 3 is in MODE 1 at 80% power.
9	- 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.
	By 0300 on 1/4/99.
C	By 0300 on 1/4/35.
	By 0700 on 1/4/99.
V D	
Explanation	A. Incorrect, 1/1/99 at 0900 + 24 hr frequency + 36 hours to MODE 4.
of Answer	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.
	Materials
Exam Leve SRO	Application PBAPS
KA Informati	on
Tier PWGs	RO Grp: 1 SRO Grp: 1 RO Val: 2.9 SRO Val: 4.0 55.43 🗸
System:	Generic
KA Group Nu	m: 2.1 Conduct of Operations
KA Detail Nur	
Question So	burce Information
Ques Source:	Question
	Source
Ques Mod Me	et <b>e</b> se
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### References

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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	<ul> <li>Facility Ref. No.</li> </ul>	Section	Pg#	Rev.	L.O.
Introduction to Improved Tech Spe	PLOT-1800	111	7	6	2

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# Question Data for Test: 1999 SRO

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Question:	A Post Maintenance Tes stroke time a valve follow notes that the acceptanc to a recent Tech Spec re	ring maintenance e criteria for valv	to prove OPER	ABILITY. The	CRS
	Which of the following is PMT.	the MINIMUM re	quired to use the	e ST to comple	ete this
- <b>A</b>	A "Partial Procedure Use		مور در مید میکور در این از این از مراجع این از ا		
B	A "Permanent Revision T	Temporary Chan	ge".		
T c	A "Single Use Temporar	y Change".	an a		· · · · · · · · · · · · · · · · · · ·
V D	A "Procedure Revision".		· · · · · · · · · · · · · · · · · · ·		
Explanation of Answer	Temporary changes, par ST acceptance criteria b would have to be revised	ecause they cha	nanges may not nge the intent of	be made for c the procedure	hanges to e, the ST
Exam Leve SRO		Facility PBAPS	Materials		
KA Informat	ion RO Grp: 2	SRO Grp: 2	RO Val: 2.5 S	RO Val: 3.4	55.43 📿
System:	Generic	na mangan sering dikenan karan manunun sering dise			s an s sa mar a
KA Group Nu	m: 2.2 Equipmer	nt Control			understand de la constant de la const
KA Detail Nur	m: 2.2.11 Knowledg	e of the process	of controlling te	mporary chan	ges.
Question Sc	ource Information				
Ques Source	New	Quest Source			•
Ques Mod Mo	et				
Reference	S .				
Reference T		acility Ref. No.	Section	Rg# Rev	L.O.
Temporary I	Procedure Change	A-3	Exhibit A-3-1	1 0	

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Reference Title		Facility Ref. No.	Section	Pg #	Rev.	L.O
Administrative Procedures	•	PLOT-1570	II.B.1.e.1	7	13	1

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Question:	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.
В	Two Special Condition Tags (SCTs).
C	A Danger Tag and Special Condition Tag (SCT).
ν̈́D	An Information Tag and a Danger Tag.
Exam Leve Both	Memory PBAPS
Tier PWGs	RO Grp: 2 SRO Grp: 2 RO Val: 3.6 SRO Val: 3.8 55.43
System:	Generic
KA Group Nu	m: 2.2 Equipment Control
KA Detail Nur	m: 2.2.13 Knowledge of Clearance and Tagging Procedures
Question So	purce Information
Ques Source:	New Question
Ques Mod Me	Source
References	6
Reference T	itle Facility Ref. No. Section Pg # Rev. L.O.
Clearance &	Tagging Manual CTM 4.2.10 4

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Clearance Application Process	NCT-0300	III.B.3		1	2

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14	You are the r refuel platforr Neutron Mon	m <mark>main ho</mark>	SRO supervising ist lowers the third ector.	g the beginning I fuel bundle arc	of core n ound the	eload as th "A" Wide F	ie Range
	Which of the	following o	conditions would I	equire suspens	ion of col	re alteratio	ns?
- A	The Unit Rea panel C05 is		ator reports that t	he white rod with	hdraw pe	ermissive li	ght on
- В	"A" Wide Rai fuel support	nge Neutro piece.	on Monitor count i	ate doubles as	the bund	le is seate	d in the
<b>⊻</b> c	The Refuel P refuel platfor	Platform Op m is NOT	perator reports the lit.	at the "Rod Bloc	k Interloo	ck #1" light	on the
. D			ator reports that t from service.	he inservice RH	R shutdo	own cooling	g pump
Exam Level SRO KA Informatic	or 4th, adjac C. Correct, I D. Incorrect, core alteratio Cognitive Compret	ent to a W FH6C - 10 , SDC may ons. e Level nension	0.2.9 doubling of RNM. 2.8 Light should be removed fror Facility PBAPS SRO Grp: 2	be list under sta n service withou <u>Materials</u> N/A	ted cond	litions. Ig a suspe	nsion of
System:	Generic						
KA Group Num	1:2.2	Equipm	ent Control	an and a strangen frame, and an an an an and a strangen at the strangen of the state			
KA Detail Num	2.2.29	Knowle	dge of SRO Fuel	Handling Respo	onsibilitie	5	• •••••••
Question Sou	urce Inform	ation			<u> </u>		
Ques Source:	New		Ques		(intersection)		
Ques Mod Met							
References							
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Core Compor	nent Moveme	nt - Core	FH6C	10.2.8	31	49	

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Reference Title	Facility Ref. No.	Section	Pg#	Rev.	L.O
Peach Bottom Refueling Procedure	NLSRO-0763	III.A			6

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#### Question Data for Test: 1999 SRO

Question: 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 15. 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 unreviewed safety question. Which of the following procedures is required to control this activity? A-C-023 "Plant Evolution/Special Test (PEST) Program". -- A A-C-041 "Troubleshooting, Rework and Testing (TRT) Control Process". В A-C-025 "Fix it Now (FIN) Process". С 'Temporary Plant Alteration (TPA)". MOD-C-7 D Explanation A. Incorrect, activity is NOT an infrequently performed complex test or evolution of Answer 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. Materials Cognitive Level Exam Level Facility None PBAPS Comprehension ISRO **KA Information** SRO Grp: 2 RO Val: 2.2 SRO Val: 3.3 55.43 🗸 RO Grp: 2 **PWGs** Tier Generic System: **Equipment Control** KA Group Num: 2.2 KA Detail Num: 2.2.20 Knowledge of the process for managing troubleshooting activities. **Question Source Information** Question Ques Source: New Source Ques Mod Met

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### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Troubleshooting, Rework and Testi-	AG-CG-41	4.4.1	4	1	nan saga saga saga sa ku s
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.

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Question:	Given the following conditions:					
18	- 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.					
В	Two individuals performing the surveillance in a 90 mR/hr area for 35 minutes.					
c 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	<ul> <li>A. 54 mR total exposure, correct answer</li> <li>B. 105 mR total exposure</li> <li>C. 90 mR total exposure</li> <li>D. 55.5 mR total exposure</li> </ul>					
	Cognitive Level Encline Materials					
Exam Level	Cognitive Level         Facility         Matchars           Application         PBAPS         Calculator					
A Informati						
Tier PWGs	RO Grp: 3 SRO Grp: 3 RO Val: 2.5 SRO Val: 2.9 55.43 🗸					
System:	Generic					
KA Group Nur	n: 2.3 Radiological Controls					
KA Detail Nun	n: 2.3.2 Knowledge of facility ALARA program					
Question So	urce Information					
Ques Source:	1998 PBAPS NRC Exam Question Source					
Ques Mod Me						

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### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
ALARA Program	PLOT-1770	1.B	5&6	10	1

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	During a decla	ared emerg	gency, it is necess	sary to raise the	e PECO /	Administ	duve
19	Dose Control Levels to the NRC annual exposure limits.						
	Which of the f	following d	escribes how this	extension is a	uthorized	?	
- A	During a decl automatically	ared emergence	gency, all Peach I to the NRC TEDE	Bottom qualifie limit.	d Radiatio	on Work	ers are
- B			n Manager provid authorizations to		ncy Direc	ctor with	verbal
. <b>c</b>	The Control F for Operation		ervisor provides in el.	nmediate verba	al extensi	on autho	rization
✓ D	The Emergen	ncy Directo	r approves a "Dos	se Extension F	orm".	. با المود بيد ماروس	
Explanation of Answer		Protection does not a	ottom Manager does no pprove extension		extensio	ns verba	illy
Exam Leve SRO	Cognitive	Level	Facility PBAPS	<u>Materials</u> N/A			<u>, , , , , , , , , , , , , , , , , , , </u>
	<b>J</b>		J				
	ion	0 Grp: 3	SRO Grp: 3	RO Val: 2.5	SRO Val	: 3.1	55.43 🟹
KA Informati	ion	O Grp: 3	SRO Grp: 3	RO Val: 2.5	SRO Val	: 3.1	55.43 👽
KA Informati Tier PWGs System:	on R Generic		SRO Grp: 3	RO Val: 2.5	SRO Val	: 3.1	55.43 🟹
KA Informati	ON R Generic m: 2.3	Radiolog		posure limits a	nd contai	mination	
KA Informati Tier PWGs System: KA Group Nur KA Detail Nur	On Generic m: 2.3 n: 2.3.4	Radiolog Knowled including	ical Control ge of radiation ex	posure limits a	nd contai	mination	
KA Informati Tier PWGs System: KA Group Nur KA Detail Nur	Generic m: 2.3 n: 2.3.4	Radiolog Knowled including ation	ical Control ge of radiation ex permissible level	posure limits a s in excess of on	nd contai	mination	
KA Informati Tier PWGs System: KA Group Nur KA Detail Nur Question So	Generic m: 2.3 n: 2.3.4 ource Informa 1998 PBAP	Radiolog Knowled including ation	ical Control ge of radiation ex permissible level am Questi	posure limits a s in excess of on	nd contai	mination	
KA Informati Tier PWGs System: KA Group Nur KA Detail Nur Question So Ques Source:	Generic Generic m: 2.3 n: 2.3.4 purce Informa 1998 PBAP2 et	Radiolog Knowled including ation	ical Control ge of radiation ex permissible level am Questi	posure limits a s in excess of on	nd contai	mination	
KA Informati Tier PWGs System: KA Group Nut KA Detail Nut Question So Ques Source: Ques Mod Me	Generic m: 2.3 n: 2.3.4 purce Informa 1998 PBAPS et	Radiolog Knowled including ation S NRC Exa	ical Control ge of radiation ex permissible level am Questi	posure limits a s in excess of on	nd contai	mination	
KA Informati Tier PWGs System: KA Group Nur KA Detail Nur Question So Ques Source: Ques Mod Me References Reference Ti	Generic m: 2.3 n: 2.3.4 purce Informa 1998 PBAPS et	Radiolog Knowled including ation S NRC Exc	ical Control ge of radiation ex permissible level am Questi Source	posure limits a s in excess of on	nd contai those aut	mination	control,
KA Informati Tier PWGs System: KA Group Nur KA Detail Nur Question So Ques Source: Ques Mod Me References Reference Ti	Generic m: 2.3 m: 2.3.4 purce Information 1998 PBAPS et Solution Radiation Expo	Radiolog Knowled including ation S NRC Exc S NRC Exc Source Gu	ical Control ge of radiation ex permissible level am Questi Source Facility Ref. No.	posure limits a s in excess of on e Section	nd contar those aut	mination thorized	control,

Question:	Which of the following is the REQUIRED immediate action if a Locked High						
20	Radiation Area door is found open with no control of area access?						
A	Inform Secu	rity and e	stablish Positive A	ccess Control.			
В	Inform the or unauthorized		alth Physics Techi el.	nician and lock (	the area a	after chec	king for
C C	Inform Secure excess of the		he area and have ted.	Health Physics	check foi	r exposun	es in
V D	Inform the H	ealth Phy	sics Supervisor ar	d establish Pos	itive Acco	ess Contr	ol
Explanation of Answer	D correct as	directed I	by HP-C-202.		• 990 co collect - • • • • • • • • •		•
Exam Level SRO	Cognitive Memory		Facility PBAPS	Materials N/A			••••
A Information er PWGs ystem:		RO Grp: 3	SRO Grp: 3	RO Val: 2.9	SRO Val	: 3.3 5	5.43 🖌
A Group Nun	and the second second	Radiati	on Control				
A Detail Num	2.3.10		o perform procedu ard against persor		excessive	levels of	radiation
estion Sou	urce Inform	ation	· · · · · · · · · · · · · · · · · · ·				
ues Source:	1997 PBAP	S NRC E	xam Ques Sourc				
lues Mod Mel				· ·			
eferences	- <u> </u>						
Reference Tit		- 0	Facility Ref. No.	Section	Pg#	Rev.	L.O.
Locked High	Radiation Are	a Contro	HP-C-202	7.13.1	9	6	
Reference Tit			Facility Ref. No.	Section	Pg #	Rev.	L.O.
Radiation Pro	tection for PA	AT Wor	GETCM-10308	د در این اور		0A	10

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Question Data for Test: 1999 SRO

Question:		a High R	adiation Area that d				
۲,	Which of the Operator to e		will meet the MININ area.	IUM requireme	nts for a	n Equipm	ent
A	Must be acco	mpanied	by an Advanced Ra	ad Worker (AR	W) qualif	ied indivi	dual.
🗹 в	individual.		by a Level II Radia				
с	Entry into the (RPM) permised		not permitted withou	t the Radiation	Protecte	ection Ma	inger
D	Entry into the	area is r	not permitted until a	ctivation of the	Emerger	ncy Plan.	2 <sup>m</sup> - 1 - 1
Explanation of Answer	HP-C-310 in RP Technicia	a effort to in may ac	o return the plant to ct in lieu of a formal	a stable condit RWP to assist	ion a Lev workers	/el II (AN	SI 3.1)
Exam Leve Both	Cognitive Memory	Level	Facility PBAPS	Materials N/A			
A Informat		O Grp:	SRO Grp: 3	RO Val: 2.6	SRO Val	: 3.0	55.43
System:	Generic					e sagange mager a rayor for fraga days faithe frag	n an
A Group Nu	m: 2.3	Radiati	on Control				
A Detail Nu	m: 2.3.1	Knowle	edge of 10CFR20 an	nd related facili	ty limits	and also file and also file the second	· · · · · · · · · · · · · · · · · · ·
uestion Sc	ource Inform	ation					
Ques Source	New		Questi Source	- · · ·			
Ques Mod M	et						
Reference	S						
Reference T	itle		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Radiation W	ork Permits	There is the second	PLOT-1760	II.C	6	14	4
Reference T	Title		Facility Ref. No.	Section	Pg #	Rev.	L.O.
	lork Permit Pro		HP-C-310	7.12	1	3	

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## Question Data for Test: 1999 SRO

Question:	Given the follo	owing conditions:					
23 -	- A plant transient occurred on Unit 3 at 1415 resulting in an Unusual Event declaration at 1425.						
		pleting the Unusual Event Notification Form an Alert was declared at nrelated event.					
.     .	The State and	Local Agencies shall be notified of the Alert no later than:					
- A	1440.						
✓ В	1450.						
. c	1515.						
	1535.						
	ر میں دور والی کر کر کا کا کار کر کر کر کر کا کا کا کار کر کا						
	Agencies of U B. 15 minutes C. 1 hour from	s from Alert declaration, correct answer m event occurrence. m Alert declaration.					
Exam Level SRO	Cognitive Comprehe	IN/A					
KA Information	on						
Tier PWGs		O Grp: 4 SRO Grp: 4 RO Val: 2.2 SRO Val: 4.0 55.43 🗸					
System:	Generic						
KA Group Nur	n: <mark>2.4</mark>	Emergency Procedures and Plan					
KA Detail Nurr	n: <b>2.4.38</b>	Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as the Emergency Director					
Question So	urce Informa	ation					
Ques Source:		S NRC Exam Question Source					
Ques Mod Me	t						

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### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Emergency Notification Phone L	ist - ERP-110, App. 1		1	51	ar a tana manana ana kata ka tana ana
Reference Title	Facility Ref. No.	Section	Pg#	Rev.	<b>L.O</b> .
Emergency Director	ERP-200	1.3	1	15	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Emergency Director Training	PEPP-6010		T	2	2.a

Question:

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)
 Primary Containment Control (T-102)
 C Secondary Containment Control (T-103)
 C 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	N/A
SRO	Comprehension	PBAPS	

#### **KA Information**

Tier PWGs	f	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	
Ques Source.			

				. 1	Page 25 of 179
Ques Mod Met	•		and a set of the set of the	•	
References	<b>-</b>				
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Primary Containment Control	T-102	and a substantiant of the substant	1	12	-
Reference Title	Facility Ref. No.	Section	Pg#	Rev.	L.O.
TRIP Procedures	PLOT-1560			8	1

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Question:

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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 offsite 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.

<b>– A</b>	Unusual Event	
B	Alert	
₹ c	Site Area Emergency	
D	General Emergency	
Explanation of Answer	A Site Area Emergency must be declared bas has existed for > 15 minutes and NO diesel ge associated busses for > 15 minutes.	

<b>5</b>	Cognitive Level	<b>F</b> = = 1114 -	Materials
Exam Level	Cognilia e Level	Facility	ERP-101 Tables
SRO	Application	PBAPS	
J. The second		and a second second	na estavenesis i antiseteri namenara a ser fela esta i di anti di antisetta composi di contra composi

#### **KA Information**

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Tier PWGs	R	O 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	المراجع والمراجع والمراجع والمستعم والمستعم ومناهد والمراجع والمراجع
			•

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Ques Mod Met					
References					
Reference Title	Facility Ref. No.	Section	Pg#	Rev.	<b>L.O</b> .
Classification of Emergencies	ERP-101	Table 8	15	20	

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# Question Data for Test: 1999 SRO

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Question:	ON-114 is designed Bottom. An actual fin into this procedure.	to mitigate actual fin re reported in which	es reported in s of the following	elected areas at l areas would requ	Peach uire entry	
A	The Low Level Radv	vaste Storage Facili	iy.			
✓ В	The Inner Screen St	ructure.		a staar aan ah	5 	
_ C	C The SU-25 Start-Up House.					
<b>D</b>	The Water Treatmer	Na serie de la constante de la	a ana sa sa arawa arawa kata manaka manak		an a	
Explanation of Answer	While important, the Answer B is specific		y symptom into		ON-114.	
Exam Level SRO	Cognitive Level	Facility PBAPS	Materials N/A			
KA Informatio	RO Grp:	4 SRO Grp: 4	RO Val: 3.0	SRO Val: 3.5	55.43 🟹	
System:	Generic	a . Marina I. I. Junio a Alfrida da Santa Marina, <b>Marina Marina da Santa da Santa da</b>			. Sawa anto nganaga ya na na na na na	
KA Group Nur	n: 2.4 Erner	gency Procedures/F	Plan	n anna an an an an an an ann an ann an a	an a	
KA Detail Num	1: 2.4.27 Know	viedge of fire in the p	lant procedure		an mar a an an an an an an an an	
Question So	urce Information					
Ques Source:	New	Ques Sourc	1		and a second	
Ques Mod Me					and an an arranged	
References						
Reference Ti		Facility Ref. No.	Section	Pg # Rev.	L.O.	
Actual Fire R	eported in	ON-114	Entry Sympton	ms 1 6	an analasina analasina ana ana ana ana ana ana ana ana ana	
Reference Ti	and the second state of th	Facility Ref. No.	Section	Pg # Rev.	L.O.	
Off Normal P	rocedures	PLOT-1550	II.B.1	6 7	1	

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# Question Data for Test: 1999 SRO

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
<b></b>	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.
🖌 В	1 Control Rod is at position 44, all other rods are at position 00, 2% of the SBLC tank has been injected.
С	3 Control Rods are at position 06, all other Control Rods are at position 00, 45% of the SBLC tank has been injected.
	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 Leve	Cognitive Level Facility Materials
SRO	Cognitive Level         Facility         N/A           Application         PBAPS         N/A
SRO	Application PBAPS N/A
SRO KA Informati	Application PBAPS N/A
SRO KA Informati Tier PWGs	Application     PBAPS       on       RO Grp:     4       SRO Grp:     4       RO Val:     3.7       SRO Val:     4.3
SRO KA Informati Tier PWGs System:	Application PBAPS N/A on RO Grp: 4 SRO Grp: 4 RO Val: 3.7 SRO Val: 4.3 55.43 Generic
SRO KA Informati Tier PWGs	Application     PBAPS       on       RO Grp:     4       SRO Grp:     4       RO Val:     3.7       SRO Val:     4.3       55.43        Generic        m:     2.4       Emergency Procedures/Plan
SRO KA Informati Tier PWGs System: KA Group Nur KA Detail Nun	Application       PBAPS       N/A         on       RO Grp:       4       SRO Grp:       4       RO Val:       3.7       SRO Val:       4.3       55.43       ✓         Generic
SRO KA Informati Tier PWGs System: KA Group Nur KA Detail Nun	Application       PBAPS       N/A         on       RO Grp:       4       SRO Grp:       4       RO Val:       3.7       SRO Val:       4.3       55.43       ✓         Generic
SRO KA Informati Tier PWGs System: KA Group Nur KA Detail Nun Question So	Application       PBAPS       N/A         on       RO Grp: 4       SRO Grp: 4       RO Val: 3.7       SRO Val: 4.3       55.43       ✓         Generic
SRO KA Informati Tier PWGs System: KA Group Nur KA Detail Nun Question So Ques Source:	Application       PBAPS       N/A         on       RO Grp: 4       SRO Grp: 4       RO Val: 3.7       SRO Val: 4.3       55.43       ✓         Generic
SRO KA Informati Tier PWGs System: KA Group Nur KA Detail Nun Question So Ques Source: Ques Mod Me	Application       PBAPS       N/A         On       RO Grp: 4       SRO Grp: 4       RO Val: 3.7       SRO Val: 4.3       55.43         Generic

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Reference Title		Facility Ref. No.	Section	Pg #	Rev.	L.O
TRIP Procedures	•	PLOT-1560			8	11

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## Question Data for Test: 1999 SRO

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Question:	Which of the following the following the second sec		conditions will resu	It in Recirc flow	controlle	er output	being
			u naka anala na atanaki kana apanatan kana kana kana kana kana kana kan	a 1941 - 1110 - 1110 - 1110 - 1110 - 1110 - 1110 - 1110 - 1110 - 1110 - 1110 - 1110 - 1110 - 1110 - 1110 - 1110			n Marina Marina (Marina)
- A	Total feedwate	er flow g	reater than 85% ar	nd any condens	ate pump	o trip.	· · · ·
- B	Individual feed	ipump fi	ow less than 20% a	and Reactor lev	el less th	an 17".	
c	Total feedwate	er flow g	reater than 20% ar	nd Reactor leve	l less tha	n 17".	an and a state of the state of the state
₩ D	Reactor scran	n and Re	eactor level less the	an 17".			
Explanation of Answer	<ul> <li>A. Incorrect -</li> <li>B. Incorrect -</li> <li>C. Incorrect -</li> <li>D. Correct</li> </ul>	results i	n 45% limiter		•		· · · · · · ·
Exam Leve Both	Cognitive Memory	Level	Facility PBAPS	Materials N/A			
KA Informati Tier SYS	on Ro	D Grp:	SRO Grp: 1	RO Val: 3.1	SRO Val	: 3.2 5	55.43
System:	202002	Recircu	lation Flow Contro	I System			-
KA Group Nur	n: K1	Knowle relation	edge of the physica Iship between recir	l connections a c flow control s	nd/or cat ystem an	use effect id the foll	l owing
KA Detail Nun	n: K1.09	Reacto	r water level				
Question So	urce Informa	ation					
Ques Source:	New	· · · · · · · · · · · · · · · · · · ·	Quest Sourc				
Ques Mod Me	t	·	anna a tha an	an ang sa		erigene Bregelingelin, J. at. 1, 1 at. 1, 1 (1).	
References	j						1
Reference Ti	tle		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Lów	Level	a	OT-101	4.0	2	9	n an
Reference Ti	tle		Facility Ref. No.	Section	Pg#	Rev.	L.O.
Recirc Flow	Control		PLOT-0040	IV.B	15	8	5b

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Question:	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.
<b>√</b> 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.
	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 Both	Cognitive Level     Facility     Materials       Application     PBAPS     N/A
KA Informatio	n
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 Nun	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 Sou	urce Information
Ques Source:	New Question Source
Ques Mod Mel	
	· · · · · · · · · · · · · · · · · · ·

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### References

Reference Title	Facility Ref. No.	Section	Pg#	Rev.	L.O.
Initiation of Drywell Sprays Using R	·· <b>T-204</b>			1	
Reference Title	Facility Ref. No.	Section	Pg#	Rev.	<b>L.O</b> .

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# Question Data for Test: 1999 SRO

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Question:	secured usi Condition IS	ng the "Sh 6 Present"	I initiation due to hi ort Term HPCI Sys method of SO-23.2 Ind to initiate HPCI in	tem Shutdown 1 2.2A-3, "HPCI S	When an ystem Sh	Initiation hutdown".	The
. * <sup>1</sup> .	Under these	e condition	s, HPCI Turbine sp	eed during star	tup is cor	ntrolled by	<u>/:</u>
A	The ramp g 014.	enerator ir	nitiated by the oper	ing of HPCI ste	am suppl	ly valve, <b>N</b>	10-3-23-
В	The slow of	pening of t	he HPCI Turbine S	top Valve, HO-3	3-23-4513	3.	
C	The ramp g 23-4512.	enerator ir	nitiated by opening	of the HPCI Tu	rbine Cor	ntrol Valve	e, HO-3-
V. D	The ramp g 4513.	enerator ir	nitiated by opening	of the HPCI Tu	rbine Sto	p Valve, H	10-3-23-
Explanation of Answer			· · · · · · · · · · · · · · · · · · ·				
Exam Level Both	Cognitiv	ve Level V	Facility PBAPS	<u>Materials</u> N/A			
KA Informatio		RO Grp:	I SRO Grp: 1	RO Val: 3.3	SRO Val	: 3.3 5	5.43
System:	206000	High P	ressure Coolant In	ection (HPCI)			
KA Group Nun	n: <b> K5</b>		edge of the operation apply to HPCI	onal implications	s of the fo	ollowing c	oncepts
KA Detail Num	K5.05	Turbin	e Speed Control				-
Question Sol	urce Inform	nation					
Ques Source:	New		Ques Source				
Ques Mod Me							-
References				· · · · · · · · · · · · · · · · · · ·			
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	L.O.
High Pressur		jection	PLOT-5023	II.C.3.d	14	0	5.d

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# Question Data for Test: 1999 SRO

	An ADS blowdown has occurred following a LOCA. The ADS valve control
36	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.
В	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.
<u> </u>	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.
	Cognitive Level Equility Materials
Exam Level Both	Materials
Exam Level Both	Cognitive Level     Facility     Materials       Comprehension     PBAPS     N/A
Exam Level Both A Informatio	Cognitive Level Facility Materials N/A
Exam Level Both A Information	Cognitive Level       Facility       Materials         Comprehension       PBAPS       N/A         On       RO Grp: 1       SRO Grp: 1       RO Val: 3.8       SRO Val: 3.9       55.43
Exam Level Both A Information	Cognitive Level       Facility       Materials         Comprehension       PBAPS       N/A         On       RO Grp: 1       SRO Grp: 1       RO Val: 3.8       SRO Val: 3.9       55.43         209001       Low Pressure Core Spray Subsystem
Exam Level Both A Information Tier SYS System:	Cognitive Level       Facility       Materials         Comprehension       PBAPS       N/A         On       RO Grp:       1       SRO Grp:       1       RO Val:       3.8       SRO Val:       3.9       55.43         209001       Low Pressure Core Spray Subsystem
Exam Level Both A Informatio	Cognitive Level       Facility       Materials         Comprehension       PBAPS       N/A         On       RO Grp: 1       SRO Grp: 1       RO Val: 3.8       SRO Val: 3.9       55.43         209001       Low Pressure Core Spray Subsystem         K3       Knowledge of the effect that a loss or malfunction of the low pressure core spray system will have on
Exam Level Both Tier SYS System: KA Group Nun KA Detail Num	Cognitive Level       Facility       Materials         Comprehension       PBAPS       N/A         On       RO Grp: 1       SRO Grp: 1       RO Val: 3.8       SRO Val: 3.9       55.43         209001       Low Pressure Core Spray Subsystem         K3       Knowledge of the effect that a loss or malfunction of the low pressure core spray system will have on
Exam Level Both Tier SYS System: KA Group Nun KA Detail Num	Cognitive Level       Facility       Materials         Comprehension       PBAPS       N/A         On       RO Grp: 1       SRO Grp: 1       RO Val: 3.8       SRO Val: 3.9       55.43         209001       Low Pressure Core Spray Subsystem         K3       Knowledge of the effect that a loss or malfunction of the low pressure core spray system will have on         K3.02       ADS logic
Exam Level Both A Information Tier SYS System: KA Group Num KA Detail Num Question Sol	Cognitive Level       Facility       Materials         Comprehension       PBAPS       N/A         On       RO Grp: 1       SRO Grp: 1       RO Val: 3.8       SRO Val: 3.9       55.43         209001       Low Pressure Core Spray Subsystem         K3       Knowledge of the effect that a loss or malfunction of the low pressure core spray system will have on         K3.02       ADS logic         urce Information       Question Source
Exam Level Both A Information Tier SYS System: KA Group Nun KA Detail Num Question Source:	Cognitive Level       Facility       Materials         Comprehension       PBAPS       N/A         On       RO Grp: 1       SRO Grp: 1       RO Val: 3.8       SRO Val: 3.9       55.43         209001       Low Pressure Core Spray Subsystem         K3       Knowledge of the effect that a loss or malfunction of the low pressure core spray system will have on         K3.02       ADS logic         urce Information       Question Source
Exam Level Both A Information Tier SYS System: KA Group Num KA Detail Num Question Source: Ques Source: Ques Mod Met	Cognitive Level       Facility       Materials         Comprehension       PBAPS       N/A         On       RO Grp: 1       SRO Grp: 1       RO Val: 3.8       SRO Val: 3.9       55.43         209001       Low Pressure Core Spray Subsystem       Image: Strain Stra

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Automatic Depressurization Syste				0	5

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# Question Data for Test: 1999 SRO

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Question:	An ATWS cor	ndition ha	s occurred on Uni	t 3. Reactor leve	el is 23 ir	nches an	d
37	pressure is 10	)00 psig v	with the turbine stil	ll running. The C	RS has	directed	the
• • • • • • • • • • • • • • • • • • •			Liquid Control (SE				
	switch to "PU	MP 'A' R	UN". Identify the	expected SBLC	System i	response	).
	Squib continu	ity light a	re lit, pump discha	arge pressure is	1450 psi	g.	
· A				•••	•		
		14 . I' . h 4 .	and life another diable		1400 0	ia	······································
🗹 В	Squib continu	ity lights	are lit, pump disch	large pressure is	s i ioo þ	sig.	
С	Squib continu	ity lights	are out, pump disc	charge pressure	is 1450	psig.	
	an a	and a supervised of the	n na mana na mana na mana na mana ana mana na mana mana na mana na mana mana na mana na mana na mana na mana m Na mana na mana n				ere a real real r
D	Squib continu	ity lights	are out, pump disc	charge pressure	is 1100	psig.	N. S.
[				tab. 100 paig are	stor the		
Explanation of Answer	SBLC is expe	cted to II	nject at approximate lights will stay lit	tery 100 psig gre	umn is ei	nergized	
	pressure me	continuity				nei gizea	•
Exam Leve	Cognitive	Level	Facility	Materials			
Both	Memory		PBAPS	N/A			
KA Informati	on						
	-		SRO Grp: 1	BO Val 36	SRO Val	3.6	55.43
Tier SYS	in an an international statement of the	- 4	Press and			and the second s	
System:	211000	ar 🖡 ana malancina ina ina ina	y Liquid Control S				
KA Group Nu	m: A1	Ability 1	o predict and/or m	onitor changes i	n param	eters as	sociated
	the second second second	with SE	SLC including				
KA Detail Nur	n: A1 03	Pump	lischarge pressure	2			
NA Detail Null		I dinp (		a program by colore house the state of the s			
Question So	urce Inform	ation					
			Ques	tion <b>I</b>			
Ques Source:	New		Source		•		
Ques Mod Me	st [						
Ques Mou Me	~						العاديا والور المسور ومرودي
					<u> </u>		
References	3						
Reference T	itle		Facility Ref. No.	Section	Pg #	Rev.	L.O.
	uid Control Sys	tem	PLOT-5011	II.D.3, II.F.2	14, 19	0	4h
Standby Light							
	141 -			Saction	Da #	Rev.	L.O.
Reference T			Facility Ref. No.	Section	Pg #	<u>Rev.</u>	<u> </u>
SBLC Initiati	on		SO 11.1.B	4.0 Note	1		

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## Question Data for Test: 1999 SRO

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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.
	Restore RPS trip capability within 1 hour.
✓в	Place one trip system in trip within 6 hours.
с	Be in MODE 2 within 6 hours.
D	Required number of channels met, no action required.
Explanation of Answer Exam Level SRO KA Informatic	Application PBAPS 13 5.5.1.1
Tier SYS System: KA Group Num KA Detail Num	
System: KA Group Num KA Detail Num	212000       Reactor Protection System         1: 2.1       Conduct of Operations         2: 2.1.12       Ability to apply technical specifications for a system.         urce Information
System: KA Group Num KA Detail Num	212000       Reactor Protection System         1: 2.1       Conduct of Operations         1: 2.1.12       Ability to apply technical specifications for a system.
System: KA Group Num KA Detail Num Question Sou	212000       Reactor Protection System         12.1       Conduct of Operations         12.1.12       Ability to apply technical specifications for a system.         12.1.12       Ability to apply technical specifications for a system.         12.1.12       Ability to apply technical specifications for a system.         12.1.12       Ability to apply technical specifications for a system.         12.1.12       Ability to apply technical specifications for a system.         13.1.12       Question         New       Question         Source       Source
System: KA Group Num KA Detail Num Question Sou Ques Source:	212000       Reactor Protection System         12.1       Conduct of Operations         12.1.12       Ability to apply technical specifications for a system.         12.1.12       Ability to apply technical specifications for a system.         12.1.12       Ability to apply technical specifications for a system.         12.1.12       Ability to apply technical specifications for a system.         12.1.12       Ability to apply technical specifications for a system.         13.1.12       Question         New       Question         Source       Source

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
	PLOT-5060F	11.E	38	0	8

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Question Data for Test: 1999 SRO

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			t 100% power who accordance with th		c pump t	ripped.	<b>The</b>
Ser an Arthory	Which of the	following	statements descri TUAL total core fic	bes the relation	ship betv	veen INC	DICATED
	Total core fic	ow indicat	ed on DPFR-2-3-0	95 dP/F will be:	· · · ·	• <sup>•</sup>	
A	Less than a	ctual by a	n amount TWCE i	die loop flow.	·	<u> </u>	
— в	Less than a	ctual by a	amount EQUAL	to idle loop flow.	1		
v c	Greater than	n actual by	an amount TWIC	E idle loop flow.			
D	Greater than	n actual by	an amount EQU/	AL to idle loop fig	ow.		
Explanation of Answer							
Exam Level Both	Cognitive Memory		Facility PBAPS	Materials N/A		-	
A Informatio			SRO Grp: 1	RO Val: 3.4	SRO Va	: 3.4	55.43
System:	216000		r Boiler Instrumen	an a the second s			
KA Group Num	:A3	Ability 1 Instrum	o monitor automa nentation	tic operations of	the Nuc	lear Boile	er
KA Detail Num:	A3.01		nship between me eter values	ter/recorder rea	idings an	d actual	••••
uestion Sou	rce Inform	nation					
Ques Source:	New	angag agaa , amamphanadana a V Ina.	Ques		<u> </u>		
Ques Mod Met							
References		. <u></u>	•				
Reference Title	8		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Vesse	el Instrument	tation	PSYS-5002B	III.J.k	29	0	4d

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS Power Flow Operation Ma	Exhibit GP-5-1		2	0	

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#### **Question Data for Test: 1999 SRO**

Question: The RCIC system was being restored to its normal alignment following maintenance, when a high steam flow isolation occurred due to stroking open the 40 valves too guickly. 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? The RCIC turbine trip throttle valve will need to be reset from the control room. 🗹 A The RCIC turbine trip throttle valve will need to be reset locally. В The MO-131, steam admission valve, must be stroked open manually. С RCIC will automatically align and inject when the isolation reset pushbutton is D depressed. A RCIC turbine trip is received with an isolation signal. RCIC turbine trips must be Explanation of Answer manually reset. Only an overspeed trip must be reset locally. Materials **Cognitive Level** Facility Exam Level N/A PBAPS Both Comprehension **KA Information** SRO Grp: 1 RO Val: 3.8 SRO Val: 3.8 55.43 RO Grp: 1 Tier SYS 217000 Reactor Core Isolation Cooling (RCIC) System: 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 Question New Ques Source: Source Ques Mod Met References L.O. **Reference Title** Facility Ref. No. Section Pg # Rev. Recovery from RCIC System Isolat SO 13.7.A 4.1 10

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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.

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Question:	Given the follo	wing conditions:					
<b>1</b> 41	<ul> <li>Unit 2 has experienced a loss of all AC power (station blackout).</li> <li>The Reactor Core Isolation Cooling (RCIC) system automatically initiated.</li> <li>Reactor water level is now -52 inches and rising.</li> <li>The Control Room Supervisor directs the Unit Reactor Operator to isolate RCIC.</li> </ul>						
		e expected RCIC		sponse w	then the operator depresses		
A	A normal RCI	C system isolation	and turbin	e trip will	occur.		
⊻в	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		e trip and system is e (MO-16) will not c		ill occur e	except the Outboard Steam		
Explanation of Answer	C. This would	swer, MO-15 is on	s back ab		nches, initiation auto reset point		
		n nga gungan yang agan kupi kupi kupi kalan k	· · · · · · · · · · · · · · · · · · ·	Materials	and a construction of the construction of the second second second second second second second second second se		
Exam Level Both	Cognitive Application			N/A			
KA Informatio		<b></b>	_ <b>F</b> irms				
Tier SYS	RC	) Grp: 1 SRO (	Grp: 1	RO Val:	2.8 SRO Val: 2.8 55.43		
System:	217000	Reactor Core Isol	ation Coo	ling Syste	m (RCIC)		
KA Group Num	n: K2	Knowledge of electronic	nowledge of electrical power supplies to the following:				
KA Detail Num: K2.01 Motor Operated valve							
Question Sou	urce Informa	tion					
Ques Source:	1998 PBAPS	NRC Exam	Questio Source	n			
Ques Mod Met				ی به به بر بو در در در بی بیش از بر از این در ا			

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### References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Core Isolation Cooling	· PLOT-5013	II.E.6	34	0	2a

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### Question Data for Test: 1999 SRO

Question:

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.
¥.	в	Result in an immediate ADS blowdown.
	с	Result in an ADS blowdown after a 105 second time delay.
	D	NOT result in an ADS blowdown.
Explan of Ansi		The 9 minute timer and 105 second timer have both timed out. When the RHR pump is started, the blowdown will occur immediately.

<b>—</b>	Cognitive Level	· En alliker	Materials
Exam Level	COGINUVE LEVEI	Facility	N/A
Both	Application	PBAPS	
	F. S.		a and the state of the state of the second state of the state of the state statement of the second statement of the state statement of the

#### **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:	Ā4.02	ADS logic initiation			

#### Question Source Information

Ques Source:	New	Question Source	
Ques Mod Met			
	······································		

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## References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O
Automatic Depressurization Syste	PLOT-5001G	II.E	16-18	0	4c

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# Question Data for Test: 1999 SRO

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System: KA Group Nun KA Detail Num Question Sou Ques Source: Ques Mod Met References <u>Reference Tit</u>	n: A4 A4.12 Urce Inform New	Ability to Drywell nation	Containment and o manually operat Cooler/Chillers Ques Sourc Facility Ref. No. T-223-2	tion	Pg #	Rev.	m.	
System: KA Group Nun KA Detail Num Question Son Ques Source: Ques Mod Met	n: A4 1: A4.12 urce Inform New	Ability to	Cooler/Chillers	tion	r in the c		m.	
System: KA Group Nun KA Detail Num Suestion Sou Ques Source:	n: A4 1: A4.12 urce Inform New	Ability to	Cooler/Chillers	tion	r in the c	ontrol rooi	<b>m.</b>	
System: KA Group Nun KA Detail Num Suestion Sou Ques Source:	n: A4 1: A4.12 urce Inform New	Ability to	Cooler/Chillers	tion	r in the c		m.	
System: KA Group Nun KA Detail Num	n: A4 1: A4.12 urce Inform	Ability to	o manually operat	e and/or monito	r in the c	ontrol rooi	m.	
System: KA Group Nun	n: A4	Ability to	o manually operat		r in the c	ontrol rooi	<b>m.</b>	
System: KA Group Nun	n: A4	Ability to	o manually operat		r in the c	ontrol rooi	<b>m.</b>	
System:			·		r in the e		~	
I see a see		- IPOMAN						
Tier SYS	F	<b>1</b>	SRO Grp: 1	··· • ••••	SRU va!	3.0 5	5.45	
A Informatio							= 40	
Both	Comprel	nension	PBAPS			n an airtean an a		
Exam Level	Cognitive	e Level	Facility	Materials				
Explanation of Answer	be active, an	n isolation a	es that the bypass signal must be ph ans would have h	esent. If light cle				
D	Fans will trip, light goes out when either trip signal clears. Light going out indicates that the bypass logic has dropped out. For the bypass to							
с	Fans will trip	, light goe:	s out when both t	rip signals clear.				
В			un, light goes out	n eimer uip signi	ai ciears.	nantio no fernancontecno ser o comunente en c		
				· · · · · · · · · · · · · · · · · · ·				
✓ A	Fans will cor	ntinue to ru	un, light goes out	when both trip si	gnals cle	ear.		
	Describe the	effect this	will have on Dry	well Cooler Fan	operatior	n and why	•	
•	Drywell Cooler Fan bypass switch (43-5-0165) has gone out.							
•						light over	<b>tne</b>	
43	restored usir speed. 15 m	ng T-223. ninutes late	ywell Cooling Far The trip was bypa er, the STA report pass switch (43-5	assed and the fa	ns were bypass	restored in	n fast 💦 🗋	

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Drywell Ventilation	PLOT-5040C	II.D.6.e			4c

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Question:							
44	trip on undertr	equency				-	
	Under these c in isolation val		s, which of the follo	owing PCIS isola	itions wil	l occur a	and result
	A Group II Ou		•			•	
A	A Group II Ou	tooard n	an isolation.	•		· •	
	A Group III Ou	utboard h	alf isolation.				
· 🖌 🖌 B			· · · · · · · · · · ·				
C	An Outboard I	MSIV au	to isolation.		· ·		
	A full RWCU isolation.						
D		501211011.		•			·
Explanation	Loss of power	to "B" R	PS results in a ha	If Group III outbo	oard isol	ation. A	half
of Answer	Group I is rec	eived bu	t no valves move.		mpacted	<b>I</b> .	
Exam Level			Facility	Materials N/A			
Both	Comprehe	ension	PBAPS		• • •	<u> </u>	
KA Informatio	on						
Tier SYS	R(	) Grp: 🚺	SRO Grp: 1	RO Val: 3.5	SRO Val	: 3.5	55.43
System:	223002	Primary	Containment Iso	ation System (P	CIS)		· · · · ·
KA Group Nun	n: A3	Ability t	o Monitor Automa	tic Operation of	PCIS inc	luding:	
KA Detail Num	n: A3.02	Valve C	Closures				
Question So	urce Informa	ation					
Ques Source:	New		Ques Sourc				
Ques Mod Me	t						
· · · · · · ·							
References	_						
Reference Title Facility Ref. No. Section Pg # Rev. L.O.					L.O.		
Group I, II, ar	nd III Outboard	Half Is	GP-8D	Notes	2	12	
Reference Til	tle		Facility Ref. No.	Section	Pg #	Rev.	L.O.
PCIS			PLOT-5007G	II.C.7.a.4	33	0	5h

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Question:	Unit 2 is opera	ating in MODE 1 at full power when PISH-2-5-12A the drywell							
45		t 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	in.							
	The "GROUP	II/III INBOARD ISOL RELAYS NOT RESET' annunciator will:							
A	Alarm, but NC	) valves will reposition.							
В	Alarm, and the	e inboard isolation valves will reposition.							
<b>√</b> c	✓ C NOT alarm, and NO valves will reposition.								
	I NOT alarm b	ut the inboard isolation valves will reposition.							
D		•••••••••••••••••••••••••••••••••••••••							
Explanation of Answer	This condition	a will result in only half of the A channel logic picking up and will not alarms or isolation.							
	<b>)</b>	Materials							
Exam Level		Level Facility N/A							
Both	Compreh	ension PBAPS							
KA Informati	on								
Tier SYS	R(	O Grp: 1 SRO Grp: 1 RO Val: 3.0 SRO Val: 3.2 55.43							
System:	223002	Primary Containment Isolation System (PCIS)							
KA Group Nur	n: A2	bility to predict the impact of the following on PCIS							
KA Detail Nun	n: A2.06	Containment Instrument Failures							
Question So	urce Informa	ation							
Ques Source:	New	Question Source							
Ques Mod Me	et								
References	5								
Reference Ti	itle	Facility Ref. No. Section Pg # Rev. L.O.							
PCIS Group	s II and III Char	nnel A GP-25 App. 5 4.0 2 4							
•									

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PCIS	PLOT-5007G			0	5e .

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## Question Data for Test: 1999 SRO

duestion:	A 1-112 BLOW pressure. The the SRV's are	e URO n indicatir	otes that, all ng closed.	lthough th The green	e ADS valve and white lig	switches ghts are l	are in "O it for each	PEN", of the
	ADS valves. VALVE OPEN				en lights lit.	ine "SAF	EIYREL	IEF
•	Given the abc valves.	ive cond	itions, deter	mine the (	current expe	cted posi	tion of the	ADS
× A	Fully open.				-		• 	
. В	Partially open	, but not	far enough	for prope	r indication.			
c	Failed closed	•		•				
D	Fully closed, (	due to lo	w steam pro	essure.		•		· .
Explanation of Answer	Although acound designed to s during testing	tay open						values
Exam Level	Cognitive	Level	Facility		laterials			
Both	Compreh		PBAPS	^	I/A			
KA Informatio	on	· ·····						-
Tier SYS	R	D Grp: 1	SRO G	irp: 1 F	RO Val: 3.1	SRO Val	: 3.2 5	5.43
System:	239002	Relief/S	Safety Valve	es				
KA Group Num	n: <b>K4</b>		dge of Relie provide for:	ef/Safety	/alve design	features	and/or int	erlocks
KA Detail Num	: <b>K4.07</b>	Minimu	m steam pr	essure to	keep an SR	V open.		
Question Sou	urce Informa	ation		2.1				
Ques Source:	New			Questior Source				•
Ques Mod Mel						·		
References								
Reference Tit	le		Facility Re		Section	Pg #	Rev.	L.O.
Main Steam a	and Pressure F	Relief	PLOT-0	120	5.B.8	27	14	5K

(\* \* \* \* (\* \* \*

	Given the follo	wing conditions:									
47	- Unit 2 was	operating at 100%	power.								
				e", was rec	eived indicating a loss of						
	20Y050.				- 						
	- The reactor	was later scram	ned and	the turbine	tripped.						
3		blowing is the rea Safety Relief Val		this failure	requires reactor pressure						
	The static inve	rter loss will:									
A	Cause a full G	roup I Main Stean	n Isolatic	n Valve clo	sure.						
					alves requiring the EHC Pumps						
	to be tripped to prevent a rapid depressurization.										
	✓ C Result in a loss of Turbine Bypass Valve opening capability.										
V C											
[	Result in a closure of the Inboard Main Steam Isolation Valves.										
D.					and the second						
Explanation	A. MSIVs are	not affected.									
of Answer	B. TBV close	on this loss.									
			to EHC I	ogic when i	it swaps to PMG, TBVs close						
	D. MSIVs not	affected.	··· •								
Exam Level	Cognitive I	_evel Facility	r	Materials							
Both	Memory	PBAP		N/A							
•				1							
KA Informatio	n										
Tier SYS	RC	Grp: 1 SRO	Grp: 1	RO Val:	2.8 SRO Val: 2.9 55.43						
I System:	241000	Reactor/Turbine	Pressure	Regulating	g System						
KA Group Num	K 6	Knowledge of the	e effect t	hat a loss o	r malfunction of the following						
	1	will have on the f			• • • • • • • • • • • • • • • • • • •						
KA Detail Num:	K6.01	AC Electrical pov	ver	· · · · · · · · · · · · · · · · · · ·							
Question Sou	irce Informa	tion									
Ques Source:	1997 PBAPS	NRC Exam	Ques Sourc								
Ques Mod Met	r		Gouit	, <del>C</del>	En est en						
				1							
	•				······································						

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### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
ON-112-2 Loss of Unincorrupt	ble A ON-112-2 Bases	2.0 Notes	2	5	
				•	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.

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48	100%. The I	nit 3 is performing a GP-2 Plant Startup. Power is being raised from 50% to 00%. The Plant Reactor Operator is monitoring Electrohydraulic Control (EHC) ystem performance.											
	Pressure ave	eraging manifold pressure is initially:											
A	Equal to read	ctor pressure with an increasing dP as turbine load is raised.											
В	Equal to read	ctor pressure with a constant dP as turbine load is raised.											
✓ C	Less than re	actor pressure with an increasing dP as turbine load is raised.											
D	Less than re	ss than reactor pressure with a lowering dP as turbine load is raised.											
of Answer	Answer C - F as steam flor lines.	PAM pressure remains less than reactor pressure with dP increasing w increases due to flow induced pressure drop through the steam											
Exam Level Both	Cognitive Compret												
KA Informatio		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 Sou	Irce Inform	ation											
Ques Source:	New	Question Source											
Ques Mod Met													
References		and the second secon											
Reference Titl	e	Facility Ref. No.       Section       Pg #       Rev.       L.O.         PLOT-5001DL       Transp. 3       1       0       1b											

	Question:	(DFCS) in t selected. A following wi	hree-eleme fault in the ill occur?	00% power, with the ent control with the " e level detector caus	B" Narrow Rai ses it to fail dou	nge Leve wnscale.	l automa Which c	tically If the			
	A	DFCS will s Vessel leve		r level and increase se.	RFPT speed,	thereby c	ausing F	Reactor			
	В			e Level Detector will arrow range level s							
	✓ c	The "B" Na LOWEST r	rrow Range emaining n	e Level Detector will arrow range level si	be automatica gnal will be au	ally de-se tomatical	lected, a ly select	nd the ed.			
	D	A default va	A default valve of +23" will be automatically selected by the master level controller.								
	Explanation of Answer	The DFCS	system au	omatically selects t	he middle narr	ow range	for cont	rol.			
-	xam Lev oth		ve Level ehension	Facility PBAPS	Materials N/A		• ··· · · · · · ·				
KA II Tier	nforma	tion	RO Grp: 1	SRO Grp: 1	RO Val: 3.5	SRO Val	3.5	55.43			
Syst	em:	259002	Reacto	r Water Level Contr	ol System						
KAC	Group Nu	ım: K6		edge of the effect that we on the reactor wa				llowing			
KA	Detail Nu	m: K6.05	Reacto	r water level input	· · · · · · · · · · · · · · · · · · ·	· · · ·					
Ques	stion S	ource Infori	mation		•	•					
Que	s Source	New		Questic Source							
Que	s Mod M	et		Jource	J						
Ref	erence	S									
Ref	ierence <sup>-</sup>	<b>Fitle</b>		Facility Ref. No.	Section	Pg #	Rev.	L.O.			
-		Field Instrume	ent Troubl	ARC 201 H1	· · ·	1	3				
Ref	ference <sup>•</sup>	<b>Fitle</b>		Facility Ref. No.	Section	Pg #	Rev.	L.O.			
Re	actor Fe	edwater Autor	matic 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

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Question: Following a reactor scram from a power condition, Reactor Feedwater Pump (RFP) speed automatically goes up to compensate for the shrink experienced as 50 the voids in the reactor collapse. To protect the pumps from overspeed under these conditions, RFPs are limited to 85% following a scram: With all three condensate pump running. Α With less than three condensate pumps running. В With individual feedwater flows greater than 20%. ✓ C With individual feedwater flows less than 20%. D Explanation Self explanatory. of Answer Materials **Cognitive Level** Facility Exam Level N/A PBAPS Both Memory **KA Information** SRO Grp: 1 RO Val: 3.0 SRO Val: 3.0 55.43 RO Grp: 1 Tier SYS Reactor Water Level Control System 259002 System: Ability to monitor automatic operations of the reactor water level KA Group Num: A3 control system including: KA Detail Num: A3.01 Runout flow control **Question Source Information** Question New Ques Source: Source Ques Mod Met References L.O. **Reference Title** Facility Ref. No. Section Pg # Rev 4c V.D 28 PLOT-0550 Feedwater Control Ssstem

Question:	the Standby	t 2 and Unit 3 are both in MODE 1 at 100% power. During an attempt to start Standby Gas Treatment (SGT) system, the "A" SGT fan (OAV020) failed to rt and the "Standby Gas Treatment B Filter Inlet" 00476-1 failed to open.										
•	Using the Te Unit 3.	ch Specs provided, deter	mine the required	actions for Unit 2	AND .							
		tore SGT within 7 days. tore SGT within 7 days.										
В		r LCO 3.0.3 immediately. action required.										
C		it 2 - Restore SGT within 7 days. it 3 - No action required.										
D		r LCO 3.0.3 immediately. tore SGT within 7 days.	·····									
Explanation of Answer	operable cor to EITHER th	bsystems are required for nsisting of the B fan and th he A fan or B filter inlet. L f either B or C fan and the ilet.	he A filter train, or Jnit 3 has one sub	e subsystem is IN system operable	OP due							
Exam Level	Cognitive Applicati		Materials Unit 2 and Ur 3.6.4.3	nit 3 Tech Specs S	ection							
KA Informatio	-	RO Grp: 1 SRO Grp:	1 RO Val: 2.6	SRO Val: 3.8 5	5.43 🗸							
System:	261000	Standby Gas Treatmer	nt									
KA Group Nun	n: 2.2	Equipment Control		<u></u>								
KA Detail Num	2.2.23	Ability to Track Limiting	Conditions for O	perations								
Question Sol	urce Inform	nation			•							
Ques Source:	New		estion urce									
Ques Mod Me	t											
References												
Reference Tit	le	Facility Ref. No	كالألاف المتحد المتحافظ فالمتعادي والمحاجب	Pg # Rev.	L.O.							
Tech Specs		3.6.43	3.6	3.6-4.0 210								

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					Page 61 of 179	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.	
Standby Gas Treatment	PSYS-5009A	7	28	1	10a	

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Question:	Both Units we	re operati	ng in MODE 1 at	full power when	the "3A"	RPS bu	s was			
			its alternate feed. t (SBGT) system				on of the			
A	"B" SBGT fan	has starte	ed, SBGT "A" filte	r inlet and outle	t damper	s have o	pened.			
В	"C" SBGT has	started,	SBGT "B" filter inl	et and outlet da	mpers ha	ave open	ed.			
С			ed, SBGT "B" filte			1 80				
✓ D	"C" SBGT fan	has start	ed, SBGT "A" filte	r inlet and outle	t damper	s have c	pened.			
Explanation of Answer	,									
Exam Level Both	Cognitive Memory	Level	Facility PBAPS	Materials N/A						
KA Informatio	n									
Tier SYS	R	) Grp: 1	SRO Grp: 1	RO Val: 2.9	SRO Val	3.0	55.43			
System:	261000	Standby	Gas Treatment (	SBGT)						
KA Group Num	n: K6		Knowledge of the effect that a loss or malfunction of the following will have on SBGT							
KA Detail Num	K6.01	AC Elec	trical Distribution			•				
Question Sou	urce Informa	ation								
Ques Source:	New		Quest Sourc	1			-			
Ques Mod Met		· · · · · · · · · · · · · · · · · · ·				-				
References										
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	L.O.			
Group I, II, ar	nd III Inboard H	lalf isol	GP-8C	Notes	2	17				
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	L.O.			
COL GP-8.C	Groups II and	Ili Inbo	GP-8.C COL		4	15				

Reference Title		Facility Ref. No.	1.1	Section	Pg #	Rev.	L.O.
Standby Gas Treatment	•	PSYS-5009A		V.L.3.a	23	1	8e

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# Question Data for Test: 1999 SRO

Ouarties										
Question:	Peach Bottor	n 4KV is alig	ned as follows	:						
• • • •			xiliary Transfo							
	- All eight 4 Transformer		ire being supp	lied by the #3	s Emergency	/ Auxiliary	-			
			PSW pumps a	re running in	Torus Cool	i <b>ng</b> .				
	Determine the	e expected p	lant response	to an autom	atic trip of th	e E-312 b	reaker.			
Α	The E-1 Dies	el Generator	will start after	.25 seconds	5.					
УВ	The E-1 Dies	el Generator	will start after	.5 seconds.		-				
С	The 2A RHR	and HPSW	pumps will trip	and restart of	on power res	storation.				
D	The E-124 Lo	E-124 Load Center will trip and lockout.								
Explanation of Answer	Diesel Gener source is not		l be required a	ifter .5 secon	ds since the	alternate	off-site			
		· ··· ··	• • • •	Materials						
Exam Level Both	Compreh		acility PBAPS	N/A						
				l			· • • • • • • • • • • • • • • • • • • •			
KA Informatic			,							
Tier SYS	R	O Grp: 2	SRO Grp: 1	RO Val: 2	.7 SRO Va	l: <mark>2.9</mark> 5	5.43			
System:	262001	AC Electric	al Distribution							
KA Group Num	n. A2	Ability to p distribution	redict the impa	act of the follo	owing on AC	electrical				
KA Detail Num	A2.06	De-energiz	ting a Plant Bu	IS		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			
Question Sou	urce Informa	ation								
Ques Source:	New		Ques Sour							
Ques Mod Met			· . · .				- Au. • -			
References										
Reference Tit	le	Fa	cility Ref. No.	Section	n Pg#	Rev.	L.O.			
Diesel Genera	ators and Aux	iliary I	PLOT-0670	II.D.2	11	6	3c			

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Question: 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 54 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: Scram immediately due to the loss of power to the RPS system. Α Scram immediately due to turbine stop and control valve closure. В NOT scram immediately due to "B" RPS being powered by its alternate source. ✓ C NOT scram immediately due to the RPS MG Sets maintaining power until the D diesel generators load their buses. Explanation With "B" RPS on its alternate feed, RPS will not entirely lose power during a loss of Answer of off-site power. Materials **Cognitive Level** Facility Exam Level N/A PBAPS Both Comprehension **KA Information** RO Val: 3.8 SRO Val: 4.1 55.43 SRO Grp: 1 RO Grp: 2 SYS Tier AC Electrical Distribution 262001 System: Knowledge of the effect that a loss or malfunction of AC will have KA Group Num: K3 lon: KA Detail Num: K3.06 Reactor Protection System **Question Source Information** Question New Ques Source: Source Ques Mod Met References L.O. **Reference Title** Facility Ref. No. Section Rev 6a **PLOT-5060F** II.C.2.b Reactor Protection System

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### Question Data for Test: 1999 SRO

Question:	Peach Bottom 2 Diesel Gene pump did not s then shutdowr (PSD) has bee Station Blacko Attachment D, Generators Av Given that bot PRO should s	rators sta start. The n due to n en reques but. The C , "Backfee vailable". h the 2SL	rted and lo E-3 and E ot having c ted to confi CRS has dir ding Safe \$	aded th -4 Dies ooling v igure Co rected a Shutdov	eir busse els did no water. Th onowingo a backfee wn Loads	s norma ot start. e Powe Station d in acc with E-	Illy but the The E-1 a r System for Peac ordance v 1 & E-2 D	e "A" ESV and E-2 w Director h Bottom with SE-1 biesel	N vere 1
Α	The 2SUE but "B" ESW pum	s because	e it is the no	ormal p	ower soul	rce for t	ne bus tha	at feeds t	he
В	The 2SUE but	s because	e this will al	low use	e of the SI	BO line	to power	4KV buse	<del></del>
с	C The 3SUE bus because it is the normal power source for the bus that feeds the "B" ESW pump.								
✓ D	The 3SUE bu	s because	e this will al	llow use	e of the S	BO line	to power	4KV buse	es.
Explanation of Answer	Note from SE backfeeding,	-11 Attack	nment "D" s SBO line (	states th CANNC	hat if the 2 T be use	2SUE bi d to pov	us is used ver 4KV b	l for ouses.	
Exam Leve Both	Cognitive Comprehe		Facility PBAPS		<u>Materials</u> N/A	3			
KA Informati		) Grp: 1	SRO G	rp: 1	RO Val:	3.8 SF	RO Val:	4.1 55.4	43
I System:	264000	Emerge	ncy Genera	ators					
KA Group Nur	n: <mark>K1</mark>		lge of the p ship betwee					effect	
KA Detail Nun	n: K1.01	AC Elec	trical Distri	bution					
Question So	urce Informa	ation							
Ques Source:				Questi Source					
Ques Mod Me	it .								
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### References

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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.	<b>L.O</b> .
Special Event Procedures	PLOT-1555			4	11d

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# Question Data for Test: 1999 SRO

	AALIICH OF THE	e following statements describe the power supply to the Backup Scra	an
56	Solenoid va	alves and their expected condition upon receipt of a full scram.	
✓ A	Station batte	teries, energize on a Full Scram.	
<b>F</b>	Station batte	teries, de-energize on a Full Scram.	
В			
с	Reactor Pro	otection Bus, energize on a Full Scram.	
D	Reactor Pro	otection Bus, de-energize on a Full Scram.	
Explanation of Answer			
Exam Level	Cognitiv	ve Level Facility Materials	
Both	Memory		
· · · · · · · · · · · · · · · · · · ·			
		RO Grp: 1 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.6 55.43	
Tier SYS		RO Grp: 1 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.6 55.43 Control Rod Drive Hydraulics System	
Tier SYS System:	F 201001		
Tier SYS System: KA Group Num:	201001 K2	Control Rod Drive Hydraulics System	
Tier SYS System: KA Group Num: KA Detail Num:	201001 K2 K2.03	Control Rod Drive Hydraulics System Knowledge of Electrical Power Supplies to the following Backup Scram Valve Solenoids	
Tier SYS System: KA Group Num: KA Detail Num: Question Sou	201001 K2 K2.03	Control Rod Drive Hydraulics System Knowledge of Electrical Power Supplies to the following Backup Scram Valve Solenoids	
Tier SYS System: KA Group Num: KA Detail Num: Question Sou	201001 K2 K2.03 rce Inform	Control Rod Drive Hydraulics System Knowledge of Electrical Power Supplies to the following Backup Scram Valve Solenoids mation	
Tier SYS System: KA Group Num: KA Detail Num: Question Sou Ques Source:	201001 K2 K2.03 rce Inform	Control Rod Drive Hydraulics System Knowledge of Electrical Power Supplies to the following Backup Scram Valve Solenoids mation	
I System: KA Group Num: KA Detail Num: Question Sou Ques Source: Ques Mod Met	K2 K2.03 Rce Inform	Control Rod Drive Hydraulics System Knowledge of Electrical Power Supplies to the following Backup Scram Valve Solenoids mation Question Source	.0

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Question:	Given the follo	wing conditions:			
<b>j</b> 57	<ul> <li>Unit 2 is making preparations for a reactor startup from a refueling outage.</li> <li>Reactor Building ambient temperature is 74 degrees F.</li> <li>The Reactor Building Equipment Operator is charging the hydraulic control unit accumulators with nitrogen to a pressure of 590 psig.</li> <li>Several days later with the Unit at 100% power, Reactor Building temperatures have stabilized at 92 degrees F.</li> </ul>				
			e conditions? (Refer to attached figure.)		
	The individual	control rod:			
A	Normal inserti	on speeds will be slowe	er and may result in control rod drift alarms.		
В	Scram speeds	s will be slower and will	result in reduced reactivity addition rates.		
С	Normal inserti	on speeds will be faster	r and may result in "double notching".		
✓ D	Scram speeds	will be faster and may	result in mechanism damage.		
Explanation of Answer	increase resul mechanisms. B. Scram spe				
Exam Level	Cognitive	Level Facility	Materials		
Both	Application		Accumulator Precharge Nitrogen Pressure vs. Ambient Temperature Graph		
KA Informatio	on		· ·		
Tier SYS		Grp: 1 SRO Grp:	2 RO Val: 3.4 SRO Val: 3.8 55.43		
System:	201001	Control Rod Drive Hyd	draulic System		
KA Group Nun	n: 2.1	Conduct of Operations	S		
KA Detail Num	2.1.32	Ability to explain and a	apply system limits and precautions		
Question Sou	urce Informa				
Ques Source:	1998 PBAPS		uestion purce		

Ques Mod Met	. <u> </u>	<u> </u>	······································		
References	· · · · · · · · · · · · · · · · · · ·				
Reference Title	Facility Ref. No.	Section	Pg#	Rev.	L.O.
Control Rod Drive Hydraulic Syste	PLOT-5003A	I.1.b	15	0	<b>4e</b>
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Rod Drive Hydraulic Syste	SO 3.7.A-2	Figure 1		7	

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# Question Data for Test: 1999 SRO

Que	stion: 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 ba Cleanup Syste in this system	em Start"						
	A	Excessive he	at load on	the Non-R	egener	ative Hea	t Exchange		
	в	Group II isola	tion on gro	eater than	125% s	ystem flor	N.		
~	c	Excessive RV	VCU pum	p flows with	nout coi	ntrol room	indication.	•	
	D	Auto closure o	of CV-55 '	Dump Flov	v Contr	ol Valve".	· · · ·		
of An	ination swer	<ul> <li>A. Incorrect of B. Incorrect, w.</li> <li>C. Correct, w.</li> <li>indication is d.</li> <li>flows.</li> <li>D. Incorrect, line.</li> </ul>	opening N ith the de ump flow,	10-68 wou mins bypa: , opening N	ld not ro ssed thi 10-68 v	esult in fic rough MC vill allow p	ow in excess 0-74 the only potential exc	s of 125% system f essive un	iow Imonitored
Exam Both	Level	Cognitive Memory	Level	Facility PBAPS		Materials N/A	5		
KA Info	rmatio								
Tier SY	rs	R	O Grp: 2	SRO G	rp: 2	RO Val:	3.5 SRO \	/al: 3.5	55.43
System:		204000	Reactor	Water Cle	anup S	ystem			
KA Grou	ip Nun	n: A1	Ability to predict and/or monitor changes in parameters associated with RWCU control including:						
KA Deta	il Num	A1.04	System	Flow					
Questio	n So	urce Informa	ation						
Ques So	ource:	New			Quest Source				
Ques M	od Me	t			Jource		<u> </u>	<u> </u>	<u></u>
					<b>-</b>	······			

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## References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Water Cleanup System St	SO 12.1.A-2	Table 1	T	24	
				•	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Water Cleanup	PLOT-5012		0	4.g	

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# Question Data for Test: 1999 SRO

Question:	Given the following conditions:						
<ul> <li>Unit 3 has had a complete loss of the E13 4160VAC Bus.</li> <li>This results in a loss of power to the "A" Residual Heat Removal (RHR) I</li> </ul>							
	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.						
В	An operator must manually transfer the Inboard LPCI Injection Valve (MO-25A) to the alternate power supply.						
С	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	<ul> <li>A. No procedural guidance for this step.</li> <li>B. Power transfer is automatic.</li> <li>C. MO-154A is normally open, MO-25A is normally closed.</li> <li>D. Correct answer, power transfer automatically, 30K flowrate with no operator</li> </ul>						
	action.						
Exam Level	Cognitive Level Facility Materials						
Both	Application PBAPS N/A						
KA Informatio	n						
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 Nur	Knowledge of electrical power supplies to the following.						
KA Detail Num	K2.02 Motor Operated Valves						
Question Sou	urce Information						
Ques Source:	1998 PBAPS NRC Exam Question Source						

Ques Mod Met

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## References

**(**\*\*\*:

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Residual Heat Removal System	PLOT-0370	III.D	18	10	3b

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Question Data for Test: 1999 SRO

Question: 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 60 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" RHR restarts, "B", "C", and "D" start and inject. Α 'A" RHR restarts, "B", "C", and "D" start and run on min. flow. В RHR "B", "C", and "D" start and inject. С RHR "B", "C", and "D" start and run on min flow. D 1" Reactor level will cause a PCIS Group IIb isolation. MO-17, 18, 25A and 25B Explanation of Answer 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). Materials **Cognitive Level** Facility Exam Level N/A PBAPS Both Comprehension **KA Information** SRO Grp: 2 RO Val: 3.5 SRO Val: 3.7 55.43 RO Grp: 2 Tier SYS System: 205000 Shutdown Cooling System Ability to Predict the Impacts of the following on the SDC System KA Group Num: A2 KA Detail Num: A2.05 System Isolation **Question Source Information** Question Ques Source: New Source Ques Mod Met References L.O. **Reference Title** Facility Ref. No. Section Pg # Rev. ARC 227 D-3 System I RHR Relays Not Reset

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Reference Title		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Groups II and III Isolations	•	GP-8B COL	Table Notes	4, 8	17	
						•
			<b>•</b>		_	
Reference Title	•	Facility Ref. No.	Section	Pg #	Rev.	L.O.

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#### Question Data for Test: 1999 SRO

Following a reactor scram and scram reset, the Unit Reactor Operator notes that Question: the full core display for rod 02-23 is blank with no position indicated and no green 61 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: Other rods in REFUEL due to a lack of "REFUEL MODE SELECT PERMISSIVE". Α Other rods due to "RPIS INOPERATIVE". В Rod 02-23 due to lack of position indication and backlight. С Rod 02-23 due to "ROD SELECT BLOCK TIMER MALFUNCTION". D A. Correct, position of all rods full in from the green backlight PIP reed switch is Explanation of Answer 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). Materials **Cognitive Level** Facility Exam Level N/A Comprehension PBAPS Both **KA Information** SRO Grp: 2 RO Val: 2.7 SRO Val: 2.8 RO Grp: 2 55.43 SYS Tier 214000 Rod Position Information System System: Knowledge of the operational implications of the following concepts KA Group Num: K5 as they apply to Rod Position Information System KA Detail Num: K5.01 **Reed Switches** Question Source Information Question Ques Source: New Source Ques Mod Met References Facility Ref. No. Section Pg # Rev. L.O. **Reference Title** IV.C.6 **PSYS-5062** Reactor Manual Control System

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Reference Title	•	Facility Ref. No.	Secti	on F	g#	Rev.	<b>L.O</b> .	
Control Rod Drive Mechanism		PLOT-5003	II.B.	3	20	-0	80	

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# Question Data for Test: 1999 SRO

62 a significant ir	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 w	thdrawals made after ste	am is being draw	n from th	e reacto	r.	
B Control rod w	thdrawals made as react	or power passes	1.00E0%	on WR	NMs.	
C Withdrawal of	Withdrawal of a center control rod during a fast recovery startup.					
✓ D	drawals from 50% rod de	nsity in the startu	р.			
of Answer B. This is the C. No real dif	OAH, rod withdrawals are point of adding heat, pov ference between before a swer per GP-2, 50% rod	ver response sho and after critical.	uld be le		nsive.	
Exam Level Cognitive SRO Applicatio		Materials N/A			······································	
KA Information	) Grp: 1 SRO Grp: 2	RO Val: 2.8	SRO Val	: 3.2	55.43 🗸	
System: 215003	Intermediate Range Mor	nitor (IRM) System	n			
KA Group Num: 2.2	Equipment Control					
KA Detail Num: 2.2.34	Knowledge of the proce effects on core reactivity		the inte	rnal and	external	
Question Source Informa	Ition		•			
Ques Source: 1998 PBAPS	NRC Exam Que Sou	stion rce		· · · · · · · · · ·		
Ques Mod Met						
References						
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.	
Normal Plant Start-up	GP-2	6.2 Caution 1		91		
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.	
General Plant Procedures	PLOT-1530	V.A2.f	13	10	. 4	

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	Question:	Given the follo						
	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 fue storage rack						
		3	following actions would result in a rod block?					
-	Α	The Refueling	g Platform operator raises the Main Hoist to the "full up" position.					
	В	The Unit Rea Standby".	actor Operator places the Mode Selector Switch in "Startup/Hot					
-	✓ 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 roo							
	Explanation of Answer	B. No change C. Correct ar	ear the rod block. In conditions for rod block for this condition alone. Inswer Fuel hoist interlock Materials					
	am Level RO	Cognitive Application	Level Facility N/A					
KA Ir	nformati	on						
Tier	SYS	R	O Grp: 3 SRO Grp: 2 RO Val: 2.6 SRO Val: 3.5 55.43 🗸					
Syste	em:	234000	Fuel Handling Equipment					
KA G	Broup Nur	n: 2.2	Equipment Control					
KAC	etail Num	n: 2.2.27	Knowledge of the refueling process					
Ques	stion So	urce Inform	ation					
	s Source:	1	S NRC Exam Question Source					
Que	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.							

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## References

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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

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Question Data for Test: 1999 SRO

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Question:	Unit 3 is in MO				
64	- Main Gene	erator Loa	d is 1050 MWe	9.	
	- Power fact				
	- Generator	hydrogen	pressure is 60	) psig.	
	to 400 MVAR	s. What is	s the maximum	n real load p	ects you to raise reactive loading ermitted by the attached
	2 -		ve for the new	value of rea	active loading?
A	1040 megawa	atts			
✓ В	1090 megawa	atts			
С	1190 megawa	atts	 		
D	1220 megawa	atts			
[]	A Used land	lin n finnikak	inne ve lessie		
Explanation of Answer		nswer. of .95 pow	ions vs. laggin er factor with 4 hydrogen line	100 MVARs. with 400 MV	/ARs
	<ul> <li>B. Correct an</li> <li>C. Junction of</li> <li>D. Junction of</li> </ul>	nswer. of .95 powe of 75 psig Level	er factor with 4	00 MVARs. with 400 MV <u>Materia</u>	/ARs
of Answer	B. Correct an C. Junction of D. Junction of Cognitive Applicatio	nswer. of .95 powe of 75 psig Level	er factor with 4 hydrogen line Facility	00 MVARs. with 400 MV <u>Materia</u> Main G	/ARs als
of Answer Exam Leve SRO	B. Correct an C. Junction of D. Junction of Cognitive Application	nswer. of .95 powe of 75 psig Level	er factor with 4 hydrogen line Facility PBAPS	00 MVARs. with 400 MV <u>Materia</u> Main G Curve	/ARs als
of Answer Exam Leve SRO A Informati	B. Correct an C. Junction of D. Junction of Cognitive Application	of .95 pow of 75 psig Level on O Grp: 2	er factor with 4 hydrogen line Facility PBAPS	00 MVARs. with 400 MV <u>Materia</u> Main G Curve 2 RO Val	/ARs als Generator Estimated Capability I: 2.8 SRO Val: 3.1 55.43 ✔
of Answer Exam Leve SRO A Informati Tier SYS	B. Correct an C. Junction of D. Junction of Cognitive Application on Ref	nswer. of .95 powe of 75 psig Level on O Grp: 2 Main Tu	er factor with 4 hydrogen line Facility PBAPS SRO Grp:	00 MVARs. with 400 MV <u>Materia</u> Main G Curve 2 RO Val pr and Auxili	/ARs als Generator Estimated Capability I: 2.8 SRO Val: 3.1 55.43 ✔
of Answer Exam Leve SRO A Informati Tier SYS System:	B. Correct an C. Junction of D. Junction of Application On 245000 m: 2.1	of .95 power. of .95 power of 75 psig Level on O Grp: 2 Main Tu Conduct	er factor with 4 hydrogen line Facility PBAPS SRO Grp: rbine Generators	2 RO Val or and Auxili	/ARs als Senerator Estimated Capability I: 2.8 SRO Val: 3.1 55.43 ✓ iary Systems re materials such as
of Answer Exam Leve SRO A Informati Tier SYS System: KA Group Nur KA Detail Nur	B. Correct an C. Junction of D. Junction of Application On 245000 m: 2.1	Ability to graphs/r	er factor with 4 hydrogen line Facility PBAPS SRO Grp: rbine Generator t of Operations	2 RO Val or and Auxili	/ARs als Senerator Estimated Capability I: 2.8 SRO Val: 3.1 55.43 ✓ iary Systems re materials such as
of Answer Exam Leve SRO A Informati Tier SYS System: KA Group Nur KA Detail Nur	B. Correct an C. Junction of D. Junction of Application on 245000 m: 2.1 m: 2.1.25 urce Information	Ability to graphs/r	er factor with 4 hydrogen line Facility PBAPS SRO Grp: rbine Generators of Operations o Interpret Stat	2 RO Val or and Auxili	/ARs als Senerator Estimated Capability I: 2.8 SRO Val: 3.1 55.43 ✓ iary Systems re materials such as
of Answer Exam Leve SRO (A Informati Tier SYS System: KA Group Nur KA Detail Nur Question So	B. Correct an C. Junction of D. Junction of Application on 245000 m: 2.1 m 2.1.25 urce Information	Ability to graphs/r	er factor with 4 hydrogen line Facility PBAPS SRO Grp: rbine Generators of Operations o Interpret Stat	2 RO Val or and Auxili datables wh	/ARs als Senerator Estimated Capability I: 2.8 SRO Val: 3.1 55.43 ✓ iary Systems re materials such as

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## 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.

	Question:	Shortly there	after TBC	CW Head Tank	level drops	velops in the TBCCW system. out of sight low. The operating ssure drops to 0 psig.			
				actions are take al impact of this		the following statements			
	A		DOLING"			mmediately, "ISO-PHASE BUS r, and an automatic turbine			
	B .		SO-PHASE BUS TROUBLE" and ISO-PHASE BUS LOSS OF COOLING" larms are received immediately, and an automatic turbine runback is initiated.						
	✓ C	"ISO-PHASE PHASE BUS runback will (	LOSS O	F COOLING" a	is received i larm 10 minu	mmediately, followed by "ISO- utes later. No automatic turbine			
	D					BUS LOSS OF COOLING" urbine runback will occur in this			
	Explanation of Answer	parameters. Isophase bus flow for 10 m	s loss of c inutes.	cooling is cause	d by either l	y by low water flow and other ow cooling water flow or low air phase bus cooling.			
محبن	xam Level oth	Cognitive Memory	Level	Facility PBAPS	Materia N/A	ls			
KA II	nformatio		0 Grp: 2	SRO Grp:	2 RO Val	2.6 SRO Val: 2.6 55.43			
Syst	1	245000		urbine Generate					
•	Group Nun	1	Knowle	a second a second s	sical Connec	ction and/or cause and effect			
KAI	Detail Num	K1.06	Compo	onent Cooling W	/ater System	)S			
Que	stion So	urce Inform	ation						
Que	s Source:	New			iestion urce				
Que	s Mod Me								

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#### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Isophase Bus Trouble	ARC 206 F-5		ŀ	·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.
твссw	PLOT-5034	II.E	11	0	3.b

Question: 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 · 66 that vessel level was maintained in the normal band. Which of the following statements describe the plant response to this trip? A Reactor Recirculation pump runback to 30% occurred due to the "A" condensate Α pump trip. A Reactor Recirculation pump runback to 45% occurred due to the "A" condensate V B pump trip. A Reactor Recirculation runback did NOT occur since vessel level was maintained С in the normal band. A Reactor Recirculation runback did NOT occur since total feed flow is > 85%. D B. Correct, A condensate pump trip with feed flow greater than 85% results in a Explanation of Answer 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. Materials Cognitive Level Exam Level Facility N/A PBAPS Both Memory KA Information SRO Grp: 2 RO Val: 3.5 SRO Val: 3.5 55.43 RO Grp: 1 Tier SYS 259001 Reactor Feedwater System System: Knowledge of Reactor Feedwater System design features and/or KA Group Num: K4 interlocks which provide for the following: KA Detail Num: K4.11 **Recirculation Runbacks Question Source Information** Question Ques Source: New Source Ques Mod Met References Rev. L.O. **Reference Title** Facility Ref. No. Section Pg # ARC 203 E-2 A Condensate Pump Brk Trip

			. :		Page 87 of 179
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recirculation Flow Control	PLOT-0040	III.C.1.b	11	8	5.b

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# Question Data for Test: 1999 SRO

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Question:	Both Units were operating at full power when the following alarm and indications				
67					
•	- "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:				
	Has NOT realigned since the complete initiation logic has not been satisfied.				
Α					
_	Has NOT realigned as indicated by the low flow condition.				
B					
С	Has realigned due to a low flow condition.				
✓ D	Has realigned due to a high radiation condition.				
✓ D Explanation of Answer	CREV initiated due to high radiation condition on B and D radiation monitors.				
Explanation					
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. Materials				
Explanation of Answer Exam Leve	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. Cognitive Level Facility				
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. Cognitive Level Excilipt				
Explanation of Answer Exam Leve Both	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.         Cognitive Level       Facility         Materials         Comprehension       PBAPS				
Explanation of Answer Exam Leve Both	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.         Cognitive Level       Facility         Materials         Comprehension       PBAPS         N/A				
Explanation of Answer Exam Leve Both KA Informati Tier SYS	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.         Cognitive Level       Facility         Materials         Comprehension       PBAPS         N/A         RO Grp:       2         SRO Grp:       2         RO Grp:       2         SRO Grp:       2         RO Val:       3.3         SRO Val:       3.5         55.43				
Explanation of Answer Exam Leve Both A Informati Tier SYS System:	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.         Cognitive Level       Facility         Materials         Comprehension       PBAPS         N/A         RO Grp:       2         SRO Grp:       2         RO Grp:       2         SRO Grp:       2         RO Grp:       2         SRO Grp:       3.3         SRO Val:       3.5         55.43				
Explanation of Answer Exam Leve Both (A Informati Tier SYS	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.         Cognitive Level       Facility         Materials         Comprehension       PBAPS         N/A         RO Grp:       2         SRO Grp:       2         RO Grp:       2         SRO Grp:       2         RO Grp:       2         SRO Grp:       3.3         SRO Val:       3.5         55.43				
Explanation of Answer Exam Leve Both A Informati Tier SYS System: KA Group Nu	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.         Cognitive Level       Facility         Comprehension       PBAPS         N/A         N/A         RO Grp:       2         SRO Grp:       2         RO Grp:       2         SRO Grp:       2         RO Grp:       2         SRO Grp:       3.3         SRO Val:       3.5         State       55.43         Ability to Monitor Automatic Operations of the Control Room HVAC including				
Explanation of Answer Exam Leve Both A Informati Tier SYS System: KA Group Nut KA Detail Nur	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.         Cognitive Level       Facility         Materials         Comprehension       PBAPS         N/A         Ion         RO Grp:       2         SRO Grp:       2         SRO Grp:       3.3         SRO Val:       3.5         55.43         290003       Control Room HVAC         m:       A3.01         Initiation/Re-Configuration				
Explanation of Answer Exam Leve Both (A Informati Tier SYS System: KA Group Nul KA Detail Nur Question Sc	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.         Image: Cognitive Level Facility Comprehension       Facility PBAPS         Image: RO Grp: 2       SRO Grp: 2       RO Val: 3.3         Image: 2       SRO Grp: 2       RO Val: 3.5       55.43         Image: 2       SRO Grp: 2       RO Val: 3.5       SSRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       RO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       RO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       RO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       RO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       SRO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       SRO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       SRO Val: 3.3       SRO Val: 3.5       55.43         Image: 3       Ability to Monitor Automatic Operations of the Control Room HVAC       Image: 3       SRO Val: 3         Image: 43.01       Imitiation/Re-Configuration       Image: 3				
Explanation of Answer Exam Leve Both A Informati Tier SYS System: KA Group Nut KA Detail Nur	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.         Image: Cognitive Level Facility Comprehension       Facility PBAPS         Image: RO Grp: 2       SRO Grp: 2       RO Val: 3.3         Image: 2       SRO Grp: 2       RO Val: 3.5       55.43         Image: 2       SRO Grp: 2       RO Val: 3.5       SSRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       RO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       RO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       RO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       RO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       SRO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       SRO Val: 3.3       SRO Val: 3.5       55.43         Image: 2       SRO Grp: 2       SRO Val: 3.3       SRO Val: 3.5       55.43         Image: 3       Ability to Monitor Automatic Operations of the Control Room HVAC       Image: 3       SRO Val: 3         Image: 43.01       Imitiation/Re-Configuration       Image: 3				

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#### References

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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	•

Unit 2 has experienced a total loss of instrument air with the Instrument Air Question: headers reading 0 psig. 68 Which of the following statements describe the pneumatic sources available to operate ALL of the Safety Relief Valves (SRVs). Seismic Grade Instrument Gas (via T-261). ~ Α Instrument Nitrogen (via GP-8E). В Backup N2 bottles (via SV 8130 A &B). С Relief Valve accumulators. D AO-2969A and B, drywell instrument N2 supply valves to the drywell fail closed on Explanation of Answer 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. Materials **Cognitive Level** Facility Exam Level N/A Comprehension PBAPS Both KA Information SRO Grp: 2 RO Val: 2.7 SRO Val: 2.9 55.43 RO Grp: 2 Tier SYS 300000 Instrument Air System (IAS) System: Knowledge of the effect that a loss or malfunction of the Instrument KA Group Num: K3 Air System will have on: KA Detail Num: K3.01 Containment Air System **Question Source Information** Question Ques Source: New Source Ques Mod Met References L.O. Section Pa # Rev **Reference** Title Facility Ref. No. 11 9, 12 4a **PSYS-5016** Instrument Nitrogen Ssytem

					Page 91 of 179
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	

**f** .

The Traversing In-core Probe (TIP) system is in use with a probe in the core when Question: the reactor scrams on low level following a loss of feedwater. HPCI automatically 71 starts and recovers level, containment parameters are normal. Which of the following statements describe the expected response of the TIP system to this transient? TIP automatically retracts from the core, TIP Ball valves close, TIP Nitrogen Purge Α valves close. TIP automatically retracts from the core, TIP Ball valves close, TIP Nitrogen purge В valves remain open. TIP automatically retracts from the core, TIP Ball valves and TIP Nitrogen purge С valves remain open. NO TIP system response to a reactor low level condition. D A. Correct, Tip automatically retracts, ball valves and purge valve close on 1" Explanation of Answer Group II isolation. D. Incorrect, Plausible since some GP II isolations such as RWCU do not occur on Rx to level condition. Materials **Cognitive Level** Exam Level Facility N/A PBAPS Both Memory **KA Information** SRO Grp: 3 RO Val: 3.4 SRO Val: 3.5 RO Grp: 3 55.43 SYS Tier 215001 Traversing In-Core Probe System: Knowledge of Traversing In-Core Probe Design Features and/or KA Group Num: K4 interlockes which provide for the following: KA Detail Num: K4.01 Primary Containment Isolation Question Source Information Question Ques Source: New Source Ques Mod Met References L.O. Section Rev. **Reference Title** Facility Ref. No. Pg # 2.1 15 Group II and III GP-8B

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
Groups II and III Isolations	GP-8B COL	1	3,8	17	
Reference Title	- Facility Ref. No.	Section	Pg #	Rev.	L.O.

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Question Data for Test: 1999 SRO

Question: The following	g conditions exist on Unit 3:
	y conditions exist on onit o.
- A leak on	the "3A" RWCU pump discharge has resulted in Reactor Building
	tack Radiation Levels rising. ctor Building Equipment Cell Exhaust had just been aligned to
- The Read	s Treatment (SBGT) in accordance with SO 9 when a loss of
instrument a	
1	and "3B" instrument air headers and the Unit 3 service air header are
fully depress	urized. has been entered.
- ON-1191	las been entered.
Under these	conditions, Standby Gas Treatment:
✓ A Will remain	in service. Reactor Building Ventilation will isolate.
Will remain i	n service. Reactor Building Ventilation will NOT isolate.
В	
Will NOT rer	nain in service. Reactor Building Ventilation will isolate.
C	
D Will NOT rer	nain in service. Reactor Building Ventilation will NOT isolate.
Explanation SBGT will re of Answer existence fail	main 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	e Level Facility N/A
Both Comprel	hension PBAPS
KA Information	
	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 Inform	nation
Ques Source: New	Question
Ques Mod Met	Source
· · · · · · · · · · · · · · · · · · ·	

#### References

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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.	<b>L.O</b> .
Reactor Building HVAC	PSYS-5040	V.F.2	28		5.c
•			•	• •	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Building HVAC	PSYS-5040	III.B.7.c	16	1	

	Question:	are in service momentarily s acknowledge	e in the AUTOMATIC spikes high and retu s receipt of the "CO 2) and notes that the	er with all 10 Condensate Filter Demineralizers C mode. Condensate filter demin system dP urns to normal. The Reactor Operator NDENSATE FILTER-DEMIN TROUBLE" alarm e Condensate Filter Demineralizer Bypass Valve				
		After the dP spike returns to normal, Feedpump suction pressure:						
	Α	Will drop, due	drop, due to Condensate Demin "E" Valve closure.					
•	· B	Will drop, due to Condensate Demin "E" Valve opening.						
	С	Will NOT dro	p, due to Condensa	ate Demin "E" Valve closure.				
	`✓ D	Will NOT dro	p, due to Condensa	ate Demin "E" Valve opening.				
	Explanation of Answer	The Condens If MO-2114 is	sate Filter Demin"E" s open on high dP, t es and the MO-2114	<ul> <li>/pass Valve, MO-2114, opens on high dP of 60 psi.</li> <li>' Valves open on high dP of 50 psi.</li> <li>the "E" valves will be open.</li> <li>open to maintain Condensate pressure to the</li> </ul>				
-	xam Level oth	Cognitive Application						
KA li	nformatio	on						
Tier	SYS	R	:0 Grp: 2 SR0 (	Grp: 3 RO Val: 2.9 SRO Val: 2.9 55.43				
Syst	em:	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						
Que	stion So	urce Inform	ation					
Que	s Source:	New		Question Source				
Que	s Mod Me							

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## References

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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:
 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 provide FPC pump protection.

Low Fuel Pool level to prevent Fuel Pool pump down.

Low booster pump suction pressure to provide FPC pump protection.

Explanation 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.

<b>—</b>	Cognitive Level	E 114 -	Materials
Exam Level	Cognitive Level	Facility	N/A
Both	Memory	PBAPS	
1	1 ·	a second	<ul> <li>A second sec second second sec</li></ul>

#### **KA Information**

В

С

D

Tier SYS	RC	O 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.	<b>L.O</b> .	
Euel StoragePool High/Low Level	ARC C075 B-1		1 1	2		

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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

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#### Question Data for Test: 1999 SRO

Question: 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 86 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: Continue to reduce power. Α Hold power constant. В Trip the main turbine. ✓ C Scram and enter T-100. D Explanation OT-106 Step 3.2 directs that if vacuum is > 25" and generator Mwe are < 325 of Answer Mwe, then if within bypass capability trip the main turbine. Materials **Cognitive Level** Exam Level Facility N/A Both Memory PBAPS **KA Information** SRO Grp: 2 RO Val: 3.2 SRO Val: 3.2 55.43 RO Grp: 2 E/APE Tier 295002 Loss of Main Condenser Vacuum System: Ability to operate and/or monitor the following as they apply to the KA Group Num: AA1 loss of main condenser vacuum KA Detail Num: AA1.05 Main Turbine **Question Source Information** Question Ques Source: New Source Ques Mod Met References Facility Ref. No. L.O. **Reference Title** Section Pa # Rev. 3.2 18 Condenser Low Vacuum OT-106 Facility Ref. No. Section Rev L.O. **Reference Title PLOT-1540** Operational Transient Procedures

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# Question Data for Test: 1999 SRO

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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	A Correct, since the "C" condenser provides only a "A" Channel RPS input.						
В	Correct, since the scram setpoint cannot be achieved without all three condenser losing vacuum.						
<b>√</b> 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						
Both	Memory PBAPS N/A						
KA Informati	on						
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 to loss of Main Condenser Vacuum							
KA Detail Num	n: AK3.01 Reactor Scram						
	urce Information						
	New Question						
Question So	New Question Source						
Question So Ques Source:	New Question Source						
Question So Ques Source: Ques Mod Me	Question Source						

				Page 102 of 179		
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.	
RPS	PLOT-5060F			0	1.j	

Question:

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.
* Among ton - 144 Mart - 14	в	LI-2-2-3-86 and is currently BELOW the Main Steam Lines.
	с	Wide Range indication and is currently ABOVE the Main Steam Lines.
•	D	Wide Range indication and is currently BELOW the Main Steam Lines.
Explar of Ans		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.
		Materials

Exam Level Both	Cognitive Level	Facility PBAPS	Figure 1 OT-110	-
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#### **KA Information**

**₽** \_ 3

Tier E/APE	I	RO Grp: 2 SRO Grp: 2 RO Val: 3.9 SRO Val: 3.9 55.43
System: 2	295008	High Reactor Water Level
KA Group Num:	A2	Ability to determine and/or interpret the following as they apply to high reactor water level
KA Detail Num:	A2.01	Reactor Water Level

#### Question Source Information

Ques Source:	New	 	Question Source		- <u>-</u>	
Ques Mod Met			-			
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## References

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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	<u>.</u>		6	4

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 genvironment.		ophase bus bars	to be absorbed by the			
В	Reduce the h	eat load so that R	BCCW is not ove	erloaded when it backs up TBCCW.			
С	Permit conder overheating.	nsate pumps to be	e alternated to pro	event condensate pump			
D	Reduce the he on high temper		W so that the sta	ation air compressors will NOT trip			
Explanation of Answer Exam Level Both	the environme B. Incorrect, RBCCW. C. Incorrect, pumps. D. Incorrect, TBCCW.	ent without bus du Isophase bus coo the basis for lowe Station air compre	uct cooling oling is not a TBC ering to 18,000 an essors are backe <u>Mater</u> N/A	y the bus bars can be absorbed by CW load that is backed up by nps is not to alternate Condensate ed up by RBCCW on a loss of ials			
KA Informatio	on			al: 3.3 SRO Val: 3.4 55.43			
Tier E/APE		•	•	•			
System:	295018	and the second sec	Partial or Complete loss of component cooling water				
KA Group Nur	n: AK3		Knowledge of the reasons for the following responses as they apply to partial or complete loss of component cooling water				
KA Detail Num	KA Detail Num: AK3.02		Reactor Power Reduction				
Question So	urce Informa	ation					
Ques Source: New			Question				
Ques Source:	New	i.	Source				

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## References

Reference Title	Facility Ref. No.	Section	Pg#	Rev.	L.O.
Loss of Turbine Building Close	ed Col ON-118	2	2	4	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

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# Question Data for Test: 1999 SRO

Question 90	the RCCW He	of Reactor Building Closed Cooling Water (RBCCW), directs that ead Tank Level be verified. When sent to verify RBCCW Head Tank ipment Operator must:
A	Go to Turbine sightglass.	Building 165' elevation and check the level in the head tank
В	Go to Turbine	Building 165 elevation and check make-up valve position.
С	Go to the Ref	uel Floor and check the level in the head tank sightglass level.
✓ D	Go to the Ref	uel Floor and check make-up valve position.
Explanation of Answer	<b>RBCCW</b> head	or TBCCW and DWCW are located on Turbine Building 165' El. I tank is actually located above the Refuel Floor so operators are eck make-up valve position.
Exam Level	Cognitive Memory	Level Facility Materials N/A
KA Informatio		D 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 Nun	n: <b>2.4</b>	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 Sol	urce Informa	ation
Ques Source:	New	Question Source
Ques Mod Met		
References		
Reference Tit		Facility Ref. No. Section Pg # Rev. L.O.
Loss of RBC	CW - Bases	ON-113 2.3.4 2 11
Reference Tit	le d Tank Hi Lo L	Facility Ref. No.       Section       Pg #       Rev.       L.O.         evel       ARC 217 G-5       4       4

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	

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Question:	ON-119, Loss of Instrument Air, directs that the reactor be scrammed if any rod					
91	begins to drift in due to lov	vering scram p	ilot air header pres	ssure.		
	What is the bases for this	direction?	an a			
A	To ensure that the scram	discharge volu	me is fully isolated	during the scram.		
✓ В	To ensure that various sc rod pattern.	ram valve oper	ning pressures do	not result in a random		
С	To ensure that the individ scram outlet valves.	ual control rod	scram inlet valves	do not open before the		
D	To ensure that sufficient v a full scram.	olume exists ii	n the scram discha	arge volume to complete		
Explanation of Answer	<ul> <li>A. Incorrect, Loss of air w</li> <li>B. Correct, To avoid rand pressures.</li> <li>C. Incorrect, scram outled spring preload.</li> <li>D. Incorrect, an automatic</li> </ul>	lom rod insertio t valves open p c scram would	on due to varying s prior to scram inlet be initiated off SD	valves due to greater		
	there being insufficient vo	lume in the SD				
Exam Level Both		Facility PBAPS	Materials N/A			
• • • • • • • • • • • • • • • • • • •	4 • • • • • • • • • • • • • • • • • • •					
KA Informatio						
Tier E/APE	RO Grp: 2	SRO Grp: 2	RO Val: 3.4 SF	RO Val: 3.6 55.43		
System:	295019 Partial or C	Complete Loss	of Instrument Air			
KA Group Num	1: 2.4 Emergency	ency Procedure/Plan				
KA Detail Num	2.4.11 Knowledge	e of abnormal o	condition procedure	es		
Question Sou	urce Information					
Ques Source:	New	Ques Sourc				
Ques Mod Met						
. /						
References		•				
Reference Tit	le Fa	cility Ref. No.	Section	Pg # Rev. L.O.		
Loss of Instru	ment 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

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					and a second					
	A loose fitting has resulted in the loss of instrument air to the in-service Control									
92	Rod Drive (C	RD) Flow C	Control Valve (A	O-19).	ŕ		· _			
1	Determine w loss.	hich of the I	following conditi	ons could res	ult from this	instrume	nt air			
	Control Rod	Drive accui	mulator alarms o	lue to low pre	ssure.					
A				··· ·						
✓в	Control Rod	Drive alarm	is due to high te	mperatures.						
Ď										
с	Control Rods	s begin to d	rift due to exces	sive flow.						
Ŭ	j									
D	High rod spe	eds during	control rod with	drawal.						
			<sup>-</sup>							
Explanation	A. Incorrect,	CRD accu	mulator pressur	e is not affect	ed by loss c	of air.	_			
			ument air will ca	use AO-19 to	tail closed i	resulting i	n			
			ow to CRDMs. ater flow and dP	is reduced d	ue to AO-19	ciosure				
			er flow and dP is							
,	- ···			Materials		ar * * Aar				
Exam Level			Facility	N/A						
Both	Compret	hension	PBAPS			·				
A Informatio							·			
			SRO Grp: 2			120 5	5 43			
Tier E/APE						. 15.9 5				
System:	295019	<b>I</b>	complete loss							
KA Group Num	I: AK2	Knowled and the f	ge of the interre ollowing	lationship bet	ween loss o	finstrume	ent air			
KA Detail Num	AK2.01	CRD Hyd	draulics							
Question Sou	Irce Inform	ation								
Ques Source:	New		Ques Sour							
Ques Mod Met										
· ·			•	•						
References										
Reference Titl	e	Ē	Facility Ref. No.	Section	Pg #	Rev.	L.O.			
Loss of Instru			ON-119	Attachmer	nt 1 12	13				

				í	Page 112 of 179
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550		1	7	3

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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 Aid is:	on neces	sary to determine	expected heat k	oad using	g this Op	perator	
A	Current heat	up rate.	· · · · · · · · · · · · ·					
В	Current WRN	M indica	ted power.					
с	Power history	before s	shutdown.		•		<u> </u>	
✓ D	Elapsed time	since sh	utdown.					
Explanation of Answer	The operator	aid relate	es time since shute	lown to decay h	eat load	in mega	watts.	
Exam Level Both	Cognitive Memory	Level	Facility PBAPS	Materials N/A				
KA Informatio		0.6m <sup>.</sup> [3	SRO Grp: 2	BO Val 36	SRO Val	38	55.43	
System:	295021		Shutdown Cooling	. <b>.</b> .		1		
KA Group Num:		Knowle	dge of the operation relate to a loss of	onal implications		ollowing	concepts	
KA Detail Num:	AK1.01	Decay	Heat					
Question Sou	rce Informa	ation	· · · · · · · · · · · · · · · ·					
Ques Source:	New	· · · · · · · · · · · · · · · ·	Quest					
Ques Mod Met				· · · · ·	<u> </u>	<u>.</u>		
References				· · · · · · · · · · · · · · · · · · ·				
Reference Title	2		Facility Ref. No.	Section	Pg #	Rev.	L.O.	
Loss of Shutdo		Bases	ON-125	Step 2.8.7	11	1	[	
Reference Title	and the second		Facility Ref. No.	Section	Pg#	Rev.	L.O.	
Expected Dec	ay Heat Oper	ator Aid	OP Aid 95-04		l	1		

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Reference Title	•	Facility Ref. No.	Section	<b>)</b>	Pg #	Rev.	L.O.
Off Normal Procedures		PLOT-1550				7	3

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94 r	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.									
		nder these conditions, ON-107, Loss of CRD Regulation Function, directs that a Il reactor scram be inserted. The basis for this direction is that:								
	At this reactor pressure, operable HCU accumulators are required to ensure proper scram force.									
		pressure the CRDM ball check valves will NOT reposition to permit ire to insert the control rods.								
	This condition may result in unanalyzed rod patterns due to rods inserting randomly on low accumulator pressure.									
		exceeds the Tech Spec Limit for the number of withdrawn control be declared "slow".								
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	Materials								
Both	Memory									
KA Informatio	n									
Tier E/APE	RC	O 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 Sou	rce Informa	tion								
Ques Source:	New	Question Source								
Ques Mod Met										
References										
Reference Title	e	Facility Ref. No. Section Pg # Rev. L.O.								
Loss of CRD F										

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Reference Title	•	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures		PLOT-1550			7	3

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Question:	Unit 2 has experienced a drywell steam leak with an ATWS. Current conditions are as follows:
	<ul> <li>Reactor pressure being maintained 950-1050 psig.</li> <li>TI-2501 point 126 is not available.</li> <li>TI-2501 point 127 indicates 520 degrees F.</li> <li>Narrow range RPV level indicates +5 inches.</li> <li>Wide range RPV level indicates -115 inches.</li> <li>Fuel Zone RPV level range indicates -125 inches.</li> <li>Refuel range RPV level (Shutdown Range Instrument LI-2-2-3-86) indicates - 21 inches.</li> </ul>
	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
В	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 Both	Cognitive Level         Facility         Materials           Application         PBAPS         T-102 Table DW/T-1
KA Information	on RO Grp: 2 SRO Grp: 2 RO Val: 3.7 SRO Val: 3.9 55.43
System:	295028 High Drywell Temperature
KA Group Nur	n: EA2 Ability to determine and/or interpret the following as they apply to High Drywell Temperature
KA Detail Num	n: EA2.03 Reactor Water Level

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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		

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Question: 96	the band of 14	.5 ft. to	nment Control, pro 14.9 ft. In accorda y torus level transie	ance with the TF					
Å	Submerging th	Submerging the Reactor Building to Torus Vacuum Breaker Line.							
✓ В	Excessive stre	ess on S	RV tail pipes.	- 	, .				
С	Submergence	of the T	orus Spray Heade	ir.					
D	Excessive stre	ess on E	CCS suction piping	9					
Explanation of Answer			ed submergence c quenchers, and as	sociated support		se exces	sive		
Exam Level Both	Cognitive Memory	Level	Facility PBAPS	Materials N/A		a			
KA Informatio		) Grp: 2	SRO Grp: 2	RO Val: 3.4	SRO Val	: 3.7	55.43		
System:	295029	High Su	uppression Pool W	ater Level					
KA Group Nun	n:EK1		dge of the operation high suppression		s of the fo	ollowing	as they		
KA Detail Num	EK1.01	Contair	nment Integrity	······································					
Question Sou	urce Informa	tion							
Ques Source:	New	÷	Quest Sourc	1					
Ques Mod Met									
References							• ·		
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	L.O.		
Primary Cont	ainment Contro	ol - Bas	T-102 Bases	T/L-18	8	14			
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	L.O. '		
PBAPS TRIP	S		PLOT-1560	· · · · · · · · · · · · · · · · · · ·		8	9		

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C	uestion:	T-102 step PC/P-6 directs use of Torus Sprays before Torus pressure reaches 9							
	97	psig if Torus level is below 21 ft.							
		What are the I	bases fo	r the 9 psig and 21	feet limitations	?			
	✓ A	Threshold for	downco	mer chugging and	Torus Spray he	ader bec	omes su	Ibmerged.	
	В	Threshold for become subm		mer chugging and	Torus to drywe	l vacuun	n breakei	rs	
	С	Threshold for submerged.	evapora	tive cooling and To	orus to drywell v	acuum t	preakers	become	
1 2 3 3	D	Threshold for	evapora	tive cooling and To	orus Spray head	ler beco	mes subi	merged.	
	planation Answer	C. Incorrect,	See B ar	drywell vacuum b nd no maximum d <b>i</b> tive cooling is part	<b>D</b>		-		
Exa Bot	am Level th	Cognitive Memory	Level	Facility PBAPS	Materials N/A				
	formatio		) Grp: 2	SRO Grp: 2	RO Val: 3.1	SRO Val	: 3.3	55.43	
Syste		295029		appression Pool W					
-	oup Nun		Knowle	nowledge of the interrelationship between high suppression pool ater level and the following					
KA De	etail Num	EK2.05	Contair	ment/Drywell vac	uum breakers				
Quest	ion Sou	urce Informa	tion					· · · · · · · · · · · · · · · · · · ·	
Ques	Source:	New		Quest	1				
Ques	Mod Met				<u> </u>				
Refe	rences								
Refe	rence Tit	le		Facility Ref. No.	Section	Pg #	Rev.	L.O.	
		ainment Contro	ol - Bas	T-102 Bases	PC/P-6	13	14		
Refe	rence Tit	le		Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .	
	PS TRIP			PLOT-1560			8	9	

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Question:	Plant condition	is on Unit	3 are as follows	5:					
98	<ul> <li>A steam leak exists in the Unit 3 Reactor Building.</li> <li>The Reactor has been shutdown and depressurized to a steady value</li> </ul>								
			2 indicates 325						
			vel indicates -15 indicates -172						
	- ruei zone i		mulcales - 172	Inches.					
					C/T-4 from T-103, "Secondary RPV level range may be used.				
Α	Wide Range m	nay be us	ed, Vigilant Mor	nitoring require	ed.				
В	Wide Range m	nay be us	ed, Vigilant Mor	nitoring NOT r	equired.				
<b>√</b> C	Fuel Zone may	y be used	, Vigilant Monite	oring required					
D	Fuel Zone may	Fuel Zone may be used, Vigilant Monitoring NOT required.							
Explanation					pressure plots to the "vigilant"				
of Answer			PV saturation of inches is held		um indicated level and 325				
					re not available.				
			nches is above	the minimum	indicated level and is				
	available for u	se.		Materials	•				
Exam Level	الكالمانية المستخدين	and the second	Facility	T-103 Tab	le SC/T-4				
Both	Application	ר 	PBAPS						
KA Informatio	nn	· · · · · ·	. –						
Tier E/APE		) Grp: 3	SRO Grp: 2	RO Val: 3	.3 SRO Val: 3.5 55.43				
System:	295032								
KA Group Nun		High Secondary Containment Area Temperature Ability to determine and/or interpret the following as they apply to							
	- Jerve	high secondary containment area temperature:							
KA Detail Num	EA2.02	Equipme	ent Operability	•					
Question So	urce Informa	ition							
Ques Source:	New		Que Sou	stion					
Ques Mod Me	t			<u> </u>					
		<i></i>			<u> </u>				

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## References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
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

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### Question Data for Test: 1999 SRO

Question:

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.

*	<ul> <li>A second sec second second sec</li></ul>
✓ A	Reactor Building Ventilation trips. Refuel Floor Ventilation trips. SBGT initiates and aligns to the entire Reactor Building/Refuel Floor.
В	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 Both	Cognitive Level	Facility PBAPS	Materials N/A	• ·
1	1		1	

#### **KA Information**

Tier E/APE	f	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

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Ques	Mod	Met
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### References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Refueling Floor Vent Exhaust Hi R	ARC 218 A-1		T	2	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reac. Bldg. Zone Vent Exhaust Hi	ARC 218 B-1		T		
read. Didg. Zone vent Exhaust m	ARC 210 B-1	enten siste entre si	l astronomica i	2	
lan ing panganan ang panganan Ang panganan ang panganan ang panganan ang panganan ang panganan ang panganan ang Ang panganan ang pan	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reference Title Reac. Bldg. Or Refueling Floor Ven	Facility Ref. No.	Section	Pg #		L.O.
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O. L.O.

Question:	condition in Se	03, "Secondary Containment Control", due to high water level econdary Containment. The Reactor has been conservatively d the Group II/III isolations (from the level shrink) are complete.
	discharòing in	urrently attempting to determine whether a Primary System is to the Reactor Building. Given the above conditions, evaluate the determine which constitutes a primary system discharging into the ng.
A		a pipe flange on the discharge of the Reactor Water Cleanup Non- leat Exchanger.
В		e from a rupture on the piping of the #2 Main Steam stop valve inlet.
С		a weld crack on the "A" RHR suction piping penetration to the Torus.
✓ D	Steam leakag drywell penet	e from the Standby Liquid Control Injection line just outboard of the ration.
Explanation of Answer	B. Incorrect,	RWCU is isolated on a complete Group II isolation. #2 MSV is not in the Reactor Building and not a T-103 issue. RHR suction is not a primary system.
Exam Level Both	Cognitive Compreh	
KA Informatio	on R	O 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 Nun	n: 2.4	Emergency Procedure/Plan
KA Detail Num	n: <b>2.4.20</b>	Knowledge of operational implications of EOP Warnings/Cautions/and Notes
Question So	urce Inform	ation
Ques Source:	New	Question Source
Ques Mod Me	t	
References	i .	
Reference Ti	tie	Facility Ref. No. Section Pg # Rev. L.O.
Secondary C	ontainmnet Co	ontrol - T-103 Note 25.1 11 12

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560		1	8	9

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Question Data for Test: 1999 SRO

Question: 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 101 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: Lowering Instrumentation Variable Leg density. Α Raising Instrumentation Variable Leg density. 8 owering Instrumentation Reference Leg density. С Rising Instrumentation Reference Leg density. D Localized heating of the 3B reference leg backfill system could eventually raise Explanation of Answer 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. Materials **Cognitive Level** Facility Exam Level N/A Both Memory PBAPS **KA** Information SRO Grp: 2 RO Val: 3.1 SRO Val: 3.6 55.43 RO Grp: 2 E/APE Tier Plant Fire on Site 600000 System: Ability to determine and interpret the following as they apply to a KA Group Num: AA2 plant fire on site KA Detail Num: AA2.17 Systems that may be affected by the fire **Question Source Information** Question New Ques Source: Source Ques Mod Met References L.O. Rev. **Reference Title** Facility Ref. No. Section 6 Actual Fire Reported - Bases Note 1 **ON-114** 

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

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### Question Data for Test: 1999 SRO

ON-114, for an Actual Reported Fire, has a note to inform the Operator that a loss Question: of power to the Motor Driven Fire Pump for more than 8 seconds will defeat that 102 pumps automatic start capability. The basis for this feature is to prevent: A simultaneous start with the Diesel Driven Fire Pump and resultant water Α hammer. A spurious start due to loss of power to the fire header pressure instrumentation. В The pump from automatically starting with reduced bus voltage. С Overloading the diesel generators on a loss of off-site power. D V Defeat of the auto start feature occurs after 8 sec. Loss of power to prevent an Explanation auto start during a Loop event which could cause an Emergency Diesel Generator of Answer to exceed its 200 hour rating. Materials

Exam Level SRO	Memory	Facility PBAPS	N/A	, ,		
1	· · · · · · · · · · · · · · · · · · ·	•		· ·	 	

#### **KA Information**

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Tier E/APE	RC	Grp: 2 SRO Grp: 2 RO Val: 2.8 SRO Val: 3.4 55.43
System:	1	Plant Fire on Site
KA Group Num	АКЗ	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	Questic Source				
Ques Mod Met					
References					
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Actual Fire Reported In - Bases	ON-114		3	6	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Fire Protection System	PLOT-0685	V.A	17	7	.5.h

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# Question Data for Test: 1999 SRO

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	Question:						
	103	Given the foll	owing conditions:				
	1 103	<ul> <li>A loss of off-site power has occurred.</li> <li>The E-1 and E-4 Diesel Generators (DG) are running.</li> <li>The E-43 4KV bus has an overcurrent lockout.</li> </ul>					
			oling water is availat				
		- Drywell pr	essure is 3.6 psig ar	nd slowly rising.	· · · · ·		
		Why are jump	ers, installed in the	Control Room the	PREFERRED method for		
		shutting down	the two diesel gene	erators?			
•	•	This bypasse	s the 10 minute time	er on the MCA sign	nal enabling the DG Control		
	A	Switch "Pull-T	o-Lock" position.	-	, •		
	В	Local method	s of DG shutdown a	re disabled for the	e conditions.		
	✓ C	The DG shute	lown actions need to	be completed as	s quickly as possible.		
		I lse of the DG	Control Switch "Pu	II-To-Lock" positiv	on will not allow a restart should		
	D	cooling be res					
	Explanation	A. Jumpers in	nsert a DG differenti	al overcurrent sig	nal.		
Ċ	of Answer	B. All local st	ops remain available	e, just can't be doi	ne in 3 minutes.		
			nswer, need to shutd I not shutdown the D		ninutes.		
				Materials			
	kam Level			- N/A			
	RO	Memory	PBAPS	_			
KA Ir	formatio	n			· · · · · · · · · · · · · · · · · · ·		
Tier	E/APE	R0	O Grp: 2 SRO G	rp: 1 RO Val:	3.4 SRO Val: 3.8 55.43 🗸		
Syste	em:	295003	Partial or Complete	, ,	<b>p</b>		
-	Foup Num	1	Conduct of Operati				
	-	,	•				
	etail Num	. [2. 1.32		iu apply system ii	mits and precautions		
Ques	tion Sou	Irce Informa	ition				
Ques	Source:	1998 PBAPS	NRC Exam	Question			
0	Mod Met			Source	<u>]</u>		
QUES							

## References

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Facility Ref. No.	Section	Pg #	Rev.	L.O.
SE-11 Bases	LP-9	6	7	1
Facility Ref. No.	Section	Pg #	Rev.	L.O.
PLOT-1555		T	4	12b
	SE-11 Bases	SE-11 Bases LP-9 Facility Ref. No. Section	SE-11 Bases LP-9 6 Facility Ref. No. Section Pg #	SE-11 Bases LP-9 6 7 Facility Ref. No. Section Pg # Rev.

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			an a				
			MODE 1 at 40% po ontrol room actions			ed a loss	of
	•	•			-		
	Under these c	conditions	, operator actions v	vill be impacte	d by a los	ss of pow	ver to:
A	The RBCCW	backup o	f DWCW which will	require manua	al transfe	r.	
					abliabte	<u></u>	· · · ·
В	The lighting in	n vital are	as which will require	e the use of the	sniights.		
с	The Fire Alari	m Panel v	which will require co	ontinuous rovin	g fire wa	tches.	
✓ D	The Control F	Room rad	ios which will requir	e the use of al	ternate c	ommunic	cations.
	B. Incorrect,	SE-11 di	backup of TBCCW rects use of flashlig wrong answer.			CW).	
Exam Level Both	Cognitive Memory	Levei	Facility PBAPS	Materials N/A			
KA Informatio			· · · · · · · · · · · · · · · · · · ·				
Tier E/APE		0 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	Knowle AC pow	dge of the interrelat ver and	lions between	partial or	complet	e loss of
KA Detail Num	AK2.04	AC Elec	ctrical Loads				
Question Sou	rce Informa	ation		·			
Ques Source:	New		Questic Source				
Ques Mod Met							
References			····· ····· ··· ··· ··· ··· ··· ·				
Reference Tit	le		Facility Ref. No.	Section	Pg#	Rev.	L.O.
Loss of Uninte	errutable AC F	Power -	ON-112-2	Note 4	2	6	
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Pr	rocedures		PLOT-1550		6	7	2
				· · · ·			

Question Data for Test: 1999 SRO

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		Quest	tion Data fo	or lest:	1999 58	(O				
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 bord	on injecti	on (Standby Liq	uid Control) it 1	his is not tru	Je.	~			
	Is assured the cooldown.	reactor i	s shutdown and	will remain sh	utdown dur	ing the ens	suing			
	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.									
of Answer	<ul><li>B. Correct an</li><li>C. T-117 entr</li><li>D. Not a conc</li></ul>	swer, Ma y require cern with	oower > 3% or u aximum Subcritio d but T-101 is c these condition	al Banked Wi ontinued.	he reactor is thdrawal Po	s not shutd sition.	own.			
Exam Level SRO	Cognitive Memory		Facility PBAPS	N/A						
KA Informatic	n									
Tier E/APE	R	) Grp: 1	SRO Grp: 1	RO Val: 4	.3 SRO Va	1: 4.4 58	5.43 🗸			
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 Sou	urce Informa	ation			•					
Ques Source:	1998 PBAPS	S NRC E	xam Que	estion rce						
Ques Mod Met										
References										
Reference Tit	le		Facility Ref. No	Sectio	n Pg#	Rev.	L.O.			
Trip Curves,	Tables & Limit	s - Bas		4	3	2				

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Transient Response Implementatio	PLOT-1560			7	6

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Que	stion	Upit 2 in an		110000 (				7	
	106	Unit 2 is op	erating in	MODE 1	at 100%	power w	hen the fo	ollowing	occurs:
		- "REACT	OR HI PF	RESS" ala	rm 210 G	-2 annui	nciates.		
		- Reactor	Pressure	indicates	1075 psi	ig and ris	ing slowly	1.	
		In accordar appropriate	ice with O immediat	T-102 "Re e operator	eactor High	gh Press	ure" whic	h of the f	following is an
		Control read	ctor press	ure by rais	sing the l	Bynass I	ack settin		
8 	A					bypass J		ıy.	
	В	Control read	ctor press	ure by low	ering the	Max Co	mbined F	low Limi	t Pot.
		Control read	tor press	ure by low	erina res	actor nou	(Of		
×	С				oning ice		rei.		·
	D	Control read	tor pressu	are by rais	ing the M	Aax Com	bined Flo	w Limit F	Pot
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2				•	•			. Entity (	
Explar of Ans	nation wer	A. Incorrect	, EHC pre	ssure set	is lowere	ed if reac	tor press	ure has s	stabilized (OT-
		TUZ SIEP Z.Z							pressure (OT-
		i i step i j					red for rea	actor low	pressure (OT-
		C. Correct,	Per OT-1	02 Step 2.	1.1.		_		
	1	D. Incorrect	, Raising i	viax Com	oined Flo			have no	effect.
Exam	evel	Cognitive	Level	Facility		Materia N/A	ls		
Both		Memory		PBAPS	;				
KA Inform	natio	n		· ······		······			··· -
Tier E/AF			0 Grp: 1						
System:	-			and the second sec			[3.5 SR		3.7 55.43
•		295007		High Pre					
KA Group	Num:	AK2	Knowledge of the interrelations between high reactor pressure and the following						
KA Detail I	Num:	AK201	Reactor	/Turbine F	Pressure	Regulati	ng Syster	n	
Question	Sou	ce Inform	ation						
Ques Sour		New			Questi	on	r		
					Source				

Question Data for Test: 1999 SRO

Ques Mod Met

## References

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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.	<b>L.O</b> .
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

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# Question Data for Test: 1999 SRO

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Question:	Unit 2 is ope shears. The	rating at 87% pov Condensate pun	wer when	the "A" Co es to run	ondensate pump sl at low motor amps	haft coupling
	Given that al Operator act	I three Reactor Fi	eedpumps t is the ex	s (RFPs) i pected pla	emain in service a Int response to this	nd no s event?
A	A Recirc run	back to 45% spec	ed will occ	ur immed	iately.	<u> </u>
В	A Recirc run	back to 45% spec $\sim$	ed will occ	ur when I	evel is less than +1	7".
c	A Recirc run	back to 30% spee	ed will occ	ur immed	ately.	
✓ D	A Reactor sc	ram will occur wh	ien level is	s less that	1 +1".	
Explanation of Answer	from breaker and will not o B. Incorrect, runback. C. Incorrect,	position which is ccur. Feed pump flow Total feed flow w evel will slowly be	still close will rise or vill remain	d, runbac n the loss > 20% no	In, condensate pur requirements will of level and remain runback. d condensate flow	not be met n > 20%, no
Exam Level Both	Cognitive Comprehe			Materia N/A	<u>S</u>	
KA Informatio	n		•			• • •
Tier E/APE	R	O Grp: 1 SRC	) Grp: 1	RO Val:	3.9 SRO Val: 3.	.9 55.43
System:	295009	Low Reactor Wa	ater Level			
KA Group Num	AA1	Ability to operate reactor water lev	e and/or n vel	nonitor the	following as they	apply to low
KA Detail Num:	AA1.01	Reactor Feedwa	ater			
Question Sou	rce Informa	ition				
Ques Source:	New		Quest			
Ques Mod Met			Source	<b>-</b>	<u>.</u>	

## References

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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	

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## Question Data for Test: 1999 SRO

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Question	Unit 2 is at 10	0% power when Drywell pr	ressure begins to rise.					
108		n accordance with OT-101 "HIGH DRYWELL PRESSURE" follow up actions the following parameters and alarms are noted.						
	- PI-2-02-2-	C PUMP SEAL STAGE 2 F 033A "Seal 1 Inner" 1056 p 032A "Seal 2 Outer" 1043 p	osig					
	Evaluate thes statement bel	· •	ached drawing, and select the appropriate					
✓ A	The 1st stage	seal has failed but it is NC	DT the source of high drywell pressure.					
В	The 2nd stag	e seal has failed but it is N	OT the source of high drywell pressure.					
С	The 1st stage	seal has failed and is the	source of high drywell pressure.					
D	The 2nd stag	e seal has failed and is the	source of high drywell pressure.					
Explanatio of Answer	by a failure of stage pressur seal (ARC 21	the recirc pump first stage e, high second stage seal 4 A-1). With the 2nd stage	high second stage seal pressure caused seal. PI-032A is typically half of the first pressure indicates failure of first stage seal intact, this would not be a source of al failure would cause PI-32A to indicate					
Exam Lev Both	Cognitive		Materials T-PLOT-0030-3 Recirculation Pump Seal Piping					
KA Informa	tion		· ·					
Tier E/APE	R	O Grp: 1 SRO Grp: 1	RO Val: 3.5 SRO Val: 3.8 55.43					
System:	295010	High Drywell Pressure						
KA Group N	um: AK3	K3 Knowledge of the reasons for the following responses as they apply to high drywell pressure						
KA Detail Nu	ım: AK3.04	Leak investigation						
Question S	ource Informa	ation						
Ques Source	e: New	Quest Source						
Ques Mod N	let							

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## References

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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

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### Question Data for Test: 1999 SRO

Question: 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 109 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? Shut the suction valve first since it can close against a higher dP. Α Shut the discharge valve first since it can close against a higher dP. В Shut the suction valve first since it is limited to closing against a lower dP. С Shut the discharge valve first since it is limited to closing against a lower dP. D Explanation OT-101 Bases of Answer Materials **Cognitive Level** Exam Level Facility N/A Memory Both PBAPS **KA Information** RO Val: 3.4 SRO Val: 3.6 55.43 Tier E/APE RO Grp: 1 SRO Grp: 1 295010 System: 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 Pa # Rev. L.O. High Drywell Pressure - Bases OT-101 Note 10 **Reference Title** Facility Ref. No. Section Pg # Rev. L.O. **Operational Transient Procedures PLOT-1540** 6

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## Question Data for Test: 1999 SRO

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Question:	Unit 2 is at 1( Which of the	following e	events would	require pow	rer to be reduced or maintained in
	accordance v	vith OT-10	04, "Positive	Reactivity In	sertion"?
✓ A	"A" Reactor F	eedpump	min flow val	ve fails oper	
В	EHC pressur	e set setpo	pint drops 10	psi.	
с	Condensate	oump trip.			
D	Loss of RBC	CW to RW	CU Non-reg	en Heat Exc	hanger.
of Answer	heaters result B. Incorrect, drop, causing C. Incorrect,, runback, a ne D. Incorrect,	ing in a re a reduction additional A conden gative rea a loss of F	duction in fe n in pressure voiding a ne sate pump to ctivity additio RBCCW will r	ed water hea set setpoin gative react ip at 100% p on. esult in a R\	additional flow through feedwater ating, a positive reactivity insertion. t will cause reactor pressure to ivity addition. bower will cause a 45% recirc NCU isolation. RWCU returns result in a higher core inlet
Exam Level Both	Cognitive Applicatio		Facility PBAPS	- Materi N/A	als
KA Informatio		) Grp: 1	SRO Grp:	1 RO Va	II: 4.0 SRO Val: 4.3 55.43
System:	295014	Inadverte	nt Reactivity	Addition	
KA Group Num	AA2		determine an nt reactivity		et the following as they apply to
KA Detail Num:	AA2.03	Cause of	reactivity ad	dition	
Question Sou	rce Informa	tion			
Ques Source:	New			uestion ource	
Ques Mod Met					
· · · · · · · · · · · · ·	-	· · · · · · · · · · · · · · · · · · ·		·····	· · · · · · · · · · · · · · · · · · ·

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## References

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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		1	6	4
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Feedwater System	PLOT-0540			6	4.j

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## Question Data for Test: 1999 SRO

Question:	The following	g condition	ns exist follo	owing the I	receipt c	of an autom	atic scran	n signal:
111				•	, •			0
	- Reactor	ower: <	1.00 E 0%					
			0 psig AND	dropping				
			ches AND st					
			.5 psig AND	•				
÷			pressure: 0	•				
			is at positio					
			ods are fully					
			en injected					
	- boron na	S NOT DE	en injecteu	IO THE RE	v			
	Which one o insertion of (					lirection for	the succ	essful
✓ A	GP-3, "Norm	nal Plant S	Shutdown"					
	T-100, "Scra							,
В	1-100, 5012	1110						
	Ι							
	T-101, "RPV	Control"			····			
C								
			i i is is in the second		a		· ·· ·· ·	
	T-117, "Leve	el/Power C	Control"					
D		•						
1								
	A. Correct,						_	
	B. Incorrect							
	C. Incorrect					ssful inserti	on of Con	trol Rod
	34-27 becau							
	D. Incorrect	:, T-117 w	ould not app	oly since i	t is ente	red for ATV	VS only.	
-	<b>.</b>			Ň	/laterials			
Exam Level	Cognitive	a Level	Facility		N/A			
SRO	Memory		PBAPS	ľ	•••			
	•						· · · · · · · · · · · · · · · · · · ·	
KA Informatio	-							
KA Informatic								
Tier E/APE	F	RO Grp: 1	i SRO G	irp: 1 F	₹O Val:	3.1 SRO \	/al: 4.0	55.43 🗸
l Ourstansi	005045		lata Caram					
System	295015		olete Scram					
KA Group Num	2.4	Emerg	ency Proces	dures/Plar	าร	•		
KA Detail Num	2.4.6	Knowle	edge sympto	om based	EOP mi	tigation stra	ategy	
Question Sou	Irce Inform	nation						
Ques Source:	New			Question	า	[		
Ques Source:	1			Source				-
Ques Mod Met	<b></b>					<u> </u>		
	1	· ··· · .	· • • • • • • • • • • • • • • • • • • •					

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## References

1.1

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
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.	<b>L.O</b> .
Normal Plant Shutdown	GP-3	6.69	41	80	

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## Question Data for Test: 1999 SRO

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Question:	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 of the Remote S	closed, a Shutdow	all reactor inventor in Panel.	y and pressure of	control m	ay take	place at
В	Since plant re closing the M	elease p SIVs pro	oints cannot be m ecludes any conc	ionitored at the F ern for off-site re	Remote S leases.	Shutdowi	n Panel,
с	The MSIV clo that may not	sure ou be acce	tside the Main Co ssible during an e	ntrol Room requivacuation.	res acce	ess to pla	ant areas
D	If the MSIVs a for verification	are close n of com	ed from outside th plete closure.	e Main Control F	Room, th	ere is no	method
Explanation of Answer			· · · · · · · · · · · · · · · · · · ·				
Exam Level Both	Cognitive Memory	Level	Facility PBAPS	Materials N/A			· .
KA Informatio	n						
Tier E/APE	R	) Grp:	2 SRO Grp: 1	RO Val: 3.4	SRO Va	l: 3.6	55.43
System:	295016	Contro	Room Abandon	nent	· · · · ·	-	
KA Group Num	2.4	Emerg	ency Procedures/	Plans			
KA Detail Num	2.4.11	Knowle	edge of abnormal	condition proced	ures		
Question Sou	rce Informa	tion					
Ques Source:	1997 PBAPS	NRC E	xam Ques Sour				
Ques Mod Met	ſ						
References							
Reference Title			Facility Ref. No.	Section	Pg #	Rev.	L.O.
Plant Shutdow	in from the Re	mote S	SE-1	mmeidate Actio	51	16	l .
Reference Title	9		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Special Events						1c	

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## Question Data for Test: 1999 SRO

113 A re U	Iternate Shut eactor level o Ising SE-10 A	tdown Pa on LI-2-2- Attachme	or is controlling re anel following Co 3-112 is currentl ant 9, provided, d ase if an actual hi	ntrol Room A y 20" and rea etermine the	bandonment ictor pressur current reac	: Indicat e is 500 tor level	ed psig.
A	ctual level is	> 40", H	PCI will automat	ically trip on I	nigh level coi	ndition.	
в	ctual level is	> 40", H	PCI must be mai	nually tripped	on high leve	el conditi	on.
	ctual level is ondition.	betweer	n 0" and 40", HPC	CI will automa	atically trip or	n a high l	evel
	ctual level is ondition.	betweer	n 0" and 40", HP(	CI must be m	anually trippo	ed on a h	high level
	E-10 Bases, uto Starts ar		#100 "HPCI Ope sed".	eration is Mar	nual. All Trip	s, Isolati	ons, and
Exam Level Both	Cognitive Comprehe		Facility PBAPS	Materials SE-10 AT	T. 9		
KA Information	-	) Grp: 2	SRO Grp: 1	RO Val:	.0 SRO Val	: 4.1	55.43
System:	295016	Control	Room Abandonr	nent			
KA Group Num:	AA1		o operator and/or room abandonme		following as	they app	ly to
KA Detail Num:	AA1.06	Reactor	r Water Level				
Question Sour	ce Informa	tion					
Ques Source:	New		Que				· · · · · · · · · · · · · · · · · · ·
Ques Mod Met	<u></u>	<u></u>					
References							
Reference Title			Facility Ref. No.	Sectio	n Pg#	Rev.	L.O.
Special Events		·	PLOT-1555			4	2.e
Reference Title			Facility Ref. No.	Sectio	n Pg#	Rev.	L.O.
Reactor Water	Level Determ	nination	SE-10	Att. 9 Fig	g. 1	0	

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Reference Title	Facility Ref. No.	Section			L.O.
Plant Shutdown from the Alternativ	SE-10 Bases	Caution #100	7	10	

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Question	Data	for Test:	1999 SRO
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Unit 2 was operating at full power in MODE 1 when a positive reactivity event Question: occurred due to a control rod drifting out. The CRS has directed you to monitor for 114 evidence of fuel damage. Which of the following indications would be the first indication of a small fuel pin leak from this transient? Main Steam Line Radiation Recorders. Α Air Ejector Discharge Log Monitor Recorders. В Off-Gas Adsorber Outlet Radiation Indication. С Main Stack Gas Recorder. D A. Incorrect, Fission gasses from a small fuel leak would be diluted in the Explanation of Answer 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. Materials **Cognitive Level** Exam Level Facility N./A PBAPS Both Comprehension **KA Information** RO Grp: 2 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.6 55.43 E/APE Tier High Off-Site Release Rate 295017 System: Ability to operator and/or monitor the following as they apply to high KA Group Num: AA1 off-site release rate Process radiation monitoring system KA Detail Num: AA1.07 **Ouestion Source Information** Question Ques Source: New Source Ques Mod Met

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#### References

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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 Hi	g ARC 218 E-1		1	3	

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Question	Data	for Test:	1999	SRO

Question:	Given the foll	owing conditions:						
115	<ul> <li>Drywell an</li> <li>Sprays we</li> </ul>	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.						
	- Sprays did	I NOT automatically isolate at 1 psig.						
	Which of the f	following is the expected impact on the plant for these conditions?						
✓ A	The drywell o	xygen concentration may rise.						
В	Torus water le	evel indication will be unavailable.						
C	The running F	e running Residual Heat Removal Pumps may cavitate.						
D	Failure of the Building a Hig	ailure of the Reactor Building - Torus Vacuum Breakers will make the Reactor uilding a High Radiation Area.						
Explanation of Answer	<ul> <li>B. Not a cond</li> <li>C. RHR Pum</li> </ul>	nswer, Negative pressure results in de-inerting the drywell. cern for these conditions. p NPSH not affected for small negative pressures. o the Torus during the event.						
Even Level	·	Materials						
Exam Level SRO	Comprehe	Level Facility N/A						
KA Informatio	าก	······						
Tier E/APE		D Grp: 1 SRO Grp: 1 RO Val: 4.2 SRO Val: 4.4 55.43 🗸						
I System:		High Drywell Pressure						
KA Group Nurr	1 EA2	Ability to determine and/or interpret the following as they apply to High Drywell Pressure						
KA Detail Num	EA2.01	Drywell Pressure						
Question Sou	urce Informa	Ition						
Ques Source:	1998 PBAPS	S NRC Exam Question Source						
Ques Mod Met								
		· · · · · · · · · · · · · · · · · · ·						
References								
References Reference Titl	e	Facility Ref. No. Section Pg # Rev. L.O.						

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
Transient Response Implementatio	PLOT-1560			7	3

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#### Question Data for Test: 1999 SRO

Following a LOCA on Unit 2 the CRS directs restoration of Drywell Cooling, using Question: T-223, "Drywell Cooler Fan Bypass" for Drywell pressure control. The Unit 116 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? Water hammer and rupture of piping inboard of DWCW Isolation valves when flow Α is restored. Inadvertent lifting of overpressure relief valves inboard of the DWCW Isolation В valves when flow is restored. Overcurrent trips of the Drywell Cooler Fans if restarted with a LOCA condition. С Overpressurization and rupture of piping inboard of the closed DWCW Isolation D valves with a LOCA condition. A. Correct, Drywell temperatures above saturation may cause boiling within the Explanation of Answer 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. Materials **Cognitive Level** Facility Exam Level N/A PBAPS Both Memory

#### **KA Information**

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 Infor	
Question Source Infor Ques Source: New	Question Source

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### References

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**(**<sup>1</sup> :

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
•	NRC GL 96-06		1		
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560	1. A. A.		8	9
Reference Title	• Facility Ref. No.	Section	Pg #	Rev.	L.O.
	MOD P00802		1		
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Drywell Cooler Fan Bypass	T-223	2	1	3	

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Question	Data for	· Test:	1999 \$	SRO

Unit 2 was operating at 100% power when a total loss of Instrument Air occurred Question: resulting in a plant scram. T-101, "RPV Control" was entered on high reactor 117 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? Manual operation of SRVs between 950 psig and 1050 psig. Α Automatic operation of the EHC system at 920 psig. B Manual operation of ADS SRVs to stabilize pressure below 1050 psig. С Automatic operation of SRVs at their setpoint. D A. Incorrect, opening and closing of SRV following a GPI is NOT cycling per T-Explanation of Answer 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. Materials Cognitive Level Facility Exam Level N/A PBAPS Both Comprehension KA Information SRO Grp: 1 RO Val: 4.4 SRO Val: 4.4 55.43 RO Grp: 1 E/APE Tier High Reactor Pressure 295025 System: ---Ability to operate and/or monitor the following as they apply to high KA Group Num: EA1 reactor pressure KA Detail Num: EA1.03 Safety/Relief Valves **Question Source Information** Question New Ques Source: Source Ques Mod Met

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### References

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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		1	8	9

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## Question Data for Test: 1999 SRO

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	Question:	Unit 3 has ex	perience	d a reactor scram	following a stear	m leak in the D	rywell. The
	118	CRS directs	restoratio	n of Drywell Instru	ument Nitrogen fi	rom T-101, RP	V Control,
	•			or pressure contr			
		Drywell in ac	cordance	with GP-8E, "Prin	nary Containmer	nt Isolation By	bass":
		May contribu	te to a fla	mmable environn	nent in the Drywe	ell.	
	× A	- 		•••			
		Will only sup	nly nitroa	en to the "B" Instr	ument Nitrogen I	Header	· · · · · · · · · · · · · · · · · · ·
	В		biy maog		ument tha ogen i		
						• · · · • •	· · · · · · · · · · · · · · · · · · ·
	C	way uepiete		ogen tank invento	iy.		
		Will only be permitted if Instrument Air Header pressure is greater than Drywell					
	D	vvill only be p pressure.	ermitted	if Instrument Air F	leader pressure	is greater than	Drywell
	!			· · · · ·			
	Explanation of Answer			essors isolated by			
		operation.	trogen an	d may release ai	r into the drywell	auring pneum	atic valve
		•	IG only s	upplies B header,	restoring supplie	es both.	
				plete the CAD ta			t.
				as long as instrun	nent nitrogen pre	ssure is greate	er than
		drywell press	ure.				
, E	xam Level	Cognitive	Level	Coolity	Materials		
	oth	Memory	LEVEI	Facility PBAPS	N/A		
P		Internory			<u> </u>		
KA 1.	nformatio						Ċ
			<b>F</b>	<u> </u>			
Tier	E/APE	R	0 Grp: 1	SRO Grp: 1	RO Val: 3.3	SRO Val: 4.0	55.43
Syst	em:	295025	High Re	eactor Pressure	· · · · · · · · · · · · · · · · · · ·		
KA (	Group Num	1:2.4	Emerge	ency Procedures/	Plans		
KAE	Detail Num	2.4.20	Knowle	dge of operationa	l implications of	EOP	
				s/cautions/and n			
			-				
Ques	stion Sou	Irce Information	ation				·
Que	s Source:	New		Ques			
Que	s Mod Met	Г					
			<b>.</b>				
Ref	erences	······································					
<b>D</b> -4		-		Enalling Def Ma	Castien		
-	erence Titl			Facility Ref. No.	Section	Pg # Rev	. L.O.
IKP	V Control -	Dases		T-101	Caution #7	20 21	I

Reference Title	Facility Ref. No.	Section	Pg#	Rev.	L.O.
PBAPS TRIPS	PLOT-1560		· ·	8	11

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## Question Data for Test: 1999 SRO

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Question:	Unit 3 has exp	perienced a transient and the following is observed:
119	- Torus tem - Torus leve - Reactor pr - RHR "A" L - Core Spray	ressure: 1000 psig .oop Flow: 23,000 gpm y "B" Loop Flow: 7500 gpm
	Use the attack	w pressure ECCS pump are NOT in service. hed T-102 Sheet 3 curves to determine if Net Positive Suction Head rements are being met.
A	There is suffic	cient NPSH for the "A" Loop of the RHR ONLY.
✔ В	There is suffic	cient NPSH for the "B" Loop of Core Spray ONLY.
С	There is suffic Spray.	cient NPSH for both the "A" Loop of RHR and the "B" Loop of Core
D	There is NOT Core Spray.	sufficient NPSH for either the "A" Loop of RHR or the "B" Loop of
Explanation of Answer	Using the T-1 region.	02 curves, only the B loop of Core Spray is operating in the safe
Exam Leve Both	Cognitive Applicatio	11-102 50. 3
KA Informat		O Grp: 2 SRO Grp: 1 RO Val: 3.0 SRO Val: 3.4 55.43
System:	295026	Suppression Pool High Water Temperature
KA Group Nu	m:EK1	Knowledge of the operational implications of the following concepts as they apply to Suppression Pool High Water Temperature
KA Detail Nur	n: EK1.01	Pump NPSH
Question Sc	ource Information	ation
Ques Source	New	Question Source
Ques Mod Me	et	
	•	

### References

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Reference Title	Facility Ref. No.	Section	Pa #	Rev.	LO
PBAPS TRIPS	PLOT-1560	· .	1	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:	A full power ATWS occurred on Unit 2 which caused excessive heat input to the
120	Torus and a Torus leak. The following conditions currently exist:
1 120	
	- 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
	- Torus level 14 m. 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.
	Perform an Emergency Blowdown using T-112.
A	
	Perform an Emergency Blowdown using Bypass valves.
В	
С	Depressurize to 900 psig.
Y D	Depressurize to 750 psig.
D 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
Explanation	Direction is to maintain pressure below the curve or move towards a blowdown.
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. Materials
Explanation of Answer Exam Leve	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. Cognitive Level Facility Materials Portion of T-102 containing steps T/T-8,
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. Materials
Explanation of Answer Exam Level SRO	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.Cognitive LevelFacilityMaterials Portion of T-102 containing steps T/T-8, 9, 10 and Curve T/T-1
Explanation of Answer Exam Leve SRO A Information	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.         Cognitive Level       Facility         Application       PBAPS         Materials         9, 10 and Curve T/T-1
Explanation of Answer Exam Leve SRO A Information	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.         Cognitive Level       Facility         Application       Facility         PBAPS       Portion of T-102 containing steps T/T-8, 9, 10 and Curve T/T-1         On       RO Grp:       2         RO Grp:       2       SRO Grp:       1         RO Grp:       2       SRO Grp:       1       RO Val:       3.1       55.43       ✓
Explanation of Answer Exam Leve SRO A Information fier E/APE	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.         Cognitive Level       Facility         Application       PBAPS         Materials         9, 10 and Curve T/T-1
Explanation of Answer Exam Leve SRO A Information	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.         Cognitive Level       Facility         Application       Facility         PBAPS       Portion of T-102 containing steps T/T-8, 9, 10 and Curve T/T-1         On       RO Grp:       2         SRO Grp:       1       RO Val:       2.8         Suppression Pool High Water Temperature       Suppression Pool High Water Temperature
Explanation of Answer Exam Leve SRO A Information Fier E/APE System: A Group Nur	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.         Cognitive Level       Facility         Application       Facility         PBAPS       Portion of T-102 containing steps T/T-8, 9, 10 and Curve T/T-1         on       RO Grp:         295026       Suppression Pool High Water Temperature         n:       2.1
Explanation of Answer Exam Leve SRO A Information Fier E/APE System: (A Group Nur	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.         Cognitive Level       Facility         Application       Facility         PBAPS       Portion of T-102 containing steps T/T-8, 9, 10 and Curve T/T-1         On       RO Grp:       2         SRO Grp:       1       RO Val:       2.8         SRO Val:       3.1       55.43         295026       Suppression Pool High Water Temperature         n:       2.1       Conduct of Operations         n:       2.1.25       Ability to obtain and interpret station reference materials such as
Explanation of Answer Exam Leve SRO A Information Fier E/APE System: (A Group Nur	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.         Cognitive Level       Facility         Application       Facility         PBAPS       Portion of T-102 containing steps T/T-8, 9, 10 and Curve T/T-1         on       RO Grp:         295026       Suppression Pool High Water Temperature         n:       2.1
Explanation of Answer Exam Leve SRO A Information Fier E/APE System: (A Group Nur (A Detail Nur	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.         Cognitive Level       Facility         Application       PBAPS         Portion of T-102 containing steps T/T-8, 9, 10 and Curve T/T-1         On
Explanation of Answer Exam Level SRO A Information SRO A Information Fier E/APE System: (A Group Nur (A Detail Nur (A Detail Nur (A Detail Nur (A Detail Nur)	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.         Cognitive Level       Facility         PBAPS       Portion of T-102 containing steps T/T-8, 9, 10 and Curve T/T-1         On       RO Grp:         2       SRO Grp:         2       SRO Grp:         1       RO Val:         2.8       SRO Val:         3.1       55.43         295026       Suppression Pool High Water Temperature         n:       2.1.25         Ability to obtain and interpret station reference materials such as graphs, monograph, and tables which contain performance data         urce Information       Question
Explanation of Answer Exam Leve SRO A Information Fier E/APE System: (A Group Nur (A Detail Nur	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.         Cognitive Level       Facility         Application       PBAPS         Portion of T-102 containing steps T/T-8, 9, 10 and Curve T/T-1         On       RO Grp:         2 SRO Grp:       T RO Val:         2.1       Conduct of Operations         n:       2.1.25         Ability to obtain and interpret station reference materials such as graphs, monograph, and tables which contain performance data         urce Information       Question

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## References

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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	Pa #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560		·····	8	9

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# Question Data for Test: 1999 SRO

Question:	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'.						Torus at RCIC
	What is the t	What is the basis for securing HPCI but not RCIC at 9.5'?					
Ą	HPCI turbine uncovered a	e exhaus t 6'.	t becomes uncove	ered at 9.5', RCI	C turbine	e exhaust	becomes
✓ В	HPCI turbine	exhaus containn	t becomes uncove nent input.	ered at 9.5', RCI	C turbine	exhaust	is an
с	HPCI NPSH uncovered at	become t 6'.	s a concern at 9.5	o', RCIC turbine	exhaust	becomes	
D	HPCI NPSH containment	become input.	s a concern at 9.5	', RCIC turbine	exhaust i	s a insign	ificant
Explanation of Answer	Self explanat RCIC is secu		' if it is aligned to t	he Torus to prev	ent vorte	exing.	
Exam Level Both	Cognitive Memory	Level	Facility PBAPS	Materials N/A			·
KA Informatio	on						
Tier E/APE	R	O Grp:	2 SRO Grp: 1	RO Val: 3.6	SRO Va	al: 3.7 £	55.43
System:	295030		uppression Pool V				
KA Group Num	EK3	Knowle to low	edge of the reason suppression pool	ns for the followi water level	ng respo	nses as th	ney apply
KA Detail Num	EK3.03	RCIC	Operations				<u></u>
Question Sou	rce Informa	ation					
Ques Source:	New		Ques				
Ques Mod Met				•			
References			<u>.</u>				
Reference Title	e		Facility Ref. No.	Section	Pg#	Rev.	L.O.
Primary Conta	inment Contro	<b>b</b> l	T-102	/L-11 to T/L-16		14	
Reference Title			Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	5		PLOT-1560			8	9

## Question Data for Test: 1999 SRO

Question:

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".
✓ В	ACC exists until level is below -210".
с	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".
	Matoriala

Exam Level	Cognitive Level	Facility	N/A
Both	Memory	PBAPS	
1	-	<ul> <li>A set of the set of</li></ul>	

#### **KA Information**

Tier E/APE	R	O 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			• Company of the second sec
	•		

### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Introduction to TRIPS and SAMPS	S T-BAS (INTRO)	5.1	17	4	
· · · · · · · · · · · · · · · · · · ·					
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.

Question Data for Test: 1999 SRO

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the following         KA Detail Num:       EK2.01       Reactor Water Level Indication         Question Source Information       Question         Ques Source:       New       Question         Ques Mod Met       Source	Question:	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.				
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       Would NOT be impacted.         D       Would NOT 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.		172", what y	would be the impact on vessel level indications and ECCS initiation			
B       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", (indicatio would go high), ECCS -160" inputs continue to be taken from LT-72.	✓ A					
C       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.	В		ue pen input would swap at -100", low level ECCS initiations would be			
D       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.	с					
of Answer 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 ar the following         KA Detail Num:       EK2.01       Reactor Water Level Indication         Question       Source       New       Question         Ques Mod Met	D					
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       Kowledge of interrelations between reactor low water low level and the following         KA Detail Num:       EK2.01       Reactor Water Level Indication         Question Source Information       Question       Source         Ques Mod Met	of Answer Exam Level	would go hi Cognitiv	gh), ECCS -160" inputs continue to be taken from LT-72. <u>Materials</u> <u>N/A</u>			
System:       295031       Reactor Low Water Level         KA Group Num:       EK2       Knowledge of interrelations between reactor low water low level ar the following         KA Detail Num:       EK2.01       Reactor Water Level Indication         Question Source Information Ques Source:       Question Source         Ques Mod Met			RO Grp: 1 SRO Grp: 1 RO Val: 4.4 SRO Val: 4.4 55.43			
Ithe following         KA Detail Num:       EK2.01       Reactor Water Level Indication         Question Source Information       Question         Ques Source:       New       Question         Ques Mod Met       Source	I System:	<u></u>				
Question Source Information         Ques Source:       New         Ques Mod Met	KA Group Nun	m: EK2 Knowledge of interrelations between reactor low water low level and				
Ques Source:     New     Question       Ques Mod Met     Source	KA Detail Num	EK2.01	Reactor Water Level Indication			
Ques Mod Met	Question So	urce Inforn	nation			
	Ques Source:	New				
References	Ques Mod Met		<u></u>			
	References					
Reference Title Facility Ref. No. Section Pg # Rev. L.C	Reference Tit	le	Facility Ref. No. Section Pg # Rev. L.O.			

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# Question Data for Test: 1999 SRO

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Question: 124	- Reactor ( - Reactor I - Torus ter - SRV's A, T-117 level p T-240.	ATWS and Group I Isolation on Unit 2, the following conditions exist: power: 30% evel: -100" nperature: 115 degrees F. B, C, G open power control directs RPV injection be terminated and prevented using
-	performing I	
A	Uncontrolled	injection of large amounts of cold water.
✓ В	Power gener	ation which is a threat to primary containment.
с	Neutron flux	oscillations which challenge fuel clad integrity.
D	Power excurs	sions while establishing minimum alternative RPV flooding pressure.
Explanation of Answer	B. Correct, L C. Incorrect,	basis for performing T-240 prior to blowdown, T-117 LQ-21 Q-11 Basis for lowering level to -60", T-117 LQ-13 Basis for performing T-240 prior to establishing MARFP, T-116 RF-25
Exam Leve Both	_	Level Facility Materials
KA Informati		
Tier E/APE	R	O 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 Nun	n: EK2	Knowledge of the interrelationship between scram condition present and reactor power above APRM downscale or unknown and the following
KA Detail Num	ЕК2.09	Reactor Water Level
Question Sou	irce Informa	tion
Ques Source:	New	Question Source

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Ques Mod Met	•	······································			
References	•				
Reference Title	Facility Ref. No.	Section	Pg#	Rev.	L.O.
PBAPS TRIPS	PLOT-1560		<b>I</b> .	8	9
Reference Title	Facility Ref. No.	Section	Pg#	Rev.	L.O.
Level/Power Control	T-117		1 1	12	

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### Question Data for Test: 1999 SRO

Question:

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"
В	T-214, "Isolating and Venting the Scram Air Header"
<b>√</b> 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	<ul> <li>A. Incorrect, T-213 N/A due to scram valves open, evidenced by blue lights lit.</li> <li>B. Incorrect, T-214 N/A ARI initiated at 1106 psig and blue lights lit.</li> <li>C. Correct</li> <li>D. Incorrect, No instrument air available for closing scram inlet and outlet and</li> </ul>

open SDV for accumulator charge and discharge volume draining.

Exam Level	Cognitive Level	Facility	N/A	
Both	Application	PBAPS		

#### 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				

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<b>Question Source Informa</b>	ation				
Ques Source: New	Questio Source	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.
		· · · ·	<b>1</b> .		
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
1	Ī				
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .

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### Question Data for Test: 1999 SRO

Question: 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.
В	Restart ventilation to lower the radioactive release.
С	Maintain ventilation tripped to prevent an unmonitored release.
D	Maintain ventilation tripped to lower the radioactive release.

Explanation 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	N/A
Both	Memory	PBAPS	
•			

#### **KA** Information

Tier	E/APE		RO Grp: 2 SRO Grp: 1 RO Val: 3.6 SRO Val: 3.8 55.43	
Syste	em:	295038	High Off-Site Release Rate	
KAG	Group Num	EK2	Knowledge of the interrelationship between off-site release rates and the following:	
KAF	etail 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		Step RR-6	3	10	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

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# Question Data for Test: 1999 SRO

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Question:			ng conditions v hether Adequa					Drywell
- <b>A</b>	To prevent ex	xceeding	the Pressure S	Suppr	ession Press	ure Limi	<b>t</b> .	
- B	To maintain [	Drywell pro	essure below th	ne Dr	well Spray I	nitiation	Limit.	
✓ C	To mitigate th	ne conseq	uence of a H2	defla	gration.	<u></u>		
D	To mitigate th	ne conseq	uences of cont	ainm	ent overpress	surization	٦.	
Explanation of Answer	B. Incorrect - ACC. C. Correct - 1	- Sprays a See T-102 - If ACC is	re not used to re utilized prior 2 DW/G-3.9 Ba assured spray	to ex ses.	ceeding this	limit but	not rega	
Exam Level	Cognitive	•	Eccility	<u>.</u>	laterials			
Both	Memory		Facility PBAPS	٩	I/A			
A Informatic Tier E/APE System:		O Grp: 1 High Co	SRO Grp:		O Val: 3.3 Concentratio		1: 3.9	55.43
KA Group Num	EK1	Knowled	ge of the operation of	ationa	I implications	s of the f	-	•
KA Detail Num:	EK1.01	Containr	ment Integrity	- 1 <sup>-</sup>			•••••••	
uestion Sou	rce Informa	ation						
Ques Source:	New		Que Sou	estior arce				
Ques Mod Met			· · ·		3			
References						••••••••••••••••••••••••••••••••••••••		
Reference Title	e	F	Facility Ref. No	).	Section	Pg #	Rev.	L.O.
Primary Conta	inment Contro		T-102 - Bases		DW/G-3.9	3.6	14	

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Reference Title	Facility Ref. No.	Section	Pg#	Rev.	L.O.
PBAPS TRIPS	PLOT-1560	•		8	9

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#### **BWR RO Examination Outline**

Printed: 06/24/1999

Form ES-401-2

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#### Facility: Peach Bottom Atomic Power Station

Exam Date: 09/13/1999

Exam Level: RO

			· · ·		ŀ	K/A Ca	ategory	Points	;				
Tier	Group	K1	K2	К3	<u>K4</u>	K5	K6	Al	A2	A3	A4	G	Point Total
1.	l	2	3	2				3	-1			2	13
Emergency &	2	3	4	3				4	3			2	19
Abnormal Plant Evolutions	3	1	0	0				0	1			2	4
	Totals Tier	6	7	5				7	- 5			6	36
×.	1	3	2	1	4	3	3	1	3	.3	4	1	28
2. Plant	2	1	2	2	2	2	2	2	2	2	1	1	19
Systems	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. Generi	3. Generic Knowledge And Abilities					t 1	Cat	t 2	Ca	t 3	С	at 4	
					4	ļ		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.

### BWR R( amination Outline

#### Facility: Per. Bottom Atomic Power Stat

ES - 401	Emerg	gency	and	Abn	orm	al Pla	nt l	Evolutions - Tier 1 / Group 1	Form	ES-401-2
E/APE #	E/APE Name / Safety Function	К1	К2	К3	A1	A2	G	КА Торіс	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
29501 <b>0</b>	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

1

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## BWR R( amination Outline

Printed: 06/1 '9

ES - 401	Em	ergency	and	Abn	orn	al Pl	ant	Evolutions - Tier 1 / Group 2	Form	ES-401-
E/APE #	E/APE Name / Safety Function	KI	К2	кз	AI	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

Facility: Per .. Bottom Atomic Power Stat

BWR R amination Outline

Facility: I'cu... Bottom Atomic Power Stat

ES - 401	Emer	gency	y and	Abr	10rm	al Pla	ant	Evolutions - Tier 1 / Group 2	Form	ES-401-2
E/APE #	E/APE Name / Safety Function	кі	К2	кз	<u>A1</u>	A2	G	КА Торіс	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 2 3 3 4 - 4

**Group Point Total:** 19

Printed: 06/. 19

## BWR R( amination Outline

Printed: 06/. 79

ES - 401	Eme	gency	/ and	l Abr	orm	al Pla	ant	Evolutions - Tier 1 / Group 3	Form	ES-401-2
E/APE #	E/APE Name / Safety Function	кі	К2	кз	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				l		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

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Facility: Pe. .. Bottom Atomic Power Stat

K/A Category Totals: 1 0

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Group Point Total: 4

# BWR RO

Printed: 06 999

## Facility: Peach Bottom Atomic Power Stat

ES - 401	· · · · · · · · · · · · · · · · · · ·	1			_		1	Plant	Syst	ems -	Tier	r 2 /	Group 1	Form	ES-401-2
Sys/Ev #	System / Evolution Name	К1	к2	кз	К4	К5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
201001	Control Rod Drive Hydraulic System /		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					A 1.03 - 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

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BWR RO \_\_\_\_\_ rination Outline

Printed: 0. 999

Facility: Peach Bottom Atomic Power Stat

ES - 401				•	·		ľ	lant	Syste	ems -	Tier	• 2 /	Group 1	Form	ES-401-2
Sys/Ev #	System / Evolution Name	кі	К2	кз	K4	К5	K6	A1	A2	A3	A4	G	КА Торіс	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*	<b>1</b>
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						<b>X</b> -						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

BWR RO nination Outline

Printed: 0. '999

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#### Facility: Peach Bottom Atomic Power Stat

ES - 401		<b></b>			<b>.</b>		F	lant	Syst	ems -	Tier	• 2 /	Group 1	Form	ES-401-2
Sys/Ev #	System / Evolution Name	кі	К2	кз	K4	К5	K6	<u>A1</u>	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

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#### Facility: Peach Bottom Atomic Power Stat

ES - 401			<b>.</b>				F	lant	Syst	ems -	Tier	2/	Group 2	Form	ES-401-2
Sys/Ev #	System / Evolution Name	K1.	К2	кз	К4	К5	К6	A1	A2	A3	<u>A4</u>	G	КА Торіс	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

## BWR RO

#### Facility: Peach Bottom Atomic Power Stat

ES - 401					·····		l	Plant	Syst	ems -	Tier	-2/	Group 2	Form	ES-401-2
Sys/Ev #	System / Evolution Name	<u>K1</u>	К2	кз	К4	К5	K6	<u>A1</u>	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

## BWR RO nination Outline

#### Facility: Peach Bottom Atomic Power Stat

ES - 401			Plant Systems - Tier 2 / Group 3					Form ES-401-2							
Sys/Ev #	System / Evolution Name	кі	К2	<u>кз</u>	К4	К5	K6	A1	A2	<u>A3</u>	<u>A4</u>	G	КА Торіс	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 - Abilities Outline (Tier 3)

## **BWR RO Examination Outline**

Printed: 06/24/195

Facility: Peach Bottom Atomic Power Stat

Form ES-401-5

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.30	Ability to locate and operate components, including local controls.	3.9	11
	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	fuel handling area / communication with fuel storage facility / systems operated from the	3.5	1
	2.2.13	control room in support of fueling operations / and supporting instrumentation.	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

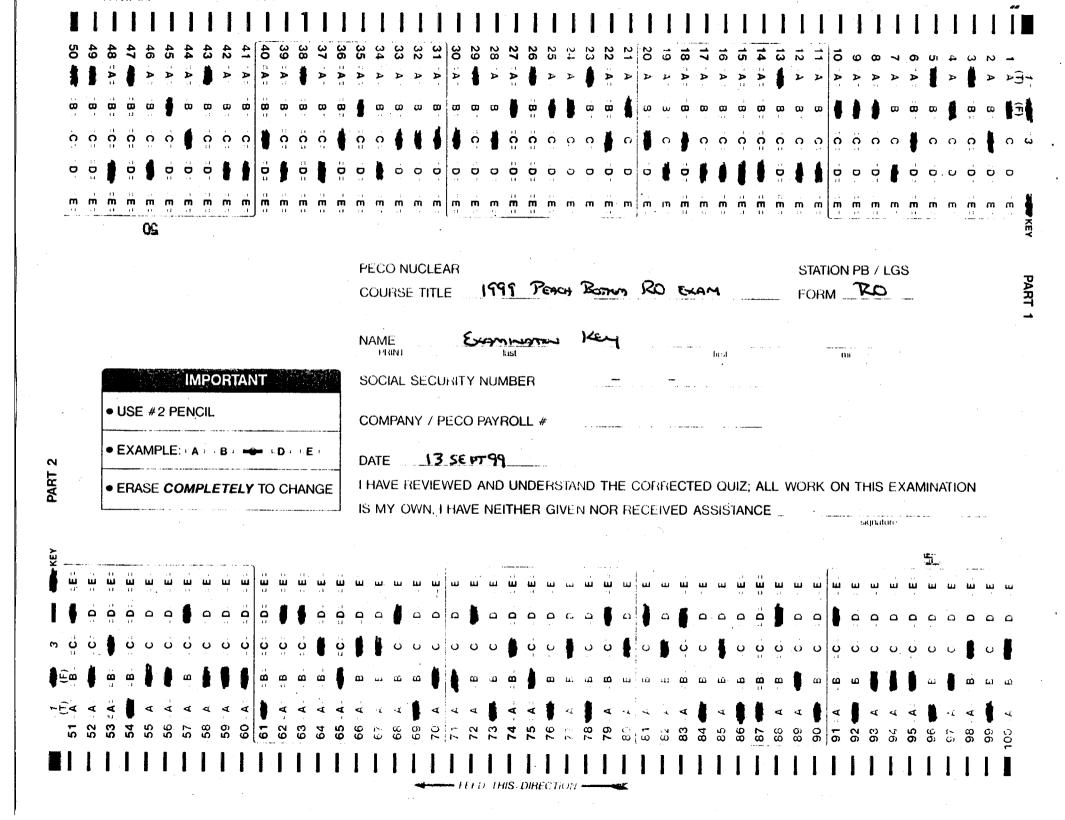
Category Total: 3

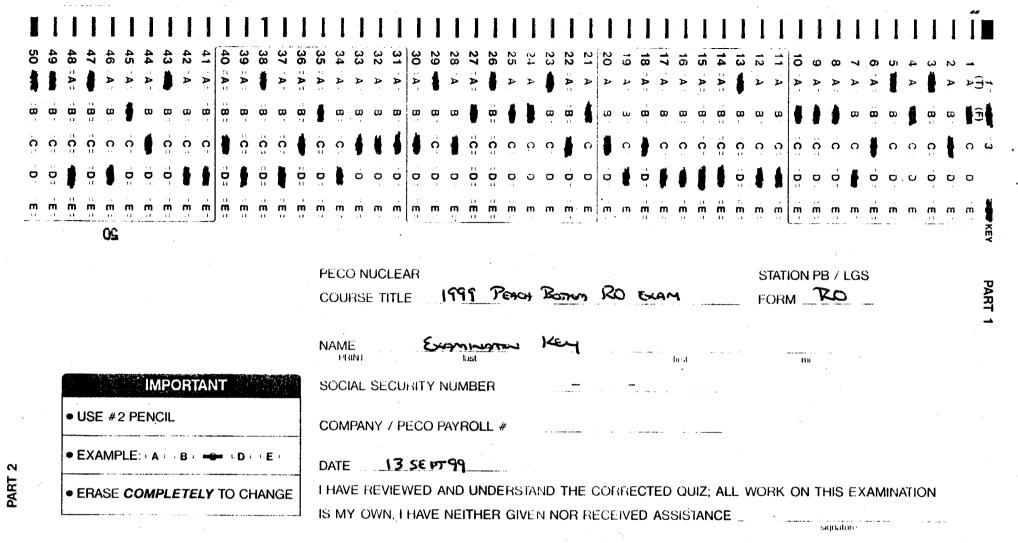
Emergency Plan	2.4.25	Knowledge of fire protection procedures.	2.9	i
	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	3.3	1
	2.4.39	Knowledge of the RO's responsibilities in emergency plan implementation.	3.3	1

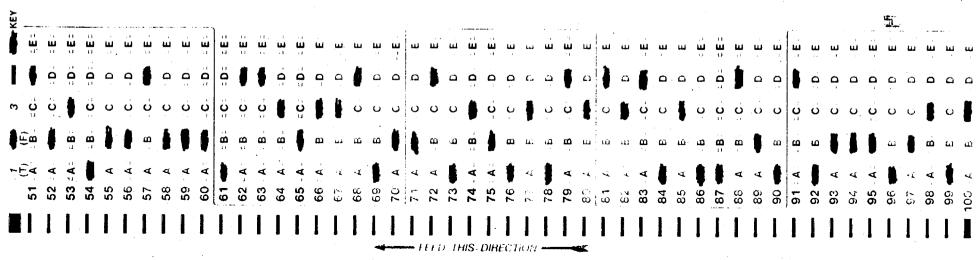
Category Total: 3

Generic Total: 13

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### **NRC Report**

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## Question Data for Test: 1999 RO

Question:

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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.
✓ в	Return to work at 1745, but can only work 9 hours.
С	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	<ul> <li>A. Should not return to work until after 8 hour rest period.</li> <li>B. Correct answer, 8 hour rest then 9 hours maximum 24/48.</li> <li>C. Could return to work at 1845 but 12 hours exceeds 24/48.</li> <li>D. Don't need to wait 12 hour to return to work, still limited by 24/48.</li> </ul>

Exam Level	Cognitive Level	Facility	Materials
Both	Application	PBAPS	None

#### KA Information

Tier PWGs	RC	O 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:		Knowledge of operator responsibilities during all modes of plant operations.

### **Question Source Information**

Ques Source:	New	Question Source	
Ques Mod Met			

## References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Unit 2 Tech Specs	1	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			
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Administrative Practices Lesson Pl	PLOT-1570		I	12	1.j

Question Data for Test: 1999 RO

<ul> <li>With Unit 2 operating at 50% power, a packing leak is discovered on an accessible motor operated valve in a safety-related system.</li> <li>The leak is not severe and it has been decided to backseat the valve during next shift.</li> <li>All plant systems are operating as designed.</li> <li>In accordance with OM-C-7.5, "Valves", which of the following describes how th valve should be backseated?</li> <li>A The appropriate System Manager should manually backseat the valve using The Operator in the Main Control Room should electrically backseat the valve.</li> <li>C Maintenance personnel should manually backseat the valve.</li> <li>D An Equipment operator at the motor control center should electrically backseat the valve.</li> <li>Explanation of Answer</li> <li>Exam Level Cognitive Level Facility Materials</li> <li>KA Information</li> <li>Tier PWGs RO Grp: T SRO Grp: T RO Val: 3.9 SRO Val: 3.4 55.43</li> <li>System: Generic</li> <li>KA Group Num 2.1 Conduct of Operations</li> <li>KA Detail Num: 2.1.30 Ability to locate and operate components, including local control</li> </ul>		
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 next shift.     All plant systems are operating as designed.     In accordance with OM-C-7.5, "Valves", which of the following describes how th valve should be backseated?     A     The appropriate System Manager should manually backseat the valve using TI B     The Operator in the Main Control Room should electrically backseat the valve.     Maintenance personnel should manually backseat the valve.     D     Maintenance personnel should manually backseat the valve.     Explanation of Answer     Exam Level Cognitive Level Facility     RO     C     C     Maintenance     Facility     Materials     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; 2.1.30     Ability to locate and operate components, including local contro     Question Source Information		Question: Given the following conditions:
accessible motor operated valve in a safety-related system.         - The leak is not severe and it has been decided to backseat the valve during next shift.         - All plant systems are operating as designed.         In accordance with OM-C-7.5, "Valves", which of the following describes how th valve should be backseated?         A         The appropriate System Manager should manually backseat the valve using TI         B         The Operator in the Main Control Room should electrically backseat the valve.         V       C         Maintenance personnel should manually backseat the valve.         D       An Equipment operator at the motor control center should electrically backseat valve.         Explanation of Answer       Facility         Exam Level       Cognitive Level       Facility         RO       Comprehension       PBAPS         KA Information       Tier       PWGs       RO Grp: 1         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 controp         Question Source Information       Ability to locate and operate components, including local controp       Ability to locate and operate components, including loc		
The leak is not severe and it has been decided to backseat the valve during next shift.     All plant systems are operating as designed. In accordance with OM-C-7.5, "Valves", which of the following describes how the valve should be backseated?      A     The appropriate System Manager should manually backseat the valve using Ti     B     The Operator in the Main Control Room should electrically backseat the valve.     A     Maintenance personnel should manually backseat the valve.     D     An Equipment operator at the motor control center should electrically backseat     valve.      Explanation of Answer     Exam Level Cognitive Level Facility     Materials     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; 2.1.30     Ability to locate and operate components, including local contro      Question Source Information		
- All plant systems are operating as designed.         In accordance with OM-C-7.5, "Valves", which of the following describes how the valve should be backseated?         A       The appropriate System Manager should manually backseat the valve using TI         B       The Operator in the Main Control Room should electrically backseat the valve.         B       The Operator in the Main Control Room should electrically backseat the valve.         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 valve.         Explanation of Answer       Exam Level         Cognitive Level       Facility         Materials       Materials         KA Information       The Operation of Operations         Tier       FWGs       RO Grp: 1         System:       Generic       KA Group Num: 2.1.         KA Detail Num:       2.1.30       Ability to locate and operate components, including local controc         Question Source Information       Extended operate components, including local controc	g the	- The leak is not severe and it has been decided to backseat the valve during
In accordance with OM-C-7.5, "Valves", which of the following describes how the valve should be backseated?         A       The appropriate System Manager should manually backseat the valve using The Operator in the Main Control Room should electrically backseat the valve.         B       The Operator in the Main Control Room should electrically backseat the valve.         V       C         Maintenance personnel should manually backseat the valve.         D       An Equipment operator at the motor control center should electrically backseat valve.         Explanation of Answer       Facility         Exam Level       Cognitive Level       Facility         RO       Comprehension       PBAPS         KA Information       Tier       PWGs       RO Grp: 1         Tier       PWGs       RO Grp: 1       SRO Grp: 1       RO Val: 3.9         KA Information       Eaclity       Materials         KA Group Num:       2.1       Conduct of Operations         KA Detail Num:       2.1.30       Ability to locate and operate components, including local control         Question Source Information       Eaclity       Eaclity       Eaclity		
valve should be backseated?         A       The appropriate System Manager should manually backseat the valve using TI         B       The Operator in the Main Control Room should electrically backseat the valve.         V       C         Maintenance personnel should manually backseat the valve.         D       An Equipment operator at the motor control center should electrically backseat valve.         Explanation of Answer       Exam Level         Comprehension       Facility         Materials       KA Information         Tier       PWGs         RO       Grp:         If       SRO Grp:         System:       Generic         KA Group Num:       2.1.         Conduct of Operations         KA Detail Num:       2.1.30         Ability to locate and operate components, including local contro         Question Source Information		- All plant systems are operating as designed.
A       B       The Operator in the Main Control Room should electrically backseat the valve.         B       Maintenance personnel should manually backseat the valve.         D       An Equipment operator at the motor control center should electrically backseat valve.         Explanation of Answer       Exam Level         Cognitive Level       Facility         Materials       Materials         KA Information       The Orgination of PBAPS         There is a comprehension       PBAPS         KA Information       The Orgination of Comprehension         The PWGs       RO Grp: 1       SRO Grp: 1         RO       Conduct of Operations         KA Group Num:       2.1.       Conduct of Operations         KA Detail Num:       2.1.30       Ability to locate and operate components, including local contro         Question Source Information	his	In accordance with OM-C-7.5, "Valves", which of the following describes how valve should be backseated?
B       Image: Constraint of the second	MT.	A The appropriate System Manager should manually backseat the valve using
An Equipment operator at the motor control center should electrically backseat valve. Explanation of Answer Exam Level Cognitive Level Facility Materials Comprehension PBAPS Comprehension PBAPS	•	B The Operator in the Main Control Room should electrically backseat the valve
D       valve.         Explanation of Answer       Facility         Exam Level       Cognitive Level       Facility         RO       Comprehension       PBAPS         KA Information       Tier       PWGs         Tier       PWGs       RO Grp:       1         System:       Generic       KA Group Num:       2.1.         KA Detail Num:       2.1.30       Ability to locate and operate components, including local contro         Question Source Information       Conduct of Operation		<ul> <li>C</li> <li>Maintenance personnel should manually backseat the valve.</li> </ul>
of Answer       Materials         Exam Level       Cognitive Level       Facility       Materials         RO       Comprehension       PBAPS       Materials         KA Information       Facility       PBAPS       Secondary         Tier       PWGs       RO Grp:       SRO Grp:       RO Val:       3.9       SRO Val:       3.4       55.43         System:       Generic       Generic       Secondary	it the	
Exam Level       Cognitive Level       Facility         RO       Comprehension       PBAPS         KA Information       Facility       PBAPS         Tier       PWGs       RO Grp: 1       SRO Grp: 1       RO Val: 3.9       SRO Val: 3.4       55.43         System:       Generic       Generic       Facility       Facility       Facility         KA Group Num:       2.1.       Conduct of Operations       Facility       Facility       Facility         KA Detail Num:       2.1.30       Ability to locate and operate components, including local contro       Facility       Facility         Question Source Information       Facility       Facility       Facility       Facility		
Exam Level       Cognitive Level       Facility         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       Generic       KA Group Num: 2.1.       Conduct of Operations         KA Detail Num:       2.1.30       Ability to locate and operate components, including local contro         Question Source Information       Supervision		Materials
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 contro         Question Source Information		Exam Level Cognitive Level Facility
Tier       PWGs       RO Grp:       1       SRO Grp:       1       RO Val:       3.9       SRO Val:       3.4       55.43         System:       Generic		RO Comprehension PBAPS
Tier       PWGs       RO Grp:       1       SRO Grp:       1       RO Val:       3.9       SRO Val:       3.4       55.43         System:       Generic		Information
System:       Generic         KA Group Num:       2.1.         Conduct of Operations         KA Detail Num:       2.1.30         Ability to locate and operate components, including local contro         Question Source Information	3	er PWGs RO Grp: 1 SRO Grp: 1 RO Val: 3.9 SRO Val: 3.4 55.4
KA Group Num:       2.1.       Conduct of Operations         KA Detail Num:       2.1.30       Ability to locate and operate components, including local contro         Question Source Information       Ability to locate and operate components, including local contro	<u></u>	
KA Detail Num: 2.1.30 Ability to locate and operate components, including local contro Question Source Information		
Question Source Information		A Group Num 2.1. Conduct of Operations
	ols.	A Detail Num: 2.1.30 Ability to locate and operate components, including local cont
		Jestion Source Information
Ques Source: 1997 PBAPS NRC Exam Question		Ques Source: 1997 PBAPS NRC Exam Question
Ques Mod Met         Added procedure reference to question stem at NRC recommendation.		ues Mod Met Added procedure reference to question stem at NRC recommendation.
References		
		References
Valves         OM-C-7.5         2.4         2         6	L.O.	References

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Reference Title	Facility Ref. No.	00000		_	L.O.
OM Chapters 6 - 9	PLOT-0007	II.A.5.a	6	0	

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Question Data for Test: 1999 RO

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**(**1)

Question:	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.
В	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 Exam Leve	<ul> <li>B. Independent Verifier not authorized to modify COL steps.</li> <li>C. Independent Verifier not authorized to "N/A" COL steps.</li> <li>D. COL is correct, valve position is the problem. A-3 is not required here.</li> </ul>
RO	Memory PBAPS
KA Informati	ion RO Grp: 1 SRO Grp: 1 RO Val: 3.4 SRO Val: 3.3 55.43
Tier PWGs	Generic Generic
System: KA Group Nu	
KA Detail Nur	
Question So	purce Information
Ques Source:	1998 PBAPS NRC Exam Question Source
Ques Mod Me	Added procedure reference to question stem at NRC recommendation.
References	3
Reference T	
Independent	t Verification OM-C-11.1 6.3.e 7 & 8 1

t	Reference Title	Facility Ref. No.	Section	Pa #	Rev.	Page 6 of 175
	Operations Manual Chapters 10 thr		000001	T. 9#	Tev.	<u>L.O.</u>

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## Question Data for Test: 1999 RO

	Question	- 1	Both units are other evolution of the licensed The selected of would require minutes. Dete	ns in prog l operator operator i the opera ermine the	ress. The rs has bee s currently ator to leave MINIMU	e Shift M en selec / the Ur /e the r M shift	Manger rece cted for a rai nit 2 Reactor nain control response to	ives a call ndom subs r Operator room for a this cond	indicating stance scr (URO). 1 approxima ition.	y that one reening. The testing Itely 45
	Ą		A temporary r	elief of th	e URO by	the on	-shift Plant f	Reactor O	perator (P	RO).
	✓ E	3	A temporary r	elief of th	e URO by	the fou	irth Reactor	Operator	(4th RO).	
	c	;	A complete tu	rnover of	the URO	position	n to the Plan	it Reactor	Operator	(PRO).
	C	>	No relief is rec testing while h					empt from	random s	substance
	Explanati		A. The PRO a CRS and 3 B. Correct an C. A complete PRO cannot f D. Licensed o case by case operator leavi	Ros in the swer. e turnove ormally h operators basis if th	e Control F r is not rec old two sh may be e	Room. quired s ift posif xcused	since it will t tons. from rando	e less tha m substar	in 1 hour. Ince exams	Also, the s only on a
-			Cognitive	Level	Facility	1.1	<b>Materials</b>			- 1
-	xam Le Ioth	ever	Memory		PBAPS		N/A			
KA I	nform	atio	n							
Tier	PWGs			O Grp: 1	SROC	Grp: 1	RO Val:	3.0 SRO	Val: 3.4	55.43
Syst	tem:		Generic							
KA	Group N	Num	1:2.1	Conduc	t of Opera	tions		· 16	ananan tanan ta	
KA I	Detail N	lum	2.1.3	Knowled	dge of Shi	ft Turno	over Practice	es		
Que	stion \$	Soi	urce Informa	ation	•					
Que	s Sour	ce:	New		·	Ques				

Ques Mod Met

#### References

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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
<b>Operations Manual Chapters 6-9</b>	PLOT-0007	II.A.2	5	0	1

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## Question Data for Test: 1999 RO

Question:	In accordance	with OM	A-C-11.2, "Double \	/erification", wl	hich of th	e followi	ng would
10			idividual to actually				
✓ A	Restoration of	f a thrott	ed valve to its requ •	ired locked po	sition.		
В	Fuse removal	as direc	ted by the T-200 pr	ocedures.		- <u> </u>	
С	Restoration of	f a cleara	ance on an ECCS s	ystem.			
D	A routine surv	eillance	test being performe	ed in a Radiatio	on Area.		
Explanation of Answer	C. System re	iired for f storatior	fuse removal but no is require IV. ire IV, a radiation a	-	-		V.
Exam Level	Cognitive Memory	Level	Facility PBAPS	Materials N/A		· · · · · · · · · · · · · · · · · · ·	· · · · ·
KA Informatio		) Grp: 2	SRO Grp: 2	RO Val: 3.6	SRO Va	: 3.8	55.43
System:	Generic	· ·					<u>.</u>
KA Group Nun	n: 2.2	Equipm	ent Control				
KA Detail Num	: 2.2.13	Knowle	dge of tagging and	clearance pro	cedures.		
Question Sou	urce Informa	ation		e.	• •		
Ques Source:	1998 PBAPS	NRC E	xam Question Source				<u></u>
Ques Mod Met	Added proce	dure ref	erence to question	stem at NRC r	ecomme	ndation.	
References							
Reference Tit	the second s		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Double Verific	cation		OM-C-11.2	2.1	2	1	
Reference Tit			Facility Ref. No.	Section	Pg #	Rev.	L.O.
Administrativ	Dreadures		PLOT-1570			12	1.b

**f** :

				P	age 10 of 175	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .	
Control of Locked Valves and Dev	(i A-C-8	7.3.2	4	0		
• •			•	••••		
	•					

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Question Data for Test: 1999 RO

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Question:	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.
В	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.
<b>√</b> 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	<ul> <li>B. Incorrect, White light should extinguish under these conditions FH6C - 10.2.7.</li> <li>C. Correct, FH6C - 10.2.9 required notification component movement if any WRNM count rate doubles (after the 4th placed around a detector).</li> <li>D. Incorrect, Loss of Fuel Pool Cooling Service Water Booster pump has no impact on core alterations.</li> </ul>
Exam Level RO	Cognitive Level Facility N/A Comprehension PBAPS
KA Informatio	on
Tier PWGs	RO Grp: 2 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.3 55.43
System:	Generic
KA Group Nurr	n: 2.2 Equipment Control
KA Detail Num	1: 2.2.30 Knowledge of RO duties in the Control Room during fuel handling
Question Sou	urce Information
Ques Source:	New Question Source
Ques Mod Met	t Added procedure reference to question stem at NRC recommendation.
References	
Reference Tit	
Core Compon	nent Movement - Core FH-6C 10.2.9 31-32 49

Page	12	of	175	
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	• •				•
				P	age 12 of 175
Reference Title	Facility Ref. No.	Section.	Pg #	Rev.	L.O.
Peach Bottom Refueling Procedure	NLSRO-0763		1	3	6

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## Question Data for Test: 1999 RO

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Question	Which of the	following co	ombinations of ta	ags may be app	olied to the	e same	
13	component a Manual?	it the same	time in accordar	nce with the Cle	arance a	nd Tagging	g 
Α	A Special Co suspension I		(SCT) and a ta	gged compone	nt bearing	a green	
В	Two Special	Condition 1	ags (SCTs).	· · · ·			<u></u>
С	A Danger Ta	ig and Spec	ial Condition Ta	g (SCT).			· · ·
✓ D	An Informatio	on Tag and	a Danger Tag.				<u></u>
Explanation of Answer	green suspe B. Incorrect C. Incorrect SCT (C&T 4 D. Correct	nsion label. only one S a Danger 4.3). the compon with any ot	IALL NOT be ap (C&T 4.3.7) ICT shall be app Tag SHALL NO Ident position spe ther tags applied	lied to a compo r be applied to cified on an Inf	onent (C& a compor ormation <sup>-</sup>	T 4.3.4): nent bearir Tag SHOL	ng a JLD
Exam Level Both	Cognitive	e Level	Facility PBAPS	Materials N/A			
A Informatio		RO Grp: 2	SRO Grp: 2	RO Val: 3.6	SRO Va	l: 3.8 5	5.43
System:	Generic						
KA Group Nun	n: 2.2	Equipme	nt Control				
KA Detail Num	2.2.13	Knowled	ge of Clearance	and Tagging P	rocedure	S	
uestion So	urce Inform	nation					
Ques Source:	New		Ques				
Ques Mod Me						<b></b>	· · · ·
References							
Reference Tit	le	. f	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Clearance &	Tagging Man	ual	СТМ	4.2.10		4	

•					•
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Clearance Application Process	NCT-0300	III.B.3	4	1	2

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## Question Data for Test: 1999 RO

Question:A check-off list (COL) Independent Verification (IV) is required to be completed on168 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?

	1	•					-
A	2 minutes.			·		•	
✔ В	5 minutes.						
c	10 minutes						
D	12 minutes					·	
Explanation	OM-C-11.1 p	rovides 10	) mR as the guidel	ine for waiving a	an IV.		
of Answer	A. 4 mR B. 10 mR co C. 20 mR D. 24 mR All based upo		ver R/hr divided by 60	minutes = 2 mR	/minute		
	•			Materials			
Exam Leve RO	Cognitive		Facility PBAPS	Calculator			
A Informati	4	O Grp: 3	SRO Grp: 3	RO Val: 2.9	SRO Val	3.3 5	5.43
System:	Generic		2 - 1 - 1				
KA Group Nu	m:2.3	Radiolo	gical Controls				
KA Detail Nur	n: 2.3.10	Ability to and gua	o perform procedu ard against person	res to reduce ex nel exposure	kcessive	levels of	radiation
Question So	ource Inform	ation					
Ques Source	1998 PBAF	S NRC E	xam Quest Sourc				
Ques Mod Me	et						
References	5						
Reference T	itle		Facility Ref. No.	Section	Pg#	Rev.	<b>L.O</b> .
	t Verification		OM-C-11.1	1.2.1	2		

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Basic Radiation Worker Training	GETCM-10400			3	17

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# Question Data for Test: 1999 RO

Ques		Given the follo	owing conditions:
	17	- A male, ful	ly qualified radiation worker at Peach Bottom has just returned from
		weeks of ou	tage support at Limerick.
			tive Dose Equivalent (TEDE) received at Limerick was 250 mrem. ers' current TEDE from Peach Bottom for 1999 is 225 mrem.
	h	What is the M	AXIMUM annual non-emergency Total Effective Dose Equivalent
			an be received at Peach Bottom for the remainder of 1999 ceeding the Federal Exposure Limits.
4 4	A	4475 mrem	
		4525 mrem	
	В		
	c [	4750 mrem	
	D	4775 mrem	
Explan			sure Limit is 5000 mrem. 5000 mrem - 250 mrem (Limerick) -225
of Ans	wer	mrem (PBAPS	S) = 4525 mrem
Exam	Level	Cognitive	IN/A
RO		Applicatio	n PBAPS
KA Infor	matio	n	
Tier PW			O Grp: 3 SRO Grp: 3 RO Val: 2.5 SRO Val: 3.1 55.43
System:		Generic	
KA Group	n Num		Radiation Control
KA Detail		-	Knowledge of 10CFR20 and related facility radiation control
	INUITI.	2.0.1	requirements
			A:
		rce Informa	
Ques Sou		1997 PBAPS	Source
Ques Mo	d Met	Dates chang	ed to reflect current year.
Referer	nces		
Referen	ce Title	2	Facility Ref. No. Section Pg # Rev. L.O.
Dosimet	try Pro	gram	HP-C-106 7.1.1 3 4

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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.

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## Question Data for Test: 1999 RO

Question:	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 Operator to	following enter the a	will meet the MINIM area.	IUM requireme	nts for ar	n Equipm	ient	
A	Must be acc	ompanied	by an Advanced R	ad Worker (AR	W) qualif	ied indivi	dual.	
✓ В	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		·	not permitted until a		•			
Explanation of Answer	HP-C-310 in RP Technici	a effort to an may a	o return the plant to ct in lieu of a formal	a stable condit RWP to assist	ion a Lev workers	el II (AN	SI 3.1)	
Exam Leve Both	el Cognitiv		Facility PBAPS	Materials N/A			· · · · · · · · · · · · · · · · · ·	
KA Informat		RO Grp:	3 SRO Grp: 3	RO Val: 2.6	SRO Val	3.0 5	55.43	
System:	Generic	-						
KA Group Nu	m: 2.3	Radiati	on Control					
KA Detail Nu	m: 2.3.1	Knowle	edge of 10CFR20 a	nd related facili	ty limits			
Question So	ource Inforn	nation						
Ques Source		•	Questi					
Ques Mod M	et							
Reference	S							
Reference 1	itle		Facility Ref. No.	Section	Pg #	Rev.	L.O.	
Radiation W	lork Permits	• • •	PLOT-1760	11.C	6	14	4	
Reference 1	ītle		Facility Ref. No.	Section	Pg #	Rev.	L.O.	
	/ork Permit Pr	ogram	HP-C-310	7.12		3		

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Question	Data	for	Test:	1999	RO
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Question:	The Plant Rea Building.	actor Operator (	PRO) has ju	st received a fi	re alarm	from the	Turbine
	The PRO is R	EQUIRED to m	ake a call for	r off-site fire fig	hting su	oport:	
A	After 10 minu	tes if an actual f	ire is confirm	ned.		8. 494 - 1. <u>1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1</u>	
В	Immediately in	f equipment for	safe shutdov	vn is jeopardize	ed.	· · ·	
С	When 2 or mo	ore fire alarms a	re received i	in the same are	ea.		
✓ D	After 20 minu	tes if the Incider	nt Command	er reports the f	ire is NC	OT contro	lled.
Explanation of Answer	A. UE classif B. Not IAW F C. Not IAW F D. Correct ar	F-01 F-01			• .		<u></u>
Exam Level RO	Cognitive Memory	Level Faci PBA		Materials N/A	<i>y</i>		
KA Informatio		D Grp: 4 SR	O Grp: 4	RO Val: 2.9	SRO Val	: 3.4	55.43
System:	Generic	l l					
KA Group Nun	n: 2.4	Emergency Pr	ocedures an	id Plan			
KA Detail Num	2.4.25	Knowledge of	fire protectio	n procedures.			
Question So	urce Informa	ation					
Ques Source:	1998 PBAPS	S NRC Exam	Questic Source				
Ques Mod Me	t			• • • • • • • • • • • • • • • • • • •			
References	· · · · · · · ·	• • • • • • • • • • • • • • • • • • •					
Reference Tit	le		y Ref. No.	Section	Pg #	Rev.	L.O.
Fire Brigade		<b>j</b> . <b>F</b>	F-01	6.1.1 Note	3	6	l .
Reference Til			y Ref. No.	Section	Pg #	Rev.	L.O.
Fire Protectio	on System	PLC	DT-0685	VI.B	24	7	

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Question:	shift when a Emergency	orking as the fourth an emergency occu Director, has assig ator. From the follo	irred on Unit gned you the	3. The Shift responsibility	Manager, y of being t	acting as the NRC	the
A	Establish co	ommunications with	the TSC to	report Trip T	able status	<b>k.</b>	
В	Establish co	ommunications with	the PBAPS	SNRC Reside	ent Inspecto	Dr.	
С	Initiating the	Emergency Resp	onse Organ	ization call ou	it.		
✓ D	Initiating the	Emergency Respo	onse Data S	System.			
Explanation of Answer	B. Not a val	le Communicator re lid responsibility imunicator respons Answer					R <u></u>
Exam Level RO	Cognitive Memory		<u>y</u>	<u>Materials</u> N/A			
A Informatic		RO Grp: 4 SRC	) Grp: 4	RO Val: 3.3	SRO Val:	3.1 55	.43
System:	Generic		F	P			
- KA Group Num	2.4	Emergency Pro	cedures/Pla	n	New region of		
KA Detail Num:		Knowledge of the implementation	ie RO's resp	oonsibilities in	emergenc	y pian	<u></u>
uestion Sou	rce Inform	nation					
Ques Source:	New	••••••••••••••••••••••••••••••••••••••	Question	n, <b>[</b>			
Ques Mod Met							
References		·	• · · · · • · · · · · · · · · · · · · ·				
Reference Title	e	Facility	Ref. No.	Section	Pg #	Rev.	L.O.
Emergency No	otifications		2-110	2.2.20	5	12	

		Room annunciator has a "blue" dot on its window.
29	Which of the fo annunciator?	ollowing describes the status of the equipment monitored by that
	The monitored	equipment has a deficiency that:
× A	Affects the per procedures.	rformance of the Transient Response Implementation Plan (TRIP)
В	Is NOT consid	lered a Main Control Room deficiency.
C	Affects the per	formance of the Emergency Response Procedures (ERP).
D	Does not impa	ict any safety related plant equipment.
Exam Level	<ul> <li>Blue tinted</li> <li>ERPs not re</li> <li>Yellow for r</li> <li>Cognitive L</li> </ul>	referred to in this procedure. non-MCR deficiencies.
1	Memory	
A Informatio	on	Grp: 4 SRO Grp: 4 RO Val: 3.0 SRO Val: 3.1 55.43
A Informatic	on	
A Informatic er PWGs ystem:	on RO Generic	
A Informatic er PWGs ystem: A Group Num	On RO Generic 2.4 2.4.45	Grp: 4 SRO Grp: 4 RO Val: 3.0 SRO Val: 3.1 55.43
A Informatic er PWGs ystem: A Group Num A Detail Num	On RO Generic 2.4 2.4.45	Grp: 4 SRO Grp: 4 RO Val: 3.0 SRO Val: 3.1 55.43 Emergency Procedures/ Plan Ability to prioritize and interpret the significance of each annunciator or alarm
A Informatic er PWGs ystem: A Group Num A Detail Num Jestion Sou	On RO Generic 2.4 2.4.45	Grp: 4 SRO Grp: 4 RO Val: 3.0 SRO Val: 3.1 55.43 Emergency Procedures/ Plan Ability to prioritize and interpret the significance of each annunciator or alarm
A Informatic er PWGs ystem: A Group Num A Detail Num Jestion Sou ues Source:	Dn RO Generic 2.4 2.4.45 2.4.45	Grp: 4 SRO Grp: 4 RO Val: 3.0 SRO Val: 3.1 55.43 Emergency Procedures/ Plan Ability to prioritize and interpret the significance of each annunciator or alarm tion NRC Exam Question
A Information ier PWGs system: A Group Num A Detail Num Jestion Source: sues Mod Met	Dn RO Generic 2.4 2.4.45 2.4.45	Grp: 4 SRO Grp: 4 RO Val: 3.0 SRO Val: 3.1 55.43 Emergency Procedures/ Plan Ability to prioritize and interpret the significance of each annunciator or alarm tion NRC Exam Question
A Informatic ier PWGs System: A Group Num A Detail Num	On Generic 2.4 2.4.45 Irce Informat 1998 PBAPS	Grp: 4 SRO Grp: 4 RO Val: 3.0 SRO Val: 3.1 55.43 Emergency Procedures/ Plan Ability to prioritize and interpret the significance of each annunciator or alarm tion NRC Exam Question

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E	•					Page 23 of 175
٩	Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
	Operations Manual Chapte	rs 10 thr PLOT-0008		Τ	0	1

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# Question Data for Test: 1999 RO

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Question:	Given the foll	owing conditions:
30	- A Unit 2 re - Rod Worth withdrawn fro - 11 rods fro Notch "42". - A control r	eactor startup is in progress with control rod withdrawals occurring. In Minimizer (RWM) Group 1 contains 12 control rods that are to be im Notch "00" to Notch "48". Tom this group are withdrawn to Notch "48" and the remaining rod to rod in Group 2 is then selected but not withdrawn. following is the expected response of the RWM?
Α	One withdraw with the withd	verror and further rod withdrawals will be blocked except for the rod lraw error.
•В		error and if a second withdraw error is made further rod withdrawals d except for the two rods with the withdraw errors.
c	One insert erro	ror and further rod withdrawals will be blocked except for the rod with or.
✓ D		ror and if a second insert error is made, further rod withdrawals will ccept for the two rods with the insert errors.
Explanation of Answer		
Exam Level RO	Cognitive Applicatio	IN/A
KA Informatio	n	
Tier SYS	R	O Grp: 2 SRO Grp: 2 RO Val: 3.5 SRO Val: 3.5 55.43
System:	201006	Rod Worth Minimizer
KA Group Nurr	n: K5	Knowledge of the operational implication of the following as they apply to the RWM
KA Detail Num	K5.13	Insert Block
Question Sou	Irce Informa	ation
Ques Source:	1997 PBAPS	S NRC Exam Question
Ques Mod Met		Source

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# References

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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	

During steady power reduction from 100% to 65% power on Unit 3 the Unit Question: Reactor Operator notes Wide Range reactor water level indications, which had 31 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? The density compensation signal (reactor pressure) has failed full "downscale". Α 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 В level rise. The Digital Feedwater redundant feedback signals have failed full "upscale". С 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. A. This failure results in a -30" level on wide range. Explanation of Answer B. Possibly true but not of this magnitude C. DFCS feedback signals do not exist D. Correct answer from the reference Materials **Cognitive Level** Facility Exam Level N/A Comprehension PBAPS RO **KA Information** SRO Grp: 1 RO Val: 2.9 SRO Val: 2.9 55.43 RO Grp: 1 SYS Tier Nuclear Boiler Instrumentation 216000 System: Knowledge of the operational implications of the following concepts KA Group Num: K5 as they apply to Nuclear Boiler Recirculation flow effects on level indications: Design-Specific KA Detail Num: K5.09 **Question Source Information** Question Ques Source: 1998 PBAPS NRC Exam Source Ques Mod Met References L.O. Rev. Pg # Section Facility Ref. No. **Reference Title** 2e III.E.8 PSYS-5002B Reactor Vessel Instrumentation

Question:	- The E-42 4 - The fast tra	wing conditions: KV Bus has lost power.       nsfer and Diesel Generator start both failed to occur automatically.
	- The E-42 bi 42 4KV Bus.	esel Generator (DG) was started with the "Quick Start" pushbutton. reaker is closed and the DG is now carrying all the loads on the E-
		Ilowing describes the current Mode of operation of the DG and what ynchronize the DG back to the Grid?
	The E-4 DG is	operating in:
Α		I), the DG Quick Start pushbutton must be pressed again and synch eted within 3 minutes.
В		Init), the DG Quick Start pushbutton must be pressed again and completed within 3 minutes.
С		<ol> <li>the DG Auto Start Bypass pushbutton must be pressed and completed within 3 minutes.</li> </ol>
⊽ D		Jnit), the DG Auto Start Bypass pushbutton must be pressed and completed within 3 minutes.
Explanation of Answer		
Exam Level	Cognitive l	evel Facility Materials
RO	Comprehe	IN/A
KA Informatio	on	
Tier SYS		Grp: 1 SRO Grp: 1 RO Val: 3.7 SRO Val: 3.7 55.43
System:	264000	Emergency Generators (Diesel/Jet)
KA Group Nun	n: 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 Sol	urce Informa	tion
Ques Source:	1998 PBAPS	NRC Exam Question Source

Ques Mod Met Terminology updated.

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#### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Diesel Generators and Auxiliaries	PLOT-0670	IV.D.2.h	1 & 32	6	1b

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Question	Data	for	Test:	1999	RO
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Question:	Which of the fi limited to 30%		conditions will rea	sult in Recirc flow	v controll	er output	being
Α	Total feedwate	er flow gr	eater than 85% a	and any condens	ate pum	p trip.	
В	Individual feed	dpump fic	w less than 20%	and Reactor lev	vei less th	nan 17".	<u></u>
С	Total feedwate	er flow gr	eater than 20% a	and Reactor leve	I less that	an 17".	<b>.</b>
✓ D	Reactor scran	n and Re	actor level less th	nan 17".			
Explanation of Answer	A. Incorrect - B. Incorrect - C. Incorrect - D. Correct	results in	45% limiter		· · · · · · · · · · · · · · · · · · ·	<u>.</u>	······
Exam Level Both	Cognitive Memory	Level	Facility PBAPS	Materials N/A			
KA Informatio		) Grp: 1	SRO Grp: 1 ation Flow Contr	RO Val: 3.1	SRO Va	l: <b>3.2</b>	55.43
KA Group Num	3	Knowled	ge of the physic ship between rec	al connections a			
KA Detail Num	: K1.09	Reactor	water level				
Question Sou	urce Informa	tion					
Ques Source:	New	Ň	Ques				
Ques Mod Met							
References					-		
Reference Tit			Facility Ref. No.	Section	Pg #	Rev.	·L.O.
Reactor Low	Level	ļ	OT-101	4.0	2	9	.
Reference Tit			Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recirc Flow C	Control	6	PLOT-0040	IV.B	15	8	5b

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## Question Data for Test: 1999 RO

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C C	Question:	The following	a conditio	ns exist on Uni	t 2 after a I O	CA	
	34	- Drywell p - Reactor r - Reactor l - All low pr - Level is b - "D" RHR 1000 gpm	pressure 7 pressure 4 level -75" ressure E0 peing main pump was to drop to	psig, rising slo 100 psig, dropp CCS pumps we ntained with co s placed in Tor -200" what wo	owly ing slowly ere manually ndensate inje us Sprays at	secured	
	Α					ontinue to run, LPCI or valves would auto close	
in Age, comme ange	В					ontinue to run, LPCI or valves would remain op	
	✓ C		ection val			build continue to run, LF closed, spray valves we	
					t, "D" RHR w	ould continue to run, LF	PCI
<b> _</b>		outboard inje close.	ection valv	re (MO-154) w	ould remain c	losed, spray valves wo	uld auto
	cplanation Answer		ection valu	ve (MO-154) w	ould remain c	losed, spray valves wo	ould auto
of	Answer am Level	close.	e Level	Facility	Materia N/A		ould auto
of Exa Bot	Answer am Level	close. Cognitive Applicati	e Level	Facility	Materia		ould auto
of Exa Bot	Answer am Level th	close. Cognitive Applicati	e Level	Facility PBAPS	Materia N/A	S	55.43
of Exa Bot	Answer am Level th formations	close. Cognitive Applicati	e Level on RO Grp: 1	Facility PBAPS	Materia N/A 1 RO Val	S	
of Exa Bot (A Inf <sup>Tier</sup>	Answer am Level th formations	Close Cognitive Application R 203000	e Level on RO Grp: 1 RHR/LI Knowle	Facility PBAPS SRO Grp: PCI Injection M	Materia N/A 1 RO Val ode	s 3.9 SRO Val: 4.1 node design features a	55.43
of Exa Bot (A Inf <sup>Tier</sup> Syster KA Gr	Answer am Level th formation SYS m:	Close Cognitive Application R 203000 n: K4	e Level on RO Grp: 1 RHR/LI Knowle interloc	Facility PBAPS SRO Grp: PCI Injection M dge of RHR/LF ks which provid	Materia N/A 1 RO Val ode PCI Injection i de for the follo stem during a	s 3.9 SRO Val: 4.1 node design features a	55.43 and/or
of Exa Bot (A Inf <sup>Tier</sup> Syster KA Gri KA De	Answer am Level th formation SYS m: roup Nun etail Num	Close Cognitive Application R 203000 n: K4	e Level on RO Grp: 1 RHR/LI Knowle interloc Dedicat (injectic	Facility PBAPS SRO Grp: PCI Injection M dge of RHR/LF ks which provided injection sy	Materia N/A 1 RO Val ode PCI Injection i de for the follo stem during a	s 3.9 SRO Val: 4.1 node design features a pwing	55.43 and/or
of Exa Bot (A Inf <sup>Tier</sup> Syster KA Gr KA De	Answer am Level th formation SYS m: roup Nun etail Num	Cognitive Application Con R 203000 n: K4	e Level on RO Grp: 1 RHR/LI Knowle interloc Dedicat (injectic	Facility PBAPS SRO Grp: PCI Injection M dge of RHR/LF ks which provided injection sy on valve interloo	Materia N/A 1 RO Val ode PCI Injection i de for the follo stem during a	s 3.9 SRO Val: 4.1 node design features a pwing	55.43 and/or

### References

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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	10	5a .

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Question Data for Test: 1999 RO

Question: 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 35 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: The ramp generator initiated by the opening of HPCI steam supply valve. MO-3-23-Α 014. The slow opening of the HPCI Turbine Stop Valve, HO-3-23-4513. В The ramp generator initiated by opening of the HPCI Turbine Control Valve, HO-3-С 23-4512. The ramp generator initiated by opening of the HPCI Turbine Stop Valve, HO-3-23-D 4513. Explanation of Answer Materials Cognitive Level Exam Level Facility N/A Memory Both PBAPS **KA Information** SRO Grp: 1 RO Val: 3.3 SRO Val: 3.3 55.43 RO Grp: 1 Tier SYS 206000 High Pressure Coolant Injection (HPCI) System: 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** Question Ques Source: New Source Ques Mod Met References **Reference Title** Facility Ref. No. Section Pa # Rev L.O. High Pressure Coolant Injection PLOT-5023 II.C.3.d 14 0 5.d

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Quest	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 additiona	al Core Spray pump needs to be shutdown to control level recovery.				
	-		e following statements accurately describe the response of the ADS ump shutdown?				
	A		own will stop when the "A" Core Spray pump is shutdown.				
i	В	ADS blowd	own will stop when the "B" Core Spray pump is shutdown.				
~	с	ADS blowd	own will stop when the "C" Core Spray pump is shutdown.				
	D	An ADS se	al in prevents inadvertent blowdown termination by pump shutdown.				
Explar of Ans		A or B AND continue.	C or D Core Spray pumps are required for the ADS blowdown to				
Exam Both	Level	-	ve Level Facility Materials N/A				
		on	RO Grp: 1 SRO Grp: 1 RO Val: 3.8 SRO Val: 3.9 55.43				
System:		209001	Low Pressure Core Spray Subsystem				
KA Grou	p Nun	n: <b>K</b> 3	Knowledge of the effect that a loss or malfunction of the low pressure core spray system will have on				
KA Detai	il Num	K3.02	ADS logic				
Question	n So	urce Infor					
Ques So	urce:	New	Question Source				
Ques Mc	od Me	t					
Refere	nces						
Referen	nce Ti	tle	Facility Ref. No. Section Pg # Rev. L.O.				
ADS an	nd Rel	ief Valve Ali	gnment fo SO 1.G.1.A 3.1 1 3				

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Automatic Depressurization Syste	PLOT-5001G	11.E.1.r.3	19	0	5

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## Question Data for Test: 1999 RO

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· · · · ·	tion:	AN A I WO C	condition has	occurred on Unit 3	. Reactor is			
1	37	pressure is 1000 psig with the turbine still running. The CRS has directed the						
8	- 1	URO to inject Standby Liquid Control (SBLC). The URO positions the SLBC switch to "PUMP 'A' RUN". Identify the expected SBLC System response.						
		switch to "P	UMP 'A' RU	JN". Identify the ex	pected SBL	C System re	esponse.	
		Quilling and	evite light or	e lit ouron discharr		is 1450 psig		<u></u>
	Α	Squib continuity light are lit, pump discharge pressure is 1450 psig.						
				وحريب والموري المردي				
		Squib conti	nuity lights a	are lit, pump discha	rge pressure	e is 1100 psi	g.	
✓	B	Oquib Com			<b>•</b> •			
						4450 -		· · ·
	С	Squib conti	inuity lights a	are out, pump disch	arge pressu	re is 1450 p	sig.	
	U							
		Oib. comti	in uitu liahta a	are out, pump disch	arge pressu	re is 1100 r	sia.	
	D	Squib cont	inuity lights a	are out, pump disci	arge pressu			
		l						
Expla	nation	SBLC is ex	pected to in	ject at approximate	ly 100 psig g	greater than	reactor	
of An		pressure th	ne continuity	lights will stay lit as	long as the	pump is en	ergized.	
		<b>P</b> . <b>C C C C C</b>		· · · · · · · · · · · · · · · · · · ·	Materials			
Exam	Level	Cogniti	ve Level	Facility	N/A			
Both		Memor	and the second se	PBAPS				
100m		1	· · · · · · · · · · · · · · · · · · ·	and the second sec				
KA Info	matio	on					<b>1111111111111</b>	- 40
Tier SY	'S		RO Grp: 1	SRO Grp: 1	RO Val: 3.6	5 SRO Val:	3.6 5	5.43
1		211000						the second se
System:		1711000		Liquid Control Sve	tom			
KA Grou		1211000	· ·	/ Liquid Control Sys				
	ıd Nur	1	· ·	/ Liquid Control Sys		es in parame	eters asso	ociated
	ip Nur	1	Ability to			es in parame	eters asso	ociated
• · · · · ·		n: A1	Ability to with SB	o predict and/or mo LC including		es in parame	eters asso	ociated
KA Deta		n: A1	Ability to with SB	o predict and/or mo		es in parame	eters asso	ociated
KA Deta	il Nur	n: A1	Ability to with SB	o predict and/or mo LC including		es in parame	eters asso	ociated
KA Deta	il Nur	n: A1	Ability to with SB	o predict and/or mo LC including lischarge pressure	nitor change	es in parame	eters asso	ociated
KA Deta Questio	iil Num n So	n: A1 A1.03 urce Infor	Ability to with SB	o predict and/or mo LC including	nitor change	es in parame	eters asso	
KA Deta	iil Num n So	n: A1 A1.03 urce Infor	Ability to with SB	o predict and/or mo LC including lischarge pressure	nitor change	es in parame	eters asso	
KA Deta Questio Ques So	nil Nurr In So Durce:	n: A1 A1.03 urce Infor New	Ability to with SB	o predict and/or mo LC including lischarge pressure Questi	nitor change	es in parame	eters asso	
KA Deta Questio	nil Nurr In So Durce:	n: A1 A1.03 urce Infor New	Ability to with SB	o predict and/or mo LC including lischarge pressure Questi	nitor change	es in parame	eters asso	
KA Deta Questio Ques So	nil Nurr In So Durce:	n: A1 A1.03 urce Infor New	Ability to with SB	o predict and/or mo LC including lischarge pressure Questi	nitor change	es in parame	eters asso	
KA Deta Questio Ques So Ques M	il Nurr n So ource: od Me	n: A1 A1.03	Ability to with SB	o predict and/or mo LC including lischarge pressure Questi	nitor change	es in parame	eters asso	
KA Deta Questio Ques So	il Nurr n So ource: od Me	n: A1 A1.03	Ability to with SB	o predict and/or mo LC including lischarge pressure Questi Source	nitor change		· · · · · · · · · · · · · · · · · · ·	
KA Deta Questio Ques So Ques M	n So ource: od Me	n: A1 A1.03 Arce Infor New	Ability to with SB	o predict and/or mo LC including lischarge pressure Questi	nitor change	Pg #	eters asso	L.O.
KA Deta Questio Ques So Ques M Refere Refere	nil Nurr n So burce: od Me ences nce Ti	n: A1 A1.03 urce Infor New t	Ability to with SB Pump d	o predict and/or mo LC including lischarge pressure Questi Source	nitor change	Pg #	· · · · · · · · · · · · · · · · · · ·	
KA Deta Questio Ques So Ques M Refere Refere	nil Nurr n So burce: od Me ences nce Ti	n: A1 A1.03 Arce Infor New	Ability to with SB Pump d	o predict and/or mo LC including lischarge pressure Questi Source	nitor change	Pg #	Rev.	L.O.
KA Deta Questio Ques So Ques M Refere Standt	il Num n So burce: od Me ences <u>nce Ti</u> by Liqu	n: A1 A1.03 urce Infor New t t tle nid Control S	Ability to with SB Pump d	Predict and/or mo LC including lischarge pressure Questi Source Facility Ref. No. PLOT-5011	nitor change	Pg # .2 14, 19	Rev.	<u>L.O.</u> 4h
KA Deta Questio Ques So Ques M Refere Standt Refere	il Num in So burce: od Me ences ince Ti by Liqu	h: A1 A1.03 Urce Infor New t tle tid Control S	Ability to with SB Pump d	Predict and/or mo LC including lischarge pressure Questi Source Facility Ref. No. PLOT-5011 Facility Ref. No.	nitor change on Section II.D.3, II.F Section	Pg # .2 14, 19 Pg #	Rev. 0	L.O.
KA Deta Questio Ques So Ques M Refere Standt	il Num in So burce: od Me ences ince Ti by Liqu	h: A1 A1.03 Urce Infor New t tle tid Control S	Ability to with SB Pump d	Predict and/or mo LC including lischarge pressure Questi Source Facility Ref. No. PLOT-5011	nitor change	Pg # .2 14, 19 Pg #	Rev.	<u>L.O.</u> 4h

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Question: Unit 2 was operating at 100% power when the "A" Recirc pump tripped. The pump was isolated in accordance with the procedure. 39

> 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.
В	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	

Exam Level	Cognitive Level	Facility	Materials	
Both	Memory	PBAPS	N/A	

#### **KA Information**

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Tier SYS	R	O 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			 <u></u>

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
Reactor Vessel Instrumentation	PSYS-5002B	lll.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	

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### Question Data for Test: 1999 RO

Question: The RCIC system was being restored to its normal alignment following 40 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? The RCIC turbine trip throttle valve will need to be reset from the control room. Α The RCIC turbine trip throttle valve will need to be reset locally. В The MO-131, steam admission valve, must be stroked open manually. С RCIC will automatically align and inject when the isolation reset pushbutton is D depressed. Explanation A RCIC turbine trip is received with an isolation signal. RCIC turbine trips must be of Answer manually reset. Only an overspeed trip must be reset locally. Materials Cognitive Level Exam Level Facility N/A Both Comprehension PBAPS KA Information RO Grp: 1 SRO Grp: 1 RO Val: 3.8 SRO Val: 3.8 55.43 Tier SYS 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 Question Ques Source: New Source Ques Mod Met References **Reference Title** Facility Ref. No. L.O. Section Rev. Recovery from RCIC System Isolat SO 13.7.A 4.1

					Page 39 of 175
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RCIC	PLOT-5013	11.D.4	18019	0	4f
	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recovery from a RCIC System Isol	SO 13.7.A	4.1	2-3	10	

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Question Data for Test: 1999 RO

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Question:	Given the follo	wing conditions:	
41	- The Reactor	experienced a loss of all AC power (s or Core Isolation Cooling (RCIC) syste iter level is now -52 inches and rising I Room Supervisor directs the Unit Re	em automatically initiated.
		e expected RCIC system response w lation Pushbutton?	when the operator depresses
A	A normal RCI	C system isolation and turbine trip will	loccur.
✓ В		e trip and system isolation will occur e (MO-15) will not close.	except the Inboard Steam
С	No RCIC isola	tion actions or turbine trip will occur.	
D		e trip and system isolation will occur ( (MO-16) will not close.	except the Outboard Steam
Explanation of Answer	C. This would	s no power. swer, MO-15 is only AC RCIC valve be true if level was back above -48 i a DC valve, should close.	nches, initiation auto reset point
Exam Leve Both	Cognitive Application		l
KA Informati			
Tier SYS	RC	) Grp: 1 SRO Grp: 1 RO Val:	
System:	217000	Reactor Core Isolation Cooling System	and the second secon
KA Group Nur	n: K2	Knowledge of electrical power suppl	lies to the following:
KA Detail Nun	n: K2.01	Motor Operated valves	······································
Question So	urce Informa	ition	
Ques Source:	1998 PBAPS	NRC Exam Question Source	
Ques Mod Me	et 📔		· · · · · · · · · · · · · · · · · · ·

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## References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Core Isolation Cooling	PLOT-5013	II.E.6	34	0	2a

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### Question Data for Test: 1999 RO

Qu	estion
r	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:

Α	Result in an ADS blowdown after a 9 minute time delay.
✓в	Result in an immediate ADS blowdown.
С	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
•		-	3

#### **KA Information**

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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
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#### Question Source Information

Ques Source:	New	Question Source	
Ques Mod Met		······································	

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# References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
Automatic Depressurization Syste	PLOT-5001G	II.E	16-18	0	4c 🔩

A small recirc leak has resulted in 8 psig drywell pressure and -170" reactor level Question: on Unit 2. After the Drywell Cooling Fans tripped, the CRS directed them to be 43 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.

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Describe the effect this will have on Drywell Cooler Fan operation and why.

I	Describe and				· · · · · · · ·			
Y A	Fans will continue to run, light goes out when both trip signals clear.							
В	Fans will con	Fans will continue to run, light goes out if either trip signal clears.						
С	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	be active, an	isolation s	s that the bypass signal must be pre ans would have no	sent. If light cle	ed out. I ears, the i	For the b solation	ypass to signals	
Exam Level Both	Cognitive Compreh		Facility PBAPS	Materials N/A	<u>.</u>		• •	
KA Informati	on R	:O Grp: 1	SRO Grp: 1	RO Val: 3.5	SRO Val	3.6	55.43	
System:	223001	Primary	Containment and	Auxiliaries				
KA Group Nur	n: Ā4	Ability to	o manually operate	e and/or monito	r in the c	ontrol ro	om.	
KA Detail Nun	n: A4.12	Drywell Cooler/Chillers						
Question So	urce Inform	ation						
Ques Source:	New		Quest Sourc					
Ques Mod Me	et 🛛					· · · · · · · · · · · · · · · · · · ·		
References	5					·		
Reference T	itle		Facility Ref. No.	Section	Pg#	Rev.	L.O.	
Drywell Cool	ler Fan Bypas	s	T-223-2	4.4 Note	3	3	j .	

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Reference Title	Facility Ref. No.	Section		_	L.O.
Drywell Ventilation	PLOT-5040C	II.D.6.e	13	0	4c

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Question:	Unit 2 is operating in MODE 1 at full power. The 2B RPS MG set output breakers trip on underfrequency.						
	Under these of in isolation val		is, which of the foll ositioning?	owing PCIS iso	lations w	ill occur	and result
A	A Group II Ou	tboard I	nalf isolation.	· ·			
✓ В	A Group III Oi	utboard	half isolation.				
С	An Outboard I	MSIV au	ito isolation.	· · · · ·			
D	A full RWCU i	solation	•				
			RPS results in a ha it no valves move.				half
Exam Level Both							
KA Information		) Grp: 1	SRO Grp: 1	RO Val: 3.5	SRO Va	1: 3.5	55.43
System:	223002	Priman	y Containment Isol	ation System (F	PCIS)		<u> </u>
KA Group Num:	A3	Ability (	to Monitor Automat	tic Operation of	PCIS inc	luding:	
KA Detail Num:	A3.02	Valve (	Closures				
Question Sou	rce Informa	tion		•			
Ques Source:	New		Quest Sourc				
Ques Mod Met							
References	· - · · · · · · · · · · · · · · · · · ·			/			
Reference Title			Facility Ref. No.	Section	Pg #	Rev.	<u> </u>
Group I, II, and	III Outboard	Half is	GP-8D	Notes	2	12	ļ
Reference Title	) 		Facility Ref. No.	Section	Pg #	Rev.	L.O.
PCIS		1	PLOT-5007G	II.C.7.a.4	33	0	5h

Unit 2 is operating in MODE 1 at full power when PISH-2-5-12A the drywell Question: pressure input to RPS and PCIS fails high resulting in an "A" channel RPS half 45 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: Alarm, but NO valves will reposition. Α Alarm, and the inboard isolation valves will reposition. В NOT alarm, and NO valves will reposition. С V NOT alarm, but the inboard isolation valves will reposition. D Explanation This condition will result in only half of the A channel logic picking up and will not of Answer result in any alarms or isolation. Materials **Cognitive Level** Facility Exam Level N/A PBAPS Both Comprehension **KA Information** RO Val: 3.0 SRO Val: 3.2 55.43 SRO Grp: 1 RO Grp: 1 Tier SYS Primary Containment Isolation System (PCIS) 223002 System: Ability to predict the impact of the following on PCIS KA Group Num: A2 Containment Instrument Failures KA Detail Num: A2.06 **Question Source Information** Question New Ques Source: Source Ques Mod Met References L.O. Rev. Section Pg # Facility Ref. No. **Reference Title** GP-25 App. 5 4.0 PCIS Groups II and III Channel A

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Reference Title PCIS Facility Ref. No. PLOT-5007G L.O. Section Pg # Rev. 0 5e I

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Question: 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", 46 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.
В	Partially open, but not far enough for proper indication.
С	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 N/A
Both	Comprehension	PBAPS	17.0

#### **KA Information**

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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**

Main Steam and Pressure Relief

Ques Source: New	Questio Source	n 「			
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

PLOT-0120

47       - 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.         ✓ C         Result in a closure of the Inboard Main Steam Isolation Valves.         D         Result in a closure of the Inboard Main Steam Isolation Valves.         C Correct answer, power loss to EHC logic when it swaps to PMG, TBVs close D. MSIVs 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         Both       Memory         PEAPS       N/A         KA Information       Reactor/Turbine Pressure Regulating System         KA Group Num:       K.6         KA Group Num:       K.6         KA D		Quest	ion:	Given the foll	owing condition	ns:				
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         B       Correct answer, power loss to EHC logic when it swaps to PMG, TBVs close D. MSIVs not affected.         Exam Level       Cognitive Level       Facility         Materials       Materials         KA Information       The SYS       RO Grp: [1]         Ther       SYS       RO Grp: [1]       SRO Grp: [1]         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       [1997 PBAPS NRC Exam       Question			47	- Annunciator 220 F-5, "Inverter Trouble", was received indicating a loss of 20Y050.						
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         N/A         KA Information         Tier       SYS         RO Grp:       T         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         Question Source       1997 PBAPS NRC Exam       Question Source					-		y this failu	re requires re	eactor pre	ssure
A       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         N/A         KA Information         Tier       SYS         RO Grp:       TSRO Grp:         Tier       SYS         RO Grp:       SRO Grp:         Tier       SYS         RA 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         Question Source       Information         Question       Source				The static inv	erter loss will:				•	
B       to be tripped to prevent a rapid depressurization.         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         Both       Memory         PBAPS       N/A         KA Information       Tier         Tier       SYS         RO Grp:       1         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         Question Source       1997 PBAPS NRC Exam       Question			A	Cause a full (	Group I Main S	iteam Isolati	on Valve	closure.		
P       C       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.       Materials         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       1997 PBAPS NRC Exam       Question Source		a com a deveni com	в					Valves requi	ring the E	HC Pumps
D       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:       T       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       Question         Question       Source       Question		~	с	Result in a loss of Turbine Bypass Valve opening capability.						
of Answer       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       RO 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       Question         Ques Source:       1997 PBAPS NRC Exam       Question       Source       Source			D	Result in a cl	osure of the Inl	board Main	Steam Iso	plation Valve	S.	
Exam Level       Cognitive Level       Facility       N/A         Both       Memory       PBAPS       N/A         KA Information       PBAPS       N/A         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       1997 PBAPS NRC Exam       Question Source				B. TBV close C. Correct at	on this loss. Inswer, power l	oss to EHC			PMG, TB	Vs close
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       Question         Ques Source:       1997 PBAPS NRC Exam       Question			evel	-				als <u>`</u>		
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       Question         Ques Source:       1997 PBAPS NRC Exam       Question		_			O Grp: 1 S	RO Grp: 1	RO Va	1: 2.8 SRO	Val: 2.9	55.43
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	Syst	iem:		241000	Reactor/Turt	oine Pressu	re Regula	ting System		•
Question Source Information         Ques Source:       1997 PBAPS NRC Exam         Question         Source	KA	Group	Num	K.6						
Ques Source: 1997 PBAPS NRC Exam Question Source	KA [	KA Detail Num: K6.01 A				lpower				
Ques Source Source Source	Que	stion	Soι	Irce Inform	ation	•				
	Que	Ques Source: 1997 PBAF			S NRC Exam	-				<u></u>
	Que									

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### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
ON-112-2 Loss of Uninterrupt	ible 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

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# Question Data for Test: 1999 RO

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· ·	Question:		rforming a GP-2 Plant Startup. Power is being raised from 50% to Plant Reactor Operator is monitoring Electrohydraulic Control (EHC) formance.			
		Pressure av	veraging manifold pressure is initially:			
	A	Equal to rea	actor 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 re	eactor pressure with an increasing dP as turbine load is raised.			
	D	Less than re	eactor pressure with a lowering dP as turbine load is raised.			
	Explanation of Answer		PAM pressure remains less than reactor pressure with dP increasing ow increases due to flow induced pressure drop through the steam			
_		. Coonitiu	Materials			
-	xam Leve		A Level Facility N/A			
le le	Both	Compre	ehension PBAPS			
•	• • •					
KA I	nformat	ion				
Tier	SYS	1	RO Grp: 1 SRO Grp: 1 RO Val: 3.3 SRO Val: 3.3 55.43			
Sys	tem:	241000	Reactor/Turbine Pressure Regulating System			
KA	Group Nu	m: K5	Knowledge of the operational implications of the following concepts as they apply to reactor/turbine			
KAI	Detail Nur	n: K5.04	Turbine inlet pressure vs. reactor pressure.			
Que	stion Sc	ource Inform	nation			
Que	s Source:	New	Question Source			
Que	s Mod Me	et				
Ref	erences	5				
Re	ference T	itle	Facility Ref. No. Section Pg # Rev. L.O.			
EH	C		PLOT-5001DL Transp. 3 1 0 1b			

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Question Data for Test: 1999 RO

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Questic 4	9 (DFCS) selected	operating at 100% power, with the Digital Feedwater Control System in three-element control with the "B" Narrow Range Level automatically . A fault in the level detector causes it to fail downscale. Which of the will occur?			
		ill sense a low level and increase RFPT speed, thereby causing Reactor evel 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.				
<ul> <li>•</li> </ul>	C The "B" LOWES	Narrow Range Level Detector will be automatically de-selected, and the remaining narrow range level signal will be automatically selected.			
	D A defaul	valve of +23" will be automatically selected by the master level controller.			
Explanat of Answe	tion The DF(	S system automatically selects the middle narrow range for control.			
Exam Le Both		itive Level Facility <u>Materials</u> prehension PBAPS N/A			
KA Inform	ation				
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 I	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 N	lum: K6.05	Reactor water level input			
Question \$	Source Info	· · · · · · · · · · · · · · · · · · ·			
Ques Source	e: New	Question			
Ques Mod I	Met .				
Referenc	es				
Reference		Facility Ref. No. Section Pg # Rev. L.O.			
Feedwater	Field Instru	nent Troubl ARC 201 H1 1 3			
Reference					
		Facility Ref. No.         Section         Pg #         Rev.         L.O.           omatic 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

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Question:	(RFP) speed a	eactor scram from a power condition, Reactor Feedwater Pump automatically goes up to compensate for the shrink experienced as he reactor collapse.
	To protect the 85% following	e pumps from overspeed under these conditions, RFPs are limited to g a scram:
Α	With all three	e condensate pump running.
В	With less that	an three condensate pumps running.
✓ C	With individua	ual feedwater flows greater than 20%.
D	With individua	ual feedwater flows less than 20%.
Explanation of Answer	Self explanat	
Exam Leve		e Level Facility Materials
Both	Memory	
	•	
KA Informat	ion	BO Gro 1 SBO Gro 1 BO Val 3.0 SBO Val 3.0 55.43
Tier SYS	R	
System:	259002	Reactor Water Level Control System
KA Group Nu	ım: A3	Ability to monitor automatic operations of the reactor water level control system including:
KA Detail Nu	m: A3.01	Runout flow control
Question So	ource Inform	nation
Ques Source	New	Question Source
Ques Mod M	et	
Reference	S	
Reference	Title	Facility Ref. No. Section Pg # Rev. L.O.
	Control Sssterr	

Question:	Both Units we	ere opera	ating in MODE 1 a	at full power whe	en the "3/	A" RPS H	NIE Wae
52	manually tran	sferred t	to its alternate fee ent (SBGT) system	d. Determine th	ne expect	ted cond	ition of the
Α	"B" SBGT fan	has sta	rted, SBGT "A" fil	ter inlet and out	let dampo	ers have	opened.
В	"C" SBGT ha	s started	, SBGT "B" filter i	nlet and outlet o	lampers	have ope	ened.
С	"B" SBGT fan	has sta	rted, SBGT "B" fil	ter inlet and out	let dampe	ers have	opened.
<b>~ D</b>	"C" SBGT fan	has sta	rted, SBGT "A" fil	ter inlet and out	let dampe	ers have	opened.
Explanation of Answer		· · · · · · · · · · · · · · · · · · ·		- <del></del>			
Funne Laurel	Cognitive		- -	Materials			
Exam Level Both	Memory		Facility PBAPS	N/A			
KA Informatio	'n						
Tier SYS		O Grp: 1	SPO Grov II	RO Val: 2.9	SPO Ve	1. 12.0	EE 40
. <b>I</b> .			- 1	•		. <b>1</b> 3.0	55.43
System:	261000	1	y Gas Treatment	• •			
KA Group Num	: <b> </b> K6	Knowle will hav	dge of the effect t e on SBGT	that a loss or ma	alfunction	of the fo	ollowing
KA Detail Num:	K6.01	AC Elec	ctrical Distribution	)			
Question Sou	rce Informa	tion		······		·····	
Ques Source:	New		Ques				
Ques Mod Met						· · · · · · · · · · · · · · · · · · ·	
References					A	-	
Reference Title	9	_	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
Group I, II, and	III Inboard H	alf Isol	GP-8C	Notes	2	17	
Reference Title			Facility Ref. No.	Section	Pg #	Rev.	L.O.
COL GP-8.C G	Groups II and I	ll Inbo	GP-8.C COL		4	15	

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Reference Title		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Standby Gas Treatment	•	PSYS-5009A	V.L.3.a	23	1	8e

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Question:	Peach Bottom	4KV is aligned as f	ollows:		<u> </u>		
53	- All eight 4K	ergency Auxiliary T V busses are being	ransformer (( supplied by	OAX04) is ( the #3 Em	out of servergency A	vice. Auxiliary	
	Transformer (	OBX04). R and 2A HPSW pu					
• · ·	Determine the	expected plant res	ponse to an a	automatic t	rip of the I	E-312 brea	ker.
Α	The E-1 Diese	el Generator will sta	rt after .25 se	conds.			
✓ В	The E-1 Diese	el Generator will sta	rt after .5 sec	conds.			
С	The 2A RHR	and HPSW pumps v	will trip and re	estart on po	ower resto	ration.	
D	The E-124 Lo	ad Center will trip a	nd lockout.				<u> </u>
Explanation of Answer	Diesel Genera source is not	ator start will be req available.	uired after .5	seconds s	ince the a	Iternate off	-site
Exam Leve Both	Cognitive Comprehe	والمستعقبين سمعير المساري	N/A	erials			
KA Informat	ion R	0 Grp: 2 SRO (	Grp: 1 RO	Val: 2.7	SRO Val:	2.9 55.4	13
System:	262001	AC Electrical Dist			<u> </u>		
KA Group Nu		Ability to predict the distribution	ne impact of t	he followin	g on AC e	electrical	<u>, , , , , , , , , , , , , , , , , , , </u>
KA Detail Nu	m: A2.06	De-energizing a P	'lant Bus				
Question So	ource Informa	ation					
Ques Source	New		Question Source				
Ques Mod M	et	•	<u> </u>				
Reference	S						
Reference 1		Facility R		Section	Pg #	Rev.	L.O.
Diesel Gene	erators and Aux	iliary PLOT-	0670	II.D.2	11	6	3c

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# Question Data for Test: 1999 RO

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Question:	other equipr	nent is in il nultaneou	full power with "B ts normal alignmen sly. All diesel gen	nt. Both of the i	nservice	off-site sta	art up
	Determine th	ne respons	se of Unit 3 to this	loss of AC pow	er event.	Unit 3 wi	<b>H</b> :
A	Scram imme	ediately du	e to the loss of po	wer to the RPS	system.		
В	Scram imme	ediately du	e to turbine stop a	nd control valve	e closure	•	
<b>∨</b> C	NOT scram	immediate	ly due to "B" RPS	being powered	by its all	ernate so	urce.
D	NOT scram diesel gener		ly due to the RPS their buses.	MG Sets main	taining po	ower until	the
Explanation of Answer	With "B" RP of off-site po		ernate feed, RPS	will not entirely	lose pow	er during	a loss
Exam Level Both	Cognitiv Compre		Facility PBAPS	Materials N/A			
KA Informatio	on						
Tier SYS	F	RO Grp: 2	SRO Grp: 1	RO Val: 3.8	SRO Val	: 4.1 5	5.43
System:	262001	AC Elec	ctrical Distribution				<u> </u>
KA Group Nun	n: K3	Knowle on:	dge of the effect the	nat a loss or ma	lfunction	of AC will	have
KA Detail Num	( K3.06	Reacto	r Protection System	n			
Question Sou	urce Inform	nation					
Ques Source:	New		Quest Sourc		· · · · ·		
Ques Mod Met	:						
References							
Reference Tit	le		Facility Ref. No.	Section	Pg#	Rev.	<b>L.O</b> .
Reactor Prote	ection System	n l	PLOT-5060F	II.C.2.b	T	0	6a

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# Question Data for Test: 1999 RO

•	Question:	2 Diesel Gene pump did not then shutdow (PSD) has be Station Black Attachment D Generators A Given that bo	erators starte start. The E n due to not en requested out. The CR , "Backfeedin vailable". th the 2SUE	ed and loaded -3 and E-4 Die having cooling d to configure S has directed ng Safe Shutd	their busses esels did not water. The Conowingo a backfeed own Loads	off-site power. The E-1 and E- s normally but the "A" ESW t start. The E-1 and E-2 were e Power System Director Station for Peach Bottom d in accordance with SE-11 with E-1 & E-2 Diesel	
		PRO should s	· ·	·		- for the hard the for the the	
	Α	"B" ESW pur		is the normal	power sourc	ce for the bus that feeds the	
	В	The 2SUE bu	s because th	nis will allow u	se of the SB	O line to power 4KV buses.	•
	С	The 3SUE bu "B" ESW pur		is the normal	power sourc	ce for the bus that feeds the	_
	✓ D	The 3SUE bu	s because th	nis will allow u	se of the SB	30 line to power 4KV buses.	•
	Explanation of Answer		•			SUE bus is used for i to power 4KV buses.	đi -
Ē	xam Leve	Cognitive	Level F	acility	Materials		-
	oth	Compreh	a second se	PBAPS	N/A	•	
KA lı	nformat	ion					
Tier	SYS	R	O Grp: 1	SRO Grp: 1	RO Val:	3.8 SRO Val: 4.1 55.43	
Syst	em:	264000	Emergency	y Generators			•
KA (	Group Nu	m: <mark>K1</mark>		e of the physic p between em		n and/or cause-effect nerators a	
KA [	Detail Nur	n: K1.01	AC Electric	al Distribution			
Ques	stion Sc	ource Informa	ation				
-	s Source:			Ques		·	•
Que	s Mod Me	et 📔		Sour			r

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### References

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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		T	4	11d

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### Question Data for Test: 1999 RO

			ements describe expected conditi				Scram		
✓ A	Station batte	ries, energize	on a Full Scran	<b>).</b>					
В	Station batte	ries, de-energ	ize on a Full Sc	ram.					
с	Reactor Prot	actor Protection Bus, energize on a Full Scram.							
D	Reactor Prot	ection Bus, de	e-energize on a	Full Scram.					
Explanation of Answer									
Exam Level Both	Cognitive Memory		acility BAPS	Materials			<u> </u>		
KA Informatio	• •	O Grp: 1	SRO Grp: 2	RO Val: 3.5	SRO Val	: 3.6 5	5.43		
System:	201001	Control Roo	d Drive Hydrauli	cs System					
KA Group Num	: K2	Knowledge	of Electrical Po	wer Supplies	to the foll	owing			
KA Detail Num:	K2.03	Backup Sci	am Valve Solen	oids					
Question Sou	rce Inform	ation	н 1. с. н						
Ques Source:	New		Questio Source	n 🚺					
Ques Mod Met							· · ·		
References				· · ·					
Reference Title	e	Fac	cility Ref. No.	Section	Pg #	Rev.	L.O.		
Control Rod D	rive Hydrauli	c Syste P	LOT-5003A	l.4.d	17	0	4d		

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Que	stion:
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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:

Α	Normal insertion speeds will be slower and may result in control rod drift alarms.
В	Scram speeds will be slower and will result in reduced reactivity addition rates.
С	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	<ul> <li>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.</li> <li>B. Scram speeds are faster, not slower.</li> <li>A &amp; C Does not affect normal insert/withdraw functions.</li> </ul>
Exam Level Both	Cognitive Level         Facility         Materials           Application         PBAPS         Accumulator Precharge Nitrogen           Pressure vs. Ambient Temperature         Graph

#### **KA Information**

Tier SYS	RC	D 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

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### 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		Figure 1	T	7	

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# Question Data for Test: 1999 RO

Question:	by the Contro	l Rod Driv	e Hydraulic o the main c	syste	m and the	essel level is being maintain e Reactor Water Cleanup ugh the "RWCU Filter Bypas	
		em Start"				12.1.A-2, "Reactor Water e "RWCU Outlet Valve" MO	-68
Α	Excessive he	at load on	the Non-Re	egene	rative He	at Exchanger.	
В	Group II isola	tion on gro	eater than 1	25% \$	system flo	DW.	
<b>√</b> C	Excessive R	VCU pum	p flows with	out co	ntrol roor	n indication.	
D	Auto closure	of CV-55 '	Dump Flow	Cont	rol Valve"	•	
of Answer Exam Level Both	C. Correct, w indication is c flows. D. Incorrect, line.	vith the de lump flow, auto closu	mins bypass opening M(	sed th O-68 v	rough M( will allow	ow in excess of 125% of dea D-74 the only system flow potential excessive unmonit ecific pressures in the dump	ored
KA Informati			• or our				
Tier SYS		O Grp: 2		,		3.5 SRO Val: 3.5 55.4	3
System:	204000		Water Clea		-		
KA Group Nur	n: A1	Ability to predict and/or monitor changes in parameters associated with RWCU control including:					
KA Detail Num	n: A1.04	System	Flow				
Question So	urce Inform	ation					
Ques Source:	New			Quest Sourc			
Ques Mod Me	t				<u></u>		
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### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Water Cleanup System	n St SO 12.1.A-2	Table 1	I	24	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Water Cleanup	PLOT-5012		0	4.g	

Question:	Given the follo	wing conditions:							
59	<ul> <li>Unit 3 has had a complete loss of the E13 4160VAC Bus.</li> <li>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).</li> <li>A valid LOCA signal occurs.</li> </ul>								
	What must oc conditions of 3		nal, design RHR	injection flowrate for these					
A	The RHR Loo operator.	p Cross-Tie Valve	e (MO-20) must be	e unlocked and opened by an					
В	An operator m the alternate p		sfer the Inboard I	PCI Injection Valve (MO-25A) to					
C		LPCI Injection Va ormally open MO-		nust automatically open to inject					
✓ D	The Inboard L alternate powe		e (MO-25A) mus	t automatically transfer to the					
Explanation of Answer	B. Power tran C. MO-154A	ural guidance for i sfer is automatic. is normally open, swer, power trans	MO-25A is norma	ally closed. , 30K flowrate with no operator					
Exam Level Both	Cognitive Application			als					
KA Information	on								
Tier SYS	RC	Grp: 2 SRO	Grp: 2 RO Va	l: 2.5 SRO Val: 2.7 55.43					
System:	205000	Shutdown Coolir	ig System (RHR	Shutdown Cooling Mode)					
KA Group Nur	n: K2	Knowledge of ele	ectrical power sup	pplies to the following.					
KA Detail Num	n: <b>K2.02</b>	Motor Operated	Valves	· · · · · · · · · · · · · · · · · · ·					
Question So	urce Informa	tion							
Ques Source:	1998 PBAPS	NRC Exam	Question Source						
Ques Mod Me									

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### References

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Reference Title	Facility Ref. No.	000000	Pg #		L.O.
Residual Heat Removal System	PLOT-0370	III.D	18	10	3b

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Question Data for Test: 1999 RO

Question: 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 60 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" RHR restarts, "B", "C", and "D" start and inject. Α 'A" RHR restarts, "B", "C", and "D" start and run on min. flow. В RHR "B", "C", and "D" start and inject. С RHR "B", "C", and "D" start and run on min flow. ~ D Explanation 1" Reactor level will cause a PCIS Group IIb isolation. MO-17, 18, 25A and 25B of Answer 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). Materials **Cognitive Level** Exam Level Facility N/A Comprehension PBAPS Both **KA Information** SRO Grp: 2 RO Val: 3.5 SRO Val: 3.7 55.43 RO Grp: 2 Tier SYS 205000 System: Shutdown Cooling System Ability to Predict the Impacts of the following on the SDC System KA Group Num: A2 KA Detail Num: A2.05 System Isolation Question Source Information Question Ques Source: New Source Ques Mod Met References L.O. **Reference Title** Facility Ref. No. Section Pg # Rev. System I RHR Relays Not Reset ARC 227 D-3

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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

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#### Question Data for Test: 1999 RO

Question: 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 61 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: Other rods in REFUEL due to a lack of "REFUEL MODE SELECT PERMISSIVE". Α Other rods due to "RPIS INOPERATIVE". В Rod 02-23 due to lack of position indication and backlight. С Rod 02-23 due to "ROD SELECT BLOCK TIMER MALFUNCTION". D Explanation A. Correct, position of all rods full in from the green backlight PIP reed switch is of Answer 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). Materials **Cognitive Level** Exam Level Facility N/A Both Comprehension IPBAPS KA Information SRO Grp: 2 RO Val: 2.7 SRO Val: 2.8 55.43 SYS RO Grp: 2 Tier 214000 System: 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** Question Ques Source: New Source Ques Mod Met References **Reference Title** Facility Ref. No. Section Pg # Rev L.O. Reactor Manual Control System **PSYS-5062 IV.C.6** 2g

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Reference Title	. Facility Ref. No.	Section	Pg #	Rev.	L.O.
Control Rod Drive Mechanism	PLOT-5003	II.B.3	20	0	8c

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# Question Data for Test: 1999 RO

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**{**<sup>1,1</sup>,1

Question: 65	Shortly therea	after TBCCW Head Tank	en a leak develops in the T k level drops out of sight lov scharge pressure drops to	w. The operating
	Assuming no		en, which of the following s	
A	"ISO-PHASE LOSS OF CC runback is ini	OLING" is received 10 r	is received immediately, "Is minutes later, and an auton	SO-PHASE BUS natic turbine
В	"ISO-PHASE alarms are re	BUS TROUBLE" and IS ceived immediately, and	O-PHASE BUS LOSS OF an automatic turbine runb	COOLING" ack is initiated.
<b>√</b> c	PHASE BUS	BUS TROUBLE" alarm LOSS OF COOLING" al ccur in this condition.	is received immediately, fo arm 10 minutes later. No a	llowed by "ISO- automatic turbine
D			SO-PHASE BUS LOSS OF automatic turbine runback	
Explanation of Answer	parameters. Isophase bus flow for 10 mi	loss of cooling is caused nutes.	immediately by low water d by either low cooling water n loss of isophase bus cool	er flow or low air
Exam Level Both	Cognitive Memory	Level Facility PBAPS	Materials N/A	
KA Informatic	n		· · · · · · · · · · · · · · · · · · ·	
Tier SYS	RC	Grp: 2 SRO Grp:	RO Val: 2.6 SRO Val	2.6 55.43
System:	245000	Main Turbine Generato	r and Auxiliary Systems	
KA Group Num	K1	Knowledge of the Phys relationship between m	ical Connection and/or cau ain turbine general	se and effect
KA Detail Num:	K1.06	Component Cooling Wa	ater Systems	· · · · · · · · · · · · · · · · · · ·
Question Sou	rce Informa	tion		······································
Ques Source:	New		estion	
Ques Mod Met		Sou		

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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		1 ·	3	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
TBCCW	PLOT-5034	II.E	11	0	3.b

Unit 2 is operating at 95% power with all condensate pumps and all feedpumps Question: running. The "A" CONDENSATE PUMP trips on motor overload. The RO verified 66 that vessel level was maintained in the normal band. Which of the following statements describe the plant response to this trip? A Reactor Recirculation pump runback to 30% occurred due to the "A" condensate Α pump trip. A Reactor Recirculation pump runback to 45% occurred due to the "A" condensate ✓ B pump trip. A Reactor Recirculation runback did NOT occur since vessel level was maintained С in the normal band. A Reactor Recirculation runback did NOT occur since total feed flow is > 85%. D B. Correct, A condensate pump trip with feed flow greater than 85% results in a Explanation of Answer 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. Materials **Cognitive Level** Facility Exam Level N/A PBAPS Memory Both **KA Information** SRO Grp: 2 RO Val: 3.5 SRO Val: 3.5 55.43 RO Grp: 1 Tier SYS Reactor Feedwater System 259001 System: Knowledge of Reactor Feedwater System design features and/or KA Group Num: K4 interlocks which provide for the following: KA Detail Num: K4.11 Recirculation Runbacks **Question Source Information** Question Ques Source: New Source Ques Mod Met References L.O. Pg # Rev. Section Facility Ref. No. **Reference Title** ARC 203 E-2 A Condensate Pump Brk Trip

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Reference Title	[	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recirculation Flow Control	·	PLOT-0040	III.C.1.b	11	8	5.b

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# Question Data for Test: 1999 RO

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.         V       D         Has realigned due to a low flow condition.         Explanation       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         [Both       [Comprehension]         Ther SYS       RO Grp: [2]         System:       [290003]         [Control Room HVAC         KA Group Num:       [A3.01]         [Initiation/Re-Configuration         Question       Source         Question       Source		Quest	tion: 67	- MCR Ra	were opera ved: ROL ROOM adiation Mo n with their	I RAD MO	NITOR 760B a	DIV. II II		D" (003	A-3)	
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 signal.         Exam Level       Cognitive Level       Facility         Both       Comprehension       PBAPS         KA Information       Terr SYS       RO Grp: 2         Tier       SYS       RO Grp: 2       SRO Grp: 2         System:       290003       Control Room HVAC         KA Group Num:       A3.01       Initiation/Re-Configuration         Question       Source       New				- "CONTI - "CONTI	ROL ROOM	I VENT SU I VENT SU	IPPLY IPPLY	FAN HI-L LO FLOV	_O" (003	A-1)		) )
A       Has NOT realigned as indicated by the low flow condition.         B       Has realigned due to a low flow condition.         Image: D       Has realigned due to a high radiation condition.         Image: D       Has realigned due to a high radiation condition.         Image: D       Has realigned due to a high radiation condition.         Image: D       Has realigned due to a high radiation condition.         Image: D       Has realigned due to a high radiation condition.         Image: D       Has realigned due to high radiation condition.         Image: D       Has realigned due to a high radiation condition.         Image: D       Has realigned due to high radiation condition.         Image: D       CREV initiation alow flow to the Fresh Air Supply Fans resulted in a second CREV initiation signal.         Exam Level       Cognitive Level       Facility         Both       Cognitive Level       Facility         Materials       N/A         KA Information       Tier         Tier       SYS       RO Grp:         290003       Control Room HVAC         KA Group Num:       A3         Ability to Monitor Automatic Operations of the Control Room HVAC         KA Detail Num:       A3.01         Initiation/Re-Configuration         Question			•	The Contro	I Room Em	ergency V	entilatio	on Syster	m:			
B       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       Ter       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:       Ability to Monitor Automatic Operations of the Control Room HVAC including         KA Detail Num:       A3.01       Initiation/Re-Configuration       Question         Question       Source       New       Question			A	Has NOT r	ealigned sir	nce the cor	nplete	initiation	logic has	s not bee	en satisfied	d.
Image: Control Room HVAC         KA Information         Tier       SYS         RO Grp:       2         System:       290003         Control Room HVAC         KA Group Num:       A3.01         Initiation/Re-Configuration         Question Source         New         Question         Question         Source:			В	Has NOT r	ealigned as	indicated	by the	low flow (	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         KA Detail Num:       A3.01       Initiation/Re-Configuration       Question       Question         Question       Source:       New       Question       Source       Question			С	Has realign	ed due to a	a low flow c	onditio	n.				
of Answer       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         Question       Source       New       Question Source	· .	~	D	Has realign	ed due to a	a high radia	ition co	ndition.				•
Exam Level       Congritute Level       Facility       N/A         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         Question       Source       New       Question Source		•		After the CI	REV initiatio	on, a low flo						
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       New       Question Source			evel			the second s			als			
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       Question         Ques Source:       New       Question	KA li	nforn	natio	on								
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       Question         Ques Source:       New       Question	Tier	SYS			RO Grp: 2	SRO G	Grp: 2	RO Va	I: 3.3 S	RO Val:	3.5 55	.43
including KA Detail Num: A3.01 Initiation/Re-Configuration Question Source Information Ques Source: New Question Source	Syst	em:		290003	Control	Room HV	AC					
Question Source Information Question Question Source	KAG	Group	Num	n: A3			lutoma	tic Opera	ations of	the Cont	trol Room	HVAC
Ques Source: New Question Source	KAC	Detail	Num	A3.01	Initiation	n/Re-Config	guratio	n	<u> </u>			
Ques Source: New Question Source	Ques	stion	Soi	urce Inform	nation							
									<b></b>			
	Ques	s Mod	Met				Sourc	.e		·	<u>.</u>	

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### References

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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	
			-	- •	•

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**f** :

Question:	Unit 2 has e headers rea	experienced a total loss of instrument air with the Instrument Air ading 0 psig.
	Which of the operate ALL	e following statements describe the pneumatic sources available to L of the Safety Relief Valves (SRVs).
✓ A	Seismic Gra	ade Instrument Gas (via T-261).
В	Instrument N	Nitrogen (via GP-8E).
С	Backup N2 I	bottles (via SV 8130 A &B).
D	Relief Valve	e accumulators.
Explanation of Answer Exam Level Both KA Informatic	loss of instru AO-2969B a separate sup accumulator Cognitive Compret	e Level Facility Materials
Tier SYS	F	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	n: <mark>K</mark> 3	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 Sou	urce Inform	nation
Ques Source:	New	Question Source
Ques Mod Met		
References	• • • • • • · · ·	
Reference Titl		Facility Ref. No. Section Pg # Rev. L.O.
Instrument Nit	trogen Ssyter	m PSYS-5016 II 9, 12 0 4a

Reference Title P&ID Instrument Nitrogen	Facility Ref. No. M-333	Section	Pg #	Rev.	L.O.
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
Placing the Backup Instrument Nitr	T-261	<u>- Martinet - Banaro (1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1</u>	T		
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Backup Instrument Nitrogen to AD	SO 16A.1.A		T	4	

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Question	Data	for	Test:	1999	RO
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Question:	The Standby debris.	r Liquid Control (SBLC) injection sparger has become clogged with
	Which of the	following instruments will be impacted by this event?
Α	Calibrated Je	et Pump flow indication.
В	Core Spray li	line break detection.
С	Control Rod	Drive (CRD) cooling water differential pressure.
✓ D	Core Plate di	ifferential pressure.
Explanation of Answer		
Exam Level RO	Cognitive Compreh	IN/A
KA Informatio		O 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 Sou	rce Inform	ation
Ques Source:	New	Question Source
Ques Mod Met		
References		
Reference Title	e	Facility Ref. No. Section Pg # Rev. L.O.
Standby Liquid	d Control	PLOT-5011 II.D.5 15-16 0 3c

The Traversing In-core Probe (TIP) system is in use with a probe in the core when Question: the reactor scrams on low level following a loss of feedwater. HPCI automatically 71 starts and recovers level, containment parameters are normal. Which of the following statements describe the expected response of the TIP system to this transient.? TIP automatically retracts from the core, TIP Ball valves close, TIP Nitrogen Purge Α valves close. TIP automatically retracts from the core, TIP Ball valves close, TIP Nitrogen purge В valves remain open. TIP automatically retracts from the core, TIP Ball valves and TIP Nitrogen purge С valves remain open. NO TIP system response to a reactor low level condition. D A. Correct, Tip automatically retracts, ball valves and purge valve close on 1" Explanation of Answer Group II isolation. D. Incorrect, Plausible since some GP II isolations such as RWCU do not occur on Rx lo level condition. Materials **Cognitive Level** Facility Exam Level N/A PBAPS Memory Both **KA Information** RO Grp: 3 SRO Grp: 3 RO Val: 3.4 SRO Val: 3.5 55.43 Tier SYS 215001 Traversing In-Core Probe System: Knowledge of Traversing In-Core Probe Design Features and/or KA Group Num: K4 interlockes which provide for the following: KA Detail Num: K4.01 Primary Containment Isolation **Question Source Information** Question Ques Source: New Source Ques Mod Met References L.O. Section Pg # Rev. Facility Ref. No. **Reference Title** GP-8B 2.1 Group II and III

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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	Pa #	Rev.	L.O.
Tip System	PSYS-5007F		15, 16		4.a

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Question Data for Test: 1999 RO

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Question:	The following	conditions exist	on Unit 3		·
72	Ventilation St - The Reac Standby Gas instrument air - The "3A" a fully depress - ON-119 h	ack Radiation Le tor Building Equip Treatment (SBG r occurred. and "3B" instrume	evels rising pment Ce GT) in acco ent air hea	g. I Exhaust h ordance with aders and th	resulted in Reactor Building ad just been aligned to h SO 9 when a loss of he Unit 3 service air header are
✓ A	Will remain in	n service. React	or Building	Ventilatior	n will isolate.
B	Will remain in	service. Reacto	or Building	Ventilation	will NOT isolate.
С	Will NOT rem	ain in service. R	leactor Bu	ilding Venti	lation will isolate.
D	Will NOT rem	ain in service. R	eactor Bu	ilding Venti	lation will NOT isolate.
Explanation of Answer	SBGT will ren systems fail to	nain in service ar their isolation c	nd Reacto ondition p	r Building w ositions on	ill isolate because these a loss of instrument air.
Exam Level	Cognitive		•	Materials	·
Both	Comprehe	1 0.0/11		N/A	
KA Informatio	on .				· · · · · · · · · · · · · · · · · · ·
Tier SYS	RC	Grp: 3 SRC	O Grp: 3	RO Val:	2.7 SRO Val: 2.7 55.43
System:	288000	Plant Ventilation	n Systems		
KA Group Num	: K6	Knowledge of the will have on the	ne effect ti plant ven	nat a loss of tilation syst	r malfunction of the following em
KA Detail Num:	K6.03	Plant Air Syster	ns		
Question Sou	rce Informa	tion	•		····· · · · · · · · · · · · · · · · ·
Ques Source:	New	•	- Quest		
Ques Mod Met			Sourc		<u> </u>
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### 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		5.C
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Reactor Building HVAC	PSYS-5040	III.B.7.c	16	1	

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		•		· · · · ·		
Question: 73	are in service in momentarily sp acknowledges	n the AUTOMATIC bikes high and return receipt of the "CON and notes that the	mode. Condensate f ns to normal. The Re DENSATE FILTER-I	ite Filter Demineralizers ilter demin system dP eactor Operator DEMIN TROUBLE" alarm emineralizer Bypass Valve		
	After the dP sp	ike returns to norm	al, Feedpump suction	n pressure:		
Α	Will drop, due	to Condensate Den	in "E" Valve closure			
В	Will drop, due	to Condensate Den	nin "E" Valve opening			
C	Will NOT drop	due to Condensate	e Demin "E" Valve clo	osure.		
✓ D	Will NOT drop	due to Condensate	e Demin "E" Valve op	ening.		
Explanation of Answer	The Condensa	ate Filter Demin"E" open on high dP, th and the MO-2114	Valves open on high e "E" valves will be c open to maintain Col	, opens on high dP of 60 psi. dP of 50 psi. open. ndensate pressure to the		
Exam Level Both	Cognitive   Application		Materials N/A			
KA Informati	on					
Tier SYS	RC	Grp: 2 SRO G	rp: 3 RO Val: 2.9	SRO Val: 2.9 55.43		
System:	256000	Reactor Condensa				
KA Group Nur	n: A1	Ability to predict an with condensate s	ility to predict and/or monitor changes in parameters associated h condensate system conditions			
KA Detail Nun	n: A1.01	System Flow	· · · · · · · · · · · · · · · · · · ·			
Question So	urce Informa	tion				
Ques Source:	New	• •	Question Source			
Ques Mod Me	t					

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### References

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Facility Ref. No.	Section	Pg #	Rev.	L.O.
RC 20C089R D-6		1	5	
Facility Ref. No.	Section	Pg #	Rev.	L.O.
PLOT-0520	III.F	14-16	6	1b
	RC 20C089R D-5	RC 20C089R D-5 Facility Ref. No. Section	RC 20C089R D-5 1 Facility Ref. No. Section Pg #	RC 20C089R D-5 1 5 Facility Ref. No. Section Pg # Rev.

 Question:
 A refueling outage is in progress on Unit 2, with the reactor cavity flooded and the

 74
 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:

	Α	Low skimmer surge tank level to prevent Fuel Pool pump down.
~	в	Low skimmer surge tank level to provide FPC pump protection.
	С	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		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:	А3	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				<u> </u>
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	

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Facility Ref. No.	Section	Pg #	Rev.	L.O.
ARC C075 B-3	•	1	2	
- Eacility Dof No	Section	Do #	Bau	
		Fy#	Rev.	L.O.
PLOT-0750	IV	9	7	3b
		ARC C075 B-3 Facility Ref. No. Section	ARC C075 B-3 1 Facility Ref. No. Section Pg #	ARC C075 B-3     1     2       Facility Ref. No.     Section     Pg #     Rev.

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Question:	The following annunciators are alarming on Unit 2:							
75	- "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.							
Α	Loss of brake circuit continuity.							
В	Recirc Lube (	Oil pressure at < 15 psi for 20 sec.	<sup>^</sup>					
<b>√</b> C	Loss of scoop	p tube positioner power.						
D	Recirc Lube (	Dil temperature at 221 degrees F.	<u></u>					
Explanation of Answer								
-	<ul> <li>B. Incorrect, lube oil pressure &lt; 20 psi for &gt; 15 sec results in trip.</li> <li>C. Correct, see ARC 213 C-3.</li> </ul>							
· · · ·		lube oil temp > 210 degrees F results in trip.						
		Materials						
Exam Level RO	Memory	Level Facility N/A	<u></u>					
l	Internory							
KA Informatio	้า							
Tier SYS	R(	0 Grp: 1 SRO Grp: 1 RO Val: 3.1 SRO Val: 3.1 55.	43					
System:	202002	Recirculation	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 Sou	urce Informa	ation	•					
Ques Source: New		Question Source						
Ques Mod Met								
References								
Reference Title		Facility Ref. No. Section Pg # Rev.	L.O.					
Scoop Tube L	ock Up	SO 2D.7.B-2						

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
B Recirc Fluid Drive Scoop Tube B	/ ARC 214 J-1	· ·		1	·
			•	• • •	
Reference Title	- Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
B Recirc Fluid Drive Scoop Tube L	ARC 213 C-3		T		
-	•		•	* 1	• -
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
Recirculation Flow Control	PLOT-0040	III.F.6	13	8	4.a

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Question	Data	for	Test:	1999 F	20
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Question:			it 2 causing dryv osig and continu		ise to 12	psig and	reactor	
	The Plant Ro "SYSTEM II	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 conditions?	expected	response of MO	2-10-25B "Inboa	ard Disch"	valve to	these	
✓ A	Valve positio	on lights a	re lit, valve conti	nues to stroke o	pen autor	natically.		
В	Valve positio	on lights a	re NOT lit, valve	continues to stro	oke open	automatio	cally.	
с	Valve positio	on lights a	re lit, valve strok	e stops but may	be opene	d manua	lly.	
D	Valve positio	n lights a	re NOT lit, valve	stroke stops but	may be o	opened m	anually.	
Explanation of Answer			ypass thermal o on the switch is h		ney have	an autom	atic	
Exam Leve	Cognitive	Level	Facility	Materials				
RO	Compret		PBAPS	N/A				
KA Informati	on	•						
Tier SYS	R	O Grp: 1	SRO Grp: 1	RO Val: 3.4	SRO Va	1: 3.6	55.43	
System:	203000	RHR/LI	PCI Injection Mo	de			<u></u>	
KA Group Nun	n: A2	Ability t injection	o predict the imp n mode	acts of the follow	ving on th	e RHR/L	PCI	
KA Detail Num	A2.11	Motor C	perated Valve F	ailures				
Question Sol	urce Inform	ation						
Ques Source:	New		Que Sou	stion				
Ques Mod Met					<u> </u>			
References							<b>.</b>	
Reference Tit	le		Facility Ref. No.	Section	.Pg#	Rev.	L.O.	
System II RH	R Inj. Valves (	Overcurr	ARC 226 D-3		1	0		

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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

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Question Data for Test: 1999 RO

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Question:	The CRS dire	ects you	o use the arm and d	epress pushi	outton to	start the	Core
	Spray system. Normal off-site power is available.						
	After armina	and depr	essing "CS A INITIA		utton (14	A E40A)	what is
			e of the Core Spray		utton (14	A-510A),	what is
	· · · · · · · · · · · · · · · · · · ·	• • •	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			
A		ole spie	ay pumps start imme	ulately.			
	All and POILO				4		
✓ В		ore opra	ay pumps start after a	a time delay.			
1							
С	Ά, "Β', "C",		Core Spray pumps s	tart immediat	ely.		
D	'A", "B", "C",	and "D" (	Core Spray pumps s	tart after a tir	ne delay.		
							· · · · · · · · · · · · · · · · · · ·
			e an auto signal whic only starts A & C pu				ore
ľ	Spiey ~ pu	sibutton			11 <b>1, a</b> ll <del>4</del> :	slart. j	
Exam Level	Cognitive			Materials N/A			••••••••••••••••••••••••••••••••••••••
RO	Compreh	ension	PBAPS		• • • · ·		
			· · · · · · · · · · · · · · · · · · ·				
KA Information	-	-				· · · ·	
Tier SYS	R	O Grp: 1	SRO Grp: 1	RO Val: 3.8	SRO Va	1: 3.6	55.43
System:	209001	Low Pr	essure Core Spray S	System			
KA Group Num:	A4	Ability 1	o manually operate a	and/or monito	or in the c	ontrol ro	om.
KA Detail Num:	A4 05	Manua	Initiation Controls				
	l,	Imanaa					<b>.</b>
Question Sour	rce Informa	ation					
Ques Source:	New		Questio	n 🗖			
			Source				
Ques Mod Met							
	<b>I</b>		· · · · · · · · · · · · · · · · · · ·				
References	,	-					
Reference Title	1		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Core Spray			PLOT-5014	V.B.7	<u>ry#</u> 18	0	5.h
1 core opicy					1	1	
Reference Title	1		Facility Ref. No.	Section	Pg#	Rev.	L.O.
Core Spray Lo			M-1-S-40		2, 3		
1	0	ł			1 -1 -	1	l

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# Question Data for Test: 1999 RO

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	Question:	Unit 2 is in	MODE 2	with a start up in p	roaress. Which	of the fol	lowina v	alid alarm
	78	conditions	will prever	nt control rod inser	tion using "Eme	ergency R	od In".	
	-	· ·						
		"APRM FL	OW BIAS	OFF NORMAL" al	arm 211 A-4		· · · · ·	
	A	_						•
					: 	*****		
	✓ В		DBLOCK	alarm 211 F-5.				
•		]					-	
•	С	"RBM DOV	VNSCALE	" alarm 211 C-4.				
		"A WRNM	TRIP/INO	P" alarm 210 G-3.				
	D							
-	Explanation		t Rodui	thdraw block				
	of Answer			sert block prevents	s use of emerge	ency in		
				hdraw block	s use of efficing			
				hdraw block				
_			a Laval		Materials	*		
-	xam Level		ve Level	Facility	N/A			· ·
I <sup>R</sup>	0	Memor	У	PBAPS				
	• •	********			· · · ·	· · · ·		
KA li	nformatio	<b>n</b>	· _			_		
Tier	SYS		RO Grp:	1 SRO Grp: 2	RO Val: 3.4	SRO Va	l: 3.5	55.43
Syst	em:	201002	Reacto	or Manual Control	System			
KA C	Group Num	:K1	Knowl	edge of the physic	al connections	and/or ca	use effe	ct
	<b>F</b>			nship between the				
			followi	ng:				
KAE	Detail Num	K1.05	Rod W	orth Minimizer				
		1	1		· .	· • ·		
Ques	stion Sou	irce Inform	nation					•
Que	s Source:	New		Ques	stion			
		<b>J</b>		Sour	ce	· .		
Ques	s Mod Met							
		l		•				
Ref	erences							
Ref	erence Titl	e		Facility Ref. No.	Section	Pg #	Rev.	L.O.
AW	VRNM Trip	/Inop		ARC 210 G-3	,	1	3	
•				I a a y	5	<b>↓</b> .	<b>p</b>	•
Ref	erence Titl	e		Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
		ias Off Norr	nal	ARC 211 A-4		1 1	2	
1° " '					1	1. <sup>1</sup>	1 -	1

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RBM Downscale	ARC 211 C-4		1 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

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Unit 2 is operating at 100% power when the PRO responds to a "OFF-GAS Question: TROUBLE" alarm. The "A" SJAE and "A" Jet Compressor are in service. At the 79 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? Jet Compressor "STEAM" supply valve MO-2990A close. А Recombiner "RECYCLE" valves AO-2791 and AO-2792 opens. В SJAE "A 1st STAGE" steam supply valves AO 2238 A/B/C close. С SJAE "OFF-GAS INLET" valves AO 2236A/B/C close. D A. Incorrect - MO-2990A close on high recombiner condenser pressure of 8 psig. Explanation B. Incorrect - Recycle valves open on recombiner condenser pressure of 7 psig. of Answer 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. Materials **Cognitive Level** Facility Exam Level N/A PBAPS RÔ Comprehension **KA** Information SRO Grp: 2 RO Val: 3.3 SRO Val: 3.3 55.43 RO Grp: 2 Tier SYS Off-Gas 271000 System: Ability to monitor automatic operations of the off-gas system KA Group Num: A3 including KA Detail Num: A3.01 Automatic System Isolations **Question Source Information** Question Ques Source: New Source Ques Mod Met

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### References

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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	11.D.2	23	0	4.h

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.						
j.	minimum.		on listed below wh	an a		· · · · · ·	<b>.</b>
A			TAGE REGULATO				
✓ В	LOWER the	AUTO VO	LTAGE REGULAT	OR RHEOSTA	T setpoir	nt.	
с	RAISE the M	AN DC V	OLT REG setpoint				
D	Lower the M	AN DC VC	DLT REG setpoint.				
Explanation of Answer Exam Level RO	Cognitive Compret		Facility PBAPS	Materials N/A	,		
KA Informatic	n F	RO Grp: 2	SRO Grp: 2	RO Val: 2.5	SRO Val	: 2.5 5	5.43
System:	245000	Main G	enerator and Auxil	iary Systems			
KA Group Num	A4	Ability t	o manually operate	e and/or monito	r in the c	ontrol roo	m.
KA Detail Num	A4.14	Genera	tor Megavar outpu	t			••••••••••••••••••••••••••••••••••••••
Question Sou	Irce Inform	nation					
Ques Source:	New		Quest Sourc				· · · · · · · · · · · · · · · · · · ·
Ques Mod Met		· · ·					
References							•
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Main General	tor Synchron	izing and	SO 50.1.A-2		1	7	
Reference Tit	le		Facility Ref. No.	Section	Pg#	Rev.	L.O.
Main General	والمتحاجلين المتناط المحجر والتقاعد فتستعرجه	aries	PLOT-5050	II.G	30	0	4.g

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Question Data for Test: 1999 RO

Question:			MODE 1 at full p				
81	site power. All 4 Diesel Generators have started and closed in on their buses.						
. ·			s, which of the follo	owing compor	ents will c	ontinue to	o receive
	cooling water	flow?	-				
A	Instrument N	itrogen C	ompressor Cooler	S.			
✓ В	Station Air Co	ompresso	ITS.				
с	Reactor Wate	er Cleanu	p Non-regenerativ	e Heat Excha	ngers.		
D e	Condensate	Pump Co	olers.				
D							
Explanation of Answer	A. Instrumen DWCW.	t Nitroger	n compressor coo	lers lose flow	when RBC	CW back	s up
		nswer sin	ce TBCCW is bac	ked up by RB	CCW for th	ne Air	•
	Compressors						
- 1			leat Exchangers		system flo	w and the	system
			r these conditions s lose cooling whe		es nower		
	D. Condense	ste hrunh	s lose cooling whe				
Exam Level	Cognitive	Level	Facility	Materials N/A			
RO	Compreh	ension	PBAPS				
KA Informatio							
			SRO Grp: 2	BO Val D		1 30 5	55.43
Tier SYS		_				. 10.0 0	
System:	400000		nent Cooling Wate			· · · · · · · · · · · · · · · · · · ·	
KA Group Num	n: <b>K</b> 2	Knowle	dge of electrical p	ower supplies	of the follo	owing	·
KA Detail Num	: <b>K</b> 2.01	CCW P	ump				
Question. Sou	urce Informa	ation	1				
Ques Source:	New		Ques Sourc		· <u>·</u> ····		
Ques Mod Met							,
	1						
References							
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
TBCCW			PLOT-5034	V.A.2		0	4.b

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
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	

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Question: Sufficien	t NPSH for unrestricted Reactor Recirculation pump operation is assured
A The heig	ht of water above the pump suction
Feedwat	ter flow
	Dryer return flow
C	
D RPV pre	
of Answer speeds, B. Corr C. Stea	e the height of water above the suction provides NPSH for low pump feedwater flow is necessary to support unrestricted operation. ect answer. Im dryer return flow is hotter water and will actually reduce NPSH.
D. RPV	ressure is sensed on both sides of the pump. Materials
	nitive Level Facility N/A
KA Information	RO Grp: 2 SRO Grp: 2 RO Val: 3.1 SRO Val: 3.2 55.43
System: 20200	1 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 In	
Ques Source: New	Question Source
Ques Mod Met	
References	
Reference Title	Facility Ref. No. Section Pg # Rev. L.O.
Recirculation System	is PLOT-0030 47 9 5.b
Reference Title	Facility Ref. No. Section Pg # Rev. L.O.
A Recirc Flow Limit	ARC 214 B-3 12

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83	Which of the	ODE 1 at 100% power, both Recirc pumps in service at 76% speed. following conditions will result in an "A" Recirc Drive Motor Breaker
8	rip? Aux Bus #1 I	Low Voltage.
В	Exciter field I	breaker opens.
С	Recirc Pump	Cooling Water Low Flow (RBCCW).
D	Recirc Pump	Motor High Vibration.
of Answer	drive motor t B. Incorrect, C. Incorrect	Low aux. Bus voltage results in a 13 KV fast transfer and MG Set preaker trip. (ARC 219 B-1) , No automatic actions. , No automatic actions (ARC 214 A-5) , No automatic actions (ARC 214 B-1) e Level Facility
RO	Memory	IN/A
KA Informatio		RO Grp: 2 SRO Grp: 2 RO Val: 2.9 SRO Val: 3.0 55.43
I 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 Sou	irce Inform	nation
Ques Source:	New	Question Source
Ques Mod Met		
References		
Reference Tit	e	Facility Ref. No. Section Pg # Rev. L.O.
Aux Bus Low	Voltage	ARC 219 B-1 1 0

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
A Recirc Pump Cooling Water Lo F	ARC 214 A-5		1	3	•
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
A Recirc Pump Motor Hi Vibration	ARC 214 B-1		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

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Question Data for Test: 1999 RO

Question:			s the most likely caus	se of a "RBCC	CW Head	Tank H	gn
85	85 Level" alarm?						
			a a sainte a				
Α	Broken tube	inside the	in-service RBCCW H	leat Exchang	er.		
	RBCCW mal	keup valve	e (AO-2440) failure.				
B			n de la composition de la comp	•			
	Tube rupture	in RWCU	I regenerative Heat E	xchanger.			<u></u>
C				a se			
✓ D	Reactor Rec	irc Pump	Seal Cooler internal l	eak.			
			DDOOM is at higher	proceure that	service	water	
Explanation of Answer	B incorrect	herause (	RBCCW is at higher the makeup valve is r	normally isola	ted.		
	C. The RW	CU regene	erative heat exchange	er is not coole	d by RB	CCW/onl	y NRHX.
	D. Correct a	answer.	· · · ·				
Exam Level	Cognitive	e Level	E a a i i i i i i i i i i i i i i i i i	laterials			
RO	Comprei		PBAPS	UΑ			
· • • • • • • • • • • • • • • • • • • •	• • • • • • • • • •						
KA Informati	on						
Tier SYS	F	RO Grp: 2	SRO Grp: 2 F	RO Val: 2.9	SRO Val:	2.9	55.43
System:	400000	Compo	nent Cooling Water S	System (CCW	/S)		
KA Group Nur	n: <b>K</b> 6	Knowle will hav	dge of the effect that re on the CCWS	a loss or ma	lfunction	of the fo	llowing
KA Detail Nun	n: <b>K6</b> .06	Heat ex	Heat exchanger and condensers				
Question So	urce Inform	nation					
Ques Source:		<u> </u>	Question Source				
Ques Mod Me	et				· · · · ·		
References	5						
Reference T	itle		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of RBC			ON-113 Bases	2	2	11	
•			- *				
Reference T			Facility Ref. No.	Section	Pg#	Rev.	L.O.
React Bldg (	Cooling Water	r Header	ARC 217 G-5		1	4	1

		•					
				F	age 108 of 175		
Reference Title	Facility Ref.	No. Section	n Pg#	Rev.	L.O.		
RBCCW System	· PLOT-503			0	6.f		
	Question Data	a for Test:	1999 R	<b>O</b> <sup>1</sup>			
129 reactor l	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.						
Determi	ne the expected indications	for this control re	od.				
A Full Cor	e Display blue light lit, CRD	M damage will p	revent rod i	nsertion.			
B Full Cor	e Display blue light lit, rod v	vill move in slowl	y.				
C Full Cor	C Full Core Display blue light NOT lit, CRDM damage will prevent rod insertion.						
✓ D Full Cor	✓ D Full Core Display blue light NOT lit, rod will move in slowly.						
Explanation Both init of Answer move in	et and outlet scram valves i	must be open for	blue light to	be lit. R	od will		
'		Materials					
EXCIT BOTO	nitive Level Facility nprehension PBAPS	— N/A			· · · · ·		
KA Information							
Tier SYS	RO Grp: 2 SRO Gr	p: 3 RO Val:	3.3 SRO V	'al: 3.3	55.43		
System: 20100	3 Control Rod and Dr	ive Mechanism (	CRDM)				
KA Group Num: 2.4	Emergency Proced	nergency Procedure/Plan					
KA Detail Num: 2.4.48	Ability to interpret co operation of system	ontrol room indic	ations to ve	rify the sta	itus and		
Question Source In	formation		,				
Ques Source: New		Question Source					
Ques Mod Met							
References							
Reference Title	Facility Ref			Rev.	L.O.		
Control Rod Drive Me	chanism PLOT-50	03 II.C.	2 24	0	3.d		

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Question:	Unit 3 is in a re	fueling-o	utage with a core	shuffle in progres	SS. `		
69	ON-124, Fuel I	Floor and	nanticipated cond Fuel Handling Pro	oblems?		•	
Α	Inservice, oper CCTAS steps	Inservice, operable "A" Wide Range Neutron Monitor count rate doubles between CCTAS steps during fuel handling.				etween	
. В	An irradiated fi during movem	An irradiated fuel support piece is dropped in the fuel transfer canal (cattle chute) during movement to spent fuel pool.					
	A Fuel Storage Pool High Radiation alarm is received.						
D	A Refuel Floor	Vent Ex	haust High Radiat	ion alarm is rece	ived.		•
Explanation of Answer	Only C, is a sy	mptom fo	or entry listed in O	N-124.	-	· .	
Exam Leve RO	Cognitive I Memory	Level	Facility PBAPS	Materials N/A			
KA Informati							
Tier E/APE		) Grp: 3	SRO Grp: 1	RO Val: 4.0 S	RO Val:	4.3 5	5.43
system:	295023	Refuelin	g Accidents		·		
KA Group Nu	m:2	Emerge	ncy Procedures/P	lan			
KA Detail Nur	n: 2.4.4	Ability to parame	to recognize abnormal indication for system operating eters which are entry level condition				
Question Sc	ource Informa	ation					
Ques Source	New		Quest	1			
Ques Mod Me	et 📔						
References	3						
Reference T	itle		Facility Ref. No.	Section	Pg #	Rev.	L.O.
	nd Fuel Handlir	ng Probi	ON-124	1 	1	2	b.
Reference T	ïtle		Facility Ref. No.	Section	Pg#	Rev.	L.O.
Off Normal	and the second		PLOT-1550	B.1	6	7.	1

84 in progre	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	t in an auto clos	sure of th	ese valv	/es.
A Drywell r	adiation moni	tor reading exceeds	the setpoint of	3.4 E-3	uCi/cc.	
✓ B Main Sta	ick radiation H	li Hi exceeds the se	tpoint of 1 E-2 ι	ıCi/cc.		
C 2 vent ex	ch stack rad n	nonitor Hi Hi exceed	s 5E-5 uCi/cc.			
D	nent High Rar	nge Rad Monitor Hi,	exceeds 16 R/	hr.		
Explanation Only Con of Answer	ndition B will c	cause an isolation of	the AO-2506 8	AO-250	)7.	
	nitive Level	Fooility	Materials			
Exam Level Cogr RO Mem		Facility PBAPS	N/A			
					··· ··· ··· ···	
KA Information						
Tier E/APE	RO Grp:	2 SRO Grp: 2	RO Val: 3.7 S	SRO Val:	4.1	55.43
System: 272000		on Monitoring Syste				
KA Group Num K4		edge of Radiation Mo cks which provide fo		n design	feature	s and/or
KA Detail Num: K4.02		atic actions to conta termined release rat			the eve	nt that
Question Source Inf	ormation					
Ques Source: New		Questic Source				<u></u>
Ques Mod Met						<u></u>
· · · · · · · · · · · · · · · · · · ·						
References			,			
Reference Title		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Groups II & III		GP-8B		2	15	
			Section	Pa#	Rev.	<b>L.O</b> .
Reference Title Drywell Rad Monitor 1	rouble	Facility Ref. No. ARC 225 D-5	Section	Pg #	2	
				L i	1	1

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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	1.1

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### Question Data for Test: 1999 RO

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86 ti C	ransient. Cur circ water prot Maintenance e	rently powe blem has be estimates th	0% power whe er is 20% and c een discovered nat it will be 4 h onditions, the	ondenser v to be the c ours until t	vacuum is 24 cause of the v ne circ water	.5" and st vacuum lo problem v	eady. A ss.
A	Continue to re	duce powe	r.			*	
в	Hold power co	onstant.					
✓ c	Trip the main	turbine.				-	
D	Scram and en	iter T-100.			:	,	<u> </u>
			that if vacuum is capability tri			/we are <	325
Exam Level Both	Cognitive Memory		Facility PBAPS	Material: N/A	<b>3</b>		
KA Information Tier E/APE System:		,	SRO Grp: 2		3.2 SRO V	al: 3.2	55.43
KA Group Num:	AA1		perate and/or in condenser		following as	they app	y to the
KA Detail Num:	AA1.05	Main Turb	ine				
Question Sou	rce Informa	ation					
Ques Source:	New		Ques Sour				
Ques Mod Met							
References							
Reference Title	8	Fa	acility Ref. No.	Sect		Rev.	L.O.
Condenser Lo	w Vacuum		OT-106	3.	2 1	18	•
Reference Title			acility Ref. No.	Sect	ion Pg#	Rev.	L.O
Operational Tr	ansient Proce	edures	PLOT-1540	1	1	6	4

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# Question Data for Test: 1999 RO

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	Question:	Unit 2 is experiencin	ig a low condenser vacuum transient and has entered OT-106,				
	87	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 Cl	RS states that a full reactor scram will not be received until the				
		"A" or "B" low vacuu					
	•	The CRS statement					
	Α	Correct, since the "	C" condenser provides only a "A" Channel RPS input.				
	В		cram setpoint cannot be achieved without all three condenser				
		losing vacuum.					
	v 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 PS inputs for RPS channels A and B and can cause a full scram				
		by itself.	'S inputs for RFS channels A and b and bar badde a fair became				
			Materials				
	Exam Leve		Facility N/A				
· It	Both	Memory	[FDAFS ]				
	Informati	on					
		RO Grp	2 SRO Grp: 2 RO Val: 3.7 SRO Val: 3.8 55.43				
Tier	1						
•	stem:		s of Main Condenser Vacuum				
KA	Group Nu	n: AK3 Know to lo	wledge of the reasons for the following responses as they apply ss of Main Condenser Vacuum				
KA	Detail Nur	n: AK3.01 Rea	ctor Scram				
Que	estion So	urce Information					
Qu	es Source:	New	Question Source				
Qu	es Mod Me	et					
Re	eferences	3					
	-		Facility Ref. No. Section Pg # Rev. L.O.				
	eference T	itle Low Vacuum - Bases					

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
RPS	PLOT-5060F			0	1.j

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Question:

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:

	Α	LI-2-2-3-86 and is currently ABOVE the Main Steam Lines.
	В	LI-2-2-3-86 and is currently BELOW the Main Steam Lines.
	С	Wide Range indication and is currently ABOVE the Main Steam Lines.
<sup>:</sup> 🗸	D	Wide Range indication and is currently BELOW the Main Steam Lines.
Explain of Ans	nation	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.

market in the second	Cognitive Level	Facility	Materiais			
Exam Level	Cognitive Level	Statement Statements	Figure 1 OT-110			
Both	Application	PBAPS				
• 	The second se	in the second	the contraction of the second s			

### **KA Information**

Tier E/APE	R	O 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

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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.
<b>Operational Transient Procedures</b>	PLOT-1540		I	6	4

.

	Question:		of Turbine Building Closed Cooling Water (TBCCW), directs that if not be restored, Main Turbine Generator load should be reduced to						
	•	less than 18,0	000 amps in accordance with GP-9-2.						
	-	The basis for	this ON-118 step is to:						
	✓ A	A Permit heat generated by the isophase bus bars to be absorbed by the environment.							
	В	Reduce the h	eat load so that RBCCW is not overloaded when it backs up TBCCW.						
	С	Permit conder overheating.	nsate pumps to be alternated to prevent condensate pump						
	D	Reduce the hi on high tempe	eat load on TBCCW so that the station air compressors will NOT trip erature.						
	Explanation of Answer	the environme B. Incorrect, RBCCW. C. Incorrect, pumps.	It < 18,000 amps heat generated by the bus bars can be absorbed by ent without bus duct cooling. Isophase bus cooling is not a TBCCW load that is backed up by the basis for lowering to 18,000 amps is not to alternate Condensate Station air compressors are backed up by RBCCW on a loss of						
-	xam Level oth	Cognitive Memory	Level Facility Materials N/A						
KA I	nformatio	on							
Tier	E/APE	R	O Grp: 2 SRO Grp: 2 RO Val: 3.3 SRO Val: 3.4 55.43						
Syst	em:	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						
Que	stion Sou	urce Informa	ation						
Que	s 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

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## Question Data for Test: 1999 RO

			ment Air, directs			med if a	ny rođ	
91.	begins to drift	ins to drift in due to lowering scram pilot air header pressure.						
	What is the ba	ses for ti	his direction?	• •				
Α	To ensure that	t the scra	im discharge volu	ume is fully isola	ted durin	g the sci	am.	
✓в	To ensure that rod pattern.	t various	scram valve ope	ning pressures o	lo not re:	sult in a i	random	
с	To ensure that scram outlet v		vidual control rod	scram inlet valv	es do no	t open b	efore the	
D	To ensure that a full scram.	t sufficier	nt volume exists i	n the scram disc	harge vo	olume to	complete	
of Answer	<ul> <li>B. Correct, To pressures.</li> <li>C. Incorrect, s spring preload</li> <li>D. Incorrect, a</li> </ul>	o avoid ra scram ou l. an autom	r will result in SD andom rod inserti tlet valves open p atic scram would	on due to varyin prior to scram in be initiated off \$	let valves	s due to	greater	
	there being ins	sufficient	volume in the SE					
Exam Level	Cognitive I	Level	Facility	Materials N/A				
Both	Memory		PBAPS				_	
KA Informatio	<b>\</b> n							
Tier E/APE		) Grp: 2	SRO Grp: 2	RO Val: 3.4	SRO Val	: 3.6	55.43	
System:	295019		r Complete Loss			μ		
KA Group Num		1	ncy Procedure/P			. <u>x 1</u>	<u></u>	
KA Detail Num:	-	Knowled	lge of abnormal of	condition proced	ures			
Question Sou	urce Informa	tion						
Ques Source:			Ques Sourc		<u></u>			
Ques Mod Met		<u></u>	0001	<u>~ 1</u>				
References								
Reference Titl	e		Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .	
Loss of Instru	ment Air - Base		ON-119	Step 2.1 Base	2	[		

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

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Question:	A loose fitting Rod Drive (C	has resulted in the loss of instrument air to the in-service Control RD) Flow Control Valve (AO-19).
		hich of the following conditions could result from this instrument air
A	Control Rod	Drive accumulator alarms due to low pressure.
• в	Control Rod	Drive alarms due to high temperatures.
Ċ	Control Rods	s begin to drift due to excessive flow.
D	High rod spe	eeds during control rod withdrawal.
Explanation of Answer	B. Correct, I reduced coo C. Incorrect D. Incorrect	, CRD accumulator pressure is not affected by loss of air. loss of instrument air will cause AO-19 to fail closed resulting in ling water flow to CRDMs. cooling water flow and dP is reduced due to AO-19 closure. by Drive water flow and dP is reduced due to AO-19 closure. Materials
Exam Level Both	Cognitive	IN/A
KA Informati	on	
Tier E/APE	F	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 Nur	n:AK2	Knowledge of the interrelationship between loss of instrument air and the following
KA Detail Num	n: AK2.01	CRD Hydraulics
Question So	urce Inform	
Ques Source:	New	Question Source
Ques Mod Me	ot	
References	5 · · ·	
Reference Ti	itle	Facility Ref. No. Section Pg # Rev. L.O.
Loss of Instr		ON-119 Attachment 1 12 13

				F	Page 122 of 175
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

Question:	Cooling, dire	cts you to	d a loss of shutdov determine the exp back of Panel 20C6	pected decay he			
	The informat Aid is:	ion neces	ssary to determine	expected heat l	oad usin	g this Op	perator
A	Current heat	up rate.	······································	· · · · · · ·			
В		NM indica	ited power.				
C	Power histor	y before s	shutdown.				
✓ D	Elapsed time	since sh	utdown.				
Explanation of Answer	The operator	r aid relat	es time since shut	down to decay h	neat load	in mega	watts.
Exam Level Both	Cognitive Memory	e Level	Facility PBAPS	Materials N/A	<u>.</u>		
KA Informatio	- · ·	O Grp:	3 SRO Grp: 2	RO Val: 3.6	SRO Va	: 3.8	55.43
System:	295021		f Shutdown Coolin	-		1	
KA Group Nun	1	Knowle	edge of the operation o	onal implications		ollowing	concepts
KA Detail Num	AK1.01	Decay	Heat	•			
Question So	urce Inform	ation		· · · · · · · · · · · ·			
Ques Source:	New		Ques Sourc				
Ques Mod Me	t		· · ·				
References							
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Loss of Shute	lown Cooling	- Bases	ON-125	Step 2.8.7	11	1	
Reference Til	le		Facility Ref. No.	Section	Pg #	Rev.	L.O.
	cay Heat Ope	rator Aid					

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

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### Question Data for Test: 1999 RO

94	reactor power A start of the ' 920 psig and withdrawn cor Under these c	or startup was in progress with reactor pressure at 500 psig and at 1% when the running "A" Control Rod Drive (CRD) pump tripped. 'B" CRD pump is in progress. CRD charging header pressure was dropping when 3 accumulator trouble alarms were received on htrol rods. conditions, ON-107, Loss of CRD Regulation Function, directs that a ram be inserted. The basis for this direction is that:
✓ A	At this reactor proper scram	r pressure, operable HCU accumulators are required to ensure force.
В		r pressure the CRDM ball check valves will NOT reposition to permit ure to insert the control rods.
C		a may result in unanalyzed rod patterns due to rods inserting ow accumulator pressure.
D	rods that can	exceeds the Tech Spec Limit for the number of withdrawn control be declared "slow".
Explanation of Answer Exam Level	performance. important in p or at low reac	At reactor pressures less than 900 psig accumulators become very providing the scram force especially during a depressurization event tor pressures.         Level       Facility
Both	Memory	PBAPS
A Informati		O Grp: 2 SRO Grp: 2 RO Val: 3.3 SRO Val: 3.4 55.43
System:	295022	Loss of CRD Pumps
KA Group Nur	n: AK1	Knowledge of operational implications of the following concepts as they apply to loss of CRD pumps
KA Detail Num	n: AK1.01	Reactor pressure vs. rod insertion capability
Question So	urce Informa	ation
Ques Source:	New	Question Source
Ques Mod Me	t	
References		

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal Procedures	PLOT-1550			7	3

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Question:	Unit 2 has experienced a drywell steam leak with an ATWS. Current conditions are as follows:
95	<ul> <li>Reactor pressure being maintained 950-1050 psig.</li> <li>TI-2501 point 126 is not available.</li> <li>TI-2501 point 127 indicates 520 degrees F.</li> <li>Narrow range RPV level indicates +5 inches.</li> <li>Wide range RPV level indicates -115 inches.</li> <li>Fuel Zone RPV level range indicates -125 inches.</li> <li>Refuel range RPV level (Shutdown Range Instrument LI-2-2-3-86) indicates -</li> <li>21 inches.</li> </ul>
	"Primary Containment Control" to determine which RPV level indication ranges may be used.
Α	Narrow Range and Refuel Range
В	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 Leve Both	Cognitive Level     Facility     Materials       Application     PBAPS     T-102 Table DW/T-1
KA Informat	on RO Grp: 2 SRO Grp: 2 RO Val: 3.7 SRO Val: 3.9 55.43
System:	295028 High Drywell Temperature
KA Group Nu	the fillewise so they paply to
KA Detail Nu	n: EA2.03 Reactor Water Level

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#### **Question Source Information** Question Ques Source: New Source Ques Mod Met References **Reference Title** Facility Ref. No. Section Pg # Rev. L.O. PBAPS TRIPS PLOT-1650 8 9 Facility Ref. No. Section Pg# Rev. L.O. **Reference Title** Primary Containment Control T-102 Bases DW/T-4 19 14

Question:	T-102, Primary	y Contair	nment Control, pro	vides direction 1	o mainta	i <mark>in Torus</mark>	level in
			4.9 ft. In accord		RIP Base	s what is	s the first
	concern during	g a rising	torus level transie	ent?			
A	Submerging th	ne React	or Building to Toru	is Vacuum Brea	ker Line	•	
			•				
✓ в	Excessive stre	ess on S	RV tail pipes.				
			and and a second se	· . · · ·			
с	Submergence	of the T	orus Spray Heade	er.			
D	Excessive stress on ECCS suction piping.						
Explanation of Answer			ed submergence of			se exces	sive
	stress on SKV	/ pipes, c	uenchers, and as		15.		
Exam Level	Cognitive	Level	Facility	Materials N/A			
Both	Memory		PBAPS				
							•
KA Informatio						. 57	66 AD
Tier E/APE		) Grp: 2		RO Val: 3.4	SRU vai	. 3.7	55.45
System:	295029	High Su	ppression Pool W	/ater Level			
KA Group Num	EK1		dge of the operation		s of the fo	ollowing	as they
· ·			high suppression				
KA Detail Num:	EK1.01	Contain	ment Integrity	·			
Outother Cou		4:00					
Question Sou		auon	Ques				
Ques Source:	New		Sourc	1			
Ques Mod Met							
		· · · · · · · · · · · ·					<u> </u>
References							
	· .		Essility Pof No.	Section	Pg #	Rev.	L.O.
Reference Titl Primary Conta		l - Bas	Facility Ref. No. T-102 Bases	T/L-18	8	14	L.U.
I mary conte					1		L. S
Reference Titl	e		Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS			PLOT-1560		1	8	9
•		•	. ,	-			

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97	psig if Torus I		ects use of Torus S low 21 ft.	prays before 1	orus pres	isure rea	icnes 9
•	What are the	bases for	the 9 psig and 21	feet limitations	?		
✓ A	Threshold for	downcor	ner chugging and	Forus Spray he	ader bec	omes su	bmerged.
В	Threshold for become subn		ner chugging and <sup>-</sup>	Forus to drywel	l vacuum	breaker	ŝ
С	Threshold for submerged.	evapora	tive cooling and To	rus to drywell v	acuum b	reakers	become
D	Threshold for	evapora	tive cooling and To	rus Spray head	ler becor	nes subr	nerged.
Explanation of Answer	C. Incorrect,	See B ar	drywell vacuum br Id no maximum dP Live cooling is part	•			
Exam Level		·	Facility	Materials			
Both	Memory		PBAPS	N/A			
ier E/APE	R						EE 40
System:	295029	1	ppression Pool W				55. <u>43</u> ion pool
System:	295029	High Su Knowle		ater Level itionship betwe			, 
I System: A Group Nur	295029 n: EK2	High Su Knowle water le	uppression Pool W	ater Level itionship betwe			, 
I System: (A Group Nun (A Detail Nurr	295029 n: EK2	High Su Knowle water le Contair	uppression Pool W dge of the interrela evel and the followi	ater Level itionship betwe			, 
I System: (A Group Nun (A Detail Nun uestion Sol	295029 n: EK2 n: EK2.05	High Su Knowle water le Contair	uppression Pool W dge of the interrela evel and the followi iment/Drywell vacu	ater Level Itionship betwe ng ium breakers ion			, 
I System: (A Group Nurr (A Detail Nurr uestion Sou Ques Source:	295029 n: EK2 n: EK2.05 urce Inform New	High Su Knowle water le Contair	uppression Pool W dge of the interrela evel and the followi iment/Drywell vacu	ater Level Itionship betwe ng ium breakers ion			
I System: (A Group Nurr (A Detail Nurr uestion Sou Ques Source: Ques Mod Me	295029 n: EK2 n: EK2.05 urce Informa New	High Su Knowle water le Contair	uppression Pool W dge of the interrela evel and the followi iment/Drywell vacu	ater Level Itionship betwe ng ium breakers ion			, 
I System: (A Group Nun (A Detail Nurr	295029 n: EK2 n: EK2.05 urce Inform New	High Su Knowle water le Contair	uppression Pool W dge of the interrela evel and the followi iment/Drywell vacu	ater Level Itionship betwe ng ium breakers ion			, 
I System: (A Group Nurr (A Detail Nurr uestion Sol Ques Source: Ques Mod Me References Reference Tit	295029 n: EK2 n: EK2.05 urce Inform New	High Su Knowle water le Contair ation	uppression Pool W dge of the interrela evel and the followi iment/Drywell vacu Quest Source	ater Level Itionship betwe ng ium breakers ion e	en high s	uppress	
I System: (A Group Nurr (A Detail Nurr uestion Sol Ques Source: Ques Mod Me References Reference Tit	295029 n: EK2 n: EK2.05 urce Inform New t t t t t t t t t t t t t t t t t t t	High Su Knowle water le Contair ation	Ippression Pool W dge of the interrela evel and the followi iment/Drywell vacu Quest Source Facility Ref. No.	ater Level Itionship betwei ng ium breakers ion e Section	en high s	uppress	

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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.
Wide Range may be used, Vigilant Monitoring required
Wide Range may be used, Vigilant Monitoring NOT required.
Fuel Zone may be used, Vigilant Monitoring required.
Fuel Zone may be used, Vigilant Monitoring NOT required.
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.
Cognitive Level Facility
Application PBAPS T-103 Table SC/T-4

#### **KA Information**

Tier E/APE		RO Grp: 3	SRO Grp: 2 RO Va	1: 3.3 SR	O Val: 3.5	55.43
System:	295032	High Secor	ndary Containment Are	a Tempera	iture	
KA Group Num:	EA2		etermine and/or interproduced and containment area			apply to
KA Detail Num:	EA2.02	Equipment	Operability			
Question Sou	rce Inforn	nation				
Ques Source:	New		Question Source			
Ques Mod Met			· · · ·			
	•	· · · · · · · ·		· · ·	ter fan it s	

# 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:

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.
В	Reactor Building Ventilation continues to run. Refuel Floor Ventilation trips. SBGT initiates and aligns to the Refuel Floor.
С	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.
	A financial a

	Constitute Leviel		Materials		
Exam Level	Cognitive Level	Facility	N/A		
Both	Comprehension	PBAPS			
Boan	Comprenension		1		
•	-	and the second		 	

#### KA Information

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

Ques Source:	New
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Question Source

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Ques Mod Met					· · · · · · · · · · · · · · · · ·
References	• .				
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Refueling Floor Vent Exhaust Hi R	ARC 218 A-1	,	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	<b>x</b>	1	3	
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PCIS	PLOT-5007G	ll.B.4.h	18	0	1.c
				•	

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Question:	Unit 2 is in T-1	03, "Secondary Containment Control", due to high water level
100	condition in Se	condary Containment. The Reactor has been conservatively difference of the Group II/III isolations (from the level shrink) are complete.
	discharging in	irrently attempting to determine whether a Primary System is to the Reactor Building. Given the above conditions, evaluate the determine which constitutes a primary system discharging into the ng.
Α		a pipe flange on the discharge of the Reactor Water Cleanup Non- leat Exchanger.
В	Steam leakag	e from a rupture on the piping of the #2 Main Steam stop valve inlet.
С	Leakage from	a weld crack on the "A" RHR suction piping penetration to the Torus.
✔ D	Steam leakag drywell penetr	e from the Standby Liquid Control Injection line just outboard of the ation.
Explanation of Answer	B. Incorrect, #	RWCU is isolated on a complete Group II isolation. #2 MSV is not in the Reactor Building and not a T-103 issue. RHR suction is not a primary system.
Exam Leve Both	Cognitive Comprehe	IN/A
KA Informati	ion	
Tier E/APE	R(	O 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 Nu		
	m: 2.4	Emergency Procedure/Plan
KA Detail Nur		Emergency Procedure/Plan Knowledge of operational implications of EOP Warnings/Cautions/and Notes
KA Detail Nur		Knowledge of operational implications of EOP Warnings/Cautions/and Notes
KA Detail Nur	n: 2.4.20 Durce Informa	Knowledge of operational implications of EOP Warnings/Cautions/and Notes
KA Detail Nur Question Sc	n: 2.4.20 purce Informa New	Knowledge of operational implications of EOP Warnings/Cautions/and Notes ation
KA Detail Nur Question So Ques Source	n: 2.4.20 Durce Informa New	Knowledge of operational implications of EOP Warnings/Cautions/and Notes ation
KA Detail Nur Question So Ques Source Ques Mod Ma References Reference T	n: 2.4.20 Durce Informa New et	Knowledge of operational implications of EOP         Warnings/Cautions/and Notes         ation         Question         Source         Facility Ref. No.       Section       Pg #       Rev.       L.O.

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560			8	9

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Question:	Reactor Buildi an "actual fire	ing 135' el ", and the	MODE 1 at 75% evation. The Cre CRS has directe ber Backfill Syste	w has entered ( d that the Equip	DN-114, 1	he proce	dure for
,			f this system und on and unreliable				
Α	Lowering Inst	rumentatio	on Variable Leg d	ensity.			
В	Raising Instru	mentation	Variable Leg de	nsity.	- -		
<b>√</b> C	Lowering Inst	rumentatio	on Reference Lec	density.			
D	Rising Instrun	nentation I	Reference Leg de	ensity.			
Explanation of Answer	reference leg	temperatu ce leg will	3B reference leg ire. With the rise go down resultin	in reference leg	g tempera	ature, the	density
	- Cognitive	Level	Facility	Materials			
Exam Level Both	Memory		PBAPS	N/A			
			••••••••••••••••••••••••••••••••••••••				
KA Information	on						
Tier E/APE	R	O Grp: 2	SRO Grp: 2	RO Val: 3.1	SRO Val:	3.6 5	5.43
System:	600000	Plant Fire	e on Site				
KA Group Nur	n: AA2	Ability to plant fire	determine and in on site	nterpret the follo	wing as t	hey apply	to a
KA Detail Num	AA2.17	Systems	that may be affe	cted by the fire			
Question So	urce Informa	ation					
Ques Source:	New		Ques Sourc	1		•	
Ques Mod Me	t						
References		\$					
Reference Ti	tie		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Actual Fire R	eported - Base	es	ON-114	Note 1	1	6	

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
Off Normal Procedures	PLOT-1550			7	3

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# Question Data for Test: 1999 RO

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Question:			MODE 1 at 40% p			ed a loss	of
104			control room actions				
	Under these c	onditions	s, operator actions w	will be impacted	d by a los	ss of pow	ver to:
A	The RBCCW	backup o	of DWCW which will	l require manu	al transfe	r.	•
В	The lighting in	n vital are	as which will requir	e the use of fla	shlights.		
С	The Fire Aları	n Panel	which will require co	ontinuous rovin	g fire wa	tches.	
✓ D	The Control F	loom rad	ios which will requi	re the use of al	ternate c	ommunio	cations.
Explanation of Answer	B. Incorrect,	SE-11 di	backup of TBCCW rects use of flashlig wrong answer.			CW).	•
	Cognitive	Lovel	Facility	Materials			
Exam Leve Both	Memory		Facility PBAPS	N/A			
KA Informati					SBO Val	25	55.43
Tiér E/APE		-	SRO Grp: 1				
System:	295003	8 4 4 4	or Complete loss of				
KA Group Nur	m: AK2		dge of the interrela ver and	tions between	partial or	complet	e loss of
KA Detail Nun	n: AK2.04	AC Ele	ctrical Loads				
Question So	urce Informa	ation					
Ques Source:	New		Questi Source	1		•	
Ques Mod Me	et				<u> </u>		
References	;						
Reference Ti	itle		Facility Ref. No.	Section	Pg #	Rev.	L.O.
	terrutable AC F	Power -	ON-112-2	Note 4	2	6	
Reference T	itle		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Off Normal F			PLOT-1550		6	7	2

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Question Data for Test: 1999 RO

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Question:	Unit 2 is opera	ting in MODE	1 at 100%	power whe	en the following	occurs:
1 100	C	R HI PRESS" a essure indicate				
•		with OT-102 " mediate opera			re" which of the	following is an
Α	Control reacto	or pressure by i	raising the	Bypass Ja	ck setting.	<u></u>
В	Control reacto	r pressure by I	lowering th	ie Max Con	nbined Flow Lim	nit Pot.
✓ C	Control reacto	or pressure by I	lowering re	eactor powe	۶r.	
D	Control reacto	r pressure by I	raising the	Max Comb	pined Flow Limit	: Pot.
Explanation of Answer	102 step 2.2) B. Incorrect, I 111 step 1) C. Correct, P D. Incorrect, I	Max combined er OT-102 Ste Raising Max C	fiow limit p 2.1.1. combined F	put is lower	ed for reactor lo Pot would have r	s stabilized (OT- ow pressure (OT- no effect.
Exam Level Both	Cognitive Memory		APS	N/A	<u>.</u>	
KA Informatio		) Grp: 1 SI	RO Gro: 1	RO Val	: 3.5 SRO Val:	3.7 55.43
System:	295007	Reactor High	•		J	, 
KA Group Nun		<b>.</b>		elations bet	ween high reac	tor pressure and
KA Detail Num	: AK201	Reactor/Turb	ine Pressu	ire Regulati	ng System	
Question Sol	urce Informa	ition				
Ques Source:	New	· · · · · · · · · · · · · · · · · · ·	Que Sou	estion		
Ques Mod Me	t					<u></u>
· · · · · · · · · · · · · · · · · · ·	i the second second	· · · · · · · · · · · · · · · · · · ·				

# References

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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	2	
Reference Title	Facility Ref. No.	Section	Pg#	Rev.	L.O.
Operational Transient Procedures	PLOT-1540		1	6	3

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# Question Data for Test: 1999 RO

Question:	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.
В	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".
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.
	<ul> <li>B. Incorrect, Feed pump flow will rise on the loss of level and remain &gt; 20%, no runback.</li> <li>C. Incorrect, Total feed flow will remain &gt; 20% no runback.</li> <li>D. Correct, Level will slowly be lost due to reduced condensate flow and power remaining at 87%.</li> </ul>
Exam Level Both	<ul> <li>B. Incorrect, Feed pump flow will rise on the loss of level and remain &gt; 20%, no runback.</li> <li>C. Incorrect, Total feed flow will remain &gt; 20% no runback.</li> <li>D. Correct, Level will slowly be lost due to reduced condensate flow and power remaining at 87%.</li> </ul>
Both	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%.         1       Cognitive Level Facility         Materials         N/A
Both A Informatio	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%.         Image: Cognitive Level Facility Comprehension PBAPS
Both A Informatio	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%.         1       Cognitive Level Facility         Materials         N/A         ON
Both A Information Tier E/APE System:	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%.         1       Cognitive Level Facility         Materials         N/A         On         RO Grp:       1         SRO Grp:       1         RO Grp:       1         SRO Grp:       1         RO Grp:       1         SRO Grp:       1         RO Grp:       1         RO Grp:       1         SRO Grp:       1         SRO Grp:       1         RO Grp:       1         SRO Grp:       1         SRO Grp:       1         SRO Grp:       1         SRO Grp:       1
Both A Informatio	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%.         I       Cognitive Level Facility PBAPS         Materials         On         RO Grp:       1         SRO Grp:       1         RO Grp:       1         SRO Grp:       1         RO Grp:       1         SRO Grp:       1         RO Grp:       1         RO Grp:       1         SRO Grp:       1         RO Grp:       1         RO Grp:       1         SRO Grp:       1         RO Grp:       1         RO Grp:       1         RO Grp:       1         RO Grp:
Both A Information Fier E/APE System: KA Group Num KA Detail Num	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%.         I       Cognitive Level Facility PBAPS         Materials         N/A         On         RO Grp:       1         SRO Grp:       1         RO Grp:       1         RO Grp:       1         SRO Grp:       1         RO Grp:       1         SRO Grp:       1         RO Grp:       1         RO Grp:       1         SRO Grp:       1         SRO Grp:       1
Both A Information Tier E/APE System: KA Group Num KA Detail Num	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%.         1       Cognitive Level Facility PBAPS         Materials         N/A         On         RO Grp:       1         SRO Grp:       1         RO Grp:       1         At 1       Ability to operate and/or monitor the following as they apply to low reactor water level         n:       At 1.01         Reactor Feedwater       1         urce       Information

### 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		I	6	3
Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Recirculation Flow Control	PLOT-0040	IV	15	8	2k

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Question Data for Test: 1999 RO

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	IUnit 2 is at 100	% power when Drywell pressure begins to rise.
108	in accordance	with OT-101 "HIGH DRYWELL PRESSURE" follow up actions the neters and alarms are noted.
• • •	- PI-2-02-2-0	PUMP SEAL STAGE 2 HI FLOW' alarm 214 A-1 33A "Seal 1 Inner" 1056 psig 32A "Seal 2 Outer" 1043 psig
	Evaluate these statement belo	e indications, using the attached drawing, and select the appropriate w.
✓ A	The 1st stage	seal has failed but it is NOT the source of high drywell pressure.
В	The 2nd stage	e seal has failed but it is NOT the source of high drywell pressure.
С	The 1st stage	seal has failed and is the source of high drywell pressure.
D	The 2nd stage	e seal has failed and is the source of high drywell pressure.
Explanation	A. Conect-1	ligh flow alarm is due to a high second stage seal pressure caused
Explanation of Answer	by a failure of stage pressur	the recirc pump first stage seal. PI-032A is typically half of the first re, high second stage seal pressure indicates failure of first stage 4 A-1). With the 2nd stage seal intact, this would not be a source of pressure. A 2nd stage seal failure would cause PI-32A to indicate
	by a failure of stage pressur seal (ARC 214 high drywell p near 0 psig.	the recirc pump first stage seal. PI-032A is typically har of the first stage e, high second stage seal pressure indicates failure of first stage 4 A-1). With the 2nd stage seal intact, this would not be a source of pressure. A 2nd stage seal failure would cause PI-32A to indicate         Level       Facility         Materials         T-PLOT-0030-3 Recirculation Pump
of Answer Exam Leve Both A Informat	by a failure of stage pressur seal (ARC 214 high drywell p near 0 psig. Cognitive Comprehe	the recirc pump first stage seal. PI-032A is typically half of the first stage is high second stage seal pressure indicates failure of first stage 4 A-1). With the 2nd stage seal intact, this would not be a source of pressure. A 2nd stage seal failure would cause PI-32A to indicate         Level       Facility         Materials         T-PLOT-0030-3 Recirculation Pump
of Answer Exam Leve Both A Informat	by a failure of stage pressur seal (ARC 214 high drywell p near 0 psig. Cognitive Comprehe	the recirc pump first stage seal. PI-032A is typically har of the first stage is high second stage seal pressure indicates failure of first stage 4 A-1). With the 2nd stage seal intact, this would not be a source of irressure. A 2nd stage seal failure would cause PI-32A to indicate         Level       Facility         ension       PBAPS         O Grp:       1         SRO Grp:       1         RO Val:       3.5         SRO Val:       3.8         55.43
of Answer Exam Leve Both A Informat	by a failure of stage pressur seal (ARC 214 high drywell p near 0 psig. Cognitive Comprehe ion 295010	the recirc pump first stage seal. PI-032A is typically har of the first stage is high second stage seal pressure indicates failure of first stage 4 A-1). With the 2nd stage seal intact, this would not be a source of irressure. A 2nd stage seal failure would cause PI-32A to indicate         Level       Facility         ension       PBAPS         O Grp:       1         SRO Grp:       1         RO Val:       3.5         SRO Val:       3.8         55.43
of Answer Exam Leve Both A Informat fier E/APE System: KA Group Nu	by a failure of stage pressur seal (ARC 214 high drywell p near 0 psig. Cognitive Comprehe ion 295010 m: AK3	the recirc pump first stage seal. PI-032A is typically har of the first stage e, high second stage seal pressure indicates failure of first stage 4 A-1). With the 2nd stage seal intact, this would not be a source of irressure. A 2nd stage seal failure would cause PI-32A to indicate         Level       Facility         ension       PBAPS         O Grp:       1         SRO Grp:       1         RO Val:       3.5         SRO Grp:       1         High Drywell Pressure         Knowledge of the reasons for the following responses as they apply
of Answer Exam Leve Both A Informat fier E/APE System: KA Group Nu KA Detail Nu	by a failure of stage pressur seal (ARC 214 high drywell p near 0 psig. Cognitive Comprehe ion 295010 m: AK3	the recirc pump first stage seal. PI-032A is typically har of the first stage         e, high second stage seal pressure indicates failure of first stage         4 A-1). With the 2nd stage seal intact, this would not be a source of irressure. A 2nd stage seal failure would cause PI-32A to indicate         Level       Facility         ension       PBAPS         O Grp:       1         SRO Grp:       1         RO Val:       3.5         SRO Grp:       1         Ro Val:       3.5         SRO Grp:       1         Ro Val:       3.5         SRO Grp:       1         Ro Val:       3.8         55.43         High Drywell Pressure         Knowledge of the reasons for the following responses as they apply to high drywell pressure         Leak investigation         ation
of Answer Exam Leve Both A Informat Tier E/APE System: KA Group Nu KA Detail Nu	by a failure of stage pressur seal (ARC 214 high drywell p near 0 psig. Cognitive Comprehe ion 295010 m: AK3 m: AK3.04 purce Information	the recirc pump first stage seal. PI-032A is typically har or the first stage         e, high second stage seal pressure indicates failure of first stage         4 A-1). With the 2nd stage seal intact, this would not be a source of irressure. A 2nd stage seal failure would cause PI-32A to indicate         Level       Facility         ension       PBAPS         Materials         T-PLOT-0030-3 Recirculation Pump         Seal Piping         O Grp:       1         SRO Grp:       1         RO Val:       3.5         SRO Grp:       1         Ro Val:       3.5         SRO Val:       3.8         55.43         High Drywell Pressure         Knowledge of the reasons for the following responses as they apply to high drywell pressure         Leak investigation

# References

Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
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	200

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109	Using OT-10 <sup>4</sup> to be the "A" l isolate the "A'	l, High D Recircula ' Recircu	t 70% power wher rywell Pressure, th tion pump seals. lation pump.	e source of the The CRS has di	leak has rected yo	been de ou to trip	termined and
	pump and wh				loolaalig		Caration
A	Shut the suct	ion valve	first since it can c	lose against a h	igher dP	•	
В	Shut the disc	harge va	ve first since it car	n close against a	a higher (	dP.	
✓ C	Shut the suct	ion valve	first since it is limi	ted to closing a	gainst a I	ower dP	
D	Shut the disc	harge va	ive first since it is l	imited to closing	against	a lower	dP.
Explanation of Answer	OT-101 Base	S					· · ·
Exam Level Both	Cognitive Memory	Level	Facility PBAPS	Materials N/A			
KA Informatio		0 Grp: [1		RO Val: 3.4	SRO Val	3.6	55.43
Tier E/APE System:	295010	-	rywell Pressure				
KA Group Num	1	1.	ency Procedure/Pl	an			
KA Detail Num:		1	dge of abnormal c		ures		
Question Sou	rce Inform	ation					
Ques Source:	New	· · · · · · · · · · · · · · · · · · ·	Ques				
Ques Mod Met							
References							
Reference Titl	е		Facility Ref. No.	Section	Pg #	Rev.	L.O.
High Drywell I	Pressure - Ba	ses	OT-101	Note	4	10	
Reference Titl			Facility Ref. No.	Section	Pg #	Rev.	L.O.
Operational T	ransient Proc	edures	PLOT-1540	•		6	4

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# Question Data for Test: 1999 RO

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Question:	Unit 2 is at 100% power.
110	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.
В	EHC pressure set setpoint drops 10 psi.
С	Condensate pump trip.
D	Loss of RBCCW to RWCU Non-regen Heat Exchanger.
Explanation of Answer	<ul> <li>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.</li> <li>B. Incorrect, a reduction in pressure set setpoint will cause reactor pressure to drop, causing additional voiding a negative reactivity addition.</li> </ul>
	<ul> <li>C. Incorrect, A condensate pump trip at 100% power will cause a 45% recirc runback, a negative reactivity addition.</li> <li>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.</li> </ul>
Exam Level Both	<ul> <li>C. Incorrect, A condensate pump trip at 100% power will cause a 45% recirc runback, a negative reactivity addition.</li> <li>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.</li> </ul>
Both KA Information	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. <u>Cognitive Level</u> Facility <u>Application</u> PBAPS ON
Both KA Information	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. <u>Cognitive Level</u> Facility Materials <u>Cognitive Level</u> Facility N/A ON <u>RO Grp: 1 SRO Grp: 1 RO Val: 4.0 SRO Val: 4.3 55.43</u>
Both KA Information	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. <u>Cognitive Level</u> Facility Application PBAPS ON RO Grp: 1 SRO Grp: 1 RO Val: 4.0 SRO Val: 4.3 55.43 295014 Inadvertent Reactivity Addition
Both KA Information Tier E/APE System:	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. Cognitive Level Facility Materials Cognitive Level Facility PBAPS N/A ON RO Grp: 1 SRO Grp: 1 RO Val: 4.0 SRO Val: 4.3 55.43 295014 Inadvertent Reactivity Addition m: AA2 Ability to determine and/or interpret the following as they apply to inadvertent reactivity addition.
Both KA Information Tier E/APE System: KA Group Nun KA Detail Nun	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. Cognitive Level Facility Materials Cognitive Level Facility PBAPS N/A ON RO Grp: 1 SRO Grp: 1 RO Val: 4.0 SRO Val: 4.3 55.43 295014 Inadvertent Reactivity Addition m: AA2 Ability to determine and/or interpret the following as they apply to inadvertent reactivity addition.
Both KA Information Tier E/APE System: KA Group Nun KA Detail Nun	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.         I       Cognitive Level       Facility         Materials       N/A         On       RO Grp:       T SRO Grp:         RO Grp:       T SRO Grp:       T RO Val:         4.0       SRO Val:       4.3         295014       Inadvertent Reactivity Addition         m:       AA2       Ability to determine and/or interpret the following as they apply to inadvertent reactivity addition.         m:       AA2.03       Cause of reactivity addition

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### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Positive Reactivity Insertion	OT-104 Bases	3	<b>1 1</b>	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:	are closed pri	or to eval	is the reason why cuating the Main ( the Remote Shute	Control Room in	Isolation accorda	n Valves nce with	(MSIV) SE-1,
<b>~</b> A	With MSIVs of the Remote S		reactor inventory Panel.	and pressure co	ontrol ma	iy take p	lace at
В	Since plant re closing the M	elease poi SIVs prec	ints cannot be mo cludes any concer	nitored at the Re n for off-site rele	emote Sh eases.	nutdown	Panel,
С	1		ide the Main Con sible during an ev		es acces	ss to plar	nt areas
D	If the MSIVs a for verification		d from outside the lete closure.	Main Control R	oom, the	re is no i	method
Explanation of Answer							
Exam Leve Both	Cognitive Memory	Level	Facility PBAPS	Materials N/A			
KA Informati		O Grp: 2	SRO Grp: 1	RO Val: 3.4	SRO Val	3.6	55.43
System:	295016	Control	Room Abandonm	nent			
KA Group Nur	n: 2.4	Emerge	ency Procedures/	Plans			
KA Detail Nun	n: 2.4.11	Knowle	dge of abnormal o	condition proced	ures		
Question So	urce Inform	ation	. ·				
Ques Source:	1997 PBAP	S NRC E	xam Ques Sourc				
Ques Mod Me	et 🛛					•••	
References	;						
Reference Ti	· · · · · · · · · · · · · · · · · · ·		Facility Ref. No.	Section	Pg#	Rev.	L.O.
Plant Shutdo	wn from the R	emote S	SE-1	mmeidate Actio	h 5 1	16	• HAX - 4
Reference Ti	tle		Facility Ref. No.	Section	Pg #	Rev.	L.O.
Special Ever	nts		PLOT-1555		<b>J</b> .	4	10

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Question:	Unit 2 Reactor	Operator is controlling reactor leve	I using HPCI at	the Unit 2	
113	Alternate Shut	own Panel following Control Room	Abandonment.	Indicated	l
1	reactor level o	LI-2-2-3-112 is currently 20" and r	reactor pressure	is 500 ps	ig.
	Using SE-10 A	tachment 9, provided, determine the	ne current reacto	or level an	d the
	expected HPC	response if an actual high level co	ondition occurs.		
	Actual level is	40", HPCI will automatically trip o	n high level con	dition.	
Α					
	Actual level is	40", HPCI must be manually tripp	ed on high leve	condition	•
B					
	Actual level is	etween 0" and 40", HPCI will auto	matically trip on	a high lev	rel .
C	condition.			•	
	1			·	h. laural
✓ D		between 0" and 40", HPCI must be	manually trippe	d on a nig	n level
	condition.	• • • •			
Explanation	SE-10 Bases	Caution #100 "HPCI Operation is N	Aanual. All Trips	s, Isolation	is, and
of Answer	Auto Starts an		•		
	<b>F</b> 1000 - 1000 - 1000	Materia	ale		
Exam Level	Cognitive	evel Facility SE-10			
			ATT. 3		
The second s	Comprehe	nsion PBAPS			
Both	Comprehe	nsion PBAPS	•		
Both		nsion PBAPS			
ومواجدته والمراجع والمتحد والمتحد والمحد	on				
Both	on	Grp: 2 SRO Grp: 1 RO Va	l: 4.0 SRO Val	4.1 55	5.43
Both KA Informatio	on		l: 4.0 SRO Val	4.1 55	5.43
Both KA Information Tier E/APE System:	on RC 295016	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment			
Both KA Information	on RC 295016	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t			
Both CA Information Tier E/APE System: KA Group Nun	on R( 295016 n: AA1	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t control room abandonment			
Both KA Information Tier E/APE System: KA Group Nun	on R( 295016 n: AA1	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t			
Both KA Information Tier E/APE System:	on R( 295016 n: AA1	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t control room abandonment			
Both KA Information Tier E/APE System: KA Group Nun KA Detail Num	on RC 295016 n: AA1 n: AA1.06	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t control room abandonment Reactor Water Level			
Both KA Information Tier E/APE System: KA Group Num KA Detail Num Question Sol	on R( 295016 n: AA1 n: AA1.06 urce Informa	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t control room abandonment Reactor Water Level			
Both KA Information Tier E/APE System: KA Group Num KA Detail Num Question Source:	on RC 295016 n: AA1 AA1.06 urce Informa New	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t control room abandonment Reactor Water Level			
Both KA Information Tier E/APE System: KA Group Num KA Detail Num Question Sol	on RC 295016 n: AA1 AA1.06 urce Informa New	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t control room abandonment Reactor Water Level			
Both KA Information Tier E/APE System: KA Group Num KA Detail Num Question Source:	on RC 295016 n: AA1 AA1.06 urce Informa New	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t control room abandonment Reactor Water Level			
Both KA Information Tier E/APE System: KA Group Num KA Detail Num Question Source: Ques Source: Ques Mod Me	on RC 295016 n: AA1 AA1.06 urce Informa New t	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t control room abandonment Reactor Water Level			
Both KA Information Tier E/APE System: KA Group Num KA Detail Num Question Source:	on RC 295016 n: AA1 AA1.06 urce Informa New t	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t control room abandonment Reactor Water Level			
Both KA Information Tier E/APE System: KA Group Num KA Detail Num Question Source: Ques Source: Ques Mod Metail References	on RC 295016 n: AA1 AA1.06 urce Informa New t	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t control room abandonment Reactor Water Level tion Question Source	the following as t	they apply	<b>to</b>
Both KA Information Tier E/APE System: KA Group Num KA Detail Num Question Sol Ques Source: Ques Mod Metail References Reference Tit	on RC 295016 n: AA1 AA1.06 urce Informa New t	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor to control room abandonment Reactor Water Level tion Question Source Facility Ref. No. Set		they apply	to L.O.
Both KA Information Tier E/APE System: KA Group Num KA Detail Num Question Source: Ques Source: Ques Mod Metail References	on RC 295016 n: AA1 AA1.06 urce Informa New t	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor t control room abandonment Reactor Water Level tion Question Source	the following as t	they apply	to
Both KA Information Tier E/APE System: KA Group Num KA Detail Num Question Sol Ques Source: Ques Mod Metail References Reference Tit	on RC 295016 n: AA1 AA1.06 urce Informa New t	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor to control room abandonment Reactor Water Level tion Question Source Facility Ref. No. Set	the following as t	they apply	to L.O.
Both KA Information Tier E/APE System: KA Group Num KA Detail Num Question Sol Ques Source: Ques Mod Metail References Reference Tit	on RC 295016 n: AA1 AA1.06 urce Informa New t	Grp: 2 SRO Grp: 1 RO Va Control Room Abandonment Ability to operator and/or monitor to control room abandonment Reactor Water Level tion Question Source Facility Ref. No. Set PLOT-1555	the following as t	they apply	to L.O.

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
Plant Shutdown from the Alternativ	SE-10 Bases	Caution #100	7	10	

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 monito evidence of fuel damage.					
	Which of the fo leak from this t	-		d be the fi	rst indication of a small fuel pin	
A	Main Steam Li	ne Radia	tion Recorders			
✓ В	Air Ejector Dis	charge L	og Monitor Rec	orders.		
С	Off-Gas Adsor	ber Outle	et Radiation Ind	ication.		
D	Main Stack Ga	is Record	der.			
of Answer Exam Level Both	background ra B. Correct, Air gasses since I process flow n E-1). C. Incorrect, C hold up pipe a D. Incorrect, I will go up due failure.	d level fr r Ejector N-16 wou nakes this Off-gas a nd would Main stac to gland	om N-16 and si discharge radia Id have decaye s a sensitive ind dsorber outlet r not be the first is at the end	eam flow. Ition levels ad away al dication of adiation in indication of the off-(	s is primarily due to fission product t this point. The low volume of fission product gasses (ARC 218 indication is at the discharge of the of fuel damage. gas process flow and although it t be the first indication of fuel	
KA Informatio		) Grp: 2	SRO Grp:		al: 3.4 SRO Val: 3.6 55.43	
System:	295017		-Site Release		-	
KA Group Num: AA1 Ability			bility to operator and/or monitor the following as they apply to high ff-site release rate			
KA Detail Num	AA1.07	Process	radiation moni	toring sys	tem	
Question Sou	urce Informa	tion				
Ques Source:	New			estion urce		
Ques Mod Me						

### 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	· .	T	3	

. i	Question:	T-223, "Drywe Reactor Opera without an eng side of T-223 I	II Cooler I ator repor jineering Figure 1, 1 pllowing d	Fan Bypass" fi ts that the Dry evaluation due "Drywell Chille lescribes the b	or Drywell pre well Cooler fa to plant cond d Water (DW asis for restri	ation of Drywell Cooling, using essure control. The Unit ins cannot be placed inservice ditions falling on the UNSAFE CW) Saturation Curve. cting Drywell Fan restoration
	✓ A	Water hamme is restored.	r and rup	ture of piping i	nboard of DW	/CW Isolation valves when flow
	В	Inadvertent lift valves when fi			ef valves inbo	ard of the DWCW Isolation
	С	Overcurrent tr	ips of the	Drywell Coole	r Fans if rest	arted with a LOCA condition.
	D	Overpressuriz valves with a l			ing inboard o	f the closed DWCW Isolation
•	Explanation of Answer	piping resultin B. Incorrect, s during flow res C. Incorrect, 1 FAST speed D. Incorrect, 1	g in water setpoint o storation. an trip co basis for r	r hammer whe f DWCW relief oncerns are du	n flow is re-es valves shoul e to moisture	d prevent spurious actuation present and starting fans in /CW piping.
В	oth	Memory		PBAPS		
KA Ir <sub>Tier</sub>	nformati		) Grp: 1	SRO Grp:	1 RO Val:	3.4 SRO Val: 3.5 55.43
Syst	em:	295024				
KAC	Group Nur	n:EA1	Ability to Drywell		or monitor the	following as they apply to High
KA D	Detail Num	EA1.14	Drywell	Ventilation Sys	tem	
Ques	stion So	urce Informa	tion	,	· · ·	
Que	s Source:	New		_	estion . urce	
Que	s Mod Me	t				

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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		Ī	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: 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 117 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? Manual operation of SRVs between 950 psig and 1050 psig. A Automatic operation of the EHC system at 920 psig. В Manual operation of ADS SRVs to stabilize pressure below 1050 psig. С Automatic operation of SRVs at their setpoint. D Explanation A. Incorrect, opening and closing of SRV following a GPI is NOT cycling per Tof Answer 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. Materials Cognitive Level Exam Level Facility N/A Both Comprehension PBAPS

#### **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		Ability to operate and/or monitor the following as they apply to high reactor pressure				
KA Detail Num	EA1.03	Safety/Relief Valves				
Question Sou	urce Inform	nation				
Ques Source:	New	Question Source				

Ques Mod Met

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### References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .
RPV Control - Bases	T-101 Bases	Step RC/P-1	3 24, 25	21	
Reference Title	Facility Ref. No.	Section	Pa #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560		T	8	9

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# Question Data for Test: 1999 RO

Question:	CRS directs reto permit man	perienced a reactor scram following a steam leak in the Drywell. The restoration of Drywell Instrument Nitrogen from T-101, RPV Control, hual reactor pressure control. Restoring Instrument Nitrogen to the cordance with GP-8E, "Primary Containment Isolation Bypass":
✓ A	May contribut	te to a flammable environment in the Drywell.
В	Will only supp	ply nitrogen to the "B" Instrument Nitrogen Header.
С	May deplete (	CAD nitrogen tank inventory.
D	Will only be p pressure.	permitted if Instrument Air Header pressure is greater than Drywell
Explanation of Answer Exam Leve Both KA Informat	instrument nit operation. B. Using SGI C. Using SGI D. May be by drywell press el Cognitive Memory	Matorials
Tier E/APE		O Grp: 1 SRO Grp: 1 RO Val: 3.3 SRO Val: 4.0 55.43
I System:	295025	High Reactor Pressure
KA Group Nu	ım:2.4	Emergency Procedures/Plans
KA Detail Nu	m: 2.4.20	Knowledge of operational implications of EOP warnings/cautions/and notes
Question So	ource Informa	ation
Ques Source	New	Question Source
Ques Mod M	et	
	I	
Reference	s	
Reference Reference T		Facility Ref. No. Section Pg # Rev. L.O

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560	··· · · ·	I	8	11

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Question Data for Test: 1999 RO

Question:	Unit 3 has ex	xperienced a transient and the following is observed:
1	- Torus pres	essure: 9 psig
	- Torus tem	nperature: 200 degrees F
	- Torus leve	vel: 14 feet
		pressure: 1000 psig
· .		Loop Flow: 23,000 gpm
		ay "B" Loop Flow: 7500 gpm
	- All other id	low pressure ECCS pump are NOT in service.
	Lico the attac	ched T-102 Sheet 3 curves to determine if Net Positive Suction Head
		uirements are being met.
- ge there any a strategy in state of the state of the	j	
A	There is suffi	ficient NPSH for the "A" Loop of the RHR ONLY.
	There is suffi	ficient NPSH for the "B" Loop of Core Spray ONLY.
✓ В		
- - -		
С	1	ficient NPSH for both the "A" Loop of RHR and the "B" Loop of Core
	Spray.	
	There is NO	T sufficient NPSH for either the "A" Loop of RHR or the "B" Loop of
. D	Core Spray.	
[		
Explanation of Answer		-102 curves, only the B loop of Core Spray is operating in the safe
or Mildiner	region.	
Exam Lev	el Cognitive	e Level Facility Materials
Both	Applicatio	11-102 Sn. 3
Boun	Application	
A Information	tion	
Tier E/APE	R	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 Nu	Im: EK1	Knowledge of the operational implications of the following concepts
		as they apply to Suppression Pool High Water Temperature
	EK4.04	Dumo MDCH
KA Detail Nu	m: EK1.01	Pump NPSH
Question S	ource Inform	nation
		Question
Ques Source	I I I I I I I I I I I I I I I I I I I	Source
Ques Mod M	let	
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# References

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Reference Title	Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS	PLOT-1560		1	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:	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'?									
Α	HPCI turbine exhaust becomes uncovered at 9.5', RCIC turbine exhaust becomes uncovered at 6'.									
✓ В	HPCI turbine exhaust becomes uncovered at 9.5', RCIC turbine exhaust is an insignificant containment input.									
С	HPCI NPSH uncovered a		a concern at 9.5	, RCIC turbine e	xhaust b	ecomes				
D	HPCI NPSH containment		a concern at 9.5'	, RCIC turbine e	xhaust is	a insignil	icant			
Explanation of Answer	Self explana RCIC is sec		if it is aligned to th	ne Torus to preve	ent vorte	xing.				
Exam Level Both	Cognitiv Memory		Facility PBAPS	Materials N/A	· · · · · · · · · · · · · · · · · · ·					
KA Informatio	on									
Tier E/APE		RO Grp: 2	SRO Grp: 1	RO Val: 3.6	SRO Va	: 3.7 5	5.43			
System:	295030	Low Su	ppression Pool W	later Level	• •					
KA Group Nun	n:EK3		dge of the reasor suppression pool		ng respor	ises as th	ey apply			
KA Detail Num	EK3.03	RCICC	perations							
Question So	urce Inform	nation								
Ques Source:	New	•	Ques							
Ques Mod Me	t					<u></u>				
References	······································									
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	L.O.			
Primary Cont	ainment Con	trol	T-102	/L-11 to T/L-16	βa7-8	14				
Reference Tit	le		Facility Ref. No.	Section	Pg #	Rev.	<b>L.O</b> .			
PBAPS TRIP	S		PLOT-1560			8	9			

### Question Data for Test: 1999 RO

Quest	22	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 le - HPCI tripp - RCIC is bl	pressure is 800 psig. evel -195" and dropping slowly. ped on a loss of lube oil. plocked out of service.							
		Evaluate thes Cooling (ACC	se plant conditions and determine the status of Adequate Core C).							
-	Α	ACC exists u	until level is below -200".	-						
· •	в	ACC exists u	until level is below -210".							
	с	ACC does N	IOT exist, since level is below -172".							
	D	ACC does N	IOT exist, since injection is not present.							
Explar of Ans		ACC is provid	ided by steam cooling with no RPV injection until -210".	And the second second						
Exam Both	Level	Cognitive Memory	IN/A							
KA Infor			RO Grp: 1 SRO Grp: 1 RO Val: 4.6 SRO Val: 4.7 55.43	•						
System:		295031	Reactor Low Water Level							
KA Group	o Num	EK1.01	Knowledge of the operational/implications of the following concept as they apply to reactor low water level	ts						
KA Detail	Num	EK1.01	Adequate Core Cooling							
Question	n Sol	Irce Inform	nation							
Ques So	urce:	New	Question							
Ques Mo	d Met									
			المراجع والمنافع والمنافع المنافع المنافع المنافع المنافع والمنافع والمنافع والمتعادي المنافع والمنافع والمنافع							

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### References

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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

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Question Data for Test: 1999 RO

Question:	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.									
В	LR-110A blue impacted.	LR-110A blue pen input would swap at -100", low level ECCS initiations would be impacted.								
C	LR-110A blue would NOT b	ue pen input would NOT swap at -100", low level ECCS initiatio be impacted.	ins							
D	LR-110A blue would be imp	ue pen input would NOT swap at -100" low level ECCS initiation pacted.	ins							
Explanation of Answer		out swaps from LT-72 to LT-73 when LT-72 senses < -100", (in gh), ECCS -160" inputs continue to be taken from LT-72.	dication							
Exam Leve Both	Cognitive Compreh	IN/A								
KA Informati		RO Grp: 1 SRO Grp: 1 RO Val: 4.4 SRO Val: 4.4 5	5.43							
System:	295031	Reactor Low Water Level								
KA Group Nur	n: EK2	Knowledge of interrelations between reactor low water low I the following	evel and							
KA Detail Num	n: EK2.01	Reactor Water Level Indication								
Question So	urce Inform	nation								
Ques Source:	New	Question								
Ques Mod Me	t									
References	•									
Reference Ti		Facility Ref. No. Section Pg # Rev.	L.O.							
Reactro Vess	sel Instrumenta	tation an PSYS-5002B HO 4 1 0	2c							

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## Question Data for Test: 1999 RO

	Question:	- Reactor po - Reactor lev - Torus temp - SRV's A, B	wer: 30% el: -100" erature: , C, G op	% 115 degrees F en	•	terminated and prevented using	
		T-240.					
		For the conditi performing T-2		d above, which	of the follow	ing concerns is the basis for	
	A	Uncontrolled i	njection o	of large amount	s of cold wat	er.	
	✓в	Power genera	tion which	h is a threat to	primary cont	ainment.	
	С	Neutron flux o	scillations	s which challen	ge fuel clad	integrity.	
and the second	D	Power excurs	ons while	e establishing n	ninimum alte	rnative RPV flooding pressure.	
	Explanation of Answer	B. Correct, L( C. Incorrect,	Q-11 Basis for	lowering level	o -60", T-11 40 prior to e	stablishing MARFP, T-116 RF-25	
-	cam Level oth	Cognitive Comprehe		Facility PBAPS	Material N/A	S	
KA Ir <sub>Tier</sub>	formati		) Grp: 1	SRO Grp:	1 RO Val:	4.0 SRO Val: 4.2 55.43	
Syste	em:	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				
KAC	Detail Num	n: EK2.09	Reactor	Water Level		<u> </u>	
Ques	stion So	urce Informa	ation				
Que	s Source:	New			estion urce		

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					Page 169 of 175
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	

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### Question Data for Test: 1999 RO

Question:

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.

Α	T-213, "Scram Solenoid De-Energization"
B	T-214, "Isolating and Venting the Scram Air Header"
<b>√</b> C	T-215, "Control Rod Insertion by Withdraw Line Venting"
D	T-216 "Control Rod Insertion by Manual Scram or Individual Scram Test Switches"
xplanation f Answer	<ul> <li>A. Incorrect, T-213 N/A due to scram valves open, evidenced by blue lights lit.</li> <li>B. Incorrect, T-214 N/A ARI initiated at 1106 psig and blue lights lit.</li> <li>C. Correct</li> </ul>

D. Incorrect, No instrument air available for closing scram inlet and outlet and open SDV for accumulator charge and discharge volume draining.

Exam Level		Facility	N/A
Both	Application	PBAPS	and the second

#### KA Information

E

Tier E/APE	RO G	rp: 1 SRO Grp: 1 RO Val: 4.2 SRO Val: 4.3 55.43
System: 29		cram condition present and reactor power above APRM which which are a set of the set of
KA Group Num: Ek	K3 Ki to do	nowledge of the reasons for the following responses as they apply scram condition present and reactor power above APRM ownscale or unknown
KA Detail Num: Ek	K3.07 Va	arious alternate methods of control rod insertion

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Question Source In	formation					
Ques Source: New		Quest Sourc				
Ques Mod Met						
References						· .
Reference Title		Facility Ref. No.	Section	Pg #	Rev.	L.O.
RPV Control		T-101	RC/Q-19	12	21	an a
Reference Title		Facility Ref. No.	Section	Pg #	Rev.	L.O.
PBAPS TRIPS		PLOT-1560 Facility Ref. No.	Section	Pg #	8 Rev.	9 L.O.
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Reference Title		Facility Ref. No.	Section	Pg #	Rev.	L.O.
		Facility Ref. No.	Section	Pg#	Rev.	L.O.
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#### Question Data for Test: 1999 RO

A steam leak exists in the Unit 3 Turbine Building. T-104, "Radioactivity Release", Question: has been entered due to high ventilation stack radiation alarms. The Equipment 126 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. Restart ventilation to monitor the release. ¥. А Restart ventilation to lower the radioactive release. В Maintain ventilation tripped to prevent an unmonitored release. С Maintain ventilation tripped to lower the radioactive release. D Explanation T-104 Step RR-6 directs that ventilation be restored to maintain personal of Answer accessibility and prevent a ground level unmonitored release. Materials **Cognitive Level** Facility Exam Level N/A PBAPS Both Memory **KA Information** RO Val: 3.6 SRO Val: 3.8 55.43 SRO Grp: 1 RO Grp: 2 Tier E/APE 295038 High Off-Site Release Rate System: Knowledge of the interrelationship between off-site release rates KA Group Num: EK2 and the following: Plant Ventilation Systems KA Detail Num: EK2.03 **Question Source Information** Question Ques Source: New Source Ques Mod Met References Pg # Rev. L.O. **Reference Title** Facility Ref. No. Section Step RR-6 .10 Radioactivity Release - Bases T-104 Rev. L.O. **Reference Title** Facility Ref. No. Section Pg # PLOT-1560 PBAPS TRIPS

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## Question Data for Test: 1999 RO

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Question:	For which of the following conditions would direction be given to initiate Drywell									
127	Sprays regardless of whether Adequate Core Cooling is assured?									
A	To prevent e	exceeding	the Pressure Sup	opression Pressi	ure Limit					
- B	To maintain Drywell pressure below the Drywell Spray Initiation Limit.									
₹ c	To mitigate t	To mitigate the consequence of a H2 deflagration.								
D	To mitigate t	he conse	quences of contair	ment overpress	urization	<b>1.</b>				
Explanation of Answer	B. Incorrect ACC. C. Correct -	- Sprays See T-10 - If ACC	are not used to pro are utilized prior to 2 DW/G-3.9 Base is assured sprays	exceeding this s.	limit but	not rega				
	a in the second second	*** *****	naan <b>aga na</b> man ku sang membah menan su at at su kuta pas <b>a naaka panan</b> pangan pertakan pangan pertakan pertakan T	Materials	ar i na ni i ni na na ang Mar i hans ni	naguruh kongerun ke				
Exam Level Both	Cognitive Memory		Facility PBAPS	N/A						
A Informatic		O Grp:	1 SRO Grp: 1	RO Val: 3.3	SRO Va	I: 3.9 (	55.43			
System:	500000	High C	ontainment Hydro	gen Concentratio	ons	n kateloko ato nako ako na turku ku	AND ALL ALL ALL ALL ALL ALL ALL ALL ALL AL			
(A Group Num	EK1		edge of the operati apply to high con							
KA Detail Num:	EK1.01	Contai	nment Integrity			••••••••••••••••••••••••••••••••••••••				
uestion Sou	irce Inform	ation								
Ques Source:	New	· · ·	Ques							
Ques Mod Met					- 					
References	· · · · · · · · · · · · · · · · · · ·	-	<u> </u>							
Reference Titl			Facility Ref. No.	Section	Pg #	Rev.	L.O.			
Primary Conta	ainment Cont	roi	T-102 - Bases	DW/G-3.9	3.6	14				

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Reference Title	Facili	ity Ref. No.	Section	Pg#	Rev.	L.O.
PBAPS TRIPS	·PL	OT-1560	n - , , , , , , , , , , , , , , , , , ,	an a	8	9

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# 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

PI	ES-D-1				Scenari	o Outline	• .
Objectives         Evaluate the ability of the crew to swap Steam Jet Air Ejectors while maintaining vacuum rethe manipulation of several components. The crew should recognize and respond to record control rod withdraw block due to an INOP failure of the "B" Rod Block Monitor (RBM) requires to the "F" SRV failing open. The crew will perform a Rapid Power Reduction as a procedure directed efforts to close the SRV. A small leak that develops on the SRV mount will result in a rise in drywell pressure. The crew will take action per the Drywell High Press. Procedure to attempt to identify and isolate the leak but will eventually be required to initiat manual SCRAM. Twelve control rods will fail to insert when the scram is initiated resulting a TVVS. Six rods will be able to be inserted using T-220 but an ATVS will still exits. Steam the break will cause the leak to increase resulting in containment pressure instrument failures will use of containment sprays. Pressure instrument failures will use of containment sprays when they are attempted. As containment temperature rises th must terminate and prevent all injection per T-240 prior to performing the Emergency Blow 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         Malfunction         Pres           QuRO         F" Safety Relief Valve fails open           G         MSS08F         C         PRO           Start Main Colon         MRO         Representation of CRS           Start Pre-inserted         G         F" Safety Relief Valve fails open           C		Facility Peach	Bottom	<u>.</u>	Scenario No.	#1	Op Test No.
Objectives         Evaluate the ability of the crew to swap Steam Jet Air Ejectors while maintaining vacuum re the manipulation of several components. The crew should recognize and respond to recornor or dwithdraw block due to an INOP failure of the "B" Rod Block Monitor (RBM) required to interest of the "F" SRV failing open. The crew will perform a Rapid Power Reduction as procedure directed efforts to close the SRV. A small leak that develops on the SRV moun will result in a rise in drywell pressure. The crew will take action per the Drywell High Press Procedure to attempt to identify and isolate the leak but will eventually be required to initiat manual SCRAM. Twelve control rods will fail to insert when the scram is initiated resulting ATWS. Six rods will be able to be inserted using T-220 but an ATWS will still exist. Steam the break will cause the leak to increase resulting in containment pressure and temperature continue to degrade requiring use of containment sprays. Pressure instrument failures will use of containment syrays when they are attempted. As containment temperature rises the must terminate and prevent all injection per T-240 prior to performing the Emergency Blow 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         Malfunction         Event         Event           No.         Type*         Description           1         N CRS         Place "B" SJAE in service, remove "A" SJAE from service.           2         RBM03B         I         CRS         "B" Rod Block Monitor failure (Tech Spec)           3 <td>Examiners</td> <td></td> <td></td> <td>2</td> <td></td> <td>Operators</td> <td>CF</td>	Examiners			2		Operators	CF
Objectives         Evaluate the ability of the crew to swap Steam Jet Air Ejectors while maintaining vacuum reports of withdraw block due to an INOP failure of the "B" Kod Block Monitor (RBM) requires the Spec determination. Following the Tech Spec determination, the crew will be evaluate response to the "F" SRV failing open. The crew will perform a Rapid Power Reduction as a procedure directed efforts to close the SRV. A small leak that develops on the SRV mount will result in a rise in drywell pressure. The crew will take action per the Drywell High Press. Procedure to attempt to identify and isolate the leak but will eventually be required to initiate manual SCRAM. Twelve control rods will fail to insert when the scram is initiated resulting ATWS. Six rods will be able to be inserted using T-220 but an ATWS will still exist. Steam the break will cause the leak to increase resulting in containment pressure and temperature containment sprays when they are attempted. As containment tailures will use of containment sprays when they are attempted. As containment temperature rises th must terminate and prevent all injection per T-240 prior to performing the Emergency Blow 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.         Type*         Description           1         N         CRS         Place "B" SJAE in service, remove "A" SJAE from service.           2         RBM03B         I         CRS         Place "B" Sdety Relief Valve fails open           3         MSS08F         C         PRO         Rapid power red				•			PF
the manipulation of several components. The crew should recognize and respond to reco control rod withdraw block due to an INOP failure of the "B" Rod Block Monitor (RBM) requ Tech Spec determination. Following the Tech Spec determination, the crew will be evalual response to the "F" SRV failing open. The crew will perform a Rapid Power Reduction as p procedure to attempt to identify and isolate the SRV. A small leak that develops on the SRV moun will result in a rise in drywell pressure. The crew will take action per the Drywell High Press Procedure to attempt to identify and isolate the leak but will eventually be required to initiat manual SCRAM. Twelve control rods will fail to insert when the scram is initiated resulting ATWS. Six rods will be able to be inserted using T-220 but an ATWS will still exist. Steam the break will cause the leak to increase resulting in containment pressure and temperature continue to degrade requiring use of containment sprays. Pressure instrument failures will use of containment sprays when they are attempted. As containment temperature rises th must terminate and prevent all injection per T-240 prior to performing the Emergency Blow 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 Maifunction PRO           N CRS           INRO           URO           Control rods will fail to insert or will insert slowly duri           Mass of the TS Stafe PRO           Event           N CRS           Pr	•.	· · · · ·					UF
Event No.Malfunction Type*Event Type*Event Description1No.Type*Description1No.PRO CRSPlace "B" SJAE in service, remove "A" SJAE from service.2RBM03B1CRS"B" Rod Block Monitor failure (Tech Spec)3MSS08FCPRO CRS"F" Safety Relief Valve fails open4RPRO CRSCRS5MSS01MPRO CRS6Pre-inserted Control Rod MalfunctionsURO CRS7InstrumentICRS		response to the procedure dire will result in a Procedure to a manual SCRA ATWS. Six ro the break will continue to de use of contain must terminate	ne "F" S ected e rise in attemp M. Tw ods will cause egrade ment s e and p	SRV failir efforts to drywell p t to ident velve cor be able the leak requiring sprays wi prevent a	ng open. The cr close the SRV pressure. The c tify and isolate th trol rods will fail to be inserted us to increase resu g use of containr hen they are atto	ew will perform a A small leak tha rew will take acti he leak but will e to insert when th sing T-220 but an liting in containm nent sprays. Pre empted. As containm	a Rapid Power Reduction as p at develops on the SRV mount on per the Drywell High Press ventually be required to initiate he scram is initiated resulting in ATWS will still exist. Steam tent pressure and temperature ssure instrument failures will tainment temperature rises the
1       -       N       PRO CRS       Place "B" SJAE in service, remove "A" SJAE from service.         2       RBM03B       1       URO CRS       "B" Rod Block Monitor failure (Tech Spec)         3       MSS08F       C       PRO PRO CRS       "F" Safety Relief Valve fails open         4       R       PRO PRO CRS       Rapid power reduction.         5       MSS01       M       PRO PRO CRS         6       Pre-inserted Control Rod Malfunctions       URO CRS       Twelve control rods will fail to insert or will insert slowly duri (ATWS)         7       Instrument       I       CRS       Pressure instrument failure prevents using containment spr	initial Cond		. •		,	_oop Blocked Fo	r MO-154A valve work.
2       RBM03B       I       CRS       "B" Rod Block Monitor failure (Tech Spec)         3       MSS08F       C       PRO CRS       "F" Safety Relief Valve fails open         4       R       PRO CRS       Rapid power reduction.         5       MSS01       M       PRO CRS       Steam Leak In The Drywell, (small progressing to large leak CRS         6       Pre-inserted Control Rod Malfunctions       URO CRS       Twelve control rods will fail to insert or will insert slowly duri (ATWS)         7       Instrument       I       CRS       Pressure instrument failure prevents using containment spr	Turnover:	See Attached "	Shift T	'urnover" vent	,		Event
3       MSS08F       C       PRO CRS       "F" Safety Relief Valve fails open         4       R       PRO PRO CRS       Rapid power reduction.         5       MSS01       M       PRO CRS       Steam Leak In The Drywell, (small progressing to large leak CRS         6       Pre-inserted Control Rod Malfunctions       URO CRS       Twelve control rods will fail to insert or will insert slowly duri (ATWS)         7       Pre-inserted Instrument       PRO I       PRO CRS       Pressure instrument failure prevents using containment spr	Turnover: Event M No.	See Attached "	Shift T Ev Ty	'urnover" vent ype* PRO	Sheet	C	Event Description
4       R       PRO PRO CRS       Rapid power reduction.         5       MSS01       M       PRO PRO CRS       Steam Leak In The Drywell, (small progressing to large leak CRS         6       Pre-inserted Control Rod Malfunctions       URO CRS       Twelve control rods will fail to insert or will insert slowly duri (ATWS)         7       Instrument       I       CRS	Turnover: Event M No. 1	See Attached " Malfunction No.	Shift T Ev Ty	urnover" vent /pe* PRO CRS URO	Sheet Place "B" SJA	C E in service, rem	Event Description hove "A" SJAE from service.
5       MSS01       M       PRO CRS       Steam Leak In The Drywell, (small progressing to large leak CRS         6       Pre-inserted Control Rod Malfunctions       URO CRS       Twelve control rods will fail to insert or will insert slowly duri (ATWS)         7       Pre-inserted Instrument       PRO I       CRS	Turnover: Event M No. 1 2	See Attached " Malfunction No. - RBM03B	Shift T Ev Ty N	urnover" yent ype" PRO CRS URO CRS URO CRS URO PRO	Sheet Place "B" SJA "B" Rod Block	E in service, rem Monitor failure (	Event Description hove "A" SJAE from service. Tech Spec)
6     Pre-inserted     URO     Twelve control rods will fail to insert or will insert slowly duri       6     Control Rod     C     PRO     (ATWS)       Malfunctions     CRS     PRO       7     Instrument     I     CRS	Turnover: Event M No. 1 2 3	See Attached " Malfunction No. - RBM03B	Shift T Ev Ty N I C	urnover" vent /pe* PRO CRS URO CRS URO PRO CRS URO PRO PRO	Sheet Place "B" SJA "B" Rod Block "F" Safety Rel	E in service, rem Monitor failure ( ief Valve fails op	Event Description hove "A" SJAE from service. Tech Spec)
Pre-inserted         PRO           7         Instrument         I         CRS         Pressure instrument failure prevents using containment spr	Turnover: Event M No. 1 2 3 4	See Attached " Malfunction No. - RBM03B MSS08F	Shift T Ev Ty N I C R	urnover" vent /pe* PRO CRS URO PRO CRS URO PRO CRS URO PRO CRS URO PRO CRS	Sheet Place "B" SJA "B" Rod Block "F" Safety Rel Rapid power r Steam Leak Ir	E in service, rem Monitor failure ( ief Valve fails op eduction.	Event Description hove "A" SJAE from service. Tech Spec) en mall progressing to large leak
	Turnover: Event M No. 1 2 3 4 5 6	See Attached " Malfunction No. - RBM03B MSS08F MSS01 Pre-inserted Control Rod	Shift T Ev Ty N I C R M	urnover" vent /pe* PRO CRS URO CRS URO PRO CRS URO PRO CRS URO PRO CRS URO PRO CRS URO PRO CRS	Sheet Place "B" SJA "B" Rod Block "F" Safety Rel Rapid power r Steam Leak Ir Twelve contro	E in service, rem Monitor failure ( ief Valve fails op eduction.	Event Description hove "A" SJAE from service. Tech Spec) en mall progressing to large leak

ES-D-2

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

ES-D-2

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Op Test No.:	Scer	nario No.: #1	Event No.:	2	Page	2 of 9	
Event Descri	ption: RBM	Channel "B" Fails	INOP				
Cause:		Failure of 5 volt	power supply to I	NOP trip i	referenc	e circuit.	
Effects:		Receipt of a Rod	Withdraw Block	and asso	ciated a	larms	
Time	Position	Applicant's Action	ons Or Behavior				
	URO	Recognize/take a INOPERATIVE" a alarms and inform	and ARC 211 D-3	211 C-3 "F 3 "ROD W	RBM HIG /ITHDR/	GH AW BLOCK"	
•	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 the RBM in the tr	bypass the "B" ipped condition u	RBM (CR Intil troubl	S may e eshooti	elect to maintain ng has begun).	
н 1 М	URO	If directed, place position.	the Joystick for t	he "B" RB	BM in the	e Bypass	
	CRS	Direct the URO/F troubleshooting s			or EDM	for	
	URO PRO	Contact the WWI as directed.	Vi or EDM for tro	ubleshoot	ing sup	port for the RBM	

Scenario No.: #1 Event No.: 3 **Op Test No.:** Page 3 of 9 **Event Description:** "F" SRV Fails Open Mechanical failure of relief valve pilot. Cause: Alarms 210 D-2 "SAFETY RELIEF VALVE OPEN" and 227 B-4 **Automatic Actions:** "BLOWDOWN RELIEF VALVES HI TEMP" Loss of Generator load, steam/feedwater mismatch, heat input to Effects: primary containment. Position **Applicant's Actions Or Behavior** Time Recognize/take action IAW 210 D-2 "SAFETY RELIEF VALVE · URO OPEN" and 227 B-4 "BLOWDOWN RELIEF VALVES HI TEMP" PRO 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 Confirm that SRV "F" is open IAW OT-114 URO PRO Place the B loop of Torus cooling in service IAW RRC 10.1-2 "RHR PRO SYSTEM TORUS COOLING DURING A PLANT EVENT", when directed by the CRS and monitor Torus temperature. Cycle the SRV control switch when directed by the CRS. PRO Perform a Fast Power Reduction IAW GP-9-2 when directed by the URO CRS, (See details in Event 4) Coordinate removal of fuses by Equipment Operators and monitor URO valve status during attempts to close the SRV when directed by the PRO CRS. Recognize/take action IAW 226 A4 "TORUS WATER LEVEL OUT PRO 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.:	Scen	ario No.: #1 Event No.: 4 Page 4 of 9					
Event Descri	ption:	Fast Power Reduction					
Cause:		Directed from OT-114, Inadvertent Opening of a Relief Valve					
Automatic A	ctions:	None					
Time	Position	Applicant's Actions Or Behavior					
1. 	CRS	Direct a Fast Power Reduction until recirculation flow is reduced to approximately 51.25 Mlbs/hr.					
•	URO	<ul> <li>Perform a Fast Power Reduction until recirculation flow is reduced to approximately 51.25 Mlbs/hr.</li> <li>Reduce Recirculation Flow to 90% power</li> <li>Insert Table 1 Rods full in</li> <li>Reduce Recirculation Flow to 51.25 Mlbs/hr</li> </ul>					
	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.					

ES-D-2

Op Test No.: Scer	nario No.: #1 Event No.: 5 Page 5 of 9
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"
<u>Effects</u> :	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 -	<ul> <li>Enter/direct follow up actions IAW OT-101:</li> <li>Direct Fast Power Reduction IAW GP-9-2 and transfer of house loads at drywell pressure of 1.5 psig and rising.</li> <li>Direct manual scram at drywell pressure of 1.7 psig and rising.</li> <li>Direct investigation into source of drywell leakage.</li> <li>Direct drywell venting.</li> <li>Direct isolation of potential leak sources.</li> </ul>
URO	<ul> <li>Take Scram Actions when directed:</li> <li>Reduce reactor power IAW GP-9-2.</li> <li>Place the Mode Switch to Shutdown</li> <li>Verify Rods inserting</li> <li>Manually control the Reactor Feed Water System to control Reactor Level</li> <li>Verify APRMs are downscale</li> <li>Recognize that all rods did not insert, ATWS, (See Event 6)</li> <li>Report to the CRS</li> </ul>
CT URO	Recognize and report ATWS.

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#### **Operator Actions** Scenario

NO.: #1 Event No.: 5(cont.)

ES-D-2 6 of 9 Page

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.

- Recognize drywell pressure/temperature are continuing to rise, URO PRO inform CRS.
- Recognize and report 2# Drywell T-101, T-102 entry conditions. URO PRO
- Verify and take action for 2# automatic initiations and isolations. URO (HPCI initiation, Diesel Generator auto start, Group II/III isolations) PRO

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.

**Operator Actions** 

Op Test No.: Scenario No.: #1 Event No.: 6

Event Description: Twelve Rods Fail to Scram - ATWS

<u>Cause:</u> 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 Direct an EO to perform T-221.

PRO

Page 8 of 9 **Op Test No.:** Scenario No.: #1 Event No.: 7 Event Description: Inability to spray Continiment Drywell pressure input to spray logic permissive not functioning. Cause: Automatic Actions: Alarm 225 B-3 "SYSTEM II DRYWELL PRESSURE PERMIT CONTAINMENT SPRAY" is NOT received Effects: Prevents containment spray. **Applicant's Actions Or Behavior** Position Time Initiate torus sprays when directed (crew may go directly to DW PRO 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" Recognize the inability to maintain drywell bulk average CRS temperature less than 281 F. Per T-117, direct performance of T-240 to terminate and prevent CT CRS RPV injection prior to directing T-112 Emergency Blowdown. Perform T-240 Termination and Prevention of Injection into the PRO RPV for the following systems: HPCI Feedwater/Condensate Core Spray RHR **ECCS Stayfull** Inform the CRS when T-240 is completed.

#### Operator Actions Scenario NO.: #1 Event No.: 7(cont.)

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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							
Simulati	on Facility Peach	Bottom	•	Scenario No.	#2	Op Test No.	
Examiné	ers				Operators		CRS
	· · · · · · · · · · · · · · · · · · ·					· · · · · · · · · · · · · · · · · · ·	PRO
							URO
Objectiv	high. The creater require the creater INOP and mainitiation require the ATWS. A Spec determining will attempt to leak search l/ prior to the autor vac. When the Control" and initiated in an lowered to be main turbine to SRVs. Stand 110 °F. Pane approximately further lower	ew will ta ew to p ike a Te iring the Tech S nation, mainta AW OT- utomation T-117 " attemp elow -60 trips du lby Lique el aware y one m level to polling le	ake actio erform a ech Spec e crew to Spec determain corn ain vacuu -106 "Cor c signal, v al or aut Level/Por t to inser " IAW T- e to loss nid Control eness will ninute. T control p vel in its	n for a control r Fast Power Re determination. shut it down ar ermination will b denser vacuum m by performin ndenser Low Va when they deter tomatic scram is wer Control wit t control rods, a 240 "Terminatic of vacuum, the ol (SBLC) will be l alert the opera he other SBLC power when sup band. T-214. "Is	od drift in IAW duction. The c An instrument of making the s is made for the will begin to d g an additional acuum". The c rmine that vacu s inserted an e ill be entered to an ARI fuse will operators will o e placed in sen tors to a trip th pump should b operasion pool f solating and Ve	service and having the properties of the propert	tt". The ON will e control rod is spurious RCIC vel control during owing the Tech ige. The crew nd initiating a a manual scram, d above 24" Hg T-101 "RPV hen ARI is m. Level will be PV". When the manually using rature reaching is run for ie crew will 0 °F. When the der" will be
Initial C	ondition IC-14 1	00% po	ower				•
Turnove	er: See Attached	"Shift T	urnover"	Sheet			
Event No.	Malfunction No.		vent /pe*			Event Description	
1	Override		URO CRS	Standby CRD	Pump Motor C	Current Indication fails hig	h during start
2	CRH041847	С	URO CRS	Control Rod 1	8-47 Drifts into	the Core	
3		R	URO PRO CRS	Fast Power R	eduction		
4	Override	I	PRO CRS	RCIC Spuriou	Is Initiation		
5	CAR01 50	м	URO PRO CRS	Main Conden	ser Air Inleaka	ge	

6	RPS01 RPS02 RPS05	М	URO PRO CRS	Electrical ATWS
7	ARIF2A ARI01TO	1	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.

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(<sup>2</sup>,

Op Test No.:	Scen	ario No.:	#2	Event No	.: 1	Page 1 of 12			
Event Descri	ption: Stby	CRD Pump	Motor Cur	rent Indicatio	n fails h	igh during start.			
Time	Position	Applicant's Actions Or Behavior							
	CRS					D 3.6.A-2 "U/2 System Pump In			
•	URO	standby for	B pump star		5.A-2 "U/2	s are complete and 2 Placing Standby Service"			
	URO	Recognize Report this							
•	CRS	Direct troub	leshooting c	of the B CRD	oump				
			•	• .					
						•			
			•						

	ES-D-2							
Op Test No.: Sce	nario No.: #2	Event No.: 2	Page 2 of 12					
Event Description: Control Rod 18-47 drifts into the core								
Cause: Scram out	et valve leaks	•						
Automatic Actions: 211 D4, "ROD DRIFT ALARM" Full core display rod drift light illuminates								
Effects: Small power	er reduction							
Time Position	Applicant's Actions	s Or Behavior	•					
URO	Recognize and repo drift light for rod 18-	· · · · · ·	Rod Drift" alarm and rod					
URO	<ul> <li>Select the driftin</li> <li>Monitor: Reactor Reactor pressur</li> <li>Insert the drifting hold for 30 sec.</li> <li>Determine if the</li> <li>Reset "Rod Drift</li> <li>Reduce power IA 950 Mwe (see E</li> <li>Demand Official</li> <li>Request Reactor</li> <li>Declare the rod</li> <li>Notify the Operation</li> <li>Execute ON-121</li> <li>Select the drifting</li> </ul>	r power, Generator lo e g control rod to full-in u rod settles at full-in " alarm AW GP-9 "Fast React vent 3) 3D P1 and determine r Enconeering and wo inop and reference Te tions Manager I actions: g rod	ad, Reactor water level, using Emergency in and or Power Reduction" to e status of thermal limits rk week manager support					
	<ul> <li>Insert the drifting hold for 30 sec.</li> <li>Report that the r</li> <li>Reset "Rod Drift</li> <li>Reduce power la Demand Official</li> </ul>	od settled at full-in " alarm AW GP-9 to 950 Mwe 3D P1 and determine	using Emergency in and (see Event 3) e status of thermal limits possible cause of the rod					

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Op Test No.:	Scenario No.: #2	Event No.: 3	Page 3 of 12
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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.

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Op Test No.: Scer	nario No.: #2 Event No.: 4 Page 4 of 12
Event Description: R	
Cause: RO	CIC Logic Failure
Automatic Actions: R	CIC starts and injects into the vessel
Effects: Fe	eedwater 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

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	Ohe	rator Actions			E3-D-2
Op Test No.:	Scenario No.:	#2 Even	nt No.: 5	Page 5 of	12
<b>Event Description:</b>	Condenser Ai	Inleakage			· ·
Cause:	Crack in Cond	enser weld joint		·	
Automatic Actions		n @23" Hg vac and RFP turbine	es trip @ 20" H	g vac	
Effects:	Vacuum drops	, Offgas flow ris	ses, generator	load reduction	
Time Posit	ion Applicant	s Actions Or B	ehavior		
UR PR	•	, report, and tak n"	e actions IAW	ARC 206 D-2 "	Condenser
UR	Reduction	actor power IAV ' until vacuum s able 1 Rods ful e Recirculation I	tops dropping		r .
CR	Direct a restore	t actions IAW C SCRAM if con d above 24" Hg performance of earch"	denser vacuur vac and enter	n cannot be ma T-100 "SCRAN	aintained or <i>N</i> "
PR	(when it al Monitor Re Remove a	ne Main Genera arms) eactor Feed Pur Reactor Feed I Power System I	mp Flows durir Pump from ser	ng the power dro vice when requ	op. ired.
PR		, report, and tal ndenser Lo Va		ARC 203 B-2,	or C-2,or
	S Direct a R	eactor Scram a	t 24" Hg vac.		
CT UR	O Attempt to 101, "RPV	scram the read Control". (see	ctor and report event 6 for AT	the ATWS and WS details)	entry into T-
UR PR		d report main o	condenser vacu	um approachir	ıg 7" Hg vac

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Op Test No.:	Scer	nario No.: #2	Event No.:	5 (cont.)	Page	6 of <i>'</i>	12
Time	Position CRS	Applicant's Actio Anticipate lockout and direct reactor additional SRVs.	of the Main Tur	bine Bypass Va			ac
•	URO PRO	Recognize and represent the Recognize and represent the Recognize and the Recognize and Recognize and Recognize and Recognize and represent the Recognize and Recognize and represent the Recognize and Recognize an		closure of the N	√ain Tur	bine	
	PRO	Stabilize reactor p to compensate for			addition	al SRV	's
	PRO	Monitor and repor	t the increasing	rate of Torus wa	ater tem	peratui	re
•	CRS	When vacuum rea Steam Line Drain			/ISIVs aı	nd Mai	n
•	CRS	Direct Chemistry p Injection from ser		nove Condensat	te Syste	m Oxy	gen
	URO PRO	Close the MSIVs a	and Main Steam	n Line Drain valv	ies wher	n direct	ted.

Page 7 of 12 **Op Test No.:** Scenario No.: #2 Event No.: 6 Failure to scram (Electric ATWS) **Event Description:** RPS Logic Channels A1, A2, A3 fail to de-energize Cause: Alarms 211 B-1"A CHANNEL REACTOR AUTO SCRAM & D-1 "A Automatic Actions: CHANNEL REACTOR MANUAL SCRAM" are NOT received All RPS "A" channel automatic and manual scram signals fail to initiate Effects: automatic or manual scram **Applicant's Actions Or Behavior** Time Position URO Carry out Scram actions - Recoanize ATWS - Report that control rods are not inserting and the APRMs are NOT downscale Direct T-101 "RPV Control", RC/Q ATWS actions: CRS 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" Press Manual Scram pushbuttons or ARI manual pushbuttons URO Report that rods are not inserting and receipt of 207 E3 "ARI-RPT URO SYSTEM INOP LOSS OF POWER" alarm. (see event 7 for details) Enter and execute T-117 concurrently with T-101: CRS **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 Perform T-213, Direct an EO to perform applicable portions of the URO procedure. Perform T-214, Direct an EO to perform applicable portions of the URO procedure.

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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, Condense 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					
1	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°I					
	CRS	Enter/direct actions IAW T-102 Maximize Torus cooling					
	PRO	Maximize Torus cooling, monitor Torus water temperatures					
СТ	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					

ES-D-2

#### Scenario NO.: #2 Event No.: 6(cont.)

Page 9 of 12

Time

#### Position **Applicant's Actions Or Behavior**

Direct performance of T-240 IAW T-117 until any of the following: CRS

- **RPV level reaches -172**" •
- Reactor power drops below 4% .
- All SRVs remain closed
- Terminate and prevent RPV injection using T-240 until any of the PRO following:
  - **RPV level reaches -172**"
  - Reactor power drops below 4%
  - All SRVs remain closed
- Direct that level be restored and maintained between -200" and the CRS level to which it was intentionally lowered.
- Restore and maintain level between -200" and the level to which it PRO was intentionally lowered.
- Recognize and report receipt of 211 D-2 "SCRAM VALVE PILOT URO AIR HEADER PRESS HI-LO" and monitor scram air header pressure.
- Recognize and report inward control rod motion. URO
- URO Take Scram Actions:
  - Verify Rods inserting
  - Verify APRMs are downscale
  - Verity that all control rods have inserted
  - Report to the CRS
- Recognize termination of the ATWS CRS Exit T-117, T-101 RC/Q Enter T-101 RC/L-1 Direct level restoration to +5" to +35".
- Begin level restoration +5" to +35". PRO

Op Test No.:Scenario No.:#2Event No.:7Page10 of 12

Event Description: ARI FUSE FAILURE

Position

Cause: ARI "A" power supply fuse blows

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

**Applicant's Actions Or Behavior** 

Effects:

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

Time

- 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 Page 11 of 12

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.

Page 12 of 12 Scenario No.: #2 Event No.: 9 **Op Test No.:** Trip of Running Standby Liquid Control Pump **Event Description:** Contact in 42 device fails causing pump to stop Cause: **Automatic Actions:** None SBLC tank level remains constant, red pump running light out, green Effects: pump off light on **Applicant's Actions Or Behavior** Position Recognize, report the trip of the inservice Standby Liquid Control URO Pump.

> Direct the start of the other SBLC pump. CRS

Time

CT

Start the other SBLC pump and verify it is injecting boron into the URO 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

Simulat	tion Facility Peach	Bottom	Scenario No.	#3	Op Test No.	
Examin	iers	· ·		Operators		CRS
			-	-		PRO
	. <u></u>	·		-		URO
Objecti Initiał Conditi	resulting half Drywell Press response to t Positive Read Rods to lowe Main Steam isolation will t to isolate the the second te the blowdown IC-14, reduce	scrams and sure Transm he closure of ctivity proce r steam flow Tunnel of th be required leak in the l emperature h, one ADS	d isolations. The crew nitter which fails to gi of an MSIV requiring dures. The Crew will v to within the limitati e Reactor Building w due to an isolation fa Reactor Building. Th exceeds its action le SRV will not open an	w should recogn the crew to ent the crew to ent then perform a ions of the three vill require the sl ailure. One MSI he crew should p wel in the Second an additional	ernate Feed requiring to ize and respond to the IRPS Trip. Evaluate to er and execute the Hig Rapid Power Reduction open steam lines. A st nutdown of the plant. A V is mechanically stud perform an Emergency indary Containment. W SRV must be opened ocked For Motor Repla	failure of a he crew's h Pressure and on with Control steam leak in the A manual Group I k and will not shut blowdown when hen performing
Turnov		I "Shift Turn	over" Sheet			
Event No.	Malfunction No.	Event Type*			Event Description	
1		UF N PF	20		ne Alternate Power Su	pply
2	Override	I PF		ure Transmitter the Expected f	Failure RPS Trip (Tech Spec)	
3	MSS06G	C PF	RO Inboard MSIV	Fails Closed		
4		R Pf	RO Fast Power Re	eduction with Co	ontrol Rods	
5	MSS03	M PF	RO RO Steam Leak Ir RS	The Steam Tu	nnel (Inside Secondar	/ Containment)
6	Override	UF I PF	20	Fo Auto Isolate	Due to Failed Tempera	ture Instruments
7.	Override	C PF	RO Failure Of The RS	Inboard "C" MS	SIV To Manually Isolat	9
8	MSS08C	Pf	20	Fails to Open D	uring Manual Blowdov	vn.

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

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## 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.:#3Event No.:1Page1of 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.

ES-D-2

	-Polatol / (				LU-U-Z				
Op Test No.:	Scenario No.: #3	Event No.:	2	Page	2 of 9				
Event Description:	Drywell Pressure Indic Expected RPS Trip	Drywell Pressure Indicating Switch Fails Upscale Without Sending the							
Cause:	Spurious Failure of the	PIS-12B Drywe	Il Pressure	e Transi	mitter Trip Unit				
Automatic Actions:	Results in a High Dryw RPS/PCIS Trip Units ir	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 fa	ils to occur.							
<u>Time</u> <u>Positi</u>	ion Applicant's Action	s Or Behavior							
URC	D Recognize and report Trip (210 F-1) and ( Recognize and report with the DW Pressue	Gross Failure (2 ort the failure of	210 D-4).	• •					
CRS	S Direct and Equipme Use Tech Specs to have been impacte GP-25. Use GP-25, Table <sup>4</sup> using Appendix 2. Use GP-25, Table <sup>4</sup>	determine that d and that the c I to direct the tr	both RPS channels r ripping of	S and P must be the B1 I	CIS should tripped using RPS Channel				
PRC	O Verify actual Drywe Trip the B1 RPS ch			endix 2.					
NOT	E Appendix 6 can not must move on befo	be completed re the operators	in the sim s are expe	ulator, s ected to	so the scenario achieve this.				
· · · ·			•	•					

ES-D-2

Scenario No.: #3 **Op Test No.:** Event No.: 3 Page 3 of 9 **Event Description:** Inboard Main Steam Isolation Valve (MSIV) fails closed **Equipment Failure** Cause: **Automatic Actions:** None. The closure of the MSIV at this power will result in a significant power Effects: and pressure spike but will not result in a reactor scram. Position **Applicant's Actions Or Behavior** Time Recognize rising reactor pressure, inform the CRS and announce URO entry into the High Reactor Pressure OT (OT-102) Enter/direct actions IAW OT-102 CRS - 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) (GPq)Direct troubleshooting of the MSIV problem Investigate cause of the pressure rise URO PRO - Recognize the MSIV closure, inform CRS

Op Test No.:Scenario No.: #3Event No.: 4Page 4 of 9Event Description:Fast Power ReductionCause: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.: S	cenario No.: #3 Event No.: 5 Page 5 of 9						
<b>Event Description:</b>	Steam Leak In The Steam Tunnel (Inside Secondary Containment)						
<u>Cause</u> :	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 Positi	on Applicant's Actions Or Behavior						
URC PRC							
URC							
CRS	Enter and execute T-103, Secondary Containment Control. Direct a GP-15, Local Evacuation, of the Reactor Building						
PRC	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.						

Scenario No.: #3 Event No.: 5 (cont.)

Page 6 of 9

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.

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Op Test No.	.: Scen	ario No.: #3	Event No.:	6	Page	7 of 9
Event Descr		oup I Failure To A mperature Instrur		ual works	) due to	failed
Cause:	Те	mperature instrum	nents which input	into the "f	B" Group	I logic are failed
Automatic A	Actions: No	one, no alarms wil	I be received for	initiation o	of the "B'	' Group I logic.
Effects:	Gr	oup 1 failure to is e exception of the	olate, manual iso "C" Inboard MSI	lation will V (See E	l work on vent 7 fo	all MSL with r details).
Time	Position	Applicant's Act	ions Or Behavio	ŗ	·	
СТ	URO PRO	Recognize and System B High temperature is	report the failure Temperature ins olation).	of the gro struments	oup I isola s not givi	ation (due to the ng a proper high
,	CRS	Direct the isolati and to isolate sy	ion of the MSIVs ystems dischargir	(due to th ng in the t	ne failed the area	Group I isolation IAW T-103).

€° :

Op Test No.:	Scer	nario No.:	#3	Event No.:	7	Page	8 of 9
Event Descri	ption: Fa	ilure Of Th	ne Inboard	"C" MSIV To N	lanually k	solate	
Cause:		ne "C" Inboard MSIV was damaged by the hydraulic shock which curred when the "C" Outboard MSIV failed closed.					
Automatic Ac	ctions: No	one					
Effects:				ed between the an not be isola		Steam	Line Inboard
Time	Position	Applican	t's Actions	s Or Behavior			
	PRO			andswitches, r ure to manuall	-	and rep	oort the "C"
• • • •	URO PRO	Recogniz Building.	e and repo	ort additional te	emperatur	e alarm	s in the Reactor
СТ	CRS	Action Le Enter and	evel. d execute <sup>-</sup>	second area h Г-112, Emerge )pen all 5 ADS	ency Blowe	·.	greater that the
	PRO	Place the	e switches	for all 5 ADS S	RVs to th	e open	position.

**\$** 

		Ор	perator Ac	tions				ES-D-2		
Op Test No	.: Sc	enario No.:	#3	E	vent No.:	8	Page	9 of 9		
Event Descr	ription:	C" ADS SR	/ Fails to C	Open Durir	ng Manual	Blowdowi	n			
Cause:	:	SRV is mech	RV is mechanically failed in the closed position							
Automatic A	ctions:	None			1 A					
Effects:		When the "C" ADS SRV fails to open, the operator must open one additional non-ADS SRV.								
Time	Position	Applicant	t's Actions	s Or Beha	vior					
СТ	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	e opened to	o achieve	5 SRVs	open.		
	PRO	Open an a	additional	SRV to en	sure that {	5 SRVs ar	e 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).

Scenario Outline

ES-D-	1							
Simulat	tion Facility Peac	h Bottom	Scenario No.	#4	Op Test No.			
Examin	ers			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.							
Turnov		I "Shift Turnover		•				
Event No.	Malfunction No.	Event Type*		· · · · ·	Event Description			
1		URO N PRO CRS		ain Turbine Sto	p Valve Routine Test			
2	Override	C PRO CRS	Loss Of Extrac	ction Steam To	Feedwater Heaters			
3		URO R PRO CRS	Reduce React	or Power				
4	Override	URO I PRO CRS	Failure of a Va	acuum Transmit	tter (Tech Spec)			
5	MSS10	URO M PRO CRS		The Turbine B	-			
6	PCI01 Override	C PRO CRS	MSL To Manu		te (Manual works)/Failure Of The "D"			
7	Override	URO I PRO CRS	Failure To Scr	•	ode Switch/B RPS Auto Channel Failure)			
8	Override MSS08	URO C PRO CRS	Emergency Bl		itrogen/Only 2 SRVs Operate On ssurization 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

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**Op Test No.:** Scenario No.: #4 Event No.: 1 Page 1 of 8

**Applicant's Actions Or Behavior** 

**Event Description:** Main Turbine Stop Valve Routine Test

Position

Time

- 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.:	Scer	nario No.: #4 Event No.: 2 Page 2 of 8					
Event Descrip	tion: Lo	oss Of Extraction Steam To Feedwater Heaters					
<u>Cause</u> :		O Valves supplying various heaters fail closed due to a common airline eak					
Automatic Act	tions: No	one, no alarms					
Effects:		oss of extraction steam to heaters, lowering feed temps, rising eactor 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					

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Op Test No.:	Scenario No.:	#4	Event No.: 3	Page 3 of 8
	•			-

**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 "A" RPS Channel Half Scram, no rod motion Effects: Time Position **Applicant's Actions Or Behavior** URO Recognize and report 210 D-1, "CONDENSER LO VACUUM PRO TRIP" Recognize and report the "A" Channel Half Scram Verify actual condenser vacuum is normal Take action IAW ARC 210 D-1 "CONDENSER LO VACUUM TRIP" URO 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

Event No.: 5 Page 5 of 8 **Op Test No.:** Scenario No.: #4 Steam Leak In The Turbine Building **Event Description:** "D" MSL weld cracks Cause: Initially alarms will be received indicating vent stack problems and **Automatic Actions:** then will progress to Group 1 conditions High steam line flow Group 1 isolation condition and resultant reactor Effects: scram signal on MSIV closure **Applicant's Actions Or Behavior** Position Time Recognize, report, and take actions IAW ARC 218 B-5 & C-5 (Vent URO Exhaust Stack Hi Radiation) PRO - Monitor RI-2979 to verify a valid signal - Enter ON-104 Enter ON-104 and direct search for source of high vent exhaust rad CRS Recognize and report High Area Temperature Alarm with a URO potential T-103 (Secondary Containment Control) Entry PRO Monitor Area Temperatures and determine that the leak is in the PRO 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 Direct a Reactor Scram and closure of the MSIVs CRS Attempt to scram the reactor and report the ATWS and entry into T-URO 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.:	: S	cenario N	ło.: #4	E	vent No.:	6	Page	6 of 8	
Event Descri	ption:		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 A	ctions:	None, no	None, no alarms						
Effects:	•	the exce	ption of th	ne "D" lin		scram si		all MSL with MSIV closure	
<u>Time</u>	Positic	on Appl	icant's A	ctions O	r Behavio	<u>r</u>			
СТ	PRO	inforr - Clo	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				e of AO 1A ition of the			k Open MSIVs	
	PRO Dir Pe		Direct an EO to perform AO 1A.2-2 for the MSIVs Perform a GP-15 evacuation of the Turbine Building				g		
	URO PRO				ms 218 B- "Radiatio			ck Exhaust Hi Hi	
	CRS	- Initi - Cor depr Whe Eme "Eme	ate Dose ntinue to a essurize t n the rele rgency Le ergency B	Assessr attempt to take action the plant ase can evel by D Blowdowr	o isolate th on in T-10 (SEE EVE not be ma lose Asses	rence EF ne MSIV 1, "RPV ENT #7) intained ssment F	RP101 as s Control" to below the	appropriate o shutdown and	

Op Test No.: S	Cenario No.: #4 Event No.: 7 Page 7 of 8							
Event Description:	Failure to scram (Reactor Mode Switch/B RPS Auto Scram Channel failure)							
<u>Cause</u> :	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 Positi	on Applicant's Actions Or Behavior							
URC	<ul> <li>Carry out Scram actions</li> <li>Recognize ATWS</li> <li>Report that control rods are not inserting and APRMs are NOT downscale</li> </ul>							
CRS	<ul> <li>Exit T-100 and enter T-101 based upon scram condition with power greater than 4% (MSS failure)</li> <li>Direct that Manual Scram Pushbuttons be pressed or ARI be initiated</li> </ul>							
CT URC	Press Manual Scram pushbuttons or press ARI manual pushbuttons Verify rods inserting and APRMs downscale							
CRS	5 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							
URC	Attempt to control level +5 to +35 inches							
PRC	<ul> <li>Carry out Scram actions</li> <li>Verify house loads transferred</li> <li>Verify main turbine tripped and generator locked out</li> <li>Attempt to restore Drywell instrument nitrogen (SEE EVENT #8)</li> <li>Initiate a depressurization (if time allows – RPV is depressurizing slowly through the break)</li> </ul>							

Op Test No.:	Scen	ario No.:	#4	Event No.:	8	Page	8 of 8		
<b>Event Description</b>		nly 2 SRVs Operate On Emergency Blowdown/Depressurization Via ternate Methods							
Cause:	Dr	ywell nitrog	gen not available a	and some SR	/s with med	chanica	l failures		
Automatic Action	<u>is</u> : No	one	ne						
Effects:			open 2 of the requered to depres				y		
Time Pos	sition	Applican	t's Actions Or Be	ehavior					
P	RO		o restore DW inst open, report to th		en, discov	er that t	the valves		
CT	RS	Determin Emergen Emergen Blowdow - Direct L	cy depressurize t	es are going t he reactor us ndensate inje	to reach Ge ing T-112,	eneral			
U	IRO	Prevent u	uncontrolled cond	ensate injecti	on	,			
P	PRO		switches to open te that 5 ADS valu			CRS			
C	RS	Direct ad	ditional SRVs to I	be opened ur	ntil 5 are op	en	•		
. F	PRO	Attempt t Recogniz	o open SRVs unt ze only 2 SRVs ca	il 5 are open an be opened	, inform Cf	RS			
C	CRS	Direct de	pressurization us	ing alternate	means				
TERMINATION -	Scena	rio may be	terminated when	alternate de	oressurizat	ion is d	irected.		

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

Simulation Facility:	n Peach	Bottom	٦.	Scenario No.:	#5	Op Test No.:	
Examiner	S		•		Operators		CRS
			•.	•••			URO
							PRO
<b>Objective</b> Initial	During the por reactivity add Pump Speed a manual trip drywell. The action. Evalu Demonstrate	ower as dition. En I. The c D. The ro main go uate cre the abi	cension, valuate the rew shou ecirc pun enerator w's ability lity to util	a recirc pump wil ne crew's respon- uld recognize the np discharge valv will fail to lockout y to spray the dry ize TRIP procedu	I runaway requise to the Tech Recirc Pump h e will fail to clo when the turbi well with the ot ires.	perform a normal pow iring the crew to take a Spec implications of mi igh vibration and seal f se resulting in an uniso ine is tripped requiring in ther loop when the first Motor Replacement	ction for positiv smatched Reci ailures requiring lable leak in the manual operato
Condition Turnover	s See Attached	"Shift T	urnover"	Sheet	.•		
Event	Malf.		vent			Event	
No.	No.	<u> </u>	<u>vpe*</u> URO			Description	
1		N	PRO CRS	Place the "A" R	eactor Feed Pu	ump in service	
2		R	URO PRO CRS	Continue Powe	r Ascension IA	W GP-2	
3	RFC01A		URO PRO CRS	Recirc Pump R	unaway (includ	les Tech Spec for misn	natched flows)
			URO		ish Vibration R	equiring Manual Trip	·
	KRSTIA		CRS				. ·
5	RRS13A/ RRS14A	с	URO PRO CRS	"A" Recirc Purr	p Seals both f	ail .	
6	VED01_74	с	URO PRO CRS	Recirc Pump D	ischarge Valve	e Trips on Overcurrent	
		м	URO PRO CRS	Small Recirc L To Drywell Spr		A Inside Primary Conta	inment Leading
7	RRS20		0110	1			
7	RRS20 MGA01	1	PRO CRS	Main Generato	r Fails to Lock	Out Automatically	

## 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.

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Op Test No.: Scenario No.: #5 Event No.: 1 Page 1 of 10

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	<ul> <li>Place the "A" Reactor Feed Pump (RFP) in service using the normal system operating procedure.</li> <li>Raise "A" RFP Discharge Pressure to greater than reactor pressure.</li> <li>Slowly stroke open the RFP Discharge Valve while monitoring RPV Level</li> <li>Place the "A" RFP in Automatic</li> <li>Close the "A" RFP Min Flow Valve</li> </ul>
	URO PRO	Monitor plant parameters/assist as directed

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Op Test M	o.: Scer	iario No.:	#3	Event No.:	2	Page	2 01	10	
Event Desc	cription: Cont	inue Power	Ascensi	on IAW GP-2					
Time	Position	Applicant'	s Actio	ns Or Behavio	or				
	CRS	Directs cor exceed 10	•	oower increase	using	recirc flow p	er GF	2 not to	

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

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Op Test No.: Scenario No.: #5 Event No.: 3 Page 3 of 10

Event Description: "A" Recirc Pump Runaway

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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
СТ	URO PRO	Recognize rising "A" Recirc Pump speed, inform CRS
	CRS	Directs scoop tube lockup
· · ·	URO PRO	<ul> <li>Locks scoop tube with the selector switch</li> <li>Verifies post scoop tube lockup actions and indications per SO 2D.7.B-2, Recirculation MG Set Scoop Tube Lockup and Reset</li> <li>Monitors pump speed, power, level and pressure</li> </ul>
	URO PRO	Lower Core Flow to or below initial level using the "B" Recirc Pump Monitor plant parameters/assists as necessary
	CRS	<ul> <li>Verify compliance with Tech Specs Section 3.4.1 for mismatched recirculation flows. If flows are outside of the limits, then:</li> <li>Declare the pump in the low flow loop inoperable</li> <li>Start a 12 hour time clock per Tech Spec 3.4.1</li> </ul>

	$\mathbf{N}$								/
			Oper	rator Ac	ctions				ES-D-2
ŧ	Op Test No.	Scen	ario No.:	#5	Event No.:	4	Page	4 0	10
•	Event Descrip	otion: "A" R	ecirc Pump I	High Vit	pration requirir	ng Manual	Trip		
	Cause: Pump	shaft nisali	ignment					/	
1	Initial Automat	ic Actions:	Rising pur	np vibrat	tions requiring	action pe	r ARC 2	14 B-1	
	Effects (Gener	ral Sequence	<u>ce)</u> : Risi to looking u	ng pum p earlie	p vibrations, u r) or shutdown	nable to r IAW SO,	educe pu will requ	imp spe iire pum	ed (due p trip
	Time	Position	Applicant's	s Actio	ns Or Behavid	or			
		URO PRO	CRŠ - Monitor pi	umpvib	irc Pump high ration ation and tren	/	alarm 21	4 B-1, ir	nform
	· .								
		CRS	level due to in accordan	scoop ice with	np speed can tube lockup at ARC 214 B-1 Pump tripped	nd that pu	uced bel mp shuto	ow the " lown is I	Danger" required
,		PRO	Trin the "A'	' Recirc	Pump when	lirected		•	
		T NO			Pump Dischal		(MO-053	BA)	
		CRS	- Verify UR - Plot plant	O is dri	he Recirc Pun ving table 1 ro or on the pow be in Region 1	ds and m er to flow	map		scram)
		URO	Take OT-1 - Drive in a - Monitor f	<b>y</b> G-9-2	ediate Operat Appendix 1 T	or Actions able 1 co	s ntroi iods	5	
		PRO	Provide ne requester	ecessary d	data to the C	RS to Plo	t power 1	to flow a	S
•	-		1						

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Op Test No.: Scer	nario No.: #5	Event No.:	5	Page 5	of	10	
Event Description: "A" F	lecirc Pump Seals I	ooth Fail					
Cause: Excessive	<u>Cause</u> : Excessive vibration of the "A" Recirc Pump fails its seals.						
Initial Automatic Actions:	Take action in ac Pressure. Trip and						
Effects (General Sequen	ce): Seal Failur drywell pressure.	e alarms, both s	seals' pres	sure will	drop t	0.	
Time Position	Applicant's Action	ons Or Behavio	<u>or</u>		-		
URO PRO	Recognize Recirc Recognize lowerir Recognize that Dr into OT for High - Maximize Drywe - Verify that inertir Trend the Drywell	ng pressures on ywell pressure i Drywell Pressur Il Cooling ng is not in prog	both Seal is going up re ress	ls and rep			
CRS	Enter/direct action Pressure - Verify that the U Actions - Direct the "A" Re - Direct the follow - At or before 1. transferred and a - At or before 1. (continued on eve	RO/PRO have t circ Pump to be ng if the rate of 5# DW Pressure GP-9 Shutdowr 7# DW Pressure	aken their e isolated rise of DV e direct ho n to be cor	Immedia V Pressur buse loads mmenced	te Ope e perr s to be	erator mits:	

Op Test No.: Scenario No.: #5 Event No.: 6 Page 6 of 10

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

ES-D-2

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

CRS When or before drywell pressure reaches 1.7#, direct a manual scram

Op Test	Senario 5	Event # 7 (cont.) Page 8 of 10
Time	Position	Applicant's Actions Or Behavior
	PRO	<ul> <li>Transfer House Loads and take scram actions when scram occurs:</li> <li>Verify House Loads Transferred</li> <li>Trip the turbine at 50 Mwe</li> <li>Verify the Generator Lockout</li> <li>Verify all isolations</li> <li>Report to the CRS and get permission to bypass and restore DW Instrument Nitrogen</li> <li>Restore Instrument Nitrogen to the DW</li> </ul>
	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

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Op Test No.:Scenario No.:#5Event No.:8Page9of10Event 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 **Applicant's Actions Or Behavior** Position Initiate torus sprays when directed (crew may go directly to DW PRO sprays) - Place CTMT Spray Override 2/3 Core Coverage switch in "Manual Override" Recognize CTMT Spray Override 2/3 Core Coverage switch failure.

CT

Time

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 apm
  - 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

ES-301

Administrative Topics Outline

Form ES-301-1

	y: <u>Peach Bottom U</u> ination Level (circle )	
	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 recommenda- tions – PAR JPM	Given General Emergency plant conditions, make a protective action recommendation (PAR).

### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

SRO CONDUCT OF OPS

POSITION TITLE:	Unit Reactor Operator/Senior	Reactor Ope	rator	
TASK-JPM DESIGNATOR:	New-Control Rod Verif	K/A:	201003A3.0	1
			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 4<sup>th</sup> RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

### H. PERFORMANCE CHECKLIST

OTES		1 107	
STEP	STEP		STANDARD
NO			
1	Obtain the recent official 3D P1 or control rod position log.	P	Operator gets a copy of the recent official 3D P1 or control rod position log.
	(Cue: Provide a copy of the 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			
5	Identify control rod 54-31 is not driven to position 00.	P	Operator identifies and reports that control rod 54-31 is not at position 00.
	(Cue: Control rod 54-31 is at position 04.)		
4	Recognize and announce entry into ON-122, "Mispositioned Control Rod".	P	Operator recognizes and reports entry into ON-122, "Mispositioned Control Rod".
	(Cue: Acknowledge entry into ON-122, <u>DIRECT</u> the operator to take appropriate ON-122 actions.		
5	Contact Reactor Engineering for assistance, in accordance with ON-122, "Mispositioned Control Rod",.	P	Operator contacts the Reactor Engineers and requests their assistance.
	(Cue: Reactor Engineering acknowledges the request.)		
6	Notify the Shift Manager in accordance with ON-122, "Mispositioned Control Rod",.	Р	Operator contacts the Shift Manager and reports the mispositioned control rod.
	(Cue: The Shift Manger acknowledges report.)		

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.

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### 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.

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

### INITIATING CUE

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

GP-9-2 Rev. 26 Page 1 of 3 MGW:rww

### 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:
  - APRM oscillations of greater than <u>OR</u> equal to 10 percent peak-to-peak,
  - LPRM <u>OR</u> APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, <u>OR</u>
  - WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.
- 3.1 <u>IF</u> evidence of core thermal hydraulic instability exists, <u>THEN</u> place the reactor mode switch in "SHUTDOWN" <u>AND</u> enter T-100, "Scram", <u>AND</u> exit this procedure. **CM-1, CM-2**
- 3.2 Lower recirculation flow until <u>ANY</u> 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

<u> 0R</u>

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

<u>OR</u>

o FLLLP exceeds 0.995.

GP-9-2 Rev. 26 Page 2 of 3

- 3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch <u>OR</u> 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 <u>OR</u> 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 <u>WHEN</u> plant conditions permit, <u>THEN</u> 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 <u>AND</u> 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 <u>IF</u> any thermal limit value is equal to or greater than 1.000, <u>THEN</u> 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 <u>IF</u> further power reduction is required, <u>THEN</u> exit this procedure <u>AND</u> enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure <u>AND</u> 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)

CN-122, Rev. 5 Page 1 of 2 NHN:nhn 04/13/98

### PECO Energy Company Peach Bottom Units 2 and 3

### ON-122 MISPOSITIONED CONTROL ROD - PROCEDURE

### 1.0 <u>SYMPTOMS</u>

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- 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 <u>AND</u> 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 <u>IF</u> the mispositioned control rod is caused by a Rod Drift <u>THEN</u>:

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

2.3.2 Exit this procedure.

- 2.4 <u>IF</u> thermal power is below the RW1 low power setpoint <u>AND</u> control rods are positioned such that more than two insert errors <u>OR</u> more than one withdraw error exists, <u>THEN</u> manually scram in accordance with GP-4, "Manual Reactor Scram".
- 2.5 <u>IF</u> the control rod had been mispositioned less than two minutes <u>THEN</u>:
  - 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 <u>IF</u> the control rod has been mispositioned for longer than two minutes <u>AND</u> PCIOMR surveillance is required, <u>THEN</u>:
  - 2.6.1 Initiate a 100 MWe load drop, do not go below 500 MWe.

### CN-122, Rev. 5 7 Page 2 of 2

- 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 <u>IF</u> the control rod has been mispositioned for longer than two minutes <u>AND</u> PCIOMR surveillance is <u>NOT</u> required, <u>THEN</u>:
  - 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.



### PAGE 1

#### PLANT NAME: PEACH BOTTOM-2 CY-13

Cham.

		CONT	ROL ROD	POSITION	8				CALCULATED PRINTED
59		-				1			
59 L 55				18					
51 L									
47			10		10				
43 L									
39 35		10	36	08	36	10			
35 L 31	18		08		08		18		
27					,				
23 23	•	10	36	08	36	10			
19 L						· · · · ·			
15	•		10	•	10				
11 L									
07				18					
03	06 <sup>L</sup> 10	14 <sup>L</sup> 18	L 22 26	10 L 30 34	L 38 42	46 50	54 <sup>L</sup> 5	8	
s =	SUBSTI	TUTB VALU	JE						

L = LPRM

-99 = MISSING CONTROL ROD POSITION

CONTROL ROD DENSITY Sequence A-2 7.12%

LOAD	LINE	SUMMARY
CORE	POWER	99.39%
CORE	FLOW	85.10%
LOAD	LINE	110.54%
FLLL	2	0.961

# 23 PRINTED

### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

SRO CONDUCT OF OPS

POSITION TITLE:	Unit Reactor Operator/Ser	nior Reactor Ope	rator	
TASK-JPM DESIGNATOR:	New-Partial Proc	K/A:	2.2.11	
			URO: 2.5	SRO: 3.4

TASK DESCRIPTION:

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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.

### 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.	Ρ	<ul> <li>Steps which do not support the testing of the "B" SBLC pump are changed or crossed out.</li> <li>Step 6.1.1 should be made to apply to the "B" SBLC Pump Only.</li> <li>Steps 6.1.2 -6.1.5 should be crossed out.</li> <li>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).</li> </ul>
4	Submit the partial for approval. (Cue: Accept partial for approval.)	Р	Candidate will give evaluator the marked up procedure for approval.

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

### TERMINATING CUE

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

## TASK CONDITIONS/PREREQUISITES

- 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**

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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.

1	<b>PECO Energy Company</b> Peach Bottom Unit 2 Surveillance Test	05/31/9	ST-O-011-301-2 Rev. 12 Page 1 of 25 9 MRR:cah
	ST-O-011-301-2 STANDBY LIQUI	D CONTROL PUMP FUNCTIO	NAL TEST FOR IST
•	TEST FREQUENCY: Once/92 days TECH SPEC: SR 3.1.7.5, SI APPLICABILITY: Modes 1 and 2	(See Section 1.0) R 3.1.7.8, SR 3.1.7.10	, Section 5.5.6
	1 CHECK why this procedure is	being performed:	
	Schedule OVF	🗌 Retest Due To Uns	at Test
	Other Reason:		·
	Approved By SMgt: Prin	nted Name Time	// Date Initials
	2 INITIAL one of the following	g Test Results: SATISFACTORY	
	A: All <b>*/I</b> steps are B: One or More <b>*/I</b> steps Refer to Section 9.0 :	are UNSATISFACTORY	
	Performed By:	nted Name Time	// Date Initials
(3	RO/PRO Informed of Test Completion:		/_/
	Reviewed By SMgt:		/_/
	UNSAT Notification:	iscretion: Plant Mgr	or Others
	Notified By:		/_/
	3 If other portions of the te Or other discrepancies were	st did NOT function noted Then COMPLETE t	properly, he following:
	IST Step(s) in ALERT ran <b>DESCRIBE</b> discrepancies/a	ge: ctions taken: A/R or E	TT #:
			·
	4 Reviewed/Approved Plant Staff: Pri	nted 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	METE NO.	Cal Due Date
4.1	Description		Accuracy	Muil not	cal but batt
	Stopwatch		None		//
	Vibration m Raw Sign Single I (Min. Req. Range 2.8-1	al ntegration Freq.			//
-	Vibration p (Min. Req. Range 2.8-1	Freq.	± 4.0%	••••••••••••••••••••••••••••••••••••••	·//
	Test Gauge psig	0-1500	± 5.0%		//
•	Test Gauge psig (N/A i rig is to b	f one test	± 5.0%		//
2.2	(1 or 2) -	Test rig(s	) with Schrad	er fitting	(see Figure 1)
2.3	SBLC Measur	ing Stick			
2.4	Non-contami quick disco		for flushing	test tank	20T017 (with
2.5	Locked Valv	e Key For:			
	NUMBER	DESCRIPTI	ON		NORMAL POS
	HV-2-11-11		0T018 Outlet 2AP040 + 2BP0		LOCKED OPEN
	HV-2-11-15		h Header To R Isolation Val		LOCKED OPEN
	HV-2-11-26	SBLC Pump Block To	s Disch Recir Tks 20T017 +	C HDR 20T018	LOCKED CLOSED

2

			2		L1-301-2 Rev. 12 3 of 25
	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	PRERI	EQUISITES		<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 <b>VERIFY</b> at least two operators are ava to perform this test.	ilable	
			3.5.2 <b>VERIFY</b> SBLC Test Tank empty and <b>NO</b> fo objects in tank.	reign	
			3.5.3 <b>VERIFY</b> one 55 gallon drum which is empty or near empty available at Rx Bldg 165' by SBLC system drain lines.		
		L	3.5.4 <b>VERIFY</b> that qualified personnel are available for vibration data collecti and lube oil sampling. Operators may view the training video for Operation Role in Predictive Maintenance to refresh on proper technique.	,	
			3.5.5 <b>OBTAIN</b> oil sampling equipment from th Oil Sample Drop-off Box located on Turbine Bldg 116' outside the ferrography lab.	e	

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### 3.0 PREREQUISITES (Continued)

- 3.6 Approval to Start Test
  - 3.6.1 **OBTAIN** RO Permission to begin.

Date -Time 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

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- 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

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- 5.1 Each SBLC Pump develops a flow rate of  $\geq$  43 gpm at a discharge pressure  $\geq$ 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.

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### 6.0 PERFORMANCE STEPS

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Initial <u>Sat</u><u>UnSat</u>

- 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".

•			• .		2	S	T-O-011-301-2 Rev. 12 Page 7 of 25
(	6.0	PERF	ORMANCE	STEPS (Contin	nued)	······································	Initial <u>Sat UnSat</u>
		6.2	SBLC Pu	mp A Test <b>CM</b>	-1		
			6.2.1	RECORD 2BT0	76 pressure.	• •	
				psi	a		
			****** *	************	**************************************	***************************************	
			* Room	. Starting S rol Room wil	C Pumps from the BLC Pumps from 1 fire the expl ********	the *	
			6.2.2	<b>NOTIFY</b> Reac Liquid Cont	tor Operator 2A rol Pump A" wil	P040 "Standby 1 be started.	·
			6.2.3	LOCALLY STA	RT 2AP040.		
<b>(</b> 3)			30 mi	nutes follow	NOTE mmends running ing pump mainte at full load.	pump for nance	
	•		6.2.4	to satisfy testing, <b>TH</b>	ance Test is be pump post maint IEN PERFORM this I/A AND PROCEED	enance step,	đ
				SLOWLY between	np for 5 minutes THROTTLE HV-2-1 1 250 to 350 psi -03 AND RUN pum 3.	1-26 to a pro	essure ed on
	7			pressur indicat	THROTTLE HV-2-1 te between 550 t ted on PI-2-11-0 or 10 additional	o 650 psig a: )53 AND RUN	s 
				pressur indicat	THROTTLE HV-2-1 ce between 850 t ced on PI-2-11-0 or 10 additional	:o 950 psig a )53 <b>AND RUN</b>	s 

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6.0 PERFORMANCE STEPS (Continued)

Initial <u>Sat</u><u>UnSat</u>

	NOTE	
dampe throi opene	tuations on PI-2-11-053 may be ened by throttling IIV-2-11-053. If ttling is used, the valve may be ed and closed to verify pressure cation 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.	
* * * * * * * *	**************************************	
*		
* of : * Rel: * psig	NOT EXCEED a pump discharge pressure * 1300 psig while throttling HV-2-11-26.* ief valve is set to lift at 1400 * g. Pressure will continue to *	
	rease slightly when valve throttling *	
* 15 8	stopped. *	
*****	***************************************	
5.2.6	SLOWLY <b>THROTTLE</b> HV-2-11-26 to a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053.	
5.2.7	RECORD 2BT076 pressure.	
	psig	. <del>-</del>
, <u></u>	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.
- 6.2.9 **RUN** 2AP040 for at least 2 minutes to ensure accurate vibration data.

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### 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

	RED VIBRATION RED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE
*****		INBC	DARD	
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
		OUTB	OARD	
X1	IN/SEC PK	≤ 0.803	0.803 to 1.929	> 1.929
¥1	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.

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### 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u><u>UnSat</u>

- 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.
  - 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.

•	<b>.</b> .		2	-	ST-O-011-301-2 Rev. 12 Page 11 of 25		
(	6.0 PERFORMANCE STE	PS (Continu	ed)		Initial <u>Sat UnSat</u>		
• <b>1</b> • •	6.	15 minutes RECORD tim pump and w	could not be o after securin e elapsed betw ithdrawing sam ed on sample b	ng pump, <b>THEN</b> veen securing nple <b>AND RECO</b>			
	·		min.				
			040 flow rate ow rate on Dat				
			<u>x 60 sec/min</u> = 6.2.16	= Flow Rate			
		3168 /	sec =	gpm	<u> </u>		
					IV		
			TA SHEET 2 )40 IST DATA				
14			NOTE	······································			
l.	Pump flow rate ac of 53.0 gpm at a				ence value		
	PARAMETER	ACTUAL VALUE	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE		
	TIME (Seconds)		N/A	N/A	N/A		
·	FLOW RATE (gpm)		50.2 to	< 50.2 to	< 49.1 or		

(3168/Time) 58.1 49.1 > 58.1 DISCH PRESSURE (psig) 1255-1280 N/A

N/A

**VERIFY** flow and pressure recorded in Data Sheet 2 is  $\geq$ 43 gpm at  $\geq$ 1255 psig. \* 6.2.21

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6.0 PERFORMANCE STEPS (Continued)

Initial <u>Sat</u> <u>UnSat</u>

### 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.

- 6.2.23 CLOSE HV-2-11-27.
- 6.2.24 OPEN HV-2-11-26.
- 6.2.25 **OPEN** HV-2-11-30.

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- 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.

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

is empty.

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

### ST-0-011-301-2 Rev. 12

### Page 13 of 25 **PERFORMANCE STEPS** (Continued) 6.0 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. \*\*\*\*\*\*

NOTIFY Reactor Operator 2BP040 "Standby 6.3.4 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.

- IF Surveillance Test is being performed 6.3.6 to satisfy pump post maintenance testing, THEN PERFORM this step, OTHERWISE N/A this step AND PROCEED to step 6.3.7.
  - RUN pump for 5 minutes unloaded THEN 1. 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.
  - SLOWLY THROTTLE HV-2-11-26 to a 2. pressure between 550 to 650 psig as indicated on PI-2-11-053 AND RUN pump for 10 additional minutes.

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### 6.0 PERFORMANCE STEPS (Continued)

Initial <u>Sat UnSat</u>

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	*
*		*
ŧ	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	3.8 SLOWLY <b>THROTTLE</b> HV-2-11-26 to a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053.	3
6.3	8.9 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.

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### 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u><u>UnSat</u>

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



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

	RED VIBRATION KED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE				
INBOARD								
X1	IN/SEC PK	≤ 0.527	0.527 to 1.266	> 1.266				
¥1	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.

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6.3.15 CLOSE HV-2-11-30.

6.3.16 OPEN HV-2-11-27.

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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.

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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.

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### 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat</u> <u>UnSat</u>

- 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:

> <u>52.8 gal x 60 sec/min</u> = Flow rate Step 6.3.18

3168 / \_\_\_\_\_ sec = \_\_\_\_\_ gpm

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6.0 PERFORMANCE STEPS (Continued)

**(** ::

Initial <u>Sat\_UnSat</u>

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

6.3.23 VERIFY flow recorded in Data Sheet 4 is  $\geq$  43 gpm AND pressure is  $\geq$  1255 psig.

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#### 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.
- 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.

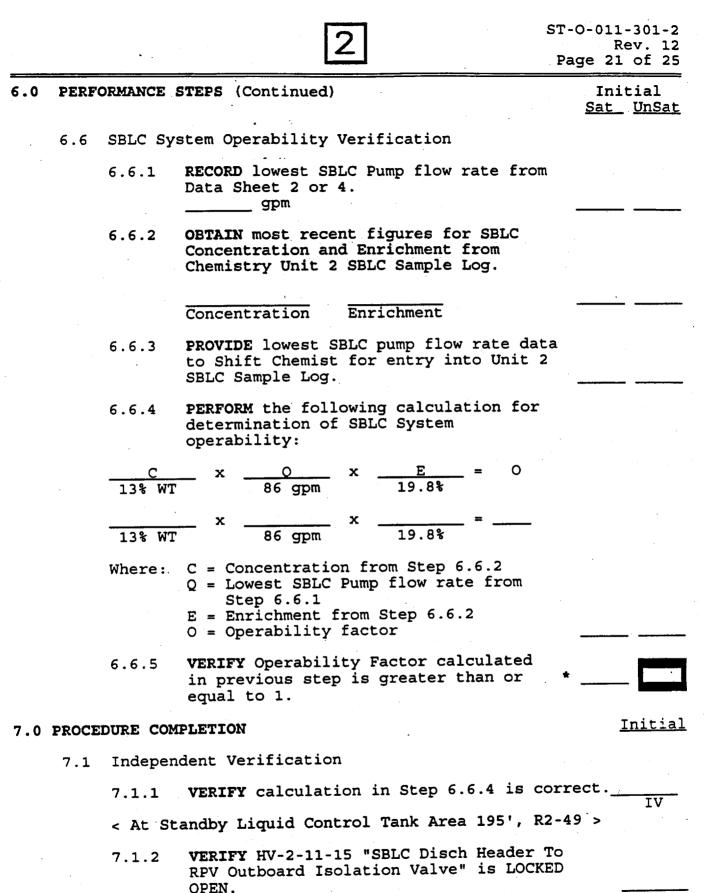
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(	6.0	PERF	ORMANCE	STEP	S (Continued)		tial <u>UnSat</u>
			6.3.30	suc dra sig	test tank level reaches top of tion line on side of tank by gravity ining, THEN N/A the next 3 n-offs. OTHERWISE, PERFORM the lowing:		
				1.	UNLOCK AND CLOSE HV-2-11-11.		<u></u>
			*****	t * * * *	*****		
			*		CAUTION *		
• •				o not s emp	run SBLC Pump when Test Tank * ty. *		
			******	****	******************************		
				2.	LOCALLY <b>START</b> 2BP040 <b>THEN STOP</b> pump when Test Tank level reaches top of suction line on side of test tank.		
				з.	<b>OPEN</b> HV-2-11-11.		
1			6.3.31	CLO	SE HV-2-11-41.		
		6.4	Restori	ing S	BLC System to Operable Status		
		,	6.4.1	LOC	K closed HV-2-11-41.	·	
			6.4.2	VER	IFY OR LOCK OPEN HV-2-11-11.		
			6.4.3	CLO	SE OR VERIFY CLOSED HV-2-11-30.		
			6.4.4	CLO	SE AND LOCK HV-2-11-26.		
			6.4.5	OPE	N AND LOCK HV-2-11-15.		
			6.4.6		IFY Reactor Operator SBLC System has n returned to service.		

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(	6.0	PERF	ORMANCE	STEPS (Continu	ed)			tial <u>UnSat</u>	
		6.5	Flushin	g Test Tank 20	T017				
			* 16	NOT OVERFILL 5'. If necess be closed wh	ary, HV-2-1	.1-23143 *			
			*	**************************************	*******	***************	- 		
			< At'Rx	Bldg 165', We	st Wall>				
			6.5.1	OPEN HV-2-11- 20T017 Outer					
			< At Sta	andby Liquid C	ontrol Tank	Area, 195', 1	R2-49 >		
	-		6.5.2	<b>REMOVE</b> SBLC m Tank.	easuring st	ick from Test	- <u></u>	<u> </u>	
			6.5.3	INSTALL hose a valve HV-2-381 Vv for SBLC Te	D-29 "Demin	Wtr Hose Blk		•	
			6.5.4	<b>OPEN HV-2-11-</b> Inner Drain Va		st Tank 20T01	7		
	<b>X</b>		6.5.5	<b>OPEN</b> HV-2-38D with demineral					
			6.5.6	CLOSE HV-2-38	D-29.				
			6.5.7	CLOSE HV-2-11	-28.				
		•	6.5.8	VERIFY Test Ta	ank empty.				
			6.5.9	INSTALL cover	on Test Ta	nk.	·		
			6.5.10	REMOVE hose five the second se		ater supply			
		·	< At Rx	Bldg 165', We	st Wall>				
			6.5.11	CLOSE HV-2-11	-23143.	•			
(			6.5.12	<b>PLACE</b> oil sam off box locate outside the fe	ed on Turbi	ne Bldg 116			
ς.									



IV

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			PLETION (Continued)	<u>Initia</u>
		7.1.3	<b>VERIFY</b> 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.	<u></u>
		7.1.5	VERIFY HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR" is LOCKED CLOSED.	
•		7.1.6	<b>VERIFY</b> HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 20T017" is CLOSED.	IV
		7.1.7	<b>VERIFY</b> HV-2-11-30 "SBLC Pumps Disch/Recirc Blk To SBLC Tank 20T018" is CLOSED.	IV
		7.1.8	<b>VERIFY</b> HV-2-11-28 "SBLC Test Tank 20T017 Drain Valve" is CLOSED.	IV
		7.1.9	<b>VERIFY</b> test rig at 2AT076 "Stby Liquid Control N2 Accumulator A" REMOVED AND cap INSTALLED.	IV
		7.1.10	<b>VERIFY</b> test rig at 2BT076 "Stby Liquid Control N2 Accumulator B" REMOVED AND cap INSTALLED.	IV IV
		7.1.11	<b>VERIFY</b> IIV-2-11-053 "PI-2-11-053 Instr Isol SBLC PPs Disch Header Press" is OPEN.	
		< At Rx	Bldg 165', West Wall>	IV
		7.1.12	<b>VERIFY</b> HV-2-11-23143 "SBLC Test Tank 20T017 Outer Drain Valve" is CLOSED.	
	7.2	Records	Completion	IV
		7.2.1	<b>COMPLETE</b> Section 2 of Cover Page (and Section 3 if applicable).	
B.O	REFE	RENCES		
•	8.1	Governi	ng	

- 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

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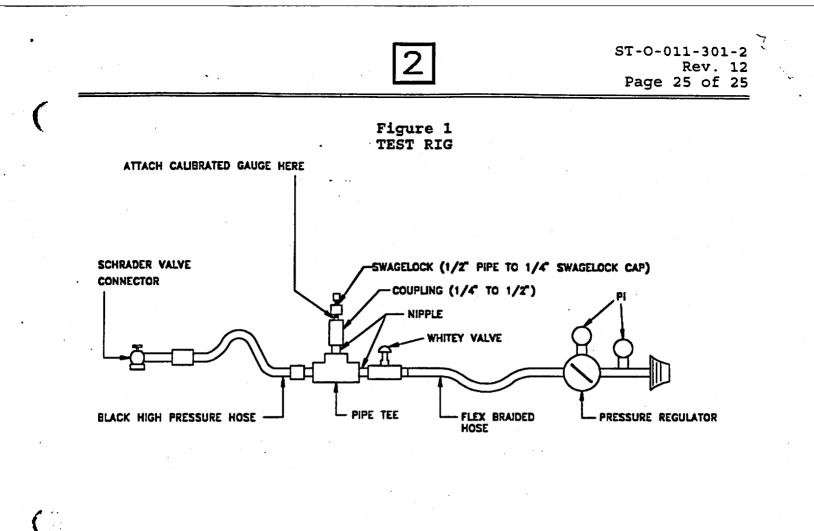
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## 10.0 PARTICIPANTS RECORD

(

Printed Name	Initials

2



### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

SRO EQUIP CONTROL

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator						
TASK-JPM DESIGNATOR:	New-TSA Log	к/А:	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.	Ρ	It is determined that Tech Spec 3.1.8 "SDV Vent and Drain Valves" is applicable.				
	(Cue: Acknowledge the determination.)						
*2	Determine that both INOP vent valves are in different lines.	P	It is determined that both vent valves are in different lines using P&IDs or Control Room panel mimics.				
	(Cue: Acknowledge the determination.)						
*3	Determine that Condition A of Tech Spec 3.1.8 is applicable for AO-2-03-032A and AO-2-03-032B INOP.	Р	It is determined that Condition A of Tech Spec 3.1.8 is applicable.				
	(Cue: Acknowledge the determination.)	÷					
*4	Determine the completion time for Required Action A.1 to be 0800, 7 days from today's date.	P .	It is determined that the completion time for Required Action A.1 is 0800, 7 days from today's date.				
	(Cue: Acknowledge the determination.)						
	*** NOTE ***						

The following Exhibit OM-P-12.1:1 entries may differ slightly from those listed in the task standard as I long as the important information is included.

iong as	the important information is included.		
*5	Complete Exhibit OM-P-12.1:1 "Technical	Р	The following data is entered in the fields
	Specification Action Log" of OM-P-12.1		listed below on Exhibit 1 OM-P-12.1:1
	Operations Manual Section 12.1		"Technical Specification Action Log".
	"Operator Action Logs" by completing the		
	following fields for AO-2-03-032A:		
	Unit – "unit experiencing inoperability"		Unit – "Unit 2"
	Entry # - sequential number consisting		Entry # - "99-2 – next TSA number"
	of year, unit and sequential TSA #		
	or year, unit and sequentiar ron #		
	- Tech Spee Number "Tech Spee		Tech Spec number – "3.1.8"
	Tech Spec Number – "Tech Spec		• Tech opec number = 5.1.0
	number for inoperability"		
			Discourse Data (Time "teday's
	Discovery Date/Time – "date and time		Discovery Date/Time – "today's
	inoperability discovered"		date/0800"
	Equipment ID – "alpha-numeric		<ul> <li>Equipment ID – "AO-2-03-032A"</li> </ul>
	designator for inop equipment"		
		-	
	<ul> <li>System Number – "system number for</li> </ul>		<ul> <li>System # - "3"</li> </ul>
	equipment inop"		

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

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

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

4

EXHIBIT OM-P-12.1:1, Rev. 1 Page 1 of 1

1-18-96

UNIT (2 or 3) (This revision is a complete rewrite.)

e rewrite.)

DS

Entry #	TS#	Discovery Date/Time	Equipment ID		System #	Reference	
				,			
Condition			Reason			Requir	ed Action 1
•	•						
•							
Is a SFD required?	VES / NO		· ·		•	Comple	tion Time Date/Time
	currently active? YI ) is still valid.)	es / No					
Required Action 2		Required Action 3	· · ·	Required Action	4	Requir	ed Action 5
					•		
					-		
Completion Time Dat	te/Time	Completion Time Date/Ti	RC .	Completion Time	Date/Time	Comple	tion Time Date/Time
Exit Justification	······································				Exit Date/Time		Exit Entries Made By
			r.		•		
					• · · ·		

### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

SRO RAD CONTROL

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	- Alte	rnate Path (II	nstrument Zero	(٥	

- 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)
  - 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	STEP	ACT	STANDARD
NO		L	
	** NO	TE ***	
	ent checks may be conducted in any order.		
*1	Perform a calibration check of the RO-2A.	P	The candidate locates the Calibration Sticker on the RO-2A and verifies that the
	(Cue: Calibration is not due until October 1999)	÷	instrument is in calibration.
*2	Verify that the RO-2A has been Source Checked.	P	The candidate locates the Source Check Sticker and observes that the RO-2A was source checked today.
	(Cue: The source check was conducted 4 hours ago)	a di se	
*3	Perform a check of the physical condition of the RO-2A.	Р	The candidate performs a careful physical inspection of the RO-2A for any damage.
	(Cue: Acknowledge physical check completed)		
*4	Perform a battery check of the RO-2A.	P	Candidate places the function switch to BOTH positions BAT 1 and BAT 2 and
	(Cue: Positions BAT 1 and BAT 2 indicate that battery voltage is in the Batt OK range)		verifies that voltage is indicated in the 'Batt OK" range
*5	Perform a Zero check of the RO-2A.	Р	Candidate places the function switch to the Zero position and observes that the
	(Cue: Needle is indicating above the Zero indication)		indication is greater than Zero.
*6	Zero the RO-2A	P	Candidate adjusts the Zero Knob to obtain a Zero indication.
	(Cue: acknowledge adjustment of knob to obtain a Zero indication)	· · ·	
*7	Take a Closed Window Gamma reading on the selected object.	Р	Candidate holds meter with the beta window closed at approximately one inch and takes readings, shifting scales until
	(Cue: Depending on selected scale indicate that the reading is upscale or downscale until the appropriate scale is		an appropriate reading is obtained.
	reached. Then indicate that the meter is reading 10 mR/hr)		

			· · · · · · · · · · · · · · · · · · ·
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)	Ρ	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.	Ρ	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. $(12 - 10) \times 4 = 8 \text{ mR/hr Beta}$
10	Candidate reports Gamma and Beta Radiation levels on the object.	Р	Candidate reports that the object is reading 10 mR/hr gamma and 8 mR/hr Beta.
	(Cue: Acknowledge report)		1

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.

### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

SRO EMERGENCY PLAN

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator					
TASK-JPM DESIGNATOR:	NEW-PRO ACT		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.

### 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".

**NEW-PRO ACT Rev000** 

H. PERFORMANCE CHECKLIST

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STEP NO	STEP	ACT	STANDARD			
<u> 110</u>	*** NO					
	. NO					
Provide	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	Р	Table 2 "Fuel Damage" General			
	that Table 2 "Fuel Damage" General		Emergency.			
	Emergency requires:					
	<ul> <li>Evacuate a full 360 degrees for 5 miles</li> </ul>					
	<ul> <li>Evacuate affected and 2 adjacent</li> </ul>					
	sectors for 5-10 miles.					
3	Complete the ERP-200, Appendix 4 PAR	Р	Determine wind speed to be 10 mph			
	worksheet portions.		determine wind direction "from" to be 270			
	<ul> <li>Wind speed 10 mph.</li> </ul>	• •	degrees and subtract 180 to determine			
	Wind direction "from" instrumentation		wind direction "to" of 90 degrees.			
	270 degrees.					
	• Wind direction "to" +/- 180 = 90		· · · ·			
	degrees.					
	(Cue: Wind speed 10 mph, wind direction					
	from 270 degrees.)					
*4	Determine:	Р	Evacuate all sectors 360 degrees, 5 miles			
•	• Evacuate all sectors 360 degrees 5		determined from ERP-101 Table 2,			
	miles.		General Emergency "2" direction			
*5	Determine:	Р	Evacuate affected sector E from wind			
	<ul> <li>Evacuate sectors E, ENE, and ESE,</li> </ul>		direction "to" and adjacent 2 sectors ENE			
	5 to 10 miles.		and ESE 5 to 10 miles from ERP-101			
			Table 2, General Emergency "2"			
			directions.			
	*** NO	TE ***				
When the	ne candidate attempts to contact Maryland M	IDE and	d Pennsylvania BRP role play as these			
	state agencies to receive the PAR notification.					
*6	Notify Maryland MDE and Pennsylvania	Ρ	Maryland MDE and Pennsylvania BRP			
	BRP of the following PAR:		are contacted by OMNI phone using the			
	<ul> <li>Evacuate all sectors 360 degrees 5</li> </ul>		numbers in ERP-200 Appendix 4 "PAR			
	miles.		Worksheet".			
	• Evacuate Sectors E, ENE, ESE 5 to 10					
	miles.	]				
	(Cue: Acknowledge receipt of report.)					
		/				

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

### TERMINATING CUE

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When Maryland MDE or Pennsylvania BRP has been notified of the PAR the evaluator will terminate the exercise.

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## 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.

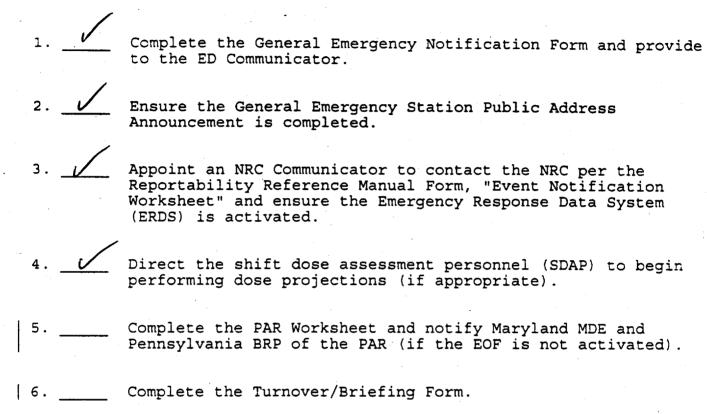
## **INITIATING CUE**

You are directed to complete step 5 of ERP-200 Appendix 4, "General Emergency Initial Actions".

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#### **APPENDIX 4**

#### GENERAL EMERGENCY INITIAL ACTIONS



ERP-200, Appendix 4 Page 2 of 6, Rev. 3

## 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 Due 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: Vait Z Shutdaun, Level + 10" reactor pressure Z00 isig Fiel Failure with stean leak into primary containment
	/ \
4.	THERE IS: 📈 No Radioactive Release in Progress
	Airborne Radioactive Release in Progress
5.	Wind Direction is "from" (installed instrumentation) degrees and blowing "to" degrees. Wind speed ismph.
	This is a Drill This is not a Drill
APPR	OVED: <u>E. Director</u> <u>XXXX</u> <u>9/XX/99</u> (Emergency Director) <u>Time</u> Date

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#### 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.

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THE EMERGENCY DIRECTOR HAS DECLARED A GENERAL EMERGENCY.

ALL MEMBERS OF THE EMERGENCY RESPONSE ORGANIZATION REPORT TO YOUR EMERGENCY FACILITY OR EMERGENCY ASSEMBLY AREA.

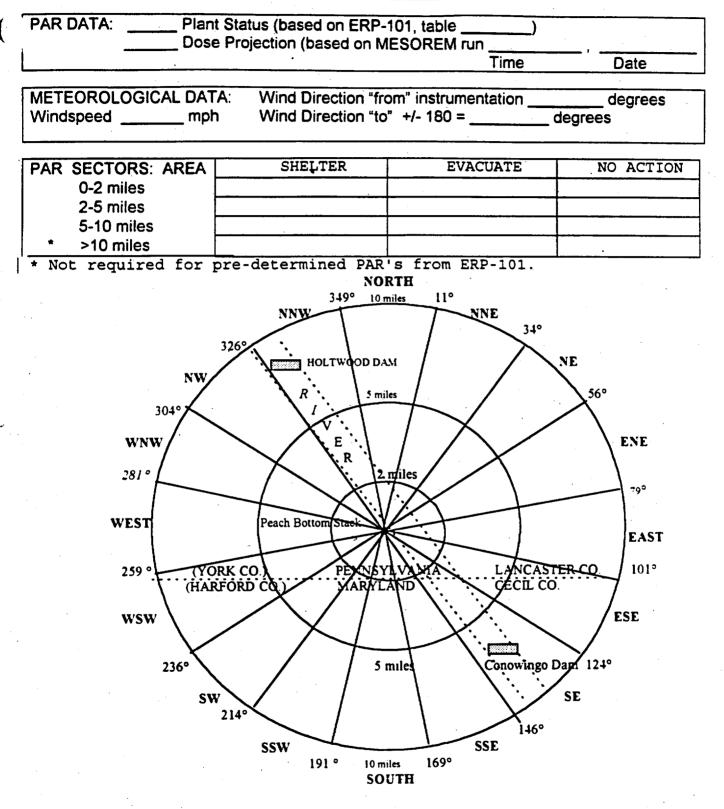
ALL NON-ESSENTIAL PERSONNEL AWAIT FURTHER PUBLIC ADDRESS INSTRUCTIONS.

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.

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### PAR WORKSHEET



ſ	PERSON NOTIFIED	TIME	DATE
PENNSYLVANIA BRP (Ext. 236 or 239)			
MARYLAND MDE (Ext. 235 or 292)			

	ERP-200, Appen Page 5 of 6, R	ev. 3
TURNOVER / BRIEFIL	NG FORM	
CURRENT EMERGENCY CLASSIFICATION:	Time	
EAL TABLE:		
CURRENT PLANT CONDITIONS:		
· · · · · · · · · · · · · · · · · · ·	·······	<del></del>
	· · · · · · · · · · · · · · · · · · ·	
PERSONNEL INJURIES:		
	· · · · · · · · · · · · · · · · · · ·	
EVACUATION STATUS:		
ACCOUNTABILITY STATUS:		
OFF SITE ELECTRICAL POWER STATUS:		·
MERGENCY DIESEL STATUS:		
ADIOLOGICAL CONDITIONS IN PLANT:		
	···	
OFF SITE RELEASE CONDITIONS:		
·		
PRIORITIES:		
Control Room Shift Manager:		
SC Director:		
EO	F ERM:	<u></u> .
IRC contacted: ERDS data link		
IRC CONCACCEU ERDS GACA IINK (		,

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ERP-200, Appendix 4 Page 6 of 6, Rev. 3

### TURNOVER/BRIEFING FORM

NIT 2 STATUS:	Reactor Power	Level or	Mode:	······································
	Reactor Level	:	Reactor P	ressure:
		•		
	System Availa	oility:		Comments:
	HPCI	Yes	No	• • • • • • • • • • • • • • • • • • •
		Yes	No	
		Yes	No	
	CONF/FEED	Yes	No	
		Yes	No	
		les	No	
	<b>L</b>	ſes	No	
	<b></b>	les	No	
		les les	No	
		les	No No	
		les les	No	
· ·		les	No	
		les	No	
	Cont. Intact Y		No	· · · ·
JNIT 3 STATUS:	Reactor Power Reactor Level			ctor Pressure:
	System Availa	ability:		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 B LOOP RHR	Yes 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	
	•	• 11		
complete by			Time:	Date:
Complete by:			_***********	

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ES-301

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Administrative Topics Outline

Form ES-301-1

	y: <u>Peach Bottom U</u> ination Level (circle o			
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	A.4 Emergency Direct an evacuation for a declared emergency. tions – Evacuation JPM			

### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

**RO CONDUCT OF OPS** 

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator				
TASK-JPM DESIGNATOR:	New-Control Rod Verif	K/A:	201003A3.0	<u>1</u>	
			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 4<sup>th</sup> RO, to verify control rod positions in accordance with step 3.5 of GP-9-2.

### H. PERFORMANCE CHECKLIST

STEP	STEP	ACT	STANDARD
NO			
1	Obtain the recent official 3D P1 or control rod position log.	P	Operator gets a copy of the recent official 3D P1 or control rod position log.
	(Cue: Provide a copy of the P1 or control rod position log.)		
2	Compare current control rod position to the position prior to the transient.	P	Operator checks current position as compared to pre-transient position.
	(Cue: Acknowledge checks in progress.)		
*3	Identify control rod 54-31 is not driven to position 00.	P	Operator identifies and reports that control rod 54-31 is not at position 00.
	(Cue: Control rod 54-31 is at position 04.)		
4	Recognize and announce entry into ON-122, "Mispositioned Control Rod".	P	Operator recognizes and reports entry into ON-122, "Mispositioned Control Rod".
	(Cue: Acknowledge entry into ON-122, <u>DIRECT</u> the operator to take appropriate ON-122 actions.		
5	Contact Reactor Engineering for assistance, in accordance with ON-122, "Mispositioned Control Rod",.	P	Operator contacts the Reactor Engineers and requests their assistance.
	(Cue: Reactor Engineering acknowledges the request.)		
6	Notify the Shift Manager in accordance with ON-122, "Mispositioned Control Rod",.	P	Operator contacts the Shift Manager and reports the mispositioned control rod.
	(Cue: The Shift Manger acknowledges report.)		

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

### TERMINATING CUE

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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 4<sup>th</sup> 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 <u>PURPOSE</u>

To rapidly reduce reactor power as required by plant conditions.

#### 2.0 PREREOUISITES

2.1 Plant conditions require a fast reduction in power.

#### 3.0 <u>PERFORMANCE STEPS</u>

#### 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 <u>ANY</u> of the following conditions exist:
  - APRM oscillations of greater than <u>OR</u> equal to 10 percent peak-to-peak,
  - LPRM <u>OR</u> APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, <u>OR</u>
  - WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.
- 3.1 <u>IF</u> evidence of core thermal hydraulic instability exists, <u>THEN</u> place the reactor mode switch in "SHUTDOWN" <u>AND</u> enter T-100, "Scram", <u>AND</u> exit this procedure. **CM-1, CM-2**
- 3.2 Lower recirculation flow until <u>ANY</u> 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

#### <u>OR</u>

o FLLLP exceeds 0.995.

GP-9-2 Rev. 26 Page 2 of 3

- 3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch <u>OR</u> 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 <u>OR</u> 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 <u>WHEN</u> plant conditions permit, <u>THEN</u> 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 <u>AND</u> 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 <u>IF</u> any thermal limit value is equal to or greater than 1.000, <u>THEN</u> 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 <u>IF</u> further power reduction is required, <u>THEN</u> exit this procedure <u>AND</u> enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure <u>AND</u> enter GP-5, "Power Operations".

#### 4.0 <u>REFERENCES</u>

- 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)

CN-122, Rev. 5 Page 1 of 2 NHN:nhn 04/13/98

## PECO Energy Company Peach Bottom Units 2 and 3

## ON-122 MISPOSITIONED CONTROL ROD - PROCEDURE

#### 1.0 <u>SYMPTOMS</u>

- 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 <u>AND</u> 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 <u>IF</u> the mispositioned control rod is caused by a Rod Drift <u>THEN</u>:

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

2.3.2 Exit this procedure.

- 2.4 <u>IF</u> thermal power is below the RWM low power setpoint <u>AND</u> control rods are positioned such that more than two insert errors <u>OR</u> more than one withdraw error exists, <u>THEN</u> manually scram in accordance with GP-4, "Manual Reactor Scram".
- 2.5 <u>IF</u> the control rod had been mispositioned less than two minutes <u>THEN</u>:
  - 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 <u>IF</u> the control rod has been mispositioned for longer than two minutes <u>AND</u> PCIOMR surveillance is required, <u>THEN</u>:
  - 2.6.1 Initiate a 100 MWe load drop, do not go below 500 MWe.

CN-122, Rev. 5 Page 2 of 2

- 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 <u>IF</u> the control rod has been mispositioned for longer than two minutes <u>AND</u> PCIOMR surveillance is <u>NOT</u> required, <u>THEN</u>:

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

CONTROL ROD POSITIONS 15-SEP

15-SEPT-1999 17:23 CALCULATED 15-SEPT-1999 17:23 PRINTED

_99 _			<b></b>			
8 = L =	LPRM	TUTE VA	LUE Ol rod po	SITION		· .
02	06 10	14 1	L 8 22 20	5 30 34	L 38 42	L L 46 50 54 58
11 L 07 D3				18		
L 15			10		10	
27 L 23 19		10	36	08	36	10
35 L 31	18		08		08	18
13 L 39		10	36	08	36	10
51 L 17			10		10	
59 L 55				18		- -

LOAD	LINE 8	UMMARY
CORE	POWER	99.39%
CORE	FLOW	85.10%
LOAD	LINE	110.54%
FLLL	<b>,</b>	0.961

## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

**RO CONDUCT OF OPS** 

POSITION TITLE:	Unit Reactor Operator	Senior Reactor Ope	rator	
TASK-JPM DESIGNATOR:	New-Partial Proc	K/A:	<u>2.2.11</u>	
			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"

## J. 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.

## TASK CONDITIONS/PREREQUISITES

- 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

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Ξ.

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

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STEP	STEP	ACT	STANDARD
NO	SIEP	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.	Ρ	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	<ul> <li>Steps which do not support the testing of the "B" SBLC pump are changed or crossed out.</li> <li>Step 6.1.1 should be made to apply to the "B" SBLC Pump Only.</li> <li>Steps 6.1.2 –6.1.5 should be crossed out.</li> <li>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).</li> </ul>
4	Submit the partial for approval. (Cue: Accept partial for approval.)	Р	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

- 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.

	Pea Uni	O Energy Company ch Bottom t 2 veillance Test	2	05/31/99	ST-O-011-301-2 Rev. 12 Page 1 of 25 MRR:cah
(	TES TEC	T FREQUENCY: Once/9 H SPEC: SR 3.1	Y LIQUID CONTROL PO 2 days (See Section .7.5, SR 3.1.7.8, S 1 and 2	n 1.0)	
	1.	CHECK why this proce Schedule Other Reason: Approved By SMgt:		ormed: Due To Unsat 	/
	2			ISFACTORY ISFACTORY	
( ( )		Performed By: RO/PRO Informed of Test Completion: Reviewed By SMgt:	Printed Name		/ eInitials /
		UNSAT Notification: Notified By:	SMgt Discretion:	Plant Mgr or	Others
	3	If other portions of Or other discrepanci IST Step(s) in AL DESCRIBE discrepa	es were noted Then	COMPLETE the	following:
	4	Reviewed/Approved Plant Staff:	Printed Name	/ 	/ eInitials

## 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	L _	Req Min Accuracy	M&TE No.	Cal Due Date
	Stopwatch		None		!!
	Vibration m Raw Sign Single I (Min. Req. Range 2.8-1	al Integration Freq.			//
	Vibration p (Min. Req. Range 2.8-1	Freq.		<u></u>	//
	Test Gauge psig	0-1500	± 5.0%		//
	Test Gauge psig (N/A i rig is to b	f one test		<del> </del>	//
2.2	(1 or 2) -	Test rig(s	) with Schra	der fitting	(see Figure 1)
2.3	SBLC Measur	ing Stick	•		
2.4	Non-contami quick disco		for flushin	g test tank	20T017 (with
2.5	Locked Valv	ve Key For:			
	NUMBER	DESCRIPTI	ON		NORMAL POS
·	HV-2-11-11		0T018 Outlet 2AP040 + 2BP		LOCKED OPEN
. •	HV-2-11-15		h Header To Isolation Va		LOCKED OPEN
	HV-2-11-26		s Disch Reci Tks 20T017 +		LOCKED CLOSED

			•••		Page	3 of 25
(	2.0	TEST	EQUIPMEN	T (Continued)		
•			NUMBER	DESCRIPTION	NORMAL	POS
			HV-2-11-	41 SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR	LOCKED	CLOSED
	3.0	PRER	EQUISITES		۰.	<u>Initial</u>
		3.1	Test Ini	tiation	••	
			3.1.1	COMPLETE Section 1 of cover page		
		3.2	Document	Review		
			3.2.1	ENSURE procedure is current revision.		
		3.3	Equipmen	t Configuration		
			None			
		3.4	Required	Redundant Safety Related Equipment		
			None			
•		3.5	Other Pr	erequisite Activities		
				<b>VERIFY</b> at least two operators are ava to perform this test.	ilable	
				<b>VERIFY</b> SBLC Test Tank empty and <b>NO</b> for objects in tank.	reign	
	į		3	<b>VERIFY</b> one 55 gallon drum which is empty or near empty available at Rx Bldg 165' by SBLC system drain lines.		
				<b>VERIFY</b> 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.		- - -
				<b>OBTAIN</b> oil sampling equipment from the Oil Sample Drop-off Box located on Turbine Bldg 116' outside the ferrography lab.	9	· .

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# ST-0-011-301-2 Rev. 12

## 3.0 PREREQUISITES (Continued)

- 3.6 Approval to Start Test
  - 3.6.1 **OBTAIN** RO Permission to begin.

Date -Time 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 SMqt.
- 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

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- 5.1 Each SBLC Pump develops a flow rate of  $\geq$  43 gpm at a discharge pressure  $\geq$ 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.

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## 6.0 PERFORMANCE STEPS

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Initial <u>Sat</u><u>UnSat</u>

- 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".

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Ċ	6.0	PERF	ORMANCE	STEPS (Con	tinued)	· · · · · · · · · · · · · · · ·			tial <u>UnSat</u>
		6.2	SBLC Pu	mp A Test	CM-1				
		.*	6.2.1	RECORD 2B	T076 press	ure.			
· ·				P	sig				
			****** * *	**************************************	CAUTION	from the Con	***** * *		•
			* Room	. Starting rol Room w	SBLC Pump	s from the he explosive	*		•
			* ******** 6.2.2		actor Oper	************************* ator 2AP040 A" will be			·
			6.2.3	LOCALLY S					· · · · · · · · · · · · · · · · · · ·
<b>(</b>			30 mi	acturer re nutes foll e operatin	owing 'pump	unning pump maintenance load.	for		
	•		6.2.4	to satisf testing,	y pump pos THEN PERFO	t is being p t maintenance RM this step ROCEED to st	:е Э,	•	
				SLOWL betwe	Y THROTTLE en 250 to 11-03 AND	minutes unlo HV-2-11-26 350 psig as RUN pump for	to a pre indicate	ssure d on	
				press indic	ure betwee ated on PI	HV-2-11-26 n 550 to 650 -2-11-053 AM itional minu	) psig as ID <b>RUN</b>		
{				press indic	ure betwee ated on PI	HV-2-11-26 n 850 to 950 -2-11-053 AN litional minu	) psig as ID RUN	:	
					• • • • •	н. 1970 - Салан Салан Салан (с. 1970) 1970 - Салан Салан (с. 1970)			

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6.0 **PERFORMANCE STEPS** (Continued)

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Initial Sat UnSat

	- NOTE
damp thro open	tuations on PI-2-11-053 may be ened by throttling IIV-2-11-053. If ttling is used, the valve may be ed and closed to verify pressure cation 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.
* * * * * * *	**************************************
* of * Rel * psi * inc	NOT EXCEED a pump discharge pressure 1300 psig while throttling HV-2-11-26. ief valve is set to lift at 1400 g. Pressure will continue to rease slightly when valve throttling stopped.
	SLOWLY <b>THROTTLE</b> HV-2-11-26 to a pressure of 1255 (1255-1280) psig as
6.2.6	indicated on PI-2-11-053.
•	indicated on PI-2-11-053. <b>RECORD</b> 2BT076 pressure.
5.2. <b>6</b>	

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.

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

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## 6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat\_UnSat</u>

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

	RED VIBRATION RED LOCATIONS	ACCEPTABLE RANGE	ALERT RANGE	ACTION RANGE			
INBOARD							
X1	IN/SEC PK	≤ 0.716	0.716 to 1.719	> 1.719			
¥1	IN/SEC PK	≤ 0.225	0.225 to 0.540	> 0.540			
		OUTE	DARD				
X1	IN/SEC PK	≤ 0.803	0.803 to 1.929	> 1.929			
¥1	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.

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## 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.
  - 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.

ST-0-011-301-2 Rev. 12 Page 11 of 25 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: 52.8 gal x 60 sec/min = Flow Rate Step 6.2.16 3168 / \_\_\_\_\_ sec = \_\_\_\_ gpm ĪV 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. ACTION ACCEPTABLE ALERT PARAMETER ACTUAL RANGE RANGE VALUE RANGE N/A N/A N/A TIME (Seconds) < 50.2 to < 49.1 or 50.2 to FLOW RATE (gpm)

 
 SULVE RATE (gpm) (3168/Time)
 SUL2 CO 58.1
 < SUL2 CO 49.1

 DISCH PRESSURE (psig)
 1255-1280
 N/A

6.2.21 VERIFY flow and pressure recorded in Data Sheet 2 is ≥43 gpm at ≥1255 psig. <sup>4</sup>

## 6.0 **PERFORMANCE STEPS** (Continued)

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> Initial Sat <u>UnSat</u>

		<u>Sal</u>	<u>0115a</u>
	NOTE		
"SBLC	ext step verifies CHK-2-11-43A Pump 2AP040 Discharge Check Valve" e OPEN direction.		
6.2.22	<b>VERIFY</b> pump test data on Data Sheets 1 and 2 do <b>NOT</b> fall within Action Range.		
6.2.23	<b>CLOSE</b> HV-2-11-27.	•	
6.2.24	<b>OPEN</b> HV-2-11-26.		- <u></u>
6.2.25	<b>OPEN</b> HV-2-11-30.		
6.2.26	<b>UNLOCK AND OPEN</b> 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 *		
	not run SBLC Pump when Test Tank * empty. *		
* * * * * * *	***************************************		
	2. LOCALLY <b>START</b> 2AP040 <b>THEN STOP</b> 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.	<u></u>	<u></u>
SBLC Pu	mp B Test <b>CM-1</b>		
6.3.1	IF one test rig is being used, THEN REMOVE test rig at 2BT076 AND INSTALL cap. OTHERWISE, N/A this step.		

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6.3

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## ST-0-011-301-2 Rev. 12

	2	ST-O-011 R Page 13	lev. 12
6.0	PERFORMANCE STEPS (Continued)		tial <u>UnSat</u>
	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	<u></u>	• •
	***************************************		
	* 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 <b>NOTIFY</b> Reactor Operator 2BP040 "Standb 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 <b>IF</b> Surveillance Test is being performe to satisfy pump post maintenance testing, <b>THEN PERFORM</b> this step, <b>OTHERWISE N/A</b> this step <b>AND PROCEED</b> to		

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RUN pump for 5 minutes unloaded THEN 1. 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.

step 6.3.7.

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.

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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
* <b>DO 1</b> * of 1 * Rel: * psig * inc	NOT EXCEED a pump discharge pressure 300 psig while throttling HV-2-11-26. Lef valve is set to lift at 1400 g. Pressure will continue to rease slightly when valve throttling stopped.
******	SLOWLY THROTTLE HV-2-11-26 to a pressure of 1255 (1255-1280) psig as indicated on PI-2-11-053.
5.3.9	RECORD 2AT076 pressure.

## 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.

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## 6.0 **PERFORMANCE STEPS** (Continued)

Initial Sat\_UnSat

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

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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 ALERT RANGE		ACTION RANGE
	-	INBC	ARD	
X1	IN/SEC PK	≤ 0.527	0.527 to 1.266	> 1.266
¥1	IN/SEC PK	≤ 0.355	0.355 to 0.853	> 0.853
		OUTB	OARD	)
X1	IN/SEC PK	≤ 0.499	0.499 to 1.197	> 1.197
¥1	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.

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6.3.15 CLOSE HV-2-11-30.

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

## 2

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6.0 **PERFORMANCE STEPS** (Continued)

Initial <u>Sat UnSat</u>

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.

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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.

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## 6.0 **PERFORMANCE STEPS** (Continued)

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Initial <u>Sat\_ UnSat</u>

IV

- 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:

> <u>52.8 gal x 60 sec/min</u> = Flow rate Step 6.3.18

3168 / \_\_\_\_\_ sec = \_\_\_\_\_ gpm

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**PERFORMANCE STEPS** (Continued) 6.0

Initial

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

VERIFY flow recorded in Data Sheet 4 is 6.3.23  $\geq$  43 gpm AND pressure is  $\geq$  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.
- **REMOVE** test rig at 2AT076 AND INSTALL 6.3.25 cap.
- IF two test rigs were used, THEN REMOVE 6.3.26 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.

Sat UnSat

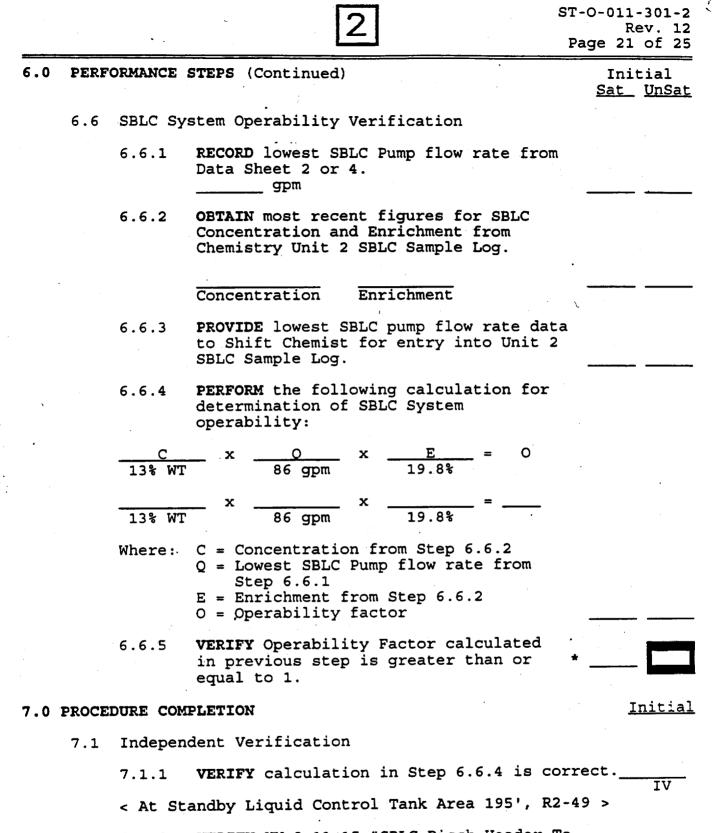
•		• .		2			-301-2 ev. 12 of 25
(	6.0	PERFORMANC	CE STEP	S (Continued)			tial <u>UnSat</u>
		6.3.3	suc dra sig	test tank level reaches top of tion line on side of tank by graining, THEN N/A the next 3 gn-offs. OTHERWISE, PERFORM the lowing:			
			1.	UNLOCK AND CLOSE HV-2-11-11.			
		****1	******	**************************************	*		
		*	Do not is emp	run SBLC Pump when Test Tank bty.	*		÷
		****	2.	LOCALLY <b>START</b> 2BP040 <b>THEN STO</b> when Test Tank level reaches t suction line on side of test t	op of		•
	۰. ۱		3.	<b>OPEN</b> HV-2-11-11.			
1 1		6.3.3	1 CLO	DSE HV-2-11-41.			. <u></u>
(		6.4 Resto	oring S	BLC System to Operable Status			
		6.4.1	LOC	CK closed HV-2-11-41.			•
		6.4.2	VER	RIFY OR LOCK OPEN HV-2-11-11.			
		6.4.3	CLC	SE OR VERIFY CLOSED HV-2-11-30	•		
		6.4.4	CLC	SE AND LOCK HV-2-11-26.			,
		6.4.5	OPE	IN AND LOCK HV-2-11-15.			
		6.4.6		<b>TIFY</b> Reactor Operator SBLC System returned to service.	em has	. <u></u>	

				2		ST-O-0 Page	Re	301-2 v. 12 of 25
6.0	PERF	ORMANCE	STEPS (Continued	1)	· ·		nit t_	ial UnSat
· . ·	6.5	Flushin	g Test Tank 20T0	17				
		******* * * DO	***************** CAUT NOT OVERFILL Wa		**************************************			
			5'. If necessar y be closed whil				•	•
		< At Rx	Bldg 165', West	Wall>				
		6.5.1	<b>OPEN</b> HV-2-11-23 20T017 Outer Dr		st Tank			
		< At Sta	andby Liquid Con	trol Tank Ar	ea, 195',	R2-49 >		
		6.5.2	<b>REMOVE</b> SBLC mea Tank.	suring stick	from Test	·		. <u></u>
		6.5.3	<b>INSTALL</b> hose at valve HV-2-38D- Vv for SBLC Tes	29 "Demin Wt	r Hose Blk			
		6.5.4	<b>OPEN</b> HV-2-11-28 Inner Drain Val		Tank 20T01	7	<u> </u>	
		6.5.5	<b>OPEN HV-2-38D-2</b> with deminerali		Test Tank			
		6.5.6	CLOSE HV-2-38D-	29.				
_		6.5.7	CLOSE HV-2-11-2	8.				
		6.5.8	<b>VERIFY</b> Test Tan	k empty.	•			
		6.5.9	INSTALL cover o	n Test Tank.		•	•	
		6.5.10	<b>REMOVE</b> hose fro valve HV-2-38D-		r supply			
		< At Rx	Bldg 165', West	Wall>				
		6.5.11	CLOSE HV-2-11-2	3143.			<b></b> .	
		6.5.12	<b>PLACE</b> oil sampl off box located outside the fer	on Turbine	Bldg 116			

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

IV

•			•	2		011-301-2 Rev. 12 22 of 25
(	7.0	PROCE	DURE COM	PLETION (Continued)		Initial
•			7.1.3	<b>VERIFY</b> HV-2-11-11 "SBLC Tk 20T018 Outlet Block To Pumps 2AP040 + 2BP040" is LOCKED OPEN.		
						IV
			7.1.4	<b>VERIFY</b> HV-2-11-26 "SBLC Pumps Disch Recirc HDR Block To Tks 20T017 + 20T018" is LOCKED CLOSED.		
·	÷		7.1.5	<b>VERIFY</b> HV-2-11-41 "SBLC Test Tk 20T017 Outlet To SBLC Pumps Suction HDR" is LOCKED CLOSED.		IV
			7.1.6	<b>VERIFY</b> HV-2-11-27 "SBLC Pumps Disch Recirc Blk To SBLC Test Tank 20T017" is CLOSED.	ł	IV
			7.1.7	<b>VERIFY</b> HV-2-11-30 "SBLC Pumps Disch/Recirc Blk To SBLC Tank 20T018" is CLOSED.		IV
			7.1.8	<b>VERIFY</b> HV-2-11-28 "SBLC Test Tank 20T017 Drain Valve" is CLOSED.		IV
			7.1.9	<b>VERIFY</b> test rig at 2AT076 "Stby Liquid Control N2 Accumulator A" REMOVED AND cap INSTALLED.		IV
			7.1.10	<b>VERIFY</b> test rig at 2BT076 "Stby Liquid Control N2 Accumulator B" REMOVED AND cap INSTALLED.		IV
					+1	IV
			/.1.11	<b>VERIFY</b> IIV-2-11-053 "PI-2-11-053 Instr SBLC PPs Disch Header Press" is OPEN.	ISOT	
	· · · ·		< At Rx	Bldg 165', West Wall>		IV
			7.1.12	<b>VERIFY</b> HV-2-11-23143 "SBLC Test Tank 20 Outer Drain Valve" is CLOSED.	<b>T017</b>	
		7.2	Records	Completion		Ĩv
			7.2.1	<b>COMPLETE</b> Section 2 of Cover Page (and Section 3 if applicable).		
	8.0	REFEI	RENCES			
		8.1	Governin	ng		

Tech Spec SR 3.1.7.5 8.1.1

- 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

C.

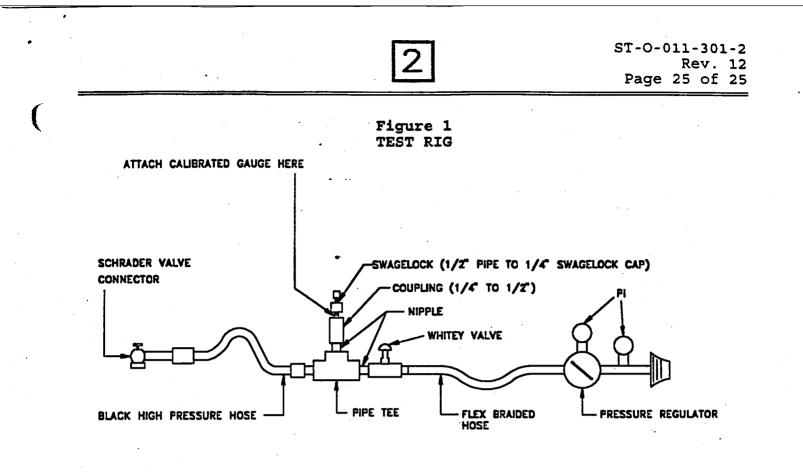
## 10.0 PARTICIPANTS RECORD

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**(** )

Printed Name	Initials
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## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

RO EQUP CONTROL

P	0	S	IT	10	Ν	TI	Т	LE:		
	C	C		<sup>i</sup> U	1.4	11	1			

## Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: NEW-P&ID USE

K/A: <u>2.1.24</u>

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.

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## H. PERFORMANCE CHECKLIST

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STEP	STEP	ACT	STANDARD
NO	UTEI .		
	Obtain M-315 Sh. 4, "P&I Diagram Emergency Service Water and High Pressure Service Water Sys's".	Р	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.	<b>P</b> ,	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.	Ρ	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".	Р	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.	Р	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.	Р	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.	Ρ	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".	Р	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.	Р	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".	Р	M-330 Sh. 1 is located using continuation identifier on M-315 Sh.1.
	LISE Boy000		Page 5 of 6

NEW-PID USE Rev000

Page 5 of 6

	STEP	ACT	STANDARD
STEP	SIEP	ACT	STANDARD
NO 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.	Ρ	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.	Р	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.	Р	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.	Ρ	<ul> <li>Inform the Control Room Supervisor that on a Diesel Generator start, the:</li> <li>A and B ESW pumps will automatically start and continue to run normally.</li> <li>ECW pump will automatically start and shutdown after 45 sec.</li> <li>ECW discharge valve (MO-0841) will</li> </ul>
1	(Cue: Acknowledge report.)		remain closed.

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

## TERMINATING CUE

Ι.

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.

## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

**RO RAD CONTROL** 

POSITION TITLE:	NTITLE: Unit Reactor Operator/Senior Reactor Operator				
TASK-JPM DESIGNATOR:	NEW-RAD INST		K/A:	<u>2.3.5</u>	
		•		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)
  - 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

<b>STEP</b>	STEP	ACT	STANDARD						
NO	UTER .		STANDARD						
· · · · · · · · · · · · · · · · · · ·	** NOTE ***								
1									
	Instrument checks may be conducted in any order.								
1 *1	Perform a calibration check of the RO-2A.	P	The candidate locates the Calibration Sticker on the RO-2A and verifies that the						
	(Cue: Calibration is not due until October 1999)		instrument is in calibration.						
*2	Verify that the RO-2A has been Source Checked.	Р	The candidate locates the Source Check Sticker and observes that the RO-2A was source checked today.						
	(Cue: The source check was conducted 4 hours ago)								
*3	Perform a check of the physical condition of the RO-2A.	Ρ	The candidate performs a careful physical inspection of the RO-2A for any damage.						
	(Cue: Acknowledge physical check completed)								
*4	Perform a battery check of the RO-2A.	Р	Candidate places the function switch to BOTH positions BAT 1 and BAT 2 and						
	(Cue: Positions BAT 1 and BAT 2 indicate that battery voltage is in the Batt OK range)		verifies that voltage is indicated in the 'Batt OK" range						
*5	Perform a Zero check of the RO-2A.	Р	Candidate places the function switch to the Zero position and observes that the						
	(Cue: Needle is indicating above the Zero indication)		indication is greater than Zero.						
*6	Zero the RO-2A	P	Candidate adjusts the Zero Knob to obtain a Zero indication.						
	(Cue: acknowledge adjustment of knob to obtain a Zero indication)								
*7	Take a Closed Window Gamma reading on the selected object.	Р	Candidate holds meter with the beta window closed at approximately one inch and takes readings, shifting scales until						
	(Cue: Depending on selected scale indicate that the reading is upscale or downscale until the appropriate scale is		an appropriate reading is obtained.						
	reached. Then indicate that the meter is reading 10 mR/hr)								

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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. $(12 - 10) \times 4 = 8 \text{ mR/hr Beta}$
10	Candidate reports Gamma and Beta Radiation levels on the object. (Cue: Acknowledge report)	Р	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.

## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

RO EMERGENCY PLAN

POSITION TITLE:	Unit Reactor Operator/Senior R			
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

## J. 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

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STEP NO	STEP	ACT	STANDARD
	Obtain a copy of procedure ERP-130.	P	A copy of procedure ERP-130 is obtained.
*2	Activate the Page Alert Tone system.	P	Station Alert Tone system pushbutton is momentarily depressed at the Plant
	(Cue: Siren noise audible on loudspeaker.)		Reactor Operator's desk.
*3	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	Ρ	Depress and hold pushbutton on GAI- Tronics handset while making evacuation announcement <u>twice</u> over the Plant Public Address System.
	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.)		
*4	Rotate "Evacuation Alarm/Mic selector" switch to position 6 (plant). (Cue: Acknowledge control switch	Ρ	Mic/Siren Selector, switch 43 is placed in "POSITION 6" at panel 00C026B.
	operation.)		
*5	Sound evacuation siren for approximately 1 minute by pulling handle out. (Cue: Acknowledge control switch	Р	Mic/Siren Selector, switch 43 is PULLED OUT for approximately 1 minute at panel 00C026B.
	operation.)		
6	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.

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STEP	STEP	ACT	STANDARD
NO			
*7	Make evacuation announcement <u>twice</u> over the PLANT RADIO SYSTEM.	Р	Depress the pushbutton on the radio system microphone while making evacuation announcement twice over the
	"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		PLANT RADIO SYSTEM.
	is NOT a drill. This is NOT a drill". (Cue: Acknowledge announcement)		
*8	Rotate the "Evacuation Alarm/Mic selector" switch, (while in the IN mode) to position 2, (microphone river speakers). Activate microphone by pulling handle <u>OUT</u> .	Ρ	Mic/Siren Selector, Switch 43, is placed in "POSITION 2", THEN handle is PULLED OUT at panel 00C026B.
	(Cue: Acknowledge control switch operation.)		
*9	Make evacuation announcement twice over the Pond Paging system.	Р	Key microphone at panel OOC026B while making evacuation announcement twice over 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.)		
10	Push switch #43 selector switch on Diesel Generator Panel <u>IN</u> .	Р	Mic/Siren Selector, Switch 43 is PUSHED IN at panel 00C026B.
	(Cue: Acknowledge control switch operation.)		

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STEP NO	STEP	ACT	STANDARD
*11	Activate the Page Alert Tone system. (Cue: Siren noise audible on loudspeaker.)	Ρ	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.)	Ρ	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.)	Р	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.)	Ρ	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	STEP	ACT	STANDARD
NO			
*16	Make evacuation announcement <u>twice</u> 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)	Ρ	Depress the pushbutton on the radio system microphone while making evacuation announcement <u>twice</u> 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 <u>OUT</u> . (Cue: Acknowledge control switch operation.)	Ρ	Mic/Siren Selector, Switch 43, is placed in "POSITION 2", THEN handle is PULLED OUT at panel 00C026B.
*18	Make evacuation announcement <u>twice</u> 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.)	Ρ	Key microphone at panel OOC026B while making evacuation announcement <u>twice</u> over Pond Paging System.
19	Push switch #43 selector switch on Diesel Generator Panel <u>IN</u> . (Cue: Acknowledge control switch operation.)	Ρ	Mic/Siren Selector, Switch 43 is PUSHED IN at panel 00C026B.

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STEP NO	STEP	ACT	STANDARD
20	Inform Emergency Director of task completion.	Р	Task completion reported.
	(Cue: Emergency Director acknowledges report.)		

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

## TERMINATING CUE

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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

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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.

ERP-130, Rev. 13 Page 1 of 6 NDY:dlk

## PEACH BOTTOM UNITS 2 AND 3 EMERGENCY RESPONSE PROCEDURE

### ERP-130 SITE EVACUATION

#### 1.0 <u>RESPONSIBILITIES</u>

- 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 <u>OR</u> 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.

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- 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 <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 IN.
- 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:

Page 3 of 6 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).

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- 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 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

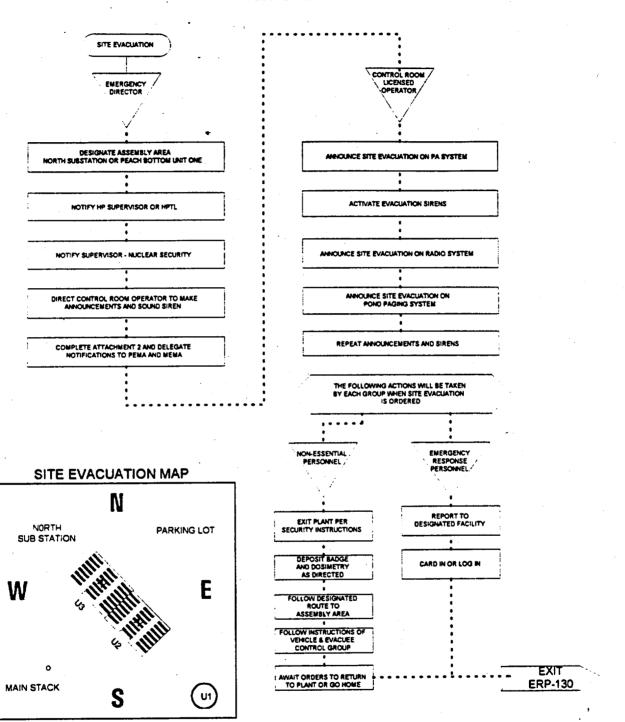
b. Conditions such as smoke, fire, uncontrolled toxic materials, or flooding preclude habitation of large portions of the site,

- 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



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# ATTACHMENT 2

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# 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 213	
2.) Pennsylvania Emergency Management Agency (PEMA) 9-1-800-424-736: ext. 216	2 <u>or</u> Emergency
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 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 (Time)	(Date)
(Person notified) (Time)	,
PEMA (Person notified) (Time)	(Date)

#### Control Room Systems and Facility Walk-Through Test Outline ES-301

Form ES-301-2

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						
а.	Instrument N <sub>2</sub> /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				

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# ES-301 Control Room Systems and Facility Walk-Through Test Outline

Form ES-301-2

Facility:       Peach Bottom Units 2 & 3       Date of Examination:       Sep. 13, 1999         Exam Level (circle one):       ROY 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 <sub>2</sub> /Backup Instrument Nitrogen to ADS	D, P, R 054P	8					
<ul> <li>Injection Systems/Maximizing CRD Flow to the Vessel (Unit 3)</li> </ul>	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, room, (S)imulator, (L)ow-Power, (R)CA	(A)Iternate pat	Type Oodes. (D)neor non bank, (m)ounde non bank, (n)ounde part (-)-					

# PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 1 -RECIRC

POSITION TITLE:

## Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR:

2000010501 / PLOR-304CA K/A: 295001.10

<u>295001.10</u>

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.

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# 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.

- 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".

STANDARD At least one GP-9-2, Appendix 1, Table 1 INCE CHECKLIST control rod is selected and driven in by ACT depressing the corresponding select STEP matrix pushbutton and placing 3A-S2, P GP-9-2, Appendix 1, Table 1 ROD CONTROL switch OR 3A-S3, EMERGENCY IN/ NOTCH OVERRIDE switch in the IN position at panel Rod select matrix pushbuttons ght for each selected rod, Full Core All APRM recorders are monitored for ay rod position has green "00" on for noise level growing by two or more times 20C005A. or oscillations greater than 10% peak to inserted rod.) P nitor for Thermal Hydraulic Instabilities peak on panel 20C005A. 5A-S1 REACTOR mode switch is placed in the SHUTDOWN position OR 5A-S3A II) on the APRMs. ue: APRMs A, B, and D readings are and 5A-S3B Scram pushbuttons are DEPRESSED within 5 minutes of the ecognize Thermal Hydraulic Instabilities P THI) and perform a manual reactor onset of THI: (Cue: Annunciators 211 B1, C1, D1 and scram. E1 are alarming, A & B CHANNEL The presence of Thermal Hydraulic Instabilities and the insertion of a manual REACTOR AUTO AND MANUAL SCRAMS, all Full Core display rod positions have green "--" on.) P Inform Control Room Supervisor of the scram reported. Thermal Hydraulic Instabilities and the insertion of a manual scram. (Cue: Control Room Supervisor acknowledges report.) Under "ACT" P - must perform When the Reactor has been manually scrammed due to the presence of thermal hydraulic internet and the control Ream Superviser about the internet. vinen me keactor has been manually scrammed due to me presence or mermal nydrau instabilities, the Control Room Supervisor should be informed. The evaluator will then TERMINATING CUE ۱. terminate the exercise. Page 5 of 5 PLOR304CA Rev005

# 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".

GP-9-2 Rev. 26 Page 1 of 3 MGW:rww

### 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 PREREOUISITES

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 <u>ANY</u> of the following conditions exist:
  - APRM oscillations of greater than <u>OR</u> equal to 10 percent peak-to-peak,
  - LPRM <u>OR</u> APRM oscillations change from random to regular with a period of approx. 1 to 2 secs, <u>OR</u>
  - WRNM period displays indicate positive-to-negative swings with an oscillation interval of approximately 1 to 2 seconds.
- 3.1 <u>IF</u> evidence of core thermal hydraulic instability exists, <u>THEN</u> place the reactor mode switch in "SHUTDOWN" <u>AND</u> enter T-100, "Scram", <u>AND</u> exit this procedure. **CM-1, CM-2**
- 3.2 Lower recirculation flow until <u>ANY</u> 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.

GP-9-2 Rev. 26 Page 2 of 3

- 3.3 Insert sufficient GP-9-2 Appendix 1, Table 1 control rods to reach the target power level using the Rod Control Handswitch <u>OR</u> 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 <u>OR</u> 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 <u>WHEN</u> plant conditions permit, <u>THEN</u> 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 <u>AND</u> 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 <u>IF</u> any thermal limit value is equal to or greater than 1.000, <u>THEN</u> 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 <u>IF</u> further power reduction is required, <u>THEN</u> exit this procedure <u>AND</u> enter GP-3, "Normal Plant Shutdown". Otherwise, exit this procedure <u>AND</u> 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)

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OT-112 PROCEDURE Rev. 30 Page 1 of 5 NHN:nhn 07/02/99

## PECO Energy Company Peach Bottom Units 2 and 3

<u>OT-112 - UNEXPECTED/UNEXPLAINED CHANGE IN CORE FLOW - PROCEDURE</u> (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 <u>IF NO</u> Recirc Pumps are operating, <u>THEN</u> SCRAM <u>AND</u> ENTER T-100, "Scram", <u>AND</u> EXIT this procedure.
- 2.2 **DETERMINE** position on Exhibit GP-5-1, "PBAPS Power Flow Operation Map" (Power to Flow Map).
- 2.3 <u>IF IN</u> Region 1 of the Power to Flow Map, <u>THEN</u> SCRAM <u>AND</u> ENTER T-100, "Scram", <u>AND</u> EXIT this procedure.
- 2.4 <u>IF</u> a Recirc Pump has tripped, <u>THEN</u> **INSERT** <u>ALL</u> GP-9-2(3) Appendix 1, Table 1 rods.
- 2.5 MONITOR for the following indications of Thermal Hydraulic Instability (THI):
  - Any LPRM <u>OR</u> APRM noise level grows by two <u>OR</u> more times its initial noise level, <u>OR</u>
  - APRM noise level of greater than <u>OR</u> equal to 10 percent (peak to peak), <u>OR</u>
  - LPRM <u>OR</u> APRM oscillations change from random to regular (with approximately 1 to 2 second oscillation period).
- 2.6 <u>IF</u> THI is present, <u>THEN</u> SCRAM <u>AND</u> ENTER T-100, "Scram", <u>AND</u> EXIT this procedure.

#### 3.0 FOLLOW-UP ACTIONS

- 3.1 <u>IF IN</u> Region 2 of the Power to Flow Map, <u>THEN</u> **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.
    - <u>IF ALL</u> GP-9-2(3) Appendix 1, Table 1 rods have been inserted, <u>THEN</u> 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 <u>IF</u> Region 2 cannot be exited within one hour, <u>THEN</u> SCRAM <u>AND</u> ENTER T-100, "Scram", <u>AND</u> EXIT this procedure.
  - 3.1.3 <u>WHEN</u> an acceptable operating point outside of Region 2 has been established, <u>THEN</u> 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 <u>IF</u> Recirc Pump speed was rising <u>AND</u> continues to rise, <u>THEN</u> **TRIP** the affected Recirc Pump <u>AND</u> **RETURN** to step 2.0 of this procedure.
  - 3.2.3 <u>IF</u> pump speed was rising, <u>THEN</u> 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.

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## 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 <u>OR</u> MO-2(3)-02-043A(B), "SUCTION" valve associated with the tripped Recirc Pump at Panel 2(3)0C004A.
  - 3.3.2 <u>IF</u> the tripped Recirc Pump is <u>NOT</u> required to be isolated, <u>THEN</u> 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 <u>OR</u> equal to 71.75 Mlbm/hr.
  - 3.4.2 <u>IF</u> recirculation jet pump loop flow limits are <u>NOT</u> met, <u>THEN</u>:
    - 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.

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## 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. <u>IF</u> the mismatch is restored in the next step, <u>THEN</u> the 12 hour time clock started in the previous step is no longer required.
  - 3. Within <u>ONE</u> 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. <u>IF</u> recirculation jet pump loop flow limits can <u>NOT</u> be restored within one hour, <u>THEN</u>:
  - INSERT ALL GP-9-2(3) Appendix 1, Table 1 rods.
  - <u>IF ALL</u> Table 1 rods are inserted <u>AND</u> operation is above the 66.7% Rod Line, <u>THEN</u> **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 <u>AND</u> RETURN to step 2.0 of this procedure.

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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 VERIFICATION OF AUTOMATIC ACTIONS

None

## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 2 - FEEDWATER

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator				
TASK-JPM DESIGNATOR:	2590060101 / PLOR-155C	K/A:	259001A402 URO: 3.9	SRO: 3.1	7
TASK DESCRIPTION:	TRANSFER RFPs TO MASTER	LEVEL C	ONTROL		

## 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	STEP	ACT	STANDARD
NO			
1	Obtain a copy of procedure SO 6C.1.D-2.	Р	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	Ρ	Verify "M/A SELECT" is lit for each operating RFP at Panel 20C005A.
	RFPs.)		
3	Verify RFP M/A Station, "RFP A(B)(C)", in "MANUAL" for each operating RFP. (Cue: The M/A Stations are in	P	Verify the RFP M/A Stations are in "MANUAL" for all three RFPs at Panel 20C005A.
	"MANUAL" for all three RFPs.)		
4	Verify a Balanced flow condition exists on FR-2565, "Feed Water F (flow)".	Р	Verify a balanced flow condition exists on FR-2565, "Feed Water F (flow)" for all three RFPs at Panel 20C005A.
	(Cue: A balanced flow condition exists on FR-2565.)		
5	Verify the Master Level Controller (MLC) is in "Manual".)	P	Verify the Master Level Controller (MLC) is in "MANUAL" at Panel 20C005A.
	(Cue: The Master Level Controller (MLC) is in "MANUAL".)		
6	Verify the "MLC" setpoint ("S" readout) and process ("P" readout-reactor water level) are matched.	Ρ	Verify that the "MLC" setpoint ("S" readout) and process ("P" readout- readout water level) values are matched at Panel 20C005A.
	(Cue: The "MLC" setpoint ("S" readout and process ("P" readout-readout water level) are matched.)		
7	Verify the "V" readout (Output) is displayed on the A(B)(C) RFP M/A Station (first RFP to be placed in AUTO).	P	Verify the "V" readout (output) is displayed on the A(B)(C) RFP M/A Station at Panel 20C005A.
	(Cue: The "V" readout (Output) is displayed on the A(B)(C) RFP M/A Station.)		
8	Verify the "V" readout (output) is displayed on the "MLC".)	Ρ	Verify the "V" readout (output) is displayed on the "MLC" at Panel 20C005A.

STEP	STEP	ACT	STANDARD
<u>NO</u> *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.)	Ρ	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".)	Р	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".)	Р	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	STEP	ACT	STANDARD
NO	UT LI		
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	Ρ	Select the "V" readout (output) display on the A(B)(C) RFP M/A Station at Panel 20C005A.
17	Station.) Select the "V" readout (output) display on	P	Select the "V" readout (output) display on
	the "MLC".	, I	the "MLC" at Panel 20C005A.
	(Cue: The "V" readout (output) is displayed on the "MLC".)		
*18	Adjust the output ("V" display) on the A(B)(C) RFP M/A Station to match the output ("V" display) on the "MLC".	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
	(Cue: The "MLC" "V" readout is matched to the A(B)(C) RFP M/A Station "V" readout.)		Panel 20C005A.
*19	Place the A(B)(C) RFP M/A Station in "AUTO".	Р	The A(B)(C) RFP M/A button is depressed, the green "AUTO" light is lit, the red "MANUAL" light is out at Panel
	(Cue: The A(B)(C) RFP M/A green light is "ON", red light is "OFF".		20C005A.
20	Inform Control Room Supervisor of task completion.	P	Task completion reported.
	(Cue: The Control Room Supervisor acknowledges the report).		

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

# I. TERMINATING CUE

1

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.

7

# 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.

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### 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 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> 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 <u>IF</u> the RFP is being controlled manually from the MSC <u>AND</u> operation from the RFP M/A Station is desired, <u>THEN</u> 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.

SO 6C.1.D-2 Rev. 4 Page 2 of 10

## 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 <u>NOT</u> lit <u>AND</u> the "Y" readout is negative, <u>THEN</u> the MSC speed setpoint must be raised <u>OR</u> the M/A Station speed set point must be lowered.

IF "M/A PERMISSIVE" is <u>NOT</u> lit <u>AND</u> the "Y" readout is positive, <u>THEN</u> the MSC speed setpoint must be lowered <u>OR</u> 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 <u>IF more than one RFP is operating, THEN verify a</u> 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.

SO 6C.1.D-2 Rev. 4 Page 3 of 10

# 4.2.6.2 Verify the "V" readout (output) is displayed on the "MLC".

### NOTES

- 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.
- 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.

### NOTE

 $\frac{WHEN}{that}$  the RFP M/A control station is placed in "AUTO", THEN that RFPT is being controlled from the Master Level Controller.

4.2.6.4 Place the RFP M/A Station in "AUTO".

### NOTE

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:

### NOTE

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".

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## 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 <u>IF</u> reactor water level setpoint adjustment is necessary, <u>THEN</u> 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)"

- o 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.

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## 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 " $\overline{V}$ ".
  - 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 <u>IF</u> the operating RFP(s) is(are) being controlled automatically from the Master Level Controller <u>AND</u> manual operation from the Master Level Controller is desired, <u>THEN</u> 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 <u>AND</u> steam flow/feed flow are matched.
- 4.3.3 Place the Master Level Controller in "MANUAL".

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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 <u>AND</u> 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:
  - SPI-2621A(B)(C), "Feed Pump Speed"
  - 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.
* * * * 1 *	**************************************
- * *	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".

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- 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".

**(** 1:

- 4.6.2 Place the RFP M/A Station in MANUAL AND adjust output ("V" setpoint) to 0%.
- 4.7 <u>IF</u> the mode of control of the Feedwater Level Control System is to be changed, <u>THEN</u> perform steps 4.7.1 through 4.7.3.
  - 4.7.1 Verify the following on Panel 20C005A:
    - Feedwater Master Level Controller is in "AUTO".
    - RFP M/A Station is in "AUTO" for each RFP being used to provide feedwater to the reactor.
    - Reactor water level LI-2-06-094A, B, AND C, "Reactor Level L(NR)", steady.

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- Reactor Steam flow AND Feed flow FR-2-06-098, "Total Steam Total F/W F/F", steady.
- Reactor Power at 30% <u>OR</u> 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. 0 0 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: ο Disagree light will be solid - override is permissible. ο 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. IF it is desired to transfer "LEVEL SELECT" to an 4.8 unselected channel, THEN perform steps 4.8.1 through 4.8.2. Push the button corresponding to the desired level 4.8.1 transmitter "A", "B", "C" OR "AUTO ABC".

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## NOTES

- 1. The selected button will flash.
- 2. <u>IF</u> the computer disagrees with the new selection, <u>THEN</u> the:
  - Disagree light will be solid override is permissible.

• Disagree light will be flashing - override is <u>NOT</u> 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

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7.0 TECHNICAL SPECIFICATIONS

None

8.0 INTERFACING PROCEDURES

None

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## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 3 - HPCI

POSITION TITLE:	Unit Reactor Operator/Senior	Reactor Ope	rator	,
TASK-JPM DESIGNATOR:	2060050101 / NEW-HPCI	<b>K/A</b> :	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
	Obtain a copy of procedure SO 23.2.A-2, "HPCI SYSTEM SHUTDOWN".	Р	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.	Ρ	"HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm on panel 221 A-2 is verified clear.
	(Cue: Annunciator 221 A-2 is not lit.)		
4	Verify "HPCI DC MOTOR POWER LOSS" alarm on panel 221 A-1 is clear.	Р	"HPCI DC MOTOR POWER LOSS" alarm on panel 221 A-1 is verified clear.
	(Cue: Annunciator 221 A-1 is not lit.)		
5	Place the gland seal condenser "Vac Pump" control switch, in "START".	P	The gland seal condenser "Vac Pump" control switch, is placed in "START".
	(Cue: Acknowledge switch operation. The "Vac Pump" switch is in the "START" position.)		
*6	Depress <u>AND</u> hold the HPCI System "Remote Trip" pushbutton.	Р	The HPCI System "Remote Trip" pushbutton is being depressed and held.
	(Cue: Acknowledge switch operation. The HPCI System "Remote Trip" pushbutton is depressed and being held.)		
*7	WHEN 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".	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".
	(Cue: Acknowledge control switch operation. The HPCI "Aux Oil Pump" control switch is in the "Pull to Lock" position.)		
8	Release the "Remote Trip" pushbutton.	Р	The "Remote Trip" pushbutton has been released.
	(Cue: Acknowledge pushbutton operation. The "Remote Trip" pushbutton has been released.)		
9	Inform Control Room Supervisor of task completion.	P	Task completion reported.
H	(Cue: Control Room Supervisor acknowledges report.)		

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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.

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# 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".

SO 23.2.A-2 Rev. 11 Page 1 of 8 TDN:tdn 09/22/98

## 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 <u>OR</u> without an initiation condition present.

#### 2.0 PREREOUISITES

- 2.1 HPCI System operation is no longer required <u>OR</u> 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

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- 3.1 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> inform Shift Management.
- 3.2 Monitor Reactor water level <u>AND</u> pressure, <u>AND</u> primary containment temperatures <u>AND</u> pressure from multiple indications.
- 3.3 <u>IF</u> the Aux Oil Pump, 20P026, is left running after the turbine is shutdown <u>AND</u> the HPCI System subsequently initiates, <u>THEN</u> a high steam flow isolation may occur. **CM-1**
- 3.4 Do <u>NOT</u> secure <u>OR</u> place an ECCS in MANUAL Mode unless, by at least two independent indications, (1) misoperation in AUTOMATIC Mode is confirmed, <u>OR</u> (2) adequate core cooling is assured. <u>IF</u> an ECCS is placed in MANUAL Mode, <u>THEN</u> it will <u>NOT</u> initiate automatically. Make frequent checks of the initiating <u>OR</u> controlling parameter. <u>WHEN</u> manual operation is no longer required, <u>THEN</u> restore the system to AUTOMATIC/STANDBY Mode if possible.
- 3.5 Do <u>NOT</u> 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 <u>AND</u> water hammer in the exhaust line. During extended low speed operation, the resulting forces could damage the turbine exhaust line check valves.

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### 4.0 PERFORMANCE STEPS

### NOTES

- 1. Communications shall be available between the control room <u>AND</u> personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects control room instrumentation <u>OR</u> alarms.
- 2. Section 4.1 provides for HPCI shutdown when an initiation condition is <u>NOT</u> present.
- 3. Section 4.2 provides for short term HPCI shutdown when an initiation condition <u>IS</u> 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 <u>IS</u> 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 <u>NOT</u> anticipated.
- 4.1 HPCI System Shutdown when an Initiation Condition is <u>NOT</u> present. **CM-3**

4.1.1 Verify 23A-S105, "HPCI Manual Initiation" collar in "DISARM".

<u>CAUTION</u> buring HPCI System shutdown, the Aux Oil Pump, 20P026, will <u>NOT</u> automatically start on lowering bearing oil pressure unless an initiation signal is present <u>OR</u> 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.

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- 4.1.5 Verify gland seal condenser "Vac Pump", 20K002, control switch in "START". CM-2
- 4.1.6 Depress <u>AND</u> hold the HPCI System "Remote Trip" pushbutton.
  4.1.7 Verify "Aux Oil Pump" starts as turbine slows down
- (1200 1500 rpm).

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- 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.
- IF HPCI is in CST to CST mode, THEN perform the 4.1.11 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

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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.
- Close MO-2-23-021 4.1.12.6
- 4.1.12.7 Close MO-2-23-031
- IF a HPCI initiation condition had existed, THEN 4.1.13 depress the "HPCI Initiation Signal" reset pushbutton, 23A-S21.
- Verify "HPCI RELAYS NOT RESET" alarm on 4.1.14 Panel 228 C-5 clear.
- Verify open AO-2-23-042 AND AO-2-23-043, "Drain 4.1.15 Isol to Mn Cndr".
- 4.1.16 Locally verify HPCI turbine shaft stopped.
- Momentarily place the HPCI "Aux Oil Pump" control 4.1.17 switch to "STOP" AND verify the control switch returns to "AUTO".

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- 4.1.18 Shutdown the turbine vibration instrumentation, VBI and VBR 4506, <u>AND</u> mark the recorder chart with the date and time of the HPCI turbine run.
- 4.1.19 Verify HPCI flow controller in "AUTO" <u>AND</u> set for 5000 gpm.

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- 4.1.20 <u>WHEN</u> torus water temperature is less than 95°F <u>AND</u> Torus Cooling is <u>NOT</u> required to support other plant operations, <u>THEN</u> remove Torus Cooling from service in accordance with SO 10.1.D-2, "RHR System Torus Cooling" <u>AND</u> return to step 4.1.21 of this procedure.
- 4.1.21 <u>WHEN</u> the HPCI gland seal condenser "Vac Pump" has run for 15 minutes, <u>THEN</u> place the HPCI gland seal condenser "Vac Pump" control switch in "STOP".
- 4.1.22 <u>IF</u> the Standby Gas Treatment System is <u>NOT</u> operating in support of other plant conditions, <u>THEN</u> Shutdown the Standby Gas Treatment System in accordance with SO 9A.2.A-2, "Standby Gas Treatment System Shutdown Following automatic Initiation" <u>AND</u> 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 <u>IS</u> 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. Verify the "Aux Oil Pump", 20P026, control switch 4.2.1 in "START". CM-2 Verify "HPCI AUX OIL PUMP MOTOR OVERCURRENT" alarm 4.2.2 on Panel 221 A-2 is clear. Verify "HPCI DC MOTOR POWER LOSS" alarm on Panel 4.2.3 221 A-1 is clear.

4.2.4 Place the gland seal condenser "Vac Pump" control switch, in "START". CM-2

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****1 * *	******	**************************************
* * * *	present in grav	A-25, "Min Flow", opens with an initiation signal * AND the HPCI turbine shutdown. This will result * Yity drain of the CST to the Torus if HPCI suction * aned to the CST. *
	4.2.5	Depress <u>AND</u> hold the HPCI System "Remote Trip" pushbutton.
	4.2.6	<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".
	4.2.7	Release the "Remote Trip" pushbutton.
	4.2.8	<u>IF</u> subsequent HPCI injection is desired, <u>THEN</u> 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 <u>WHEN</u> HPCI operation is no longer required, <u>THEN</u> perform section 4.2 or 4.3 of this procedure as directed by Shift Management.
	4.2.9	<u>WHEN</u> the HPCI Initiation condition(s) have cleared <u>AND</u> as directed by Shift Management, <u>THEN</u> perform SO 23.1.A-2, "High Pressure Coolant Injection System Setup for Automatic or Manual Operation".
4.3		erm HPCI System Shutdown when an Initiation Condition sent. <b>CM-3</b>
*****	*******	**************************************
*		*
* * * *	will <u>NC</u> pressur sealed- in "STA	HPCI System shutdown, the Aux Oil Pump, 20P026, *OT automatically start on lowering bearing oil *te unless an initiation signal is present OR *in. The HPCI "Aux Oil control switch shall be *ART" 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.

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- 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 ca	use a HPCI System isolation.
4.3.5		e "HPCI Isolation" pushbutton (23A-S27) 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 <u>AND</u> 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

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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 <u>IF</u> subsequent HPCI operation is required, <u>THEN</u> perform SO 23.7.C-2, "HPCI System Recovery from System Isolation or Turbine Trip". Do <u>NOT</u> return to this procedure.

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- 4.3.9 <u>IF</u> long term isolation of the HPCI System is necessary, <u>AND</u> sufficient time has passed to allow cooling of the turbine steam exhaust lines, <u>THEN</u> close MO-4245, "Vac Breaker".
- 4.3.10 Shutdown the turbine vibration instrumentation, VBI and VBR 4506, <u>AND</u> 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 <u>WHEN</u> torus water temperature is less than 95°F <u>AND</u> Torus Cooling is <u>NOT</u> required to support other plant operations, <u>THEN</u> remove Torus Cooling from service in accordance with SO 10.1.D-2, "RHR System Torus Cooling" <u>AND</u> return to step 4.3.13 of this procedure.
- 4.3.13 <u>WHEN</u> the HPCI gland seal condenser "Vac Pump" has run for 15 minutes, <u>THEN</u> stop the pump by placing it's control switch in "PULL TO LOCK".
- 4.3.14 <u>IF</u> the Standby Gas Treatment System is <u>NOT</u> operating in support of other plant conditions, <u>THEN</u> Shutdown the Standby Gas Treatment System in accordance with SO 9A.2.A-2, "Standby Gas Treatment System Shutdown Following automatic Initiation" <u>AND</u> return to step 4.3.15 of this procedure.
- 4.3.15 <u>WHEN</u> the HPCI initiation condition(s) have cleared <u>AND</u> as directed by Shift Management, <u>THEN</u> perform SO 23.7.C-2, "HPCI System Recovery From System Isolation or Turbine Trip".

#### 5.0 <u>CONTROL STATIONS</u>

5.1 Panel 20C004B.

5.2 HPCI Pump Room.

### 6.0 <u>REFERENCES</u>

1

- 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, Controls" (CT T00825)

"Engineered Safety Feature Reset

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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"

## PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 4 - CONTAINMENT

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator				
TASK-JPM DESIGNATOR:	2230020101 / NEW-DWVENT	K/A:	223001	4	
			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	STEP	ACT	STANDARD
NO	·		
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	Р	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	uCi/cc) Check open AO-2509, "Drywell Vent Inbd 2" Vent".	Р	AO-2509 red light is verified on.
	(Cue: AO-2509 red light is lit, green light is out.)		
*3	Open AO-2510, "Drywell Vent Outbd 2" Vent".	Р	AO-2510 switch is taken to open.
	(Cue: Acknowledge switch operation.)		
4	Verify AO-2510 is open.		The AO-2510 red light is verified ON.
	(Cue: AO-2510 red light is lit, green light is out.)		
*5	Open CV-4957, "Drywell Bleed Flow", using manual control HCS-4957 to set the desired flowrate.	Р	HCS-4957 is used to fully open CV-4957 to maximize venting via the 2" vents.
	(Cue: Acknowledge controller operation. HCS-4957 is indicating full open)		
	Not		
	If the candidate monitors drywell p		
	"Drywell pressure is 1		
6	Inform Control Room Supervisor of task completion.	Ρ	Task completion reported.
	(Cue: Control Room Supervisor acknowledges report.)	·.	

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.

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- 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 <u>PURPOSE</u>

**(** )

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<sub>2</sub>/O<sub>2</sub> 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 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> inform Shift Management.
- 3.2 Monitor drywell radiation levels and Main Stack radiation levels while venting the primary containment. <u>IF</u> any rise in radiation levels is observed, <u>THEN</u> stop venting <u>AND</u> 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 <u>AND</u> Personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation <u>OR</u> 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<sup>-3</sup> 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", <u>AND</u> 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 <u>WHEN</u> pressure at PR-2508, Drywell "P", on Panel 20C003-03 is between 0.25 to 0.75 psig, <u>THEN</u> 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", <u>AND</u> 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".

		NOTE
1.		num flowrate for Water Bath Vaporizer 00S216 is scfm.
2.		num flowrate for Ambient Vaporizers 00S492 & 93 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 <u>IF</u> cor	nitrogen ncentrati	a addition to containment is required to reduce drywell O <sub>2</sub> ion 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".
•		NOTE
B	oth Prim peration	mary Containment $H_2/O_2$ Analyzer are placed in n to maximize sampling capability during $O_2$

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<sub>2</sub>/O<sub>2</sub> Sampling System in Standby Mode and Removing From Standby Mode" <u>AND</u> return to step 4.4.3 of this procedure.

concentration reduction.

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- 4.4.3 Verify PR/RR-2-02-3-404B, "Reactor Pressure/ Drywell Rad Gas Recorder", < 3.45 X 10<sup>-3</sup> 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	<u>ANALYZER</u>
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.

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- 4.4.13 <u>WHEN</u> drywell O<sub>2</sub> concentration at XIC-80411A <u>AND</u> B are between 1.5% to 3.0%, <u>THEN</u> 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<sub>2</sub> 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", <u>AND</u> return to step 4.4.18 of this procedure.

#### <u>NOTES</u>

- 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, <u>THEN</u> 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 <u>IF</u> nitrogen addition to containment is required to reduce torus  $O_2$  concentration to less than 1%, <u>THEN</u> 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", <u>OR</u> SO 7B.1.C, "CAC Nitrogen Storage System Startup/Operation Low Flow Mode".

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Both Primary Containment  $H_2/O_2$  Analyzers are placed in operation to maximize sampling capability during  $O_2$ concentration reduction.

- <u>IF NOT</u> already in operation, <u>THEN</u> place standby analyzer XIC-80411A(B), "A(B) CAC/CAD Analyzer" in 4.5.2 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  $10^{-3} \mu Ci/cc$  on Panel 20C200, "D/W Radioactive Gas Sampler". (Refer to ST-C-095-819-2)
- Startup the SBGT System in accordance with 4.5.4 SO 9A.1.B, "Standby Gas Treatment System Manual Startup" AND return to step 4.5.5 of this procedure.
- Direct an operator to close HV-2-7B-40123A, 4.5.5 "N2 Makeup Isolation to Drywell Purge Valve".

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

- Maximum flowrate for Water Bath Vaporizer 00S216 is 1. 3200 scfm.
- Maximum flowrate for Ambient Vaporizers 00S492 & 2. 00S493 is 100 scfm.
- Open AO-2523, "D/W & Torus N2 Makeup Inlet", on 4.5.7 Panel 20C003-03.
- WHEN flow is started, THEN perform SO 7B.8.B, 4.5.8 "CAC Nitrogen Storage System Routine Inspection", concurrently with this procedure.
- Verify makeup flow on FR-2522, N2 Makeup "F", on 4.5.9 Panel 20C003-03.

4.5.6

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- 4.5.10 Open AO-2513, "Torus Vent Inbd 2" Vent", <u>AND</u> 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 <u>WHEN</u> torus O<sub>2</sub> concentration at XIC-80411A <u>AND</u> B are less than 1%, <u>THEN</u> 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<sub>2</sub> 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 <u>CONTROL STATIONS</u>

**(** ):

- 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

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- 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"

#### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 5 – DIESEL GEN

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 Contr	ol Room – (Alternate Path		

#### 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.	Р	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.	Ρ	Equipment Operator is contacted to perform pre-start inspection for 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.)	 	
*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".	Ρ	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.
	(Cue: Acknowledge control switch operation.)		
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.)	Ρ	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.)	Ρ	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.

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STEP NO	STEP	ACT	STANDARD
7	Verify `B' ESW pump start. (Cue: `B' ESW pump red light <u>NOT</u> 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.)	Ρ	'B' ESW pump red light <u>NOT</u> 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 <u>NOT</u> lit, green light on; motor amps are 0 amps on the EM CLG WTR PP ammeter, and annunciator 212 B-2 is not alarming.)	Ρ	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.)	Ρ	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.	Р	"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).
The E	***NC CW pump will not start if attempted.	DTE***	
12	Inform the Control Room Supervisor that the "A" ("B") ESW pump has been started. (Cue: Control Room Supervisor acknowledges report.)	Р	Control Room Supervisor informed that cooling water has been established to the E-4 Diesel Generator.

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

### **TERMINATING CUE**

1.

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**

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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".

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#### 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 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> inform Shift Management.
- 3.2 Notify the main control room if the CARDOX System for the diesel generator building is to be disabled. Do <u>NOT</u> disable the CARDOX System for greater than 15 minutes, without the approval from Shift Management.
- 3.3 <u>IF</u> the activity for which the CARDOX System was defeated is still in progress 15 minutes after the defeat switch was placed in defeat, <u>THEN</u> 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 <u>IF</u> severe engine vibrations <u>OR</u> unusual noises occur, <u>THEN</u> the diesel should be immediately unloaded <u>AND</u> shutdown, until the cause can be determined <u>AND</u> corrected.

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- 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 <u>IF</u> an emergency condition exists (MCA or dead bus), <u>THEN</u> 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 <u>IF</u> a Dead Bus condition exists, <u>THEN</u> 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 <u>IF</u> an RHR pump breaker trips on anti-pumping, <u>THEN</u> 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 <u>NOT</u> 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 <u>IF</u> system grid problems are anticipated by System Operations, diesel generator testing should not be performed.
- 3.12 <u>IF</u> 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.

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## 4.0 <u>PERFORMANCE STEPS</u>

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		•	NOTES
	1.	room <u>AND</u> personnel plant to coordinate	ld be available between the control performing procedures elsewhere in the e the operation of equipment that om instrumentation <u>OR</u> alarms.
	2.	The following sect without performing	ions may be performed individually 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	1.1	Diesel Generator S	low Start
			operator to perform the following as a inspection:
1	***** *	*****	**************************************
2 7 7 7 7 7 7	*****	Improper governor operation and dama	oil level may cause erratic engine *
3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	****	operation and damage	oil level may cause erratic engine *
	****	operation and damag ***********************************	verify governor oil level LG-7575A(B)(C)(D) above the black line AND below the top of the sightglass.
		operation and damag ***********************************	<pre> verify governor oil level LG-7575A(B)(C)(D) above the black line AND below the top of the sightglass. CM-7 Check the engine crankcase oil level +3" to -2" on the upper scribe mark on the</pre>

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4.1.1.5 Verify control rod pin is engaged with adjuster collar, on each fuel injection pump. (See Figure 1).

*****	*******	*****************
*		CAUTION *
*		*
*		will <u>NOT</u> start unless at least 1 minute has *
*		since the last attempt to start the diesel, <u>OR</u> *
*		he diesel was shutdown, due to the governor *
*	shutdown	n 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 OA(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	
		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" <u>AND</u> "Start Mode" switches.
	-	
	4.1.8	Direct the operator to verify the "E1(E2)(E3)(E4)
		D/G Lube Oil Pre-Lube Pump" OAP173 (OBP173)
		(0CP173)(0DP173) starts.
	4.1.9	Check the diesel generator starts approximately 3
		minutes after the start of the pre-lube sequence.

CM-2

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#### 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 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 <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.

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- 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 <u>AND</u> 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

- 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.	with 35 Source	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:

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0

0

0

0

0

- 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.	*
****	* * * * * * * * * * * * * * * * * * * *	**

.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.

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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 Deal Center".
****
<u>CAUTION</u> +
*
Perform step 4.2.10 immediately after completing step *
4.2.9 to prevent "motoring" the diesel generator.
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4.2.9 <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).
4.2.10 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".
0 E12 0 E22 0 E32 0 E42
0 E13 0 E23 0 E33 0 E43
NOTE
Loading the diesel generator shall proceed at a rate <u>NOT</u> to exceed 300 KW/min. <b>CM-3</b>
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 diese

- generator as follows: 4.2.13.1 Turn the "GOVERNOR" control switch to
  - "RAISE".

SO 52A.1.3 Rev. 20 Page 9 of 29 CAUTION Do NOT allow the KVAR value to exceed 75% of the KW value, to assure that the generator 0.8 power factor will\* Maintain the KW/KVAR ratio, by operating the "AUTO VOLT REG" control switch. NOTES IF the D/G is run above 2600 KW, THEN the Plant Reactor Operator shall log the load and duration of the run.

The maximum load to be carried by the diesel generator 2. 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

0	2600	KW		)		Continuous
0	2600	KW	-	3000	KW	2000 hr/yr
ò	3000	KW	-	3100	KW	200 hr/yr
0	3100	KW	-	3250	KW	30 min/yr

NOT be exceeded.

1.

4.2.13.2

CAUTION

Any operation over 3250 KW will require an engine shutdown, declaration of inoperability AND performance of an internal inspection. . . . . . . . . . . . . . . . .

- IF the diesel generator is operated at a load 4.2.14 greater than 3250 KW, THEN do the following:
  - Immediately reduce the load to under 4.2.14.1 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.
  - Notify Shift Management to have an 4.2.14.4 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.

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#### 4.3 <u>Diesel Generator Fast Start</u>

# 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 \*\*\*\*\*\* Verify governor oil level 4.3.1.1 LG-7575A(B)(C)(D) above the black line AND below the top of the sightglass. CM-7 Check the engine crankcase oil level +3" 4.3.1.2 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 Verify coolant expansion tank level 4.3.1.4 LG-0610A(B)(C)(D) between the green and yellow rings on the sightglass. Verify control rod pin is engaged with 4.3.1.5 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: Turn AND hold the "Start Mode" selector 4.3.2.1 switch to "MAN" AND turn the "Start-Stop" switch to "START".

4.3.3 Release the "Start-Stop" AND "Start Mode" switches.

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- 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.
  - Diesel generator running at rated frequency (58.8 to 61.2 Hz) and voltage (4.16 to 4.40KV).

		N <u>OTE</u>
		esel generator start, the A ESW, B ESW <u>AND</u> ECW eceive an auto start signal.
* * * * * * *	*****	**************************************
* * * * * *	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 AND 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). <b>CM-7</b>
	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"

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#### NOTES

- 1. It is good practice to alternate use of the D/G output breakers from test to test.
- 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.

****	******	*****	****	******	***	******	***	******
*			<u>C</u> ;	AUTION				*
* * * *	no-load loaded accumul	or low loa within 10 m ation of oi	d cond inute: l in t	ditions. s of EDG s the manifo	The tar lds		ld i e ti	he * *
****	******	********	*****	******	***	*****	* * *	******
	4.3.13	Place the	appli	cable "BKR	SY	NC" switch i	n "(	on".
		o E12	0	E22	0	E32	0	E42
		o E13	0	E23	0	E43	0	E43
	4.3.14	Verify spe generator a			con	trol of dies	el	
		4.3.14.1	Operato:	ate the "G	ÖVE	RNOR" contro	l s'	witch
			Ö	"RAISE" f	requal	uency to 0.5 value.	Hz	above
			0	"LOWER" f		uency to 0.5 value.	Hz	below
	· .		ο .	"RAISE" f: initial v	req alu	uency to ret e.	urn	to
		4.3.14.2		ate the "A' ch to:	UTO	VOLT REG" C	ont	rol
	•		0	"RAISE" ve the initia		age to 50 vo value.	lts	above
			0	"LOWER" vo		age to 50 vo value.	lts	below
			0	"RAISE" vo initial vo		age to retur	n t	0

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- 4.3.15 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"
- 4.3.16 Adjust diesel generator speed, using the "GOVERNOR" control switch, to make the synchroscope rotate slowly in the "FAST" direction.

#### 

- 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:

- 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".

(E22) (E23) (E32) (E33) (E42) (E43).

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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".

Place the applicable "BKR SYNC" switch in "OFF". 4.3.21 E12 0 E22 0 0 E32 E42 0 E13 0 o E23 E33 0 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.

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#### NOTES ·

- 1. <u>IF</u> the D/G is run above 2600 KW, <u>THEN</u> 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

0	2600	KW		•		Continuous
0	2600	KW	-	3000	KW	2000 hr/yr
0	3000	KW	-	3100	KW	200 hr/yr
0	3100	KW	-	3250	KW	30 min/yr

\$.

## <u>CAUTION</u>

Any operation over 3250 KW will require an engine shutdown, declaration of inoperability <u>AND</u> 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.

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#### 4.4 <u>4KV Switchgear Manual Transfer</u>

	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.
*****	<u>CAUTION</u> *
* * *	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.

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## 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.

*******	*****	****	*****	* * * *	******	*****	******
		<u> </u>	CAUTION				
no-loa loaded accum	the amount of ad or low loa d within 10 m lation of oi	id con iinute .l in	dition s of E the ma	s. DG s nifo	The eng: tart to	ine sh	ould be
4.4.2	Place the	appli	cable	"BKR	SYNC"	switch	in "ON".
	0 E12	о <sup>-</sup> Е	22	0	E32	0	E42
	0 E13	οE	23	ο	E33	O	E43
4.4.3	Verify spe generator	ed an as fo	d volta bllows:	age (	control	of di	esel
	4.4.3.1	Oper to:	ate th	e "G	OVERNOR	" cont:	rol switch
÷		<b>o</b> .	"RAIS the in	E" f: nitia	requency al value	y to O e.	.5 Hz abov
•		0	"LOWE the in	R" f: nitia	requency al value	y to 0 ≥.	.5 Hz belo
		0	"RAIS initia			y to r	eturn to
	4.4.3.2		ate the ch to:	e "A1	UTO VOL:	r reg"	control
		0	"RAISI the in	E" Vo nitia	oltage t al value	co 50 °	volts abov
		0	"LOWEI	211 370	oltage t		volts belo

o "RAISE" voltage to return to initial value.

- 4.4.4 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"
- 4.4.5 Adjust diesel generator speed, using the "GOVERNOR" control switch, to make the synchroscope rotate slowly in the "FAST" direction.

#### 

- 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.

#### <u>NOTE</u>

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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"
  - 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.)

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NOTE									
The diesel following	The diesel generator is considered synchronized, when the following conditions are met:								
o Diesel than "R	generator " UNNING" bus	INCOMING" voltage.	voltage s CM-4	lightly higher					
o Synchro	scope rotat	ing slowl	y in the "	FAST" direction	n.				
o Synchros	scope withi	n 13 degr	rees of "To	p Dead Center"	•				
**************************************	******	********* <u>CAUTION</u>	******	*****	**** * *				
* 4.4.9 to p	ep 4.4.10 i revent "mot ********	oring" th	ne diesel g	mpleting step enerator.	* *				
4K		bus, <u>THE</u>	<u>EN</u> close br	chronized with eaker E12 (E13 243).					
"G by	OVERNOR" CO	ntrol swi	tch to "RA	tor by turning ISE". Pickup control switch	KVAR				
4.4.11 Pla	ace the app	licable '	BKR SYNC"	switch in "OFF	۳.				
• •	E12 0	E22	o E32	o E42					
0	E13 0	E23	0 E33	o E43					
		NOTE		· ·					
Loading the diesel generator shall proceed at a rate <u>NOT</u> to exceed 300 KW/min. <b>CM-3</b>									

4.4.12 Check generator output voltage and generator amperage for all three phases.

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4.4.13 Pickup all bus loads as follows:

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#### 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 <u>IF</u> necessary, <u>THEN</u> 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.

# 

<u>IF</u> 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, <u>THEN</u> the D/G Breaker will have to be closed manually.

4.4.14 Open the applicable startup source bkr.

0	E212 O	E222	0	E232	0	E242
0	E312 o	E322	0	E332	0	E342
0	E213 o	E223	0	E233	0	E243
0	E313 O	E323	o	E333	0	E343

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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:
  - Both lights "ON" when synchroscope is at "Bottom Dead Center"
  - 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.

4.4.19 Verify the synchroscope is still rotating slowly in the "SLOW" direction.

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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 <u>WHEN</u> the diesel generator is synchronized with the startup source, <u>THEN</u> close the selected breaker.
- 4.4.21 Place the applicable "BKR SYNC" switch to "OFF".
- 4.4.22 <u>IF</u> it is desired to manually transfer back to the original S/U source breaker, <u>THEN</u> 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 <u>Diesel Generator Shutdown</u>

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 <u>IF</u> the D/G was operating near full load, <u>THEN</u> cool down the D/G by operating at 1500 KW for 5 minutes as follows:

o Turn the "GOVERNOR" control switch
to "LOWER".

0

Maintain the KW/KVAR ratio by operating the "AUTO VOLT REG" control switch.

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- 4.5.1.2 Reduce D/G load to 100 to 150 KW and VARS to 50 KVAR as follows:
  - 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 <u>WHEN</u> D/G load is reduced to 100 to 150 KW and VARS are 50 KVAR, <u>THEN</u> trip the applicable diesel generator output breaker.

0	E12	0	E22	0	E32	0 E42
0	E13	0	E23	0	E33	o E43

- 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 <u>IF</u> it is required to operate the opposite output breaker, <u>THEN</u> 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 <u>IF</u> the Emergency Service Water (ESW) was used <u>AND</u> is <u>NOT</u> required for any other evolution, <u>THEN</u> shutdown the running ESW pump in accordance with SO 33.2.A, "Emergency Service Water System Shutdown", <u>AND</u> return to step 4.5.7 of this procedure.
- 4.5.7 <u>IF</u> the Emergency Cooling Water (ECW) System was used <u>AND</u> is <u>NOT</u> required for any other evolution, <u>THEN</u> 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 <u>IF</u> equipment that was started for the sole purpose of loading the diesel generator is no longer required, <u>THEN</u> they may be shutdown in accordance with their system procedures.
- 4.5.9 <u>IF</u> the diesel generator was run for one hour <u>OR</u> more, <u>THEN</u> 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

<u>IF</u> water is present, <u>THEN</u> 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 <u>IF</u> water is observed, <u>THEN</u> 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 <u>IF</u> accumulator water was removed from the day tank, <u>THEN</u> 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).

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#### 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 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 <u>AND</u> lock open HV-0-52C-10154A(B)(C)(D).

4.5.10.7 Reset the fuel racks.

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- 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 <u>IF</u> outside air temperature is in excess of 70 degrees fahrenheit, place the 0AV091 (0BV091) (0CV091) (0DV091) in service until compartment air temperatures stabilize; <u>THEN</u> return the running fan to the "AUTO" position.

#### 5.0 <u>CONTROL STATIONS</u>

- 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 <u>REFERENCES</u>

- 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)

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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"

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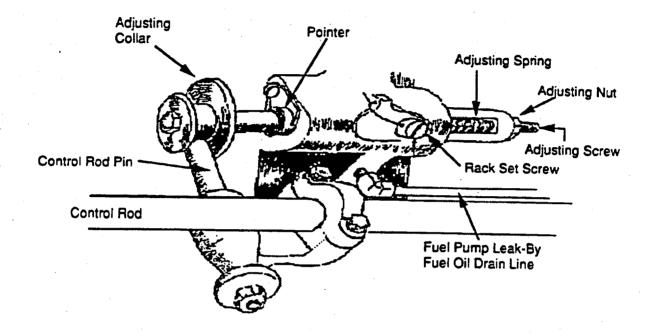
# TABLE 1

# 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 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 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



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# PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 6 - SCRAM ACTION

POSITION TITLE:	Reactor Operator/Senior Reactor Operato	<u>or</u>
TASK-JPM DESIGNATOR:	2000330501 / NEW-PRO SCRAM K/A: (ALT)	295006G10 RO: 4.1 SRO: 4.2
TASK DESCRIPTION:	Plant Reactor Operator Response to Real SDV Fails to Isolate)	ctor Scram (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

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

- 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	STEP	ACT	STANDARD
NO			
*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	Р	Phase angle difference is verified to be less than 12 degrees on the Synchroscope at panel 20C009.
	approximately 12 o'clock and Sync Lights are off.)		
*3	Close 252-0105, 11 BKR. (Cue: Acknowledge control switch operation.)	Ρ	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.)	Ρ	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.)	Ρ	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.)	Ρ	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.)	Ρ	Phase angle difference is verified to be less than 12 degrees on the Synchroscope at panel 20C009.

STEP	STEP	ACT	STANDARD
NO *9	Close 252-0202, 22 BKR.	P	22 BKR Control Switch is momentarily
	(Cue: Acknowledge control switch operation.)	,	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.)	Ρ	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.)	Ρ	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	P	225-0202 is placed in the "OFF" position and Sync Switch Handle is removed at panel 20C009.
- 12	indicate 0 VAC.)	P	
13	Green flag 252-0101, 1 BKR control switch. (Cue: Acknowledge control switch operation, "1 BKR TRIP" annunciator clears.)		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.)	Ρ	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.)	Р	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".	P	12 BKR Control Switch is removed from "PTL" and placed in the "NORMAL" position at panel 20C009.
	(Cue: 252-0210 control switch shows a green flag.)		

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	STEP	STEP	ACT	STANDARD
	NO			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	Р	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
		and B are out.)	-	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.)	Ρ	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.)	<b>P</b>	PCIS Group II and III isolation status is verified at panel 20C003-01, SBGT system status is verified at panel 20C012.
<u>s</u>	*20	Verify scram discharge volume vents and drains are closed. (Cue: SDV vent and drain red valve	P	Recognize that SDV vents and drains remain open as indicated on Panel 20C005A or 20C003-01.
		position lights are lit, green valve position lights are NOT lit.)		
	*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.)	Ρ	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.)	Р	SDV vents and drains are verified closed and indicated on panel 20C005A or 20C003-01.
	*23	Verify Hydrogen Water Chemistry is isolated.	Р	Hydrogen flow is verified to be at 0 scfm on FR-8629 on panel 20C006A
		(Cue: FR-8629 flow is 0 scfm.)		

	STEP	ACT	STANDARD
NO	• .		
*24	Verify Recirc pump speed has rur 30%. (Cue: A and B Recirc MG Set ge		A and B Recirc MG Set generator speed is verified to be 30% on SPI-2-02-184- 016A and B on panel 20C004A.
	speed is 30% on SPI-2-02-184-01 B.)		
25	Monitor Instrument Air header pre and Drywell pressure.	essure P	Instrument Air header pressure on PI- 2425A(B) on panel 20C012 is verified to be greater than Drywell pressure on PR-
	(Cue: Drywell pressure is .3 psig, instrument air header pressure is		2508 on Panel 20C003-03 or computer point M026.
	psig.)		
		** NOTE **	
	xaminee does <u>NOT</u> report scram a or his/her scram action report. Report the following to the CRS:	ctions, <u>THEN</u> info	orm the examinee that you (the CRS) are CRS informed of that:
20	Report the following to the CRS.		Cito monned of that.
•	House loads transferred.		House loads transferred.
	• Main Turbine is tripped.		Main Turbing is tripped
			Main Turbine is tripped.
	Main Generator is locked o	ut.	<ul> <li>Main Turbine is inpped.</li> <li>Main Generator is locked out.</li> </ul>
	<ul> <li>Group II and III isolations c and SGTS is initiated.</li> </ul>	omplete	Main Generator is locked out.
	Group II and III isolations c	omplete did not	<ul> <li>Main Generator is locked out.</li> <li>Group II and III isolations complete</li> </ul>
	<ul> <li>Group II and III isolations c and SGTS is initiated.</li> <li>SDV vent and drain valves initially close and had to be</li> </ul>	omplete did not	<ul> <li>Main Generator is locked out.</li> <li>Group II and III isolations complet with SGTS in service.</li> <li>SDV vent and drain valves</li> </ul>
	<ul> <li>Group II and III isolations of and SGTS is initiated.</li> <li>SDV vent and drain valves initially close and had to be manually closed.</li> <li>Hydrogen Water Chemistry</li> </ul>	omplete did not	<ul> <li>Main Generator is locked out.</li> <li>Group II and III isolations complet with SGTS in service.</li> <li>SDV vent and drain valves manually closed.</li> <li>Hydrogen Water Chemistry is</li> </ul>
	<ul> <li>Group II and III isolations c and SGTS is initiated.</li> <li>SDV vent and drain valves initially close and had to be manually closed.</li> <li>Hydrogen Water Chemistry isolated.</li> </ul>	omplete did not is sure is	<ul> <li>Main Generator is locked out.</li> <li>Group II and III isolations complet with SGTS in service.</li> <li>SDV vent and drain valves manually closed.</li> <li>Hydrogen Water Chemistry is isolated.</li> <li>Recirc pump speed is 30%.</li> </ul>
	<ul> <li>Group II and III isolations of and SGTS is initiated.</li> <li>SDV vent and drain valves initially close and had to be manually closed.</li> <li>Hydrogen Water Chemistry isolated.</li> <li>Recirc pump speed is 30%</li> <li>Instrument Air header pres</li> </ul>	omplete did not is sure is	<ul> <li>Main Generator is locked out.</li> <li>Group II and III isolations complet with SGTS in service.</li> <li>SDV vent and drain valves manually closed.</li> <li>Hydrogen Water Chemistry is isolated.</li> <li>Recirc pump speed is 30%.</li> <li>Instrument Air header pressure is</li> </ul>

<u>F</u> requested by the examinee, <u>THEN</u> grant permission for the examinee to bypass and restore Drywell Instrument Nitrogen.

NEW-PRO SCRAM ALT Rev000

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STEP	STEP	ACT	STANDARD
NO			STANDARD
	*** NO	TE ***	· · · · · · · · · · · · · · · · · · ·
t is pro	cedurally permissible for a candidate to perf	orm ste	ps 33-35 prior to steps 27-30.
*27	Place AO-2969A "Drywell Instrument N <sub>2</sub> Supply Valve" in "CLOSE".	P	AO-2969A control switch is placed in the "CLOSE" position at panel 20C003-03.
	(Cue: Acknowledge control switch operation.)		
28	Verify AO-2969A, "Drywell Instrument N <sub>2</sub> Supply Valve is closed.	. Р	AO-2969A green light is verified on at panel 20C003-03.
*29	Place AO-2969B "Drywell Instrument N <sub>2</sub> Supply Valve" in "CLOSE".	Р	AO-2969B control switch is placed in the "CLOSE" position at panel 20C003-03.
-	(Cue: Acknowledge control switch operation.)		
30	Verify AO-2969B, "Drywell Instrument N <sub>2</sub> Supply Valve is closed.	P	AO-2969B green light is verified on at panel 20C003-03.
*33	Place AO-2969A "Drywell Inst N <sub>2</sub> Bypass" Switch in "BYPASS".	Р	AO-2969A Bypass switch is placed in the "BYPASS" position at panel 20C005A.
	(Cue: Acknowledge Bypass switch operation.)		
*34	Place AO-2969B "Drywell Inst N <sub>2</sub> Bypass" switch in "BYPASS".	Ρ	AO-2969B Bypass switch is placed in the "BYPASS" position at panel 20C005A.
	(Cue: Acknowledge Bypass switch operation.)		
35	Acknowledge the "DRYWELL INST N₂ VALVES ISOLATION BYPASS" annunciator.	Ρ	The annunciator "ACKNOWLEDGE" pushbutton is depressed at panel 00C024.
	(Cue: Annunciator 219 G-1 stops flashing and clears.)		
*36	Open AO-2969A Drywell Instrument N <sub>2</sub> Supply valve.	Ρ	AO-2969A control switch is placed in the "OPEN" position at panel 20C003-03.
	(Cue: Acknowledge control switch operation.)		
37	Verify AO-2969A Drywell Instrument N <sub>2</sub> supply valve is open.	Ρ	AO-2969A red light is verified ON at panel 20C003-03.
	(Cue: AO-2969A red light is ON, green light is OFF.		

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STEP NO	STEP	ACT	STANDARD
*38	Open AO-2969B "Drywell Instrument N <sub>2</sub> Supply" valve. (Cue: Acknowledge control switch operation.)	Р	AO-2969B control switch is placed in the "OPEN" position at panel 20C003-03 panel.
39	Verify AO-2969B "Drywell Instrument N <sub>2</sub> Supply" valve is open. (Cue: AO-2969B red light is ON, green light is OFF.)	Ρ	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.)	Ρ	It is reported that Drywell Instrument Nitrogen is restored.
41	Notify Health Physics of changing plant conditions. (Cue: Health Physics acknowledges report.)	Р	Health Physics is notified of the plant scram.
42	Inform Control Room Supervisor of task completion. (Cue: Control Room Supervisor acknowledges report.)	Ρ	Task completion reported.

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

Ι.

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.

RRC 53.1-2 Rev. 0 Page 1 of 1 MTJ:rww

#### 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 <u>AND</u> 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" <u>AND</u> 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"

RRC 94.2-2 Rev. 0 Page 1 of 1 MTJ:rww

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#### 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

Exhibit RRC 94.2-11 Rev 0 Page 1 of 1 MRG:mrg 07/27/99

# **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"

GP-8.E Rev. 7 Page 1 of 4 MDF:mdf 10/29/98

#### PECO Energy Company Peach Bottom Units 2 and 3

## GP-8.E PRIMARY CONTAINMENT ISOLATION BYPASS

#### 1.0 <u>PURPOSE</u>

This procedure provides instructions for bypassing PCIS isolation signals.

#### 2.0 OPERATOR ACTIONS

2.1 Valve isolations shall <u>NOT</u> 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 SV-2(3)969B AO-8(9)098 A to D AO-8(9)099 A to D AO-2(3)509 AO-2(3)510 AO-2(3)513 AO-2(3)514 AO-2(3)523 SV-4(5)966 A to F	Instrument N <sub>2</sub> Supply A Drywell Instrument N <sub>2</sub> Supply B Drywell RHR Sample Inboard RHR Sample Outboard Drywell Vent Inbd 2" Vent Drywell Vent Outbd 2" Vent Torus Vent Inbd 2" Vent Torus Vent Outbd 2" Vent D/W & Torus N <sub>2</sub> Makeup Inlet Sample Valves
SV-8(9)101	Rad Gas Sample
SV-2(3)671 A to G	O <sub>2</sub> Anal Inbd
SV-2(3)978 A to G	$O_2$ Anal Outbd
SV-2(3)980	O <sub>2</sub> 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

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#### NOTE

The instrument  $N_2$  isolation should <u>NOT</u> 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  $N_2$ . <u>IF</u> Instrument Air Header pressure is less than D/W pressure, <u>THEN</u>  $N_2$  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 <u>RHR SAMPLE</u>

- 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<sub>2</sub> 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 CAD GAS SAMPLE VALVES

- 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 CAC ANALYZER VALVES

- 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<sub>2</sub>/O<sub>2</sub> 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.

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#### 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 <u>OR</u> 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**

j.

10.1 M-1-S-23, Primary Containment Isolation System

# PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 7 - MAIN GEN

POSITION TITLE:

## Unit Reactor Operator/Senior Reactor Operator

TASK-JPM DESIGNATOR: 2450050101 / PLOR-017C

K/A: <u>262001A4.04</u>

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.

# 5. 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.

PLOR017C Rev007

# H. PERFORMANCE CHECKLIST

S	TEP	STEP	ACT	STANDARD
	0	0121		STANDARD
_	*1	Turn on synchroscope for breaker 215 or 225. (Cue: Synchroscope meter rotating and incoming voltmeters and sensing lights are activated.)	Р	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.)	Ρ	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".)	Ρ	Sync lights verified ON at "6 o'clock position" OFF at "12 o'clock position" at panel 00C024.
	· · · · · · · · · · · · · · · · · · ·	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	Ρ	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.
		120 volts.) Verify the sync scope is rotating slowly in	P	Synchroscope verified for rotation - slowly
		the "FAST" direction. (Cue: Sync scope is rotating slowly in the clockwise direction.)		in the "FAST" direction at panel 00C024.
		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.)	Ρ	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.)	Ρ	Selected breakers red indicating light is verified ON at panel 00C024.

3

STEP	STEP	ACT	STANDARD
NO			
H 8	Verify synchroscope pointer at "12 o'clock" position.	Ρ	Synchroscope pointer verified at "12 o'clock" position at panel 00C024.
	(Cue: Synchroscope at "12 o'clock" position and lights off.)		
9	Turn off synchroscope for breaker 215 or 225.	P	Synchroscope placed in the "OFF" position for breaker 215 or 225 at panel 00C024.
	(Cue: Acknowledge sync switch operation.)		
*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.	Ρ	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.)	Р	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.)	Ρ	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.)	Ρ	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"	Ρ	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	positon. Close the selected breaker.	P	The selected breaker control switch is
UD ID		٢	placed in the "CLOSED" position.
	(Cue: Acknowledge breaker control switch operation.)		

STEP	STEP	ACT	STANDARD
NO			
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.)	Ρ	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.)	Ρ	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.)	Р	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

4

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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.

SO 50.1.A-2 Rev. 7 Page 1 of 7 GLS:tjb 12/30/97

#### PECO Energy Company Peach Bottom Unit 2

#### SO 50.1.A-2 MAIN GENERATOR SYNCHRONIZING AND LOADING

#### 1.0 <u>PURPOSE</u>

This procedure provides the instructions necessary to electrically startup the main generator and synchronize to the grid.

#### 2.0 PREREOUISITES

- 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 <u>AND</u> 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<sub>2</sub>".
- 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 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> 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.

SO 50.1.A-2 Rev. 7 Page 2 of 7

× *		•	CAUTIONS	
* 0 *	Main generator gas pressure will increase as the machine heats up.			
* * 0 * *	Generator gas pressures in excess of 80 psig can lead to generator end bell damage and loss of pressure boundary.			
* 0 * · *	lead to		sures of less than 60 psig can er cooling intrusion into the	
4.5	Perform ascensi		ing during synchronization and power	
	4.5.1	Periodica indicator	lly monitor machine gas pressure at loca PI-4356.	
	4.5.2	Vent mach psig as f	ine gas as required to maintain 72 to 78 ollows:	
		4.5.2.1	Verify HV-2-50C-47572 "CO <sub>2</sub> Purge or Fil Selector Valve for Main Gen (G-01)" in "H <sub>2</sub> Manifold" position (valve handle horizontal).	
		4.5.2.2	Slowly throttle open HV-2-50C-47574 "Outlet Block Valve for Gen $H_2$ & CO <sub>2</sub> Purge (G-03)" as required to maintain pressure at 72 to 78 psig.	
	•	4.5.2.3	WHEN pressure is reduced to the desired point, THEN close HV-2-50C-47574 (G-03)	
	4.5.3	degrees C 20C008A <u>A</u>	rator H <sub>2</sub> cold gas temperature exceeds 30 as indicated on the indicator at Panel <u>ND</u> machine gas pressure stabilizes at tely 75 psig, <u>THEN</u> monitoring is no quired.	
1.6	Close t	he "Alt Exc	Fld Bkr" and check the following:	
	o "Field" voltage and amperage			
	o "Ge	n" voltage		

(

4.7 Adjust generator output voltage, "Gen" to obtain 21.5 - 22.5 KV, using the DC manual voltage regulator.

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- 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.

\* \*

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".

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.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:
  - 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".

	o clock posicion.	
***** * *	**************************************	* *
*. *	Observe the following generator voltage limits:	k k
*	o minimum - 20.9 KV o maximum - 23.1 KV	k k
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	k
* . *	Picking up load two quickly may cause a turbine trip	* *
* *****	due to high moisture separator level.	k *
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".

SO 50.1.A-2 Rev. 7 Page 5 of 7

- 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 <u>AND</u> adjust HCS-2485 on Panel 20C009 as needed to maintain gas temperature between 30-45 degrees C.
- 4.29 <u>WHEN</u> turbine control has been returned to Panel 20C008A, <u>THEN</u> 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 <u>CONTROL STATIONS</u>

5.1 MCR 20C009, Plant Electrical Distribution

#### 6.0 <u>REFERENCES</u>

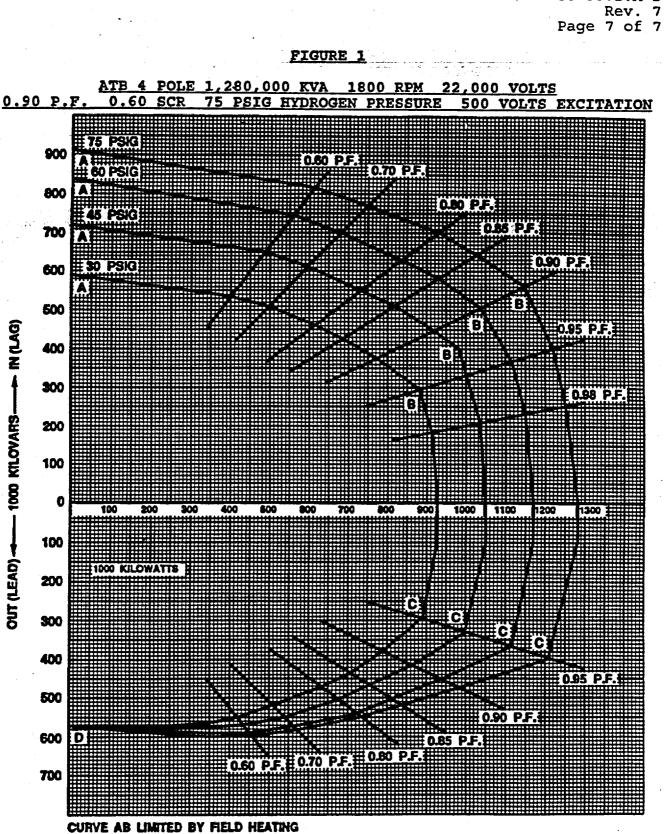
- 6.1 GEK 5595 Vol IIB, Generator
- 6.2 M-2-355-C, Alterrex Excitation System with SCR Regulator
- 6.3 E-1, Single Line Diagram Station
- 6.4 E-40, "Main Generator Unit 2
- 6.5 E-91, Generator Excitation and Regulation
- 6.6 E-98, Generator Bus Cooler
- 6.7 E-247, Annunciators, Main Turbine (Unit 2)
- 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"



SO 50.1.A-2

7

CURVE BC LIMITED BY ARMATURE HEATING CURVE CD LIMITED BY ARMATURE CORE END HEATING

- 1000 KILOVARS ----- IN (LAG)

OUT (LEAD) ---

# PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 8 – INST N<sub>2</sub>

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator					
TASK-JPM DESIGNATOR:	0201710040/ PLOR-054P	K/A:	218000A2.03		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

0		1						
STEP NO	STEP	АСТ	STANDARD					
1	Obtain a copy of procedure SO 16A.1.A-2.	Р	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	АСТ	STANDARD
7	Inform Control Room Supervisor of task completion.	S	Task completion reported using telephone, hand held radio, or GAI-TRONICS page system.
	(Cue: Control Room Supervisor acknowledges report.)		

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.

SO 16A.1.A-2 Rev. 4 Page 1 of 2 BWK:dec 04/15/96

#### · 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 <u>WHEN</u> operating equipment, <u>IF</u> it does <u>NOT</u> perform as expected, <u>THEN</u> place the equipment in a safe condition <u>AND</u> 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 <u>AND</u> Personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation <u>OR</u> 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:

<u>N2 Bottle</u> <u>Pressure Control Valve</u>

2AS377 PCV 2-16A-8917A, "Nitrogen Pressure Control Valve for Backup Supply to ADS"

SO 16A.1.A-2 Rev. 4 Page 2 of 2

- 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  $\geq$  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, <u>THEN</u> SV-8130A & B will close on a high nitrogen flow isolation upon opening.

- 4.5 Place SV-8130A, "A Supply", <u>AND</u> SV-8130B, "B Supply", control switches on Panel 20C003-03 in "OPEN", <u>AND</u> verify the valves remain open.
- 4.6 <u>IF</u> SV-8130A & B do <u>NOT</u> remain open, <u>THEN</u> place SV-8130A & B control switches in "CLOSE" <u>AND</u> 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 <u>CONTROL STATIONS</u>

5.1 MCR 20C003-03, Containment Atmosphere panel

- 6.0 <u>REFERENCES</u>
  - 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 <u>TECHNICAL\_SPECIFICATIONS</u>

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"

### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 9 - CRD

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

1

### 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

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STEP	STEP	ACT	STANDARD
1 (	Obtain a copy of procedure T-246-3.	Р	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.	S	HV-3-3-36B handwheel movement is attempted in the CLOCKWISE direction.
	(Cue: [CLOCKWISE] Valve handwheel does not move, stem length above valve yoke does not change.)		
	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.)	Р	Speed Increaser oil level verified > 1 inch.
7	Verify oil level in motor bearing sightglass.	P	Motor bearing sightglass verified > 1/2 full.
	(Cue: Oil level is 3/4 full.)	а	

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STEP NO	STEP	ACT	STANDARD
8	Verify proper oil level in pump bearing sightglasses.	Ρ	Sightglasses on pump bearings verified > 1/2 full.
	(Cue: Oil level in all sighglasses are 3/4 full.)		
9	Verify TBCW flow from Gear Box and pump bearings oil cooler.	Р	TBCW flow verified from gearbox and pump bearing oil cooler by observing flowglass flapper.
	(Cue: Flapper in flowglass is lifted up.)		
10	Verify HV-3-3-39, CRD Pump 3AP039 Seal Flood Cross Connection Valve, is open.	S	HV-3-3-39 handwheel is turned CLOCKWISE until stem movement is observed, then COUNTERCLOCKWISE until resistance of valve backseat is felt.
•	(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.]		
*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.	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.
	(Cue: MCR acknowledges report, CRD pump start announcement is heard over PA system, noise of motor start is heard from "3B" CRD pump.)		
; <u>_</u>	*** 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.	S	HV-3-3-36B handwheel is slowly turned COUNTERCLOCKWISE until resistance of valve backseat is felt.
	(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.)		

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STEP	STEP	ACT	STANDARD
NO			
*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.

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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

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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.
- 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.

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#### PECO Energy Company 'Peach Bottom Unit 3

#### T-246-3 MAXIMIZING CRD FLOW TO THE REACTOR VESSEL

#### 1.0 <u>PURPOSE</u>

This procedure provides the instructions necessary to maximize CRD System flow. Maximizing CRD flow is performed for either of the following reasons:

- Raising flow to the RPV serves as an alternate means of RPV injection.
- 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 <u>CANNOT</u> be performed concurrently with procedure T-220-3, "Driving Control Rods During Failure to Scram."

#### 2.0 PREREQUISITES

( <sup>21</sup>

- 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 <u>PERFORMANCE STEPS</u>

- 4.1 Unless directed by a TRIP or SAMP procedure to reset the scram, verify the scram is <u>NOT</u> reset.
- 4.2 <u>IF</u> no CRD pump is operating, <u>THEN</u> 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 <u>OR</u> 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 <u>AND</u> 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.

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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.

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- 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 <u>WHEN</u> a steady flow of water is observed through the vent, <u>THEN</u> 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."

*	Operating	а	CRD	pump	with	motor	current	above	41	amps	may	*
*	cause dama	age	≥. `							-	-	*
* *	********	• • •							د به به ا		. ـ ـ ـ ـ .	 

4.12 While monitoring CRD pump amps, open AO-3-3-19A(B), "Flow Control" using FIC-3-03-301.

\* Closing HV-3-3-56, which is done to maximize CRD Cooling \* Water Header dP during an ATWS, prevents recharging HCU \* accumulators. <u>IF</u> the accumulators are <u>NOT</u> charged, <u>THEN</u> \* control rod insertion using T-216-3, "Control Rod Insertion \* by Manual Scram or Individual Scram Test Switches" may be \* limited.

4.13 <u>IF</u> 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'.

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#### <u>NOTES</u>

- 1. The CRD System is now delivering maximum flow to the RPV. The expected flow is:
  - o 212 gpm at 1000 psig RPV pressureo 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 <u>RETURN TO NORMAL</u>

5.1 IF HV-3-3-56 was closed in Step 4.13

AND

HV-3-3-56 is <u>not</u> 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 <u>IF</u> <u>BOTH</u> CRD pumps are operating, <u>THEN</u> 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

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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

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5.13 Inform Shift Management upon completion of this procedure.

Performer Initials/Date I.V. Initials/Date

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#### 6.0 REFERENCES

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6.3	P&ID M-309,	"Condensate & Refueling Water Storage & Transfer Systems"
6.2	P&ID M-357,	"Control Rod Drive Hydraulic System - Part B"
6.1	P&ID M-356,	"Control Rod Drive Hydraulic System - Part A"

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"

### PECO NUCLEAR PEACH BOTTOM ATOMIC POWER STATION JOB PERFORMANCE MEASURE

JPM 10 - MAIN STEAM

POSITION TITLE:	Unit Reactor Operator/Senior Reactor Operator				
TASK-JPM DESIGNATOR:	2390110401 / PLOR-313PA	Ķ/A:	23900	<u>1G.09</u>	
			RO:	SRO:	
TASK DESCRIPTION:	CLOSING, A STUCK OPEN MSIV	- ALTER		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 <u>NOT</u> 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	STEP	ACT	STANDARD
NO		P	
1	Obtain a copy of procedure AO 1A.2-3.		A copy of procedure AO 1A.2-3 is obtained.
	** NO	TE ** 、	
	Examinee should utilize section	ns 4.1 /	AND 4.3 of AO 1A.2-3.
2	Open panel 30C042 front panel doors. (Cue: Panel 30C042 doors are open.)	Ρ	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.
	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 <u>NOT</u> 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.
	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.
	Close panel 30C042 front panel doors. (Cue: Panel 30C042 doors are closed.)	Р	Door closed and relatched using handle.
9	Direct the Unit Reactor Operator to verify RWCU isolation.	S	Unit Reactor Operator is contacted to verify RWCU isolation.
	(Cue: RWCU is isolated.)		

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STEP	STEP	ACT	STANDARD
NO			
10	Direct the Unit Reactor Operator to open Backup N <sub>2</sub> 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 <sub>2</sub> 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 <u>AND</u> 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 <u>AND</u> HS-3-36B-5696. (Cue: HS-3-36B-5695 <u>AND</u> HS-3-36B- 5696 are simultaneously depressed and held.)	S	Drain Trap Bypass pushbuttons HS-3- 36B-5695 <u>AND</u> 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.

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

## **TERMINATING CUE**

1.

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", beginning with step 4.1.

AO 1A.2-3 Rev. 4 Page 1 of 10 RWW:rww 10/14/98

#### 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 PREREOUISITES

- 2.1 Shift Management's permission to perform this procedure.
- 2.2 Group I isolation signal <u>OR</u> plant conditions warranting isolation of the main steam lines present.
- 2.3 Mode switch in shutdown.

#### 3.0 PRECAUTIONS

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- 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 <u>IF</u> stuck open MSIV <u>CLOSES</u> during performance of this procedure, <u>THEN</u> place equipment in a safe condition <u>AND</u> inform Shift Management.

#### 4.0 <u>PERFORMANCE STEPS</u>

#### NOTES

- 1. Communication should be established between the Control Room <u>AND</u> personnel performing procedures elsewhere in the plant to coordinate the operation of equipment that affects Control Room instrumentation <u>OR</u> 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.

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### NOTE

Section 4.2 shall only be used if radiological conditions permit access to the Unit 3 OBMSIV room.

4.2 <u>IF</u> radiological conditions permit access to the Unit 3 OBMSIV room, <u>THEN</u> 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>

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- 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".

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****	***************************************	**		
*	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 a to the Unit 3 Reactor Building elevation 135' header.	ir 		
	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			

- Instrument Air Backup to Instrument Nitrogen
- 0 Drywell Instrument Nitrogen supply header
- RBCCW to RWCU Non-Regen Hx and Pump Seal Coolers Ο
- Instrument Air supply to the large Primary Containment 0 Ventilation Isolation Valves
- Control Rod Drive Hydraulic System Flow ο

Attachment 1 contains more detail on effected equipment

- Isolate/Verify Isolation of Reactor Water Cleanup 4.3.1 System.
- Open SV-3-16A-9130A(B), "Backup Nitrogen to ADS 4.3.2 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".
- Direct an operator to vent the Instrument Air 4.3.4 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".

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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.

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".

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- 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 CONTROL STATIONS

4

- 5.1 30C003-01
- 5.2 30C005A
- 5.3 30C008

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#### 6.0 <u>REFERENCES</u>

k. E 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

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VALVE	DESCRIPTION	NORMAL	FAILURE
VADVE	DESCRIPTION	POSITION	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 <sup>.</sup>
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		CLOSED	OPEN
AO-3-35-9154B	• •	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

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#### ATTACHMENT 2

#### RESTORATION VERIFICATION

This attachment provides signoffs of procedure steps <u>AND</u> 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.
- 4.4.3.2 Open HV-3-36B-56981B.
- 4.4.3.3 Instrument Nitrogen system restored in accordance with SO 16.7.A-3 as directed by Shift Management (N/A if <u>NOT</u> performed).
- 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 <u>NOT</u> performed).

4.4.4.1 Close <u>AND</u> Cap HV-3-36B-56919A.

4.4.4.2 Close <u>AND</u> Cap HV-3-36B-56919B.

4.4.4.3 Open HV-3-36B-56913A.

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### ATTACHMENT 2 (Continued)

4.4.4.4 Open HV-3-36B-56913B.

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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.