JPM NUMBER:

Plant Concurrence

347

TITLE:	3-EOI APPENDIX 7D - ALTERNATE RPV INJ LINEUP - STANDBY COOLANT	IECTION SYSTEM
TASK NUMBER:	U-000-EM-39	
SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TRAINING	DATE:
PLANT CONCURR	ENCE:OPERATIONS	DATE:
* Examination JF	PMs Require Operations Training Manager Approval or D	esignee Approval and

#### **REVISION LOG**

Revision Number	Effective Date	Pages Affected	Description Of Revision
0	3/28/09	All	Initial issue
		7	Trittal 100d0

OPERATOR:				
RO	SRO		DATE:	
JPM NUMBER:	347			
TASK NUMBER:	U-000-EM-39			
TASK TITLE:	3-EOI APPENDIX 7 LINEUP - STANDB		RPV INJECTIC	N SYSTEM
K/A NUMBER:	203000A4.07	K/A RATING:	RO <u>4.5</u>	SRO <u>4.5</u>
*******	********	*******	******	*****
TASK STANDARD:	PERFORM CORRE REQUIRED TO INJ BY 3-EOI APPEND	ECT MAKEUP IN		
PERFORMANCE L	OCATION: SIM	ULATOR <u>X</u> PLA	NT CONTRO	OL ROOM
REFERENCES/PRO	OCEDURES NEEDE	D: 3-EOI AP	PENDIX 7D, RE	V 2
VALIDATION TIME	: SIMUL	_ATOR: <u>10:00</u>	LOCAL	
MAX. TIME ALLOW	/ED:	(FOR TIME CR	ITICAL JPMs ON	NLY)
PERFORMANCE T	IME:	-		
COMMENTS:				
ADDITIONAL COM	MENT SHEETS ATT	ACHED?	YES	_NO
RESULTS:	SATISFACTORY		UNSATISFACTO	ORY
EXAMINER SIGNAT	TURE:		DATE:	

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** You are a Unit 3 Operator

You are a Unit 3 Operator. a loss of Off-site power has caused a Reactor Scram on Unit 3. Due to an unisolable leak and several equipment failures, the Unit Supervisor has determined that RPV water level cannot be maintained

above -162".

INITIATING CUES: The Unit Supervisor has directed you to inject with Standby

Coolant to the RPV using RHR System I as directed by 3-EOI Appendix-7D, "ALTERNATE RPV INJECTION

SYSTEM LINEUP STANDBY COOLANT."

JPM NO. 347 REV. NO. 0 PAGE 5 of 12

START TIME	_	.,	
PERFORMANCE STEP:		**************************************	
When requested by examiner ide	entify/obtain copy of requ	ired procedure.	
STANDARD:			
Identified or obtained copy of 3-E0	OI Appendix-7D.		
SAT UNSAT	_ N/A CC	DMMENTS:	
**************************************		**************************************	
1. <b>VERIFY</b> RHR SYSTEM I a (Unit 3, Panel 3-9-3):		<del></del>	
a. VERIFY CLOSED to	he following valves:		
<ul> <li>3-FCV-74-60, RI</li> <li>3-FCV-74-57, RI</li> <li>3-FCV-74-58, RI</li> <li>3-FCV-74-59, RI</li> </ul>	HR SYS I DW SPRAY II HR SYS I DW SPRAY C HR SYS I SUPPR CHBF HR SYS I SUPPR CHBF HR SYS I SUPPR POOL HR HX 3B RHRSW OUT	OUTBD VLV R/POOL ISOL VLV R SPRAY VALVE L CLG/TEST VLV	
STANDARD:			
Verifies 3-FCV-74-61, 3-FCV-74-63-FCV-23-46 are closed by obser handswitch.	30, 3-FCV-74-57, 3-FCV ving illuminated Green c	/-74-58, 3-FCV-74-59, an only light above each	d
SAT UNSAT	N/A CO	MMENTS:	

JPM NO. 347 REV. NO. 0 PAGE 6 of 12

*******	**********	*** <del>***</del>	*****	*******	*****
PERFORMA	ANCE STEP:	CRITIC	AL	NOT CRITICAL	X_
b.	VERIFY RHR Pump	os 3A and 3C are	e NOT runnir	ng	
STANDARD	<u>:</u>				
Verifies 3A a light above 6	and 3B RHR pumps a each handswitch.	are Not running b	y observing	illuminated Green o	only
SAT	UNSAT	N/A	СОММІ	ENTS:	
************			- Parister France		
*****	********	*******	******	*******	******
PERFORMA	NCE STEP:	CRITIC	ALX_	NOT CRITICAL	
C.	PLACE 3-BKR-074- FCV-74-100 (M010- 19A)	-0100, RHR HTX -171) to ON (480	( A-C DISCH V RMOV Bo	I XTIE (TO U-2) VL ard 3B, Compartme	V ent
Simulator d reports brea	river: When dispate aker closed for 3-FC	ched, simulator V-74-100	driver calls	back after 1 minu	te and
STANDARD	• •	,			
Dispatches A 19A.	NUO to close breaker	for 3-FCV-74-10	00 at 3B 480 <sup>.</sup>	v RMOV bd, compa	artment
SAT	UNSAT	N/A	COMME	ENTS:	···
	A MARIE AND A	10 March 200 Mar			
*********					·······

JPM NO. 347 REV. NO. 0 PAGE 7 of 12

*****	*****	*****	*****	******	*****	*****	******	*****	*****
PER	ORMANO	E STEP:		C	RITICAL	X	NOT CR	RITICAL	
2.	START F	RHRSW P	umps B1	and B2					
STAN	NDARD:								
	s RHRSW 3 respectiv al)								
SAT	<del></del>	UNSAT	***************************************	N/A		COMMI	ENTS:		
	A								
*****	*****	*****	*****	******	*****	*****	*****	******	*****
PERF	ORMANC	E STEP:		С	RITICAL		NOT CR	ITICAL	X_
3.		Unit 1 Ope IGER B Co							
Simu	lator drive	er: When	contacte	d as Un	it 1 Oper	ator, rep	ort 1-FCV	-23-46 CI	osed
STAN	IDARD:								
Conta	icts Unit 1	Operator t	o verify 1	-FCV-23	-46 close	ed			
SAT		UNSAT	<del></del>	N/A		COMME	ENTS:		
			370000 · · · · · · · · · · · · · · · · ·						

JPM NO. 347 REV. NO. 0 PAGE 8 of 12

PERFORMANCE STEP:		NOT CRITICAL <u>X</u>			
4. <b>NOTIFY</b> Unit 2 Opera	tor to perform the following (	Unit 2, Panel 2-9-3):			
a. <b>VERIFY CLOSED</b> 2-FCV-23-46, RHR HX 2B RHRSW OUTLET VLV					
Simulator driver: When co	ntacted as Unit 2 Operator	, report 2-FCV-23-46 Closed			
STANDARD:					
Contacts Unit 2 Operator to	verify 2-FCV-23-46 closed				
SAT UNSAT _	N/A CC	MMENTS:			
*********	***********	*******			
PERFORMANCE STEP:		X NOT CRITICAL			
b. <b>OPEN</b> 2-FCV-2	3-57, STANDBY COOLANT	VLV FROM RHRSW			
Simulator driver: When co	ntacted as Unit 2 Operator	report 2-FCV-23-57 Open			
STANDARD:					
Contacts Unit 2 Operator to C	Open 2-FCV-23-57				
SAT UNSAT _	N/A CO	MMENTS:			

JPM NO. 347 REV. NO. 0 PAGE 9 of 12

	RMANCE STEP:		NOT CRITICAL
5. IN	NJECT Standby Coolant into RPV	as follows (Unit 3, P	anel 3-9-3):
a.	. <b>CLOSE</b> 3-FCV-74-52, RHR S	SYS I LPCI OUTBD	INJECT VALVE
STANDA	ARD:		
Closes 3 handswit	3-FCV-74-52 (Critical) and verifies (tch (Not Critical)	Green only light illur	minated above
SAT _	UNSAT N/A	COMME	ENTS:
PERFOR		CRITICAL X	NOT CRITICAL
b.		YS I U-2 DISCH XT	TE.
STANDA	ARD:		
Opens 3- (Not Critic	-FCV-74-100 (Critical) and verifies ical)	Red only light illum	inated above handswitch
SAT	UNSAT N/A	COMME	NTS:

JPM NO. 347 REV. NO. 0 PAGE 10 of 12

******	* <del>*************</del>	******	*****	********
PERFORMAN	CE STEP:	CRITICAL	X_	NOT CRITICAL
c. <b>(</b>	<b>OPEN</b> 3-FCV-74-53, RH	R SYS I LPCI	INBD INJE	ECT VALVE
STANDARD:				
Opens 3-FCV- (Not Critical)	-74-53 (Critical) and verif	ies Red only li	ght illumin	ated above handswitch
SAT	UNSAT N/	٩	COMME	NTS:
********	********	*****	*****	********
PERFORMAN	CE STEP:	CRITICAL	X	NOT CRITICAL
	THROTTLE 3-FCV-74-52/ALVE, to control injection		_PCI OUT	BD INJECT
STANDARD:				
handswitch (if of throttled) (Not of verifies level re	3-FCV-74-52 (Critical) a opened fully) (Not Critica Critical) and verifies flow covering using 3-LI-3-58 nge level (Critical)	l) or Red and to the Reacto	Green ligh r vessel u	nts illuminated (if sing 3-FI-74-50 and
SAT	UNSAT N/A	·	COMME	NTS:
	**************************************			

CUE: When flow is verified to Unit 3 Reactor from Loop I RHR (Standby Coolant) and level verified recovering, Report That completes this task.

**************************************	*******	******	**************************************	*****
PERFORMANCE STEP:		CRITICAL	NOT CRITICAL	<u>X</u>
PERFORMER demonstra	ated the use of S	ELF CHECKING	G during this JPM	
STANDARD:				
PERFORMER verified ap accordance with plant sta	plicable compor ındards.	nents by utilizing	SELF CHECKING in	
SAT UNSAT	N/A _	CC	DMMENTS:	
		· · · · · · · · · · · · · · · · · · ·	- A10014-2-1	····
********		******	********	*****
PERFORMANCE STEP:		CRITICAL	NOT CRITICAL	X
PERFORMER demonstra	ited the use of 3	-WAY COMMUI	NICATION during this JF	PM
STANDARD:				
PERFORMER utilized 3-V	VAY COMMUNI	CATION in acco	ordance with plant stand	ards.
SAT UNSAT	N/A _	co	MMENTS:	
	END	OF TASK		
	END	OF IMON		
STOP TIME:				

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** 

You are a Unit 3 Operator. a loss of Off-site power has caused a Reactor Scram on Unit 3. Due to an unisolable leak and several equipment failures, the Unit Supervisor has determined that RPV water level cannot be maintained above -162".

**INITIATING CUES:** 

The Unit Supervisor has directed you to inject with Standby Coolant to the RPV using RHR System I as directed by 3-EOI Appendix-7D, "ALTERNATE RPV INJECTION SYSTEM LINEUP STANDBY COOLANT."

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** You are a Unit 3

You are a Unit 3 Operator. a loss of Off-site power has caused a Reactor Scram on Unit 3. Due to an unisolable leak and several equipment failures, the Unit Supervisor has determined that RPV water level cannot be maintained

above -162".

**INITIATING CUES:** The Unit Supervisor has directed you to inject with Standby

Coolant to the RPV using RHR System I as directed by 3-EOI Appendix-7D, "ALTERNATE RPV INJECTION

SYSTEM LINEUP STANDBY COOLANT."

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

#### EOI PROGRAM MANUAL SECTION IX

#### 3-EOI APPENDIX-7D

## ALTERNATE RPV INJECTION SYSTEM LINEUP STANDBY COOLANT

#### **REVISION 2**

PREPARED BY: M. Morrow PHONE: 3708

RESPONSIBLE ORGANIZATION: Operations

APPROVED BY: A. S. Bhatnagar

EFFECTIVE DATE: 10/26/00

LEVEL OF USE: REFERENCE USE

VALIDATION DATE: 02/14/92

QUALITY-RELATED

### HISTORY OF REVISION/REVIEW 3-EOI APPENDIX-7D

REV.	DATE:	REVISED PAGES	REASON FOR CURRENT REVISION
0	7/28/95	ALL	New procedure. Necessary to support implementation of BFNP Unit 3 EOIs.
1	10/5/95	1	Added Step 1.c. to close breaker for 3-FCV-74-100.
		2	Added Step 5.a. to close LPCI outboard inject valve so that it can be throttled open.
2	10/26/00	All	Converted to MS-Word.

### 3-EOI APPENDIX-7D

# ALTERNATE RPV INJECTION SYSTEM LINEUP STANDBY COOLANT

LOCATION: Unit 3 Control Room	
ATTACHMENTS: None	( <u>√</u> )
1. <b>VERIFY</b> RHR SYSTEM I available for Standby Coolant as follows (Unit 3, Panel 3-9-3):	
a. <b>VERIFY CLOSED</b> the following valves:	
<ul> <li>3-FCV-74-61, RHR SYS I DW SPRAY INBD VLV</li> <li>3-FCV-74-60, RHR SYS I DW SPRAY OUTBD VLV</li> <li>3-FCV-74-57, RHR SYS I SUPPR CHBR/POOL ISOL VLV</li> <li>3-FCV-74-58, RHR SYS I SUPPR CHBR SPRAY VALVE</li> <li>3-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VLV</li> <li>3-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV.</li> </ul>	
b. <b>VERIFY</b> RHR Pumps 3A and 3C are <u>NOT</u> running.	
C. PLACE 3-BKR-074-0100, RHR HTX A-C DISCH XTIE (TO U-2) VLV FCV-74-100 (M010-171) to ON (480V RMOV Board 3B, Compartment 19A).	
2. <b>START</b> RHRSW Pumps B1 and B2.	
3. <b>NOTIFY</b> Unit 1 Operator to <b>VERIFY CLOSED</b> 1-FCV-23-46, RHR HEAT EXCHANGER B COOL WATER OUTLET VLV (Unit 1, Panel 1-9-3).	
4. <b>NOTIFY</b> Unit 2 Operator to perform the following (Unit 2, Panel 2-9-3):	
a. <b>VERIFY CLOSED</b> 2-FCV-23-46, RHR HX 2B RHRSW OUTLET VLV	
b. OPEN 2-FCV-23-57, STANDBY COOLANT VLV FROM RHRSW.	

5.		ECT Standby Coolant into RPV as follows (Unit 3, el 3-9-3):	
	a.	CLOSE 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE.	
	b.	OPEN 3-FCV-74-100, RHR SYS I U-2 DISCH XTIE.	
	c.	OPEN 3-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE.	
	d.	THROTTLE 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE, to control injection.	

LAST PAGE

JPM NUMBER:	399	
TITLE:	3-SR-3.3.2.1.2 RWM FUNCTIONAL TEST FO	OR STARTUP
TASK NUMBER:	U-085-SU-02	
Copy of 3-SR-3.3.2 Applicant (SR alrea	2.1.2 required complete up thru step 7.0[3] (curady in progress)	rent REV) – give to
3-SR-3.1.3.5(A) Co	ontrol Rod Movement Data Sheet needs to be o	ppen to Group 1
SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TDANING.	DATE:
	TRAINING	
PLANT CONCURR	ENCE:OPERATIONS	DATE:
* Examination JF	PMs Require Operations Training Manager Approval or E	Pesignee Approval and

Plant Concurrence

#### **REVISION LOG**

Revision Number	Effective Date	Pages Affected	Description Of Revision
0	03/13/09	All	Initial Issue
	00, 10,00		miliar roots

OPERATOR:					
RO	SRO	DATE:			
JPM NUMBER:	399				
TASK NUMBER:	U-085-SU-02				
TASK TITLE:	3-SR-3.3.2.1.2 RWM FUNCTIONAL TE	ST FOR STARTUP			
K/A NUMBER:	201006 A2.05 K/A RATING:	RO <u>3.1</u> SRO <u>3.5</u>			
	**************************************				
PERFORMANCE I	OCATION: SIMULATOR X PLANT	CONTROL ROOM			
REFERENCES/PR	OCEDURES NEEDED: 3-SR-3.3.2.1	l.2, Rev 3, 3-OI-85, Rev 64			
VALIDATION TIME	: SIMULATOR: 15:00	_ LOCAL:			
MAX. TIME ALLOW	VED:(FOR TIME CRITIC	CAL JPMs ONLY)			
PERFORMANCE T	IME:				
COMMENTS:	Copy of 3-SR-3.3.2.1.2 required complete REV) – give to Applicant after SR found Control Rod Movement Data Sheet need	in Book. 3-SR-3.1.3.5(A)			
ADDITIONAL COMMENT SHEETS ATTACHED? YES NO>					
RESULTS:	SATISFACTORY UN	SATISFACTORY			
EXAMINER SIGNA	EXAMINER SIGNATURE:DATE:DATE:				

\*

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** You are a U

You are a Unit Operator on Unit 3. Unit 3 is making preparations for startup using the A2 Startup Sequence. The RWM in operation per 3-OI-85, Control Rod Drive System. Reactor Engineering has performed 3-SR-3.3.2.1.7, RWM

Program Verification.

3-SR-3.3.2.1.2, "RWM Functional Test for Startup," has been

completed up thru step 7.0[3].

**INITIATING CUES:** 

The Unit Supervisor directs you to continue performance of 3-SR-3.3.2.1.2, "RWM Functional Test," for Startup at step 7.0[4]. A Reactor Engineer is present and monitoring as needed.

JPM NO. 399 REV. NO. 0 PAGE 5 of 17

START TIME						
**************************************						
When requested by examiner identify/obtain copy of required procedure.						
STANDARD:						
Locates SR in book in the Simulator (then Examiner hands copy to Candidate)						
SAT UNSAT N/A COMMENTS:						
*****************************						
PERFORMANCE STEP: CRITICAL NOT CRITICAL						
7.0 PROCEDURE STEPS						
[4] <b>RECORD</b> the start date <b>AND</b> time, reason for test, plant conditions <b>AND ANY</b> pre-test remarks on Attachment 1, Surveillance Procedure Review Form in Section 8.0.						
STANDARD:						
Records start date and time, reason for test (startup) on Attachment 1.						
SAT UNSAT N/A COMMENTS:						
NOTE						
<b>ALL</b> operations are performed on Panel 3-9-5 in the main Control Room unless otherwise noted.						

JPM NO. 399 REV. NO. 0 PAGE 6 of 17

******	********	******	*****	*********
PERFORM/	ANCE STEP:	CRITICAL	X_	NOT CRITICAL
[5]	vitch (3-HS-85-46)			
STANDARD	<u>:</u>			
Places 3-HS	-85-46 to OFF and back	to ON.		
SAT	_ UNSAT N	N/A	СОММЕ	NTS:
		***************************************		
		**************************************		
******	** <del>***</del> ********	****	****	*****
	NCE STEP:			NOT CRITICAL X
[6]	VERIFY ALL control ro	ds are deselecte	d on the r	od select matrix.
STANDARD	<u>:</u>			
Verifies no re	od selected.			
SAT	N	I/A	СОММЕ	NTS:

JPM NO. 399 REV. NO. 0 PAGE 7 of 17

****************************						
PERFORMANCE STEP:			CRITICAL		NOT CRITICAL	X_
[7]	PERF	FORM the RWN	/I Functional Test a	as follows:		
	[7.1]	VERIFY OR F	PLACE the RWM in	n operatio	n per 3-OI-85.	
STANDARD:						
N/A – Given i	n initia	al conditions.				
SAT	. UI	NSAT	N/A	COMME	ENTS:	
		*****				
	-	······································		. 100 00000		
******	*****	******	*******	*****	*******	*****
PERFORMAN	VCE S	STEP:	CRITICAL	<del></del>	NOT CRITICAL	X_
I	[7.2]		ST Reactor Engine OR VERIFY perfo			
STANDARD:						
N/A – Given ir	n initia	al conditions.				
SAT	UN	ISAT	N/A	COMME	:NTS:	
					1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	
CIIE: Evamis		- Decetes For	ineer, initial step	FT 63		

JPM NO. 399 REV. NO. 0 PAGE 8 of 17

**************************************					
PERFORMANCE S	STEP:	CRITICAL	**************************************	NOT CRITICAL _	X
[7.3]		Control Rod Move  a) to identify a rod t			
STANDARD:					
Uses Control Room Sequence.	n copy of 3-SR-3	3.1.3.5(A) to identif	y a Group	2 rod in the A2 Star	rtup
SAT UI	NSAT	N/A	COMME	NTS:	
	***				
******	*******	******	*****	*******	*****
PERFORMANCE S	STEP:	CRITICAL	***************************************	NOT CRITICAL _	_X_
[7.4]	RECORD below	w the rod chosen:			
	Rod Number: _				
STANDARD:					
Records identified (Sequence) – (02-3-47, 18-47, 18-15, 5	1, 26-07, 58-23, <sup>4</sup>	42-55, 10-39, 42-0	7, 58-39,	ıp 2 (A2 Startup 26-55, 10-23, 50-15 23, 42-23, or 34-31)	, 50-
SAT UN	NSAT	N/A	COMME	NTS:	

JPM NO. 399 REV. NO. 0 PAGE 9 of 17

****************	**************************************
PERFORMANCE STEP:	CRITICAL X NOT CRITICAL
[7.5] <b>SELECT</b> the rod rec	orded in Step 7.0[7.4].
STANDARD:	
Selects rod from A2 Startup Sequence G	roup 2.
SAT N/A N/A	COMMENTS:
*************	*******************
PERFORMANCE STEP:	CRITICAL NOT CRITICALX
[7.6] <b>VERIFY</b> the SELECT in alarm (red backgro	Γ ERROR status block on the RWM display is bund).
STANDARD:	
Verifies Select Error in alarm.	
SAT N/A _	COMMENTS:

JPM NO. 399 REV. NO. 0 PAGE 10 of 17

****************	**************************************
PERFORMANCE STEP:	CRITICAL X NOT CRITICAL
[7.7] <b>NOTCH</b> the selected	rod to position 02.
STANDARD:	
Notch withdraws selected rod to position	02.
SAT N/A N/A	COMMENTS:
**************	****************
PERFORMANCE STEP:	CRITICAL NOT CRITICAL X
[7.8] <b>VERIFY</b> that the rod withdraw error on the	moved to position 02 is identified as a RWM display.
STANDARD:	
Verifies rod at position 02 has a withdraw	error on the display.
SAT N/A _	COMMENTS:

JPM NO. 399 REV. NO. 0 PAGE 11 of 17

*******	******	********	******	******	*****
PERFORMANCE	STEP:	CRITIC	AL <u>X</u>	NOT CRITICAL	*****
[7.9]			CRD Control switch (3-HS-85-48) to ROD OUT <b>D VERIFY</b> the following:		
	[7.9.1]	The selected co	ntrol rod do	es <b>NOT</b> withdraw.	
STANDARD:					
Places control swi NOT withdraw.	tch 3-HS-85-4	8 to rod out notch	and verifies	s the selected rod o	does
SAT U	INSAT	N/A	СОММ	ENTS:	
********	*****	*******	******	******	******
PERFORMANCE	STEP:	CRITIC	AL	NOT CRITICAL	X_
	[7.9.2]	The WITHDRAV		atus block on the d background).	
STANDARD:					
Verifies the Withdr	aw Block statu	us block on the RV	VM display i	is in alarm.	
SATU	NSAT	N/A	COMMI	ENTS:	
		***************************************	4441 · · · · · · · · · · · · · · · · · ·		

JPM NO. 399 REV. NO. 0 PAGE 12 of 17

*******	******	*******	·********************************	****
PERFORMANCE STEP:		CRITICAL	NOT CRITICAL	<u>X</u>
	[7.9.3]	RWM ROD BLOCK ALARM.	K (3-XA-55-5B, Window 35) is in	1
STANDARD:				
Verifies RWM Ro	od Block alarm 3	3-XA-55-5B, window	35 is in alarm.	
SAT	UNSAT	N/A	COMMENTS:	
	***************************************	N .		
******	**************	*******	*********	****
PERFORMANCE	STEP:	CRITICAL	X NOT CRITICAL	
[7.1	0] INSERT the	selected rod from po	osition 02 to 00.	
STANDARD:				
Inserts selected r	od from positior	n 02 to 00.		
SAT	UNSAT	_ N/A	COMMENTS:	
WHITE CONTROL OF THE				
		•		

JPM NO. 399 REV. NO. 0 PAGE 13 of 17

*************	*******	**********						
PERFORMANCE STEP:	CRITICAL _	NOT CRITICAL X						
[7.11] <b>VERIFY</b> the WITHDRAW BLOCK status block on the RWM display is <b>NOT</b> in alarm.								
STANDARD:								
Verifies the Withdraw Block status	block on the RWM di	splay is NOT in alarm.						
SAT UNSAT	N/A C	OMMENTS:						
	**************************************	***************************************						
44/00/04444								
************	**** <del>*****</del>	*******						
PERFORMANCE STEP:	CRITICAL _	NOT CRITICAL X						
[7.12] <b>VERIFY</b> RWM	ROD BLOCK (3-XA-	55-5B, Window 35) will RESET.						
STANDARD:								
Verifies RWM Rod Block alarm 3-X	(A-55-5B, window 35	alarm will reset.						
SAT UNSAT	N/A Co	OMMENTS:						

JPM NO. 399 REV. NO. 0 PAGE 14 of 17

*******	******	*******	******	*** <del>**********</del>	****
PERFORMANCE ST	<u>ГЕР:</u>	CRITICAL	***************************************	NOT CRITICAL _	Χ
<del>-</del> -		Control Rod Mover entify a rod from R		a Sheet from 3-SR- up 01.	
STANDARD:					
Uses Control Room Sequence.	copy of 3-SR-3	s.1.3.5(A) to identify	y a Group	1 rod in the A2 Sta	rtup
SAT UNS	SAT	N/A	COMME	NTS:	
			***************************************	-	
***************************************					
******	******	******	*****	******	*****
PERFORMANCE ST	<u> EP:</u>	CRITICAL		NOT CRITICAL _	_X_
[7.14] i	RECORD below	w the rod chosen:			
ı	Rod Number: _				
STANDARD:					
Records identified ro Sequence) – (58-31, 47, 42-47, 42-15, 10-	34-07, 02-23,	18-55, 50-39, 19-0	7, 02-39,	34-55, 50-23, 10-15	•
SAT UNS	SAT	N/A	COMME	NTS:	
					<del></del>

JPM NO. 399 REV. NO. 0 PAGE 15 of 17

**************************************		**************************************
[7.15] <b>SELECT</b> the ro	d recorded in Step 7.0[7	7.14].
STANDARD:		
Selects rod from A2 Startup Seque	nce Group 1.	
SAT UNSAT	N/A COM	IMENTS:
	The state of the s	
		***
*************	********	**********
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X
[7.16] <b>VERIFY</b> that ro RWM Panel.	d Group 01 is indicated	as the latched group on the
STANDARD:		
Verifies Select Error in alarm.		
SAT UNSAT	N/A COM	MENTS:
	AMARAN AND AND AND AND AND AND AND AND AND A	
CUE: The remaining portions will	be completed by ano	ther Operator.

JPM NO. 399 REV. NO. 0 PAGE 16 of 17

PERFORMANCE STEP:		NOT CR			
PERFORMER demonstrated the use of	of SELF CHECK	KING during this JF	PM		
STANDARD:					
PERFORMER verified applicable com accordance with plant standards.	ponents by utiliz	zing SELF CHECK	ING in		
SAT N/.	Α	COMMENTS:	***************************************		
**************************************		**************************************			
PERFORMER demonstrated the use of	of 3-WAY COMI	MUNICATION durin	ng this JPM		
STANDARD:					
PERFORMER utilized 3-WAY COMMU	JNICATION in a	accordance with pla	ant standards.		
SAT UNSAT N//	4	COMMENTS:			
			***************************************		
		Metalenta (a. c. c.			
END OF TASK					
STOP TIME:					

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** You are a Unit Operator on Unit 3. Unit 3 is making

preparations for startup using the A2 Startup Sequence. The RWM is in operation per 3-OI-85, Control Rod Drive System. Reactor Engineering has performed 3-SR-3.3.2.1.7, RWM

Program Verification.

3-SR-3.3.2.1.2, "RWM Functional Test for Startup," has been

completed up thru step 7.0[3].

**INITIATING CUES:** 

The Unit Supervisor directs you to continue performance of 3-SR-3.3.2.1.2, "RWM Functional Test for Startup," at step 7.0[4]. A Reactor Engineer is present and monitoring as needed.

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** 

You are a Unit Operator on Unit 3. Unit 3 is making preparations for startup using the A2 Startup Sequence. The RWM is in operation per 3-OI-85, Control Rod Drive System. Reactor Engineering has performed 3-SR-3.3.2.1.7, RWM Program Verification.

3-SR-3.3.2.1.2, "RWM Functional Test for Startup," has been

completed up thru step 7.0[3].

**INITIATING CUES:** 

The Unit Supervisor directs you to continue performance of 3-SR-3.3.2.1.2, "RWM Functional Test for Startup," at step 7.0[4]. A Reactor Engineer is present and monitoring as needed.



#### **Browns Ferry Nuclear Plant**

#### Unit 3

#### Surveillance Procedure

#### 3-SR-3.3.2.1.2

#### **RWM** Functional Test for Startup

Revision 0003

**Quality Related** 

Level of Use: Continuous Use

Effective Date: 04-12-2007

Responsible Organization: RXE, Reactor Engineering

Prepared By: M. David Riden @2450

Approved By: J. Mike Keck

BFN RWM Functional Test for Startup 3-SR-3.3.2.1.2
Rev. 0003
Page 2 of 10

#### **Current Revision Description**

Pages Affected:

ΑII

Type of Change:

Revision

Tracking Number: 004

Revision 0003. This procedure was converted from a Unit 1 Word 2003 (XP) version using Revision 0001, Tracking No. 003 into a revised Unit 3 Word 2003 (XP) version initially converted from Revision 002, Tracking No. 003 of 2-SR-3.3.2.1.2 located in the BSL active file, and issued to support BFN Unit 3.

Revision 0003 was made to add Unit 3 enhancements and to make the format for this procedure series for all three Units consistent with like Table of Contents, styles and RXE preferences. These additional changes did **NOT** alter the intent of the procedure.

BFN Unit 3

## **RWM** Functional Test for Startup

3-SR-3.3.2.1.2 Rev. 0003 Page 3 of 10

## **Table of Contents**

1.0	INTRODUCTION	4
1.1	Purpose	
1.2	Scope	4
1.3	Frequency	4
1.4	Applicability	4
2.0	REFERENCES	5
2.1	Unit 3 Technical Specifications	5
2.2	Updated Final Safety Analysis Report (UFSAR)	5
2.3	Drawings	5
2.4	Other Documents	5
3.0	PRECAUTIONS AND LIMITATIONS	5
4.0	PREREQUISITES	6
5.0	SPECIAL TOOLS AND EQUIPMENT RECOMMENDED	6
6.0	ACCEPTANCE CRITERIA	6
7.0	PROCEDURE STEPS	7
8.0	ILLUSTRATIONS/ATTACHMENTS	9
Attac	chment 1: Surveillance Procedure Review Form	10

BFN Unit 3	RWM Functional Test for Startup	3-SR-3.3.2.1.2 Rev. 0003
		Page 4 of 10

#### 1.0 INTRODUCTION

#### 1.1 Purpose

This Surveillance Procedure performs the channel functional test for Rod Worth Minimizer (RWM) function for startup. This procedure demonstrates operability of the RWM in conformance with the requirements specified in Technical Specification (TS) Surveillance Requirement (SR) 3.3.2.1.2.

#### 1.2 Scope

The channel functional test is performed for the RWM to demonstrate that the entire system will perform its intended function. The channel functional test is performed by attempting to withdraw a control rod **NOT** in compliance with the prescribed sequence and verifying a control rod block occurs. This test is performed as soon as possible after the applicable conditions are entered. This test fully satisfies the requirements of Technical Specification SR 3.3.2.1.2. It may also be used to partially satisfy the requirements of Technical Specification SR 3.10.8.2.

Normally, this Surveillance Procedure will be performed during reactor startup after entering Mode 2 just prior to control rod withdrawals for the purpose of making the reactor critical.

#### 1.3 Frequency

Once every 92 days. **NOT** required to be performed until 1 hour after any control rod is withdrawn at  $\leq$  10% Rated Thermal Power (RTP) in MODE 2.

#### 1.4 Applicability

Modes 1 and 2 with THERMAL POWER ≤ 10% RTP (SR 3.3.2.1.2).

Mode 5 with the reactor mode switch in the startup/hot standby position (SR 3.10.8.2).

BFN Unit 3	RWM Functional Test for Startup	3-SR-3.3.2.1.2 Rev. 0003 Page 5 of 10
		I age 5 of 10

#### 2.0 REFERENCES

#### 2.1 Unit 3 Technical Specifications

- A. Section 3.3.2.1, Control Rod Block Instrumentation.
- B. Section 3.10.2, Reactor Mode Switch Interlock Testing.
- C. Section 3.10.8, SHUTDOWN MARGIN (SDM) Test Refueling.

## 2.2 Updated Final Safety Analysis Report (UFSAR)

- A. Section 7.7, Reactor Manual Control System.
- B. Section 7.16, Plant Process Computer.

#### 2.3 Drawings

- A. 3-729E857, Rod Worth Minimizer System Elementary Diagram.
- B. 3-730E321, Reactor Manual Control System Elementary Diagram.

#### 2.4 Other Documents

- A. 3-SR-3.1.3.5(A), Control Rod Coupling Integrity Check.
- B. 3-SR-3.3.2.1.7, RWM Program Verification.
- C. 3-GOI-100-1A, Unit Startup and Power Operation.
- D. 3-OI-85, Control Rod Drive System.

#### 3.0 PRECAUTIONS AND LIMITATIONS

- A. Whenever **ANY** step is failed, the Reactor Engineer (RE) **OR** Shift Technical Advisor (STA) should be notified for assistance.
- B. Refer to 3-OI-85 whenever moving control rods.

BFN Unit 3	RWM Functional Test for Startup	3-SR-3.3.2.1.2 Rev. 0003 Page 6 of 10	
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Date Today

#### 4.0 PREREQUISITES

[1] This copy of 3-SR-3.3.2.1.2 is verified to be the most current revision.

40

[2] The following personnel are available to perform this Surveillance Procedure:

One (1) UO AND One (1) RE.

40

[3] The reactor is in Mode 2.

UQ

### 5.0 SPECIAL TOOLS AND EQUIPMENT RECOMMENDED

None

#### 6.0 ACCEPTANCE CRITERIA

- A. Responses which fail to satisfy the following Acceptance Criteria (AC) constitute unsatisfactory Surveillance Procedure results AND require immediate notification of the Unit Supervisor (US) at the time of the failure:
  - The rod block function of the RWM for an out-of-sequence rod shall be verified by attempting to move an out of sequence control rod AND verifying a control rod block occurs.
- B. Steps which determine the above criteria are designated by (AC) next to the signoff blank.

Unit 3 Rev. 0003 Page 7 of 10 Date Today 7.0 **PROCEDURE STEPS** [1] **VERIFY** that the following initial conditions are satisfied: ALL precautions AND limitations in Section 3.0 have [1.1] UD been reviewed. [1.2] **ALL** prerequisites in Section 4.0 are satisfied. UD [2] **OBTAIN** permission from Unit Supervisor (US) to perform this 3-SR-3.3.2.1.2 test procedure: Todor/ Date Time [3] [NRC/C] NOTIFY Unit Operator (UO) before commencing this 3-SR-3.3.2.1.2 test procedure. [RPT 82-16, LER 259/8232]. [4] **RECORD** the start date **AND** time, reason for test, plant conditions AND ANY pre-test remarks on Attachment 1, Surveillance Procedure Review Form in Section 8.0. NOTE ALL operations are performed on Panel 3-9-5 in the main Control Room unless otherwise noted. [5] PLACE the Control Rod Drive (CRD) POWER switch (3-HS-85-46) momentarily to OFF AND next SWITCH to ON. [6] **VERIFY ALL** control rods are deselected on the rod select matrix.

**RWM** Functional Test for Startup

3-SR-3.3.2.1.2

**BFN** 

BFN RWM Functional Test for Startup 3-SR-3.3.2.1.2 Rev. 0003 Page 8 of 10

7.0

	Date		
PROCE	DURE	STEPS (continued)	
[7] <b>P</b> I	ERFO	RM the RWM Functional Test as follows:	
[7.1]	VE	ERIFY OR PLACE the RWM in operation per 3-OI-85.	
[7.2]	PE	RPC] REQUEST Reactor Engineering to ERFORM 3-SR-3.3.2.1.7 OR VERIFY performance of SR-3.3.2.1.7. [INPO SOER 84-002]	
[7.3]	Da	EFER to the Control Rod Movement ata Sheet from 3-SR-3.1.3.5(A) to identify a rod from VM Group 02.	RE
[7.4]	RE	ECORD below the rod chosen:	
	Ro	od Number:	
[7.5]	SE	ELECT the rod recorded in Step 7.0[7.4].	
[7.6]		ERIFY the SELECT ERROR status block on the VM display is in alarm (red background).	
[7.7]	NC	OTCH the selected rod to position 02.	
[7.8]		<b>ERIFY</b> that the rod moved to position 02 is identified a withdraw error on the RWM display.	
[7.9]		ACE the CRD Control switch (3-HS-85-48) to DD OUT NOTCH AND VERIFY the following:	
[7.	.9.1]	The selected control rod does <b>NOT</b> withdraw.	(AC)
[7.	.9.2]	The WITHDRAW BLOCK status block on the RWM display is in alarm (red background).	(AC)
[7.	9.3]	RWM ROD BLOCK (3-XA-55-5B, Window 35) is in ALARM.	
[7.10]	INS	SERT the selected rod from position 02 to 00.	
[7.11]		RIFY the WITHDRAW BLOCK status block on the VM display is <b>NOT</b> in alarm.	
[7.12] <b>VE</b>		RIFY RWM ROD BLOCK (3-XA-55-5B, Window 35) I RESET.	

BFN	RWM Functional Test for Startup	3-SR-3.3.2.1.2
Unit 3		Rev. 0003
		Page 9 of 10

				Date
7.0	PRO	CEDU	RE STEPS (continued)	
	[7	7.13]	<b>REFER</b> to the Control Rod Movement Data Sheet from 3-SR-3.1.3.5(A) to identify a rod from RWM Group 01.	
	[7	'.14]	RECORD below the rod chosen:	
			Rod Number:	
	[7	'.15]	SELECT the rod recorded in Step 7.0[7.14].	
	[7	'.16]	<b>VERIFY</b> that rod Group 01 is indicated as the latched group on the RWM Panel.	
	[8]	Surv	ORD the appropriate test information on Attachment 1, eillance Procedure Review Form (located in Section 8.0) COMPLETE up to the Unit Supervisor review.	
	[9]	NOT	IFY the UO that this SR test procedure is complete.	
	[10]	NOT	IFY the US that this SR test procedure is complete.	

## 8.0 ILLUSTRATIONS/ATTACHMENTS

Attachment 1, Surveillance Procedure Review Form.

BFN Unit 3 RWM Functional Test for Startup 3-SR-3.3.2.1.2 Rev. 0003 Page 10 of 10

## Attachment 1 (Page 1 of 1)

## **Surveillance Procedure Review Form**

☐ Maintenan		DATE/TIME COI	DATE/TIME STARTED Today Incontrol  DATE/TIME COMPLETED  PLANT CONDITIONS			
PRE-TEST RE	EMARKS:					
PERFORMED Initials	BY:  Name (Print)  Unit Openator (Test Dir/Lea  (Test Dir/Lea		nature)			
Acceptance Cr If the ab	olems (If yes, explain in POST-TES iteria Satisfied? ove answer is no, the Unit Supervi ne if an LCO exists.	•	□Yes □Yes	□ No □ No		
UNIT SUPERV	ISOR		Date			
IQR (OPS)	Date	)				
SCHEDULING	COORDINATOR		Date			
POST-TEST R	EMARKS:					
			7.7			

JPM NUMBER:	43F	
TITLE:	EOI APPENDIX-11B - ALTERNATE PRESSU RCIC TEST MODE (FROM STANDBY)	RE CONTROL –
TASK NUMBER:	U-000-EM-54	
SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TRAINING	DATE:
PLANT CONCURR	ENCE:OPERATIONS	DATE:

Examination JPMs Require Operations Training Manager Approval or Designee Approval and

Plant Concurrence

## **REVISION LOG**

Revision	Effective	Pages	Description
Number	Date	Affected	Of Revision
0	10/06/06	All	Initial issue
1	09/22/07	All	General revision
2	03/27/09	All	General revision & re-format

OPERATOR:				
RO	SRO		DATE:	
JPM NUMBER:	43F			
TASK NUMBER:	U-000-EM-54			
TASK TITLE:	EOI APPENDIX- RCIC TEST MOD		E PRESSURE CON DBY)	TROL –
K/A NUMBER:	241000A4.02	K/A RATING:	RO <u>4.1</u>	SRO <u>4.1</u>
*******	******	********	*********	******
TASK STANDARD:	TEST MODE FRO	OM STANDBY FO	SSARY TO PLACE F OR ALTERNATE RE CTED BY 2-EOI APF	<b>'</b> V
PERFORMANCE L	OCATION: SI	IMULATOR <u>X</u> PI	_ANT CONTROL	ROOM
REFERENCES/PRO	OCEDURES NEE	DED: 2-EOI A	appendix-11B, Rev 5	;
VALIDATION TIME	: SIM	IULATOR: 10:	00 LOCAL:	
MAX. TIME ALLOW	'ED:	(FOR TIME C	RITICAL JPMs ONL	.Y)
PERFORMANCE T	IME:			
COMMENTS:			***************************************	***************************************
ADDITIONAL COM	MENT SHEETS A	TTACHED?	YES	NO
RESULTS:	SATISFACTORY		UNSATISFACTOF	RY
EXAMINER SIGNA	EXAMINER SIGNATURE: DATE:			

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** You are an operator. The Unit 2 reactor has scrammed and

bypass valves are not responding properly for pressure control. EOI-1 has been followed to RC/P-11. RCIC is in

standby readiness.

**INITIATING CUES:** The UNIT SUPERVISOR directs you to place RCIC in

Alternate RPV Pressure Control as directed by 2-EOI

Appendix-11B.

JPM NO. 43F REV. NO. 2 PAGE 5 of 17

START	TIME	

***********	*******	***********
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X
When requested by examiner ide	ntify/obtain copy of re	equired procedure.
STANDARD:		
Obtained copy of 2-EOI Appendix	-11B.	
	N/A	COMMENTS:
SAT UNSAT		

JPM NO. 43F REV. NO. 2 PAGE 6 of 17

## **CAUTION**

- Operating RCIC turbine below 2100 rpm may result in unstable system operation and equipment damage.
- Elevated Suppression Chamber pressure may trip the RCIC turbine on high exhaust pressure.
- Operating RCIC Turbine with suction temperatures above 140°F may result in equipment damage.

*****	******	******	******	*********			
PERFORMANCE STEP:			CRITICAL	NOT CRITICALX			
1.	IF	OR	PV Depressurization is required,				
,	THEN		pendix 16A and 16E	B as necessary to bypass de Isolation Interlocks.			
CUE:	Emergency	depressurization a	nd steam cooling a	re not required.			
STAN	IDARD:						
deterr	mined <u>NOT</u> to	execute EOI Appen	dix 16A or 16B.				
SAT	UN	ISAT N/A	CON	MMENTS:			
<del></del>			······································				

JPM NO. 43F REV. NO. 2 PAGE 7 of 17

PERF	FORMANCE	STEP:			NOT CRITICAL	
2.	IF THEN	EXECUTI	E EOI Appendix 1	6E concur	maintained below 5.25 rently with this procedu Level Suction Transfer	ure to
STAN	NDARD:					
Deter	mined Supp	ression Pool	level <5.25 inche	s and EOI	Appendix-16E not req	uired.
SAT		JNSAT	N/A	СО	MMENTS:	
<del></del>					Manufacture Towards Transport	
*******						
					***************************************	
PERF	ORMANCE	STEP:	CRITI	CAL	NOT CRITICAL	X_
3.	THEN	ALIGN RO	CIC in test mode a	as follows:	equired for RPV level o	ontrol,
	b. VEF	RIFY OPEN 2 OSE 2-FCV-7	-38, RCIC PUMP 2-FCV-73-36, HPC 1-39, RCIC PUMI is procedure at St	CI/RCIC C	ST TEST VLV.	
STAN	IDARD:					
N/A –	RCIC is No	t operating.				
SAT	(	JNSAT	N/A	COI	MMENTS:	***************************************
	141	PANALA				

JPM NO. 43F REV. NO. 2 PAGE 8 of 17

*****	*****	*****	******	************	*****	*****	******	******
PERF	ORMAN	CE STE	<u>P:</u>	CR	ITICAL _	N	OT CRITICAL	X
4.	THEN .	ST	ART RCIO	andby reading as follows:				
	a. <b>\</b>	/ERIFY (	CLOSED 2	2-FCV-71-39	), RCIC PUI	MP INJE	CTION VALVE	
STAN	IDARD:							
Verifie	ed only G	REEN v	alve positi	on indicating	ı lamp illum	inated ab	ove 2-HS-71-3	39A.
SAT		UNSA	Т	N/A	co	OMMENT	S:	
*****	*****	*****	*****	******	*****	*****	*****	***
PERF	ORMAN						OT CRITICAL	
		<b>/ERIFY F</b> /ALVE R		d <b>OPEN</b> 2-F	CV-71-9, R	CIC TUR	B TRIP/THRO	T
STAN	DARD:							
Recog illumir	nizes FC ated REI	CV-71-9 is D position	s tripped. F n indicating	Resets and C Jamp above	pens FCV- e 2-ZI-71-9.(	71-9 (Crit Not Critic	ical) and Verifical)	∋s
SAT		UNSA	Τ	N/A	_ co	OMMENT	S:	
-		7.W.						

JPM NO. 43F REV. NO. 2 PAGE 9 of 17

******	***********	******	**********
PERFORMAN	NCE STEP:	CRITICAL	X NOT CRITICAL
C.	VERIFY OPEN the following	g valves:	
	• 2-FCV-71-38, RCIC	PUMP CST TES	T VLV
STANDARD:			
Held 2-HS-71 RED valve po Critical).	-38A in the OPEN position of sition indicating lamp illumin	until valve is oper nated above asso	n (Critical) and Verified only ociated control switch (Not
SAT	UNSAT N/A	CO	MMENTS:
**************************************	**************************************	CRITICAL	X NOT CRITICAL
STANDARD:		-022 0.2 0002	
Placed 2-HS- position indica	71-25A in the OPEN positionating lamp illuminated above	n (Critical) and V associated cont	erified only RED valve rol switch (Not Critical).
SAT	UNSAT N/A _	COI	MMENTS:
	***************************************	The same of the sa	

JPM NO. 43F REV. NO. 2 PAGE 10 of 17

	******	**************	*****
E STEP:	CRITICAL	NOT CRITICAL	X
2-FCV-71-34, R	CIC PUMP MIN F	FLOW VALVE	
UNSAT I	N/A	COMMENTS:	
		380000000000000000000000000000000000000	
********	*******	********	*****
E STEP:	CRITICAL	X NOT CRITICAL	***
	CRITICAL PCI/RCIC CST TI		····
			wit
2-FCV-73-36, H	PCI/RCIC CST TI		
2-FCV-73-36, H 3-36A in the OPEN pong lamp illuminated a	PCI/RCIC CST TI osition (Critical) ar above associated	EST VLV.  nd Verified only RED valve	
2-FCV-73-36, H 3-36A in the OPEN pong lamp illuminated a	PCI/RCIC CST TI osition (Critical) ar above associated	EST VLV.  nd Verified only RED valve control switch (Not Critical).	
	2-FCV-71-34, R -34A in the OPEN poilluminated above as	2-FCV-71-34, RCIC PUMP MIN F  -34A in the OPEN position and verified illuminated above associated control s  UNSAT N/A	2-FCV-71-34, RCIC PUMP MIN FLOW VALVE  -34A in the OPEN position and verified only RED valve position illuminated above associated control switch.  UNSAT N/A COMMENTS:

JPM NO. 43F REV. NO. 2 PAGE 11 of 17

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<del></del>
CIC
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JPM NO. 43F REV. NO. 2 PAGE 12 of 17

*****	******	*****	******	*****	*****	*******	******
PER	FORMA	NCE STEP:		CRITICAL	-	NOT CRITICAL	X_
	f.	<b>VERIFY</b> RC	IC Turbine spe	ed accelerat	es to abo	ve 2100 rpm.	
STAN	NDARD	<u>:</u>					
Verifi	ed spe	ed greater tha	ın 2100 rpm inc	licated on 2-	SI-71-42	٨.	
SAT UNSAT N/A COMMENTS:							
			***************************************				
*******	150000000						
*****	*****	*****	******	******	*****	*******	*****
PERF	ORMA	NCE STEP:		CRITICAL		NOT CRITICAL	X_
5.	VERI	<b>FY</b> proper RC	IC minimum flo	w valve ope	ration as	follows:	
	a.	IF THEN	RCIC flow is a VERIFY CLO VALVE.	above 120 g <sub>l</sub> <b>SED</b> 2-FCV-	om, ·71-34, R0	CIC PUMP MIN FL	.OW
STAN	<u>IDARD</u>	• •					
			ated flow > 120 d above 2-HS-7		d only GF	REEN valve positio	n
SAT	<del></del>	_ UNSAT	N/A		СОММЕ	NTS:	

JPM NO. 43F REV. NO. 2 PAGE 13 of 17

PERFORMANCE	STEP:		NOT CRITI	
b. IF	BOTH of	f the following exis	et:	
• R0	CIC Initiation signa	I is NOT present,		
• R0	AND CIC flow is below 6	0 gpm,		
THE	EN <b>VERIFY</b> VALVE.	<b>OPEN</b> 2-FCV-71-	34, RCIC PUMP MIN	FLOW
STANDARD:				
	w > 60 gpm as indi -71-52 Not illumina		-36A and/or RCIC ini	tiation lamp
SAT	JNSAT	N/A	COMMENTS:	
*******	*******	*******	*********	******
PERFORMANCE	STEP:	CRITICAL	X NOT CRITI	CAL
6. THROTTL discharge	E 2-FCV-71-38, Ropressure at or belo	CIC PUMP CST T w 1100 psig.	EST VLV, to control F	RCIC pump
STANDARD:				
Throttled 2-FCV-7 CRITICAL if press	1-38 to maintain pr ure exceeds 1100	essure on 2-PI-71 psig – any pressur	-35A at or below 1100 e < 1100 psig is accep	psig. (ONLY otable.)
SAT U	JNSAT	N/A	COMMENTS:	
			**************************************	
		***************************************		

JPM NO. 43F REV. NO. 2 PAGE 14 of 17

	<b>DJUST</b> 2-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller to cont PV pressure.
STANDA	<u>ARD:</u>
and adju	te recognizes RCIC Flow Controller Failure and places 2-FIC-71-36A in <u>Manusters to the flow controller in conjunction with the 2-FCV-71-38, RCIC PUMP CSTLV to obtain:</u>
	RCIC flow 120-600 gpm on 2-FIC-71-36A.
	RCIC discharge pressure ≤ 1100 psig on 2-PI-71-35A.
	RCIC speed > 2100 rpm on 2-SI-71-42A.
SAT _	UNSAT N/A COMMENTS:

JPM NO. 43F REV. NO. 2 PAGE 15 of 17

******	*****	******	******	*****	*******	*****
<u>PERFO</u>	RMANCE S	<u>TEP:</u>	CRITICAL		NOT CRITICAL	X
		RCIC injection to			sary,	
a b c	. CLOS	<b>l</b> 2-FCV-71-39, R <b>E</b> 2-FCV-71-38, <b>I</b> EOI Appendix 50	RCIC PUMP CS			
CUE: Ir	njection to	the vessel with F	RCIC is Not des	sired at th	is time.	six iç Ti
STAND	ARD:					
N/A – In	jection to ve	essel not required	per CUE.			
SAT _	UN	ISATN	I/A	COMME	NTS:	
***************************************						
CUE: T	hat comple	etes this task.			<b>《</b> 斯尼》元字学》	

JPM NO. 43F REV. NO. 2 PAGE 16 of 17

PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X				
PERFORMER demonstrated the use of SELF CHECKING during this JPM						
STANDARD:						
PERFORMER verified applicable compo accordance with plant standards.	nents by utilizing SE	LF CHECKING in				
SAT N/A	COMM	ENTS:				
	**************************************	4.10.11.11.11.11.11.11.11.11.11.11.11.11.				
**************						
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X				
PERFORMER demonstrated the use of 3	B-WAY COMMUNICA	ATION during this JPM				
STANDARD:						
PERFORMER utilized 3-WAY COMMUN	ICATION in accorda	nce with plant standards.				
SAT N/A	COMM	ENTS:				
END	OF TASK					
STOP TIME:						

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** 

You are an operator. The Unit 2 reactor has scrammed and bypass valves are not responding properly for pressure control. EOI-1 has been followed to RC/P-11. RCIC is in standby readiness.

**INITIATING CUES:** 

The UNIT SUPERVISOR directs you to place RCIC in Alternate RPV Pressure Control as directed by 2-EOI Appendix-11B.

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task

is complete.

**INITIAL CONDITIONS:** 

You are an operator. The Unit 2 reactor has scrammed and bypass valves are not responding properly for pressure control. EOI-1 has been followed to RC/P-11. RCIC is in standby readiness.

**INITIATING CUES:** 

The UNIT SUPERVISOR directs you to place RCIC in Alternate RPV Pressure Control as directed by 2-EOI Appendix-11B.

#### **TENNESSEE VALLEY AUTHORITY**

#### **BROWNS FERRY NUCLEAR PLANT**

## **EOI PROGRAM MANUAL SECTION IX** 2-EOI APPENDIX-11B

## **ALTERNATE RPV PRESSURE CONTROL SYSTEMS RCIC TEST MODE**

## **REVISION 5**

PREPARED BY: D. Powell

PHONE: 2528

RESPONSIBLE ORGANIZATION: Operations

APPROVED BY: Tony Elms

EFFECTIVE DATE: 08/22/2007

LEVEL OF USE: REFERENCE USE

EOI VALIDATION DATE: 02/14/1992

**QUALITY-RELATED** 

# HISTORY OF REVISION/REVIEW 2-EOI APPENDIX-11B

REV. <u>NO.</u>	REVISED PAGES	REASON FOR CURRENT REVISION
5	1	TR# 06 - Step 2: Changed suppression pool level at which Appendix-16E is implemented to 5.25 in. This is in agreement with NESSD 2S-073-057A(B)-00-02 for the setpoint where HPCI suction swap occurs.

## 2-EOI APPENDIX-11B

# ALTERNATE RPV PRESSURE CONTROL SYSTEMS RCIC TEST MODE

LOCATION	: Unit 2 Control Room			
ATTACHMEI	NTS: None	( <b>V</b> )		
**************************************				
-	perating RCIC turbine below 2100 rpm may result in instable system operation and equipment damage.			
	levated Suppression Chamber pressure may trip the CIC turbine on high exhaust pressure.			
-	perating RCIC Turbine with suction temperatures above 40°F may result in equipment damage.	****		
	Emergency RPV Depressurization is required, OR Steam Cooling is required, EXECUTE EOI Appendix 16A and 16B as necessary to bypass RCIC Low RPV Pressure and Test Mode Isolation Interlocks.			
	Suppression Pool level <u>CANNOT</u> be maintained below 5.25 in., <b>EXECUTE</b> EOI Appendix 16E concurrently with this procedure to bypass HPCI High Suppression Pool Level Suction Transfer Interlock.			
	RCIC Turbine is operating and NOT required for RPV level control, ALIGN RCIC in test mode as follows:			
	a. OPEN 2-FCV-71-38, RCIC PUMP CST TEST VLV.			
	b. <b>VERIFY OPEN</b> 2-FCV-73-36, HPCI/RCIC CST TEST VLV.			
	c. CLOSE 2-FCV-71-39, RCIC PUMP INJECTION VALVE.			
	d. CONTINUE in this procedure at Step 5.			

4.	4. IF RCIC is in standby readiness, THEN START RCIC as follows:				
	a. <b>VERIFY CLOSED</b> 2-FCV-71-39, RCIC PUMP INJECTION VALVE.				
	b. <b>VERIFY RESET</b> and <b>OPEN</b> 2-FCV-71-9, RCIC TURB TRIP/THROT VALVE RESET.				
	c. VERIFY OPEN the following valves:				
	• 2-FCV-71-38, RCIC PUMP CST TEST VLV				
	• 2-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV				
	• 2-FCV-71-34, RCIC PUMP MIN FLOW VALVE				
	• 2-FCV-73-36, HPCI/RCIC CST TEST VLV.				
	d. PLACE 2-HS-71-31A, RCIC VACUUM PUMP, handswitch in START.				
	e. OPEN 2-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV, to start RCIC Turbine.				
	f. <b>VERIFY</b> RCIC Turbine speed accelerates to above 2100 rpm.				
5.	<b>VERIFY</b> proper RCIC minimum flow valve operation as follows:				
	a. IF RCIC flow is above 120 gpm, THEN VERIFY CLOSED 2-FCV-71-34, RCIC PUMP MIN FLOW VALVE.				
	b. IF BOTH of the following exist:				
	• RCIC Initiation signal is $\underline{\mathtt{NOT}}$ present,				
	AND				
	• RCIC flow is below 60 gpm,				
	THEN VERIFY OPEN 2-FCV-71-34, RCIC PUMP MIN FLOW VALVE.				
6.	THROTTLE 2-FCV-71-38, RCIC PUMP CST TEST VLV, to control RCIC pump discharge pressure at or below 1100 psig.				
7.	ADJUST 2-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller to control RPV pressure.				

2-EOI APPENDIX-11B Rev. 5 Page 3 of 3

8.	IF RCIC injection to the RPV becomes necessary, THEN <b>ALIGN</b> RCIC to RPV as follows:	
	a. OPEN 2-FCV-71-39, RCIC PUMP INJECTION VALVE.	
	b. CLOSE 2-FCV-71-38, RCIC PUMP CST TEST VLV.	
	c. GO to EOI Appendix 5C.	
The state of the s		7777474
		7
		The state of the s
	LAST PAGE	
	HACI FACE	1
		****
		THE THINKS I

JPM NUMBER: 343F

TITLE:	EOI APPENDIX-11B - ALTERNATE PRESSURE CONTROL – RCIC TEST MODE (FROM STANDBY)				
TASK NUMBER:	U-000-EM-54				
SUBMITTED BY:		DATE:			
VALIDATED BY:		DATE:			
APPROVED BY:	TRAINING	DATE:			
	ENCE:	DATE:			
I LANI CONCORN	OPERATIONS	DATE			

Examination JPMs Require Operations Training Manager Approval or Designee Approval and Plant Concurrence

## **REVISION LOG**

Revision Number	Effective Date	Pages Affected	Description Of Revision
0	08/02/08	All	Initial issue
	L		

OPERATOR:					·	
RO	SRO			DATE:_	Marking and Associated States and Associated	
JPM NUMBER:	343F					
TASK NUMBER:	U-000-EM-54					
TASK TITLE:		IX-11B - ALTE ODE (FROM S			CONTROL	
K/A NUMBER:	241000A4.02	K/A RAT	ING:	RO <u>4.1</u>	SRO	4.1
*******	******	******	*****	*****	*****	*****
TASK STANDARD	TEST MODE	PERATIONS N FROM STAND CONTROL AS I	BY FOR	R ALTERNA	TE RPV	
PERFORMANCE	LOCATION:	SIMULATOR	X PLA	NT CON	ITROL ROO	М
REFERENCES/PR	OCEDURES N	EEDED: 3-	EOI Ap	pendix-11B,	Rev 3	
VALIDATION TIME	<u>:</u> :	SIMULATOR:_	10:0	<u>0</u> LO	CAL:	
MAX. TIME ALLOV	VED:	(FOR TI	ME CR	ITICAL JPM	s ONLY)	
PERFORMANCE 1	TME:					
COMMENTS:					***************************************	
	***************************************					
ADDITIONAL COM	IMENT SHEETS	S ATTACHED?		YES _	NO _	
RESULTS:	SATISFACTO	RY		UNSATISFA	CTORY _	
EXAMINER SIGNA	TURE:		*****	DATE:_		

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** 

You are an operator. The Unit 3 reactor has scrammed and bypass valves are not responding properly for pressure control. EOI-1 has been followed to RC/P-11. RCIC is in standby readiness.

**INITIATING CUES:** 

The UNIT SUPERVISOR directs you to place RCIC in Alternate RPV Pressure Control as directed by 3-EOI Appendix-11B.

Simulator Driver: This JPM require after time delay (trigger off of 71-8		and failu	re of RCIC contro	ller
**************************************			NOT CRITICAL	****** X
When requested by examiner identify	obtain copy of e	required p	rocedure.	
STANDARD:				
Obtained copy of 3-EOI Appendix-11	В.			
SAT N	/A	СОММЕ	NTS:	

START TIME \_\_\_\_\_

## **CAUTION**

- Operating RCIC turbine below 2100 rpm may result in unstable system operation and equipment damage.
- Elevated Suppression Chamber pressure may trip the RCIC turbine on high exhaust pressure.
- Operating RCIC Turbine with suction temperatures above 140°F may result in equipment damage.

*********	********	************		
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X		
OR		required,		
Steam Cooling is required, THEN  EXECUTE EOI Appendix 16A and 16B as necessary to bypass RCIC Low RPV Pressure and Test Mode Isolation Interlocks.				
CUE: Emergency depressuri	zation or steam cooling a	re not required.		
STANDARD:				
Determined NOT to execute E	OI Appendix16A or 16B.			
SAT UNSAT	N/A CO	MMENTS:		

JPM NO. 343F REV. NO. 0 PAGE 7 of 17

PERF	FORMANCE S	STEP:	CRITICAL	NOT CRITICAL	X_
2.	IF THEN	<b>EXECUTE</b> EOI App	endix 16E concui	maintained below 5.25 in rently with this procedur Level Suction Transfer	
STAN	IDARD:				
Deter	mined Suppre	ession Pool level < +5	.25 inches and E	OI Appendix-16E not red	quired.
SAT	UN	NSAT N/A	co	MMENTS:	
····		· · · · · · · · · · · · · · · · · · ·			
			· · · · · · · · · · · · · · · · · · ·		
	**************************************			**************************************	
3.	IF THEN			required for RPV level co	ontrol,
	b. VERII	N 3-FCV-71-38, RCIC FY OPEN 3-FCV-73-3 SE 3-FCV-71-39, RCIC FINUE in this procedu	66, HPCI/RCIC C C PUMP INJECT	ST TEST VLV.	
STAN	IDARD:				
N/A –	RCIC is Not	operating.			
SAT	UN	ISAT N/A	CO	MMENTS:	
	· · · · · · · · · · · · · · · · · · ·				

JPM NO. 343F REV. NO. 0 PAGE 8 of 17

PERF	ORMANCE	STEP:	CRI	ΓICAL	NOT CRITICAL	X
4.			standby readine CIC as follows:	ess,		
	a. VER	IFY CLOSEI	<b>D</b> 3-FCV-71-39,	RCIC PUMP I	NJECTION VALVE.	
STAN	IDARD:					
Verifi	ed only GRE	EN valve pos	sition indicating	amp illuminate	ed above 3-HS-71-39	9A.
SAT	U	NSAT	N/A	_ COMM	IENTS:	
		eenster -				
	· · · · · · · · · · · · · · · · · · ·	***************************************				
*****	*****	*****	******	******	*******	*****
****** PERF	**************************************	******* STEP:	**************************************	**************************************	**************************************	*****
****** PERF	b. <b>VER</b> I				NOT CRITICAL	*****
	b. <b>VER</b> I	IFY RESET				******
STAN Recog	b. <b>VER</b> I VAL\ <u>IDARD:</u> gnizes FCV-7	IFY RESET : /E RESET.  1-9 is trippe(	and <b>OPEN</b> 3-FC		TURB TRIP/THROT  (Critical) and Verifies	
STAN Recog	b. <b>VER</b> I VAL\ <u>IDARD:</u> gnizes FCV-7 nated RED po	IFY RESET : /E RESET.  1-9 is trippet	and <b>OPEN</b> 3-FC I. Resets and Op ing lamp above 3	ens FCV-71-9 3-ZI-71-9.(Not	TURB TRIP/THROT  (Critical) and Verifies	3
STAN Recog	b. <b>VER</b> I VAL\ <u>IDARD:</u> gnizes FCV-7 nated RED po	IFY RESET : /E RESET.  1-9 is trippet	and <b>OPEN</b> 3-FC I. Resets and Op ing lamp above 3	ens FCV-71-9 3-ZI-71-9.(Not	TURB TRIP/THROT  (Critical) and Verifies Critical)	3

JPM NO. 343F REV. NO. 0 PAGE 9 of 17

PERFORMA	NCE STEP:	CRITICAL	X NOT CRITICAL
c.	VERIFY OPEN the following	g valves:	
	• 3-FCV-71-38, RCIC	PUMP CST T	EST VLV
STANDARD	<u>:</u>		
			open (Critical) and Verified only associated control switch (Not
SAT	N/A	·	COMMENTS:
			**************************************
PERFORMA	NCE STEP:	CRITICAL _	X NOT CRITICAL
	• 3-FCV-71-25, RCIC	LUBE OIL CO	OOLING WTR VLV
STANDARD	<u>:</u>		
	-71-25A in the OPEN position cating lamp illuminated above	` '	•
SAT	N/A		COMMENTS:
***************************************			

JPM NO. 343F REV. NO. 0 PAGE 10 of 17

*******	*******	******	******	********	*****
PERFORMANCE	STEP:	CRITICAL		NOT CRITICAL	X_
•	3-FCV-71-34,	RCIC PUMP MIN	FLOW VA	LVE	
STANDARD:					
		position and verifie associated control		D valve position	
SAT (	JNSAT	N/A	COMME	NTS:	Minit.
				***************************************	
		**************************************			
*****	*******	******	******	******	*****
PERFORMANCE	STEP:	CRITICAL	X	NOT CRITICAL	
•	3-FCV-73-36,	HPCI/RCIC CST T	EST VLV		
STANDARD:					
		position (Critical) a l above associated			
SAT (	JNSAT	N/A	COMME	NTS:	
		,			

JPM NO. 343F REV. NO. 0 PAGE 11 of 17

*******	**********	****************	************
PERFORMA	NCE STEP:	CRITICAL	NOT CRITICAL X
d.	<b>PLACE</b> 3-HS-71-31A	, RCIC VACUUM	PUMP, handswitch in START.
STANDARD:	<u>:</u>		
Placed 3-HS	-71-31A in the START	position.	
SAT	_ UNSAT	N/A	COMMENTS:
			MANAGA A
	- Anna III anna anna anna anna anna anna		
			**********
<u>PERFORMA</u>	NCE STEP:	CRITICAL	X NOT CRITICAL
e.	<b>OPEN</b> 3-FCV-71-8, R Turbine.	CIC TURBINE ST	EAM SUPPLY VLV, to start RCIC
STANDARD:			
	-71-8A in the OPEN po ating lamp above hand		d verified illuminated RED valve cal).
SAT	UNSAT	N/A	COMMENTS:
-1			

JPM NO. 343F REV. NO. 0 PAGE 12 of 17

PERF	FORM	ANCE STEP:	CRITICAL NOT CRITICAL X
	f.	<b>VERIFY</b> RO	CIC Turbine speed accelerates to above 2100 rpm.
STAN	NDARE	<u>):</u>	
Verifi	ed spe	ed greater tha	an 2100 rpm indicated on 3-SI-71-42A.
SAT	***************************************	_ UNSAT	N/A COMMENTS:
			***************************************
PERF	FORM/	ANCE STEP:	CRITICAL NOT CRITICALX_
5.	VERI	<b>FY</b> proper RC	CIC minimum flow valve operation as follows:
	a.		
	a.	IF THEN	RCIC flow is above 120 gpm, <b>VERIFY CLOSED</b> 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE.
STAN	a. IDARD		
When	IDARD	) <u>:</u> -71-36A indic	
When	IDARD 3-FIC	<u>):</u> -71-36A indic mp illuminate	VALVE.  ated flow > 120 gpm, verified only GREEN valve position
When	IDARD 3-FIC	<u>):</u> -71-36A indic mp illuminate	VALVE.  ated flow > 120 gpm, verified only GREEN valve position d above 3-HS-71-34A.

JPM NO. 343F REV. NO. 0 PAGE 13 of 17

PERFORM	ANCE STEP:	CRITICAL NOT CRITICAL X
b.	IF	BOTH of the following exist:
	• RCIC Initia	ation signal is NOT present,
	• RCIC flow	AND is below 60 gpm,
	THEN	<b>VERIFY OPEN</b> 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE.
STANDARE	<u>):</u>	
		pm as indicated on 3-FIC-71-36A and/or RCIC initiation lamp Not illuminated.
SAT	_ UNSAT	N/A COMMENTS:
*******	******	*******************
PERFORM!	ANCE STEP:	CRITICAL X NOT CRITICAL
		7-71-38, RCIC PUMP CST TEST VLV, to control RCIC pump at or below 1100 psig.
STANDARD	<u>):</u>	
		maintain pressure on 3-PI-71-35A at or below 1100 psig. (ONLY eds 1100 psig – any pressure < 1100 psig is acceptable.)
SAT	_ UNSAT	N/A COMMENTS:

JPM NO. 343F REV. NO. 0 PAGE 14 of 17

PERFORMANCE STEP:  EXAMINERS NOTE: ALTERNATE P	CRITICAL X NOT CRITICAL  ATH STARTS HERE:	
7. <b>ADJUST</b> 3-FIC-71-36A, RCIC RPV pressure.	SYSTEM FLOW/CONTROL, controller to	control
STANDARD:		
	roller Failure and places 3-FIC-71-36A in laction with the 2-FCV-71-38, RCIC PUMF	
RCIC flow 120-600 gpm	on 3-FIC-71-36A.	
RCIC discharge pressure	e ≤ 1100 psig on 3-PI-71-35A.	
RCIC speed > 2100 rpm	on 3-SI-71-42A.	
SAT NA	'A COMMENTS:	

JPM NO. 343F REV. NO. 0 PAGE 15 of 17

PERFORMANCE STEP:		CRITICA	_	NOT CRITICAL	X_	
8.			n to the RPV beco to RPV as follows		ssary,	
	b. CLOS		, RCIC PUMP INJ 8, RCIC PUMP C : 5C.			
CUE:	Injection to	the vessel wit	h RCIC is Not de	sired at th	is time.	
STAN	NDARD:					
N/A -	- Injection to v	essel not requir	red per CUE.			
SAT	UI	NSAT	N/A	СОММЕ	NTS:	
CUE:	That comple	etes this task.				lle, l <sub>elive</sub> ll

JPM NO. 343F REV. NO. 0 PAGE 16 of 17

PERFORMANCE STEP:	CRITICAL	NOT CRITICAL	X		
PERFORMER demonstrated the use of	PERFORMER demonstrated the use of SELF CHECKING during this JPM				
STANDARD:					
PERFORMER verified applicable compo	onents by utilizing SE	ELF CHECKING in			
docordance with plant standards.					
SAT	COM	MENTS:			
	***************************************		******************************		
			<del></del>		
PERFORMANCE STEP:		**************************************			
PERFORMER demonstrated the use of	3-WAY COMMUNIC	ATION during this JPN	М		
STANDARD:					
PERFORMER utilized 3-WAY COMMUN	NICATION in accorda	ance with plant standa	rds.		
SAT N/A	COM	MENTS:			
4-4			<del></del>		
ENI	O OF TASK				
STOP TIME:					

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** 

You are an operator. The Unit 3 reactor has scrammed and bypass valves are not responding properly for pressure control. EOI-1 has been followed to RC/P-11. RCIC is in standby readiness.

**INITIATING CUES:** 

The UNIT SUPERVISOR directs you to place RCIC in Alternate RPV Pressure Control as directed by 2-EOI Appendix-11B.

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

\*

**INITIAL CONDITIONS:** 

You are an operator. The Unit 3 reactor has scrammed and bypass valves are not responding properly for pressure control. EOI-1 has been followed to RC/P-11. RCIC is in standby readiness.

**INITIATING CUES:** 

The UNIT SUPERVISOR directs you to place RCIC in Alternate RPV Pressure Control as directed by 2-EOI Appendix-11B.

#### **TENNESSEE VALLEY AUTHORITY**

#### **BROWNS FERRY NUCLEAR PLANT**

# EOI PROGRAM MANUAL SECTION IX 3-EOI APPENDIX-11B

# ALTERNATE RPV PRESSURE CONTROL SYSTEMS RCIC TEST MODE

# **REVISION 3**

PREPARED BY: D. Powell

PHONE: 2528

RESPONSIBLE ORGANIZATION: Operations

APPROVED BY: Tony Elms

EFFECTIVE DATE: 08/22/2007

LEVEL OF USE: REFERENCE USE

EOI VALIDATION DATE: 02/14/1992

**QUALITY-RELATED** 

# HISTORY OF REVISION/REVIEW 3-EOI APPENDIX-11B

REV. <u>NO.</u>	REVISED PAGES	REASON FOR CURRENT REVISION
3	1	TR# 04 - Step 2: Changed suppression pool level at which Appendix-16E is implemented to 5.25 in. This is in agreement with 3-SIMI-73B for the setpoint where HPCI suction swap occurs.

# 3-EOI APPENDIX-11B

# ALTERNATE RPV PRESSURE CONTROL SYSTEMS RCIC TEST MODE

LOCATION:	Unit 3 Control Room	
ATTACHMENTS	: None	(√)
******	**************************************	*****
	ating RCIC turbine below 2100 rpm may result in able system operation and equipment damage.	
	ated Suppression Chamber pressure may trip the turbine on high exhaust pressure.	
140°E	ating RCIC Turbine with suction temperatures above  The may result in equipment damage.	****
	Emergency RPV Depressurization is required, OR Steam Cooling is required, EXECUTE EOI Appendix 16A and 16B as necessary to bypass RCIC Low RPV Pressure and Test Mode Isolation Interlocks.	
	Suppression Pool level <u>CANNOT</u> be maintained below 5.25 in., <b>EXECUTE</b> EOI Appendix 16E concurrently with this procedure to bypass HPCI High Suppression Pool Level Suction Transfer Interlock.	
	RCIC Turbine is operating and <u>NOT</u> required for RPV level control, ALIGN RCIC in test mode as follows:	
	a. OPEN 3-FCV-71-38, RCIC PUMP CST TEST VLV.	
	b. <b>VERIFY OPEN</b> 3-FCV-73-36, HPCI/RCIC CST TEST VLV.	
	c. CLOSE 3-FCV-71-39, RCIC PUMP INJECTION VALVE.	
	d. CONTINUE in this procedure at Step 5.	

4.	IF RCIC is in standby readiness, THEN START RCIC as follows:
	a. <b>VERIFY CLOSED</b> 3-FCV-71-39, RCIC PUMP INJECTION VALVE.
	b. <b>VERIFY RESET</b> and <b>OPEN</b> 3-FCV-71-9, RCIC TURB TRIP/THROT VLV RESET.
	c. VERIFY OPEN the following valves:
	• 3-FCV-71-38, RCIC PUMP CST TEST VLV
	• 3-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV
	• 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE
	• 3-FCV-73-36, HPCI/RCIC CST TEST VLV.
	d. PLACE 3-HS-71-31A, RCIC VACUUM PUMP, handswitch in START.
	e. OPEN 3-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV, to start RCIC Turbine.
	f. <b>VERIFY</b> RCIC Turbine speed accelerates to above 2100 rpm.
5.	<b>VERIFY</b> proper RCIC minimum flow valve operation as follows:
	a. IF RCIC flow is above 120 gpm, THEN VERIFY CLOSEDD 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE.
	b. IF BOTH of the following exist:
	• RCIC Initiation signal is $\underline{NOT}$ present,
	AND
	<ul> <li>RCIC flow is below 60 gpm,</li> </ul>
	THEN VERIFY OPEN 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE.
6.	THROTTLE 3-FCV-71-38, RCIC PUMP CST TEST VLV, to control RCIC pump discharge pressure at or below 1100 psig.

7.	ADJUST 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller to control RPV pressure.	
8.	IF RCIC injection to the RPV becomes necessary, THEN <b>ALIGN</b> RCIC to RPV as follows:	
	a. OPEN 3-FCV-71-39, RCIC PUMP INJECTION VALVE.	
	b. CLOSE 3-FCV-71-38, RCIC PUMP CST TEST VLV.	
	c. GO to EOI Appendix 5C.	
		11111
		111111111111111111111111111111111111111
<b>1</b>		THE PROPERTY OF THE PROPERTY O
	LAST PAGE	
		- 11

RESPOND TO UNCOUPLED CONTROL ROD (MULTIPLE

81

NOTCHES)

JPM NUMBER:

Plant Concurrence

TITLE:

TASK NUMBER:	U-000-AB-02	
SUBMITTED BY:		
SODMILLED DI:		DATE:
VALIDATED BY:		DATE:
APPROVED:		ר א תידי .
HIIIOVED.	TRAINING	DATE:
DI INTE GONGERO		
PLANT CONCURRENCE: _	OPERATIONS	DATE:
	OFLICALIONS	

Examination JPMs Require Operations Training Manager or Designee Approval and

# REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
2	10/4/94	ALL	GENERAL REVISION
3	12/14/95	4	CHANGED PROCEDURE FROM 2-AOI-85-1 TO 2-AOI-85-2
4	12/16/96	ALL	PROCEDURE CHANGE, ADDED NON-CRIT STEP ON TOUCH STAAR, CHANGED ASOS TO US.
5	11/10/99	ALL	PROCEDURE REVISION, FORMAT DOCUMENT, CHANGED MGT. EXPECT. TO PLANT WORK EXPECT., ADDED NON- CRIT. STEP 3-WAY COMM.
6	10/11/00	ALL	GENERAL REVISION
7	9/1/02	ALL	GENERAL REVISION
8	8/21/03	ALL	FORMAT; EDITORIAL

OPERATOR:			
RO	SRO	DATE:	
JPM NUMBER:	81		
TASK NUMBER:	U-000-AB-02		
TASK TITLE:	RESPOND TO AN UNCO	UPLED CONTROL RC	DD
K/A NUMBER:	201003A2.02 K	/A RATING: RO 3.	.7 SRO: 3.8
*****	*******	******	******
TASK STANDARD:	PERFORM OPERATIONS UNCOUPLED CONTROL 1		
LOCATION OF PE	RFORMANCE: SIMULATOR	R X PLANT	CONTROL ROOM
REFERENCES/PROCEDURES NEEDED: 2-AOI-85-2, REV 12			
VALIDATION TIME: CONTROL ROOM: 11:00 LOCAL:			
MAX. TIME ALLOWED: (Completed for Time Critical JPMs only)			
PERFORMANCE TIME:LOCALLOCAL			
COMMENTS:			
Additional comm	ment sheets attached	l? YES	NO
RESULTS:	SATISFACTORY	_UNSATISFACTORY	
signature:	EXAMINER	DATE:	

\*

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

\*

INITIAL CONDITIONS: You are an Operator. Unit 2 is in the startup mode withdrawing control rods in RWM Group 1. Control rod 02-23 was withdrawn from 00 to position 48 and has just been checked for coupling integrity. CONTROL ROD OVERTRAVEL annunciator (2-XA-55-5A, Window 14) is in alarm and control rod 02-23 has been verified to be uncoupled.

INITIATING CUES: The UNIT SUPERVISOR has directed you to respond to the uncoupled control rod as directed by 2-AOI-85-2.

JPM NO. 81 REV. NO. 8 PAGE 5 OF 12

AND INSERT THE UNCOUPL	UP IC WITHDRAWING RODS TO POSITION 48 LED MALFUNCTION FOR ROD 02-23 AND UN 48 TO GENERATE THE DRIFT AND US.
	**************************************
WHEN REQUESTED BY EXA	AMINER identify/obtain copy of required
Standard:	
IDENTIFIED OR OBTAIN	ED copy of 2-AOI-85-2.
SATN/A	COMMENTS:

4.0 OPERATOR ACTIONS
4.1 <u>Immediate Actions</u>
*************
Performance Step: Critical X Not Critical
4.1.1 STOP all control rod withdrawal.
Standard:
DID NOT ATTEMPT further rod withdrawal.
SAT UNSAT N/A COMMENTS:
4.2 Subsequent Actions
**************
Performance Step: Critical Not Critical X
4.2.1 NOTIFY Reactor Engineer to evaluate the uncoupled control rod for its impact on core thermal limits and rod worth.
Standard:
NOTIFIED Reactor Engineer to evaluate the rod for its impact on core thermal limits and rod worth.
SAT UNSAT N/A COMMENTS:

CUE: [WHEN REACTOR ENGINEER ASKED] NO THERMAL LIMIT OR ROD WORTH PROBLEMS AS LONG AS NO OTHER RODS BEYOND THIS ROD IN THE SEQUENCE ARE WITHDRAWN PAST POSITION 00.

4.2.2	ADJUST the rod pattern as directed by the
	Reactor Engineer throughout the performance
	of this procedure.

4.2.3 IF the control rod drive is at position 48 and with Reactor Engineer concurrence, THEN

PERFORM the following:

CUE: THE REACTOR ENGINEER AGREES THAT STEP 4.2.3 SHOULD BE PERFORMED TO RECOUPLE THE CONTROL ROD.

*******	**********
Performance Step :	Critical X Not Critical
4.2.3.1 Standard:	NOTCH INSERT the control rod drive to position 46 to attempt to couple the control rod.
NOTCHED control rod	drive in to notch 46.
SATUNSATN/A	COMMENTS:
********	*********
Performance Step :	Critical Not Critical_X
4.2.3.2	RESET associated annunciators.
Standard:	
RESET CONTROL ROD OV annunciators.	VERTRAVEL and CONTROL ROD DRIFT
SAT UNSAT N/A	COMMENTS:

********	**********
Performance Step :	Critical X Not Critical
4.2.3.3	NOTCH WITHDRAW the control rod drive to position 48.
Standard:	
NOTCH WITHDREW the	affected control rod to position 48.
SATN/A	COMMENTS:
********	**********
Performance Step :	Critical X Not Critical
4.2.3.4	PERFORM a coupling check.
Standard:	
withdrawal signal. observing CONTROL R	integrity check by giving another notch  VERIFIED control rod still uncoupled by COD OVERTRAVEL and CONTROL ROD DRIFT alarms  rod position indication.
SATN/A	COMMENTS:

JPM NO. 81 REV. NO. 8 PAGE 9 OF 12

***************		
Performance Step :	Critical_X Not Critical	
4.2.3.5 I	F coupling integrity check fails, THEN	
ŗ	CONTINUOUSLY INSERT control rod to cosition 00 to attempt to latch control rod with control rod drive mechanism.	
Standard:		
CONTINUOUSLY INSERTED	the affected control rod to 00.	
SAT UNSAT N/A _	COMMENTS:	
********	*********	
Performance Step :	Critical X Not Critical	
4.2.3.	5.1 <b>RESET</b> associated annunciators.	
Standard:		
<b>RESET</b> CONTROL ROD OVERTRAVEL and CONTROL ROD DRIFT annunciators on Panel 2-9-5.		
SAT UNSAT N/A _	COMMENTS:	

NOTE: HAVE CONSOLE OPERATOR DELETE ROD UNCOUPLED MALFUNCTION.

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

CUE: REACTOR ENGINEERING HAS EVALUATED THERMAL LIMITS AND ROD WORTH AND RECOMMENDS THAT CONTROL ROD 02-23 BE CONTINUOUSLY WITHDRAWN FROM 00 TO 48. WE UNDERSTAND NOTCH WITHDRAWAL IS REQUIRED PER 2-AOI-85-2. FOR EXPEDIENCY WE WOULD LIKE OT USE "RONOR" TO WITHDRAW THE ROD. UNIT SUPERVISOR DIRECTS YOU TO RONOR CONTROL ROD 02-23 TO POSITION 48.

Performance Step :	Critical X Not Critical	
	4.2.3.5.2 <b>NOTCH WITHDRAW</b> the control rod drive to position 48.	
Standard:		
NOTCH WITHDREW	the affected control rod to position 48.	
SATUNSAT	N/A COMMENTS:	
******	**********	
<u>Performance Step</u> :	Critical X Not Critical	
	4.2.3.5.3 <b>PERFORM</b> a coupling check.	
Standard:		
APPLIED notch withdraw signal to the affected control rod.  DETERMINED control rod now coupled by presence of control rod position indication and/or lack of associated annunciators.		
SATUNSAT	N/A COMMENTS:	
NOTE: COUPLING INTEGRITY IS SATISFIED IF CRD NOTCH OVERRIDE SWITCH IS USED AND ROD IS WITHDRAWN TO POSITION 48.		
END OF TASK		

STOP TIME

#### GENERIC WORK PRACTICES

*****************						
Perform	ance Ste	<u>ep:</u>	(	Critical	Not C	ritical <u>X</u>
<b>PE</b> JP		demonstrated	the use	of SELF	CHECKING	during this
Standar	<u>d</u> :					
		verified appl in accordance				lizing SELF
SAT	UNSAT_	N/A	COMME	NTS:		
	·					
*****	*****	******	*****	*****	******	******
Perform	ance Ste	p:	(	Critical	Not C	ritical X_
	RFORMER is JPM.	demonstrated	the use	of 3-WAY	COMMUNIC	CATION during
Standar	<u>d:</u>					
	<b>RFORMER</b> ant star	utilized 3-WA ndards.	AY COMMUN	ICATION	in accord	lance with
SAT	_ UNSAT_	N/A	COMM	ENTS:		

\*

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

\*

INITIAL CONDITIONS: You are an Operator. Unit 2 is in the startup mode withdrawing control rods in RWM Group 1. Control rod 02-23 was withdrawn from 00 to position 48 and has just been checked for coupling integrity. CONTROL ROD OVERTRAVEL annunciator (2-XA-55-5A, Window 14) is in alarm and control rod 02-23 has been verified to be uncoupled.

INITIATING CUES: The UNIT SUPERVISOR has directed you to respond to the uncoupled control rod as directed by 2-AOI-85-2.

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

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

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

INITIAL CONDITIONS: You are an Operator. Unit 2 is in the startup mode withdrawing control rods in RWM Group 1. Control rod 02-23 was withdrawn from 00 to position 48 and has just been checked for coupling integrity. CONTROL ROD OVERTRAVEL annunciator (2-XA-55-5A, Window 14) is in alarm and control rod 02-23 has been verified to be uncoupled.

INITIATING CUES: The UNIT SUPERVISOR has directed you to respond to the uncoupled control rod as directed by 2-AOI-85-2.



# **Browns Ferry Nuclear Plant**

## Unit 2

# **Abnormal Operating Instruction**

## 2-AOI-85-2

# **Uncoupled Control Rod**

Revision 0012

**Quality Related** 

Level of Use: Continuous Use

Effective Date: 01-24-2007

Responsible Organization: OPS, Operations

Prepared By: Terry K. Boyer
Approved By: John T. Kulisek

BFN Unit 2	Uncoupled Control Rod	2-AOI-85-2 Rev. 0012	
		Page 2 of 8	

## **Current Revision Description**

Pages Affected:

ΑII

Type of Change:

Data File Conversion

Tracking Number: 0013

This procedure was converted from Word 95 to Word 2002 (XP) using Rev 11.

Minor editorial changes were made to enhance clarity and conform to the Technical

Procedure Writers Guide.

# BFN Unit 2

# **Uncoupled Control Rod**

2-AOI-85-2 Rev. 0012 Page 3 of 8

# **Table of Contents**

1.0	PURPOSE	. 4
2.0	SYMPTOMS	. 4
3.0	AUTOMATIC ACTIONS	. 4
4.0	OPERATOR ACTIONS	. 5
4.1	Immediate Actions	. 5
4.2	Subsequent Actions	. 5
5.0	REFERENCES	. 8
5.1	Technical Specifications	8
5.2	Final Safety Analysis Report	8
5.3	Plant Instructions	8
5.4	Plant Drawings	8
5.5	Vendor Manuals	8
6.0	ILLUSTRATIONS/ATTACHMENTS	8

BFN	Uncoupled Control Rod	2-AOI-85-2
Unit 2		Rev. 0012
		Page 4 of 8

#### 1.0 PURPOSE

This abnormal operating instruction provides symptoms, automatic actions and operator actions for an uncoupled control rod.

#### 2.0 SYMPTOMS

#### NOTE

If a control rod is uncoupled and being withdrawn to any position other than position 48, the Rod Position Information System will display normal control rod movement. Power must be monitored to determine if the control rod is following its associated drive.

- A. Nuclear instrumentation does not respond to control rod movement.
- B. CONTROL ROD OVERTRAVEL annunciator (2-XA-55-5A, Window 14) in alarm.
- C. Digital display and red backlighting for the uncoupled control rod on the full core display is extinguished.

#### 3.0 AUTOMATIC ACTIONS

None

BFN	Uncoupled Control Rod	2-AOI-85-2	
Unit 2	•	Rev. 0012	
		Page 5 of 8	

# 4.0 OPERATOR ACTIONS

4.1	Imme	ediate A	ctions	
	[1]	STOF	all control rod withdrawal.	
4.2	Subs	sequent	Actions	
	[1]		FY Reactor Engineer to evaluate the suspect uncoupled of rod for its impact on core thermal limits and rod worth.	
	[2]		JST rod pattern as directed by Reactor Engineer ghout performance of this procedure.	
	[3]		ntrol rod drive is at position 48, <b>THEN,</b> with Reactor eer concurrence,	
		PERF	ORM the following:	
	[3	3.1]	NOTCH INSERT control rod drive to position 46 to attempt to couple the control rod.	
	[3	3.2]	RESET associated annunciators.	
	[3	3.3]	NOTCH WITHDRAW control rod drive to position 48.	
	[3	3.4]	PERFORM coupling check.	
	[3	3.5]	IF coupling integrity check fails, THEN	
			CONTINUOUSLY INSERT control rod drive to position 00 to attempt to latch control rod with control rod drive mechanism.	
		[3.5.1	] RESET associated annunciators.	
		[3.5.2	NOTCH WITHDRAW control rod to position 48.	
		[3.5.3	PERFORM coupling check.	

BFN	Uncoupled Control Rod	2-AOI-85-2	
Unit 2		Rev. 0012	
		Page 6 of 8	

**4.2** Subsequent Actions (continued)

	•	•	
[4]	THEN with Read of the rea	ctor Engineer concurrence, after thorough evaluation actor core conditions, the following sub-steps as directed by the Engineer.	
[4		<b>TEMPT</b> to latch control rod by fully inserting control as follows:	
	[4.1.1]	CONTINUOUSLY INSERT control rod drive to position 00 to attempt to latch control rod with control rod drive mechanism.	
	[4.1.2]	NOTCH WITHDRAW control rod to position 48.	
	[4.1.3]	PERFORM coupling check.	
	[4.1.4]	IF coupling integrity check fails, THEN	
		CONTINUOUSLY INSERT control rod drive to position 00 to attempt to latch control rod with control rod drive mechanism.	
		A. RESET associated annunciators.	
		B. <b>NOTCH WITHDRAW</b> control rod to position 48.	
		C. <b>PERFORM</b> coupling check.	
[4		<b>TEMPT</b> to latch control rod by inserting control rod e notch as follows:	
	[4.2.1]	NOTCH INSERT control rod drive one notch to attempt to couple control rod.	
	[4.2.2]	NOTCH WITHDRAW control rod drive to position 48.	
	[4.2.3]	PERFORM coupling check.	

	BFN Unit 2		Uncoupled Control Rod	2-AOI-85-2 Rev. 0012 Page 7 of 8	
4.2	Subseque	nt Action	s (continued)		
	[4.2	4] IF	coupling integrity check fails, TI	HEN	
		po	ONTINUOUSLY INSERT contropsition 00 to attempt to latch control rod drive mechanism.		
		Α	RESET associated annunciat	tors.	
		В	NOTCH WITHDRAW control position 48.	rod to	
		С	PERFORM coupling check.		
•					
			CAUTION		
Tech drive		ation 3.1.	3 applies to a control rod which	CANNOT be coupled	to its
		oupling in	ntegrity check fails after above ac	ctions have been	
	[5.1]	positio control	INUOUSLY INSERT control rod n 00 AND REMOVE the associa unit from service until corrective ned. REFER TO 2-OI-85.	ted hydraulic	
	[5.2]	RESE	Γ associated annunciators.		

BFN	Uncoupled Control Rod	2-AOI-85-2	
Unit 2		Rev. 0012	
		Page 8 of 8	

#### 5.0 REFERENCES

### 5.1 Technical Specifications

Section 3.1, Reactivity Control Systems.

Section 5.4, Procedures.

Section 5.5, Programs and Manuals.

### 5.2 Final Safety Analysis Report

Section 3.4, Reactivity Control Mechanical Design.

Section 13.6, Normal Operations

### 5.3 Plant Instructions

2-ARP-9-5, Panel 9-5 Annunciator Response Procedure.

2-OI-85, Control Rod Drive System.

### 5.4 Plant Drawings

45N620-6, Wiring Diagram Annunciator.

2-47E610-85-1, Mechanical Control Diagram CRD Hydraulic System.

104B2506 Sheet 2, Connection Diagram Position Indicator Probe.

730E321 Sheet 10, Elementary Diagram Reactor Manual Control System.

#### 5.5 Vendor Manuals

GEK-32539B in GEK-779-A, Volume 3, Part 2, Book 3, General Electric, Rod Position Information System, Contract 90744 BFN-CVM-2105.

### 6.0 ILLUSTRATIONS/ATTACHMENTS

None

RESPOND TO UNCOUPLED CONTROL ROD (MULTIPLE

JPM NUMBER:

TASK NUMBER:

Plant Concurrence

TITLE:

81

NOTCHES)

U-000-AB-02

		•
SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED:		DATE:
	TRAINING	
PLANT CONCURRENCE:		DATE:
	OPERATIONS	

Examination JPMs Require Operations Training Manager or Designee Approval and

# REVISION LOG

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2	10/4/94	ALL	GENERAL REVISION
3	12/14/95	4	CHANGED PROCEDURE FROM 2-AOI-85-1 TO 2-AOI-85-2
4	12/16/96	ALL	PROCEDURE CHANGE, ADDED NON-CRIT STEP ON TOUCH STAAR, CHANGED ASOS TO US.
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6	10/11/00	ALL	GENERAL REVISION
7	9/1/02	ALL	GENERAL REVISION
8	8/21/03	ALL	FORMAT; EDITORIAL

OPERATOR:		***************************************	
RO	SRO	DATE:	
JPM NUMBER:	81		
TASK NUMBER:	U-000-AB-02		
TASK TITLE:	RESPOND TO AN UNC	COUPLED CONTROL R	OD
K/A NUMBER:	201003A2.02	K/A RATING: RO_3	3.7 SRO: <u>3.8</u>
*****	******	******	******
TASK STANDARD:	PERFORM OPERATION UNCOUPLED CONTROL		
LOCATION OF PER	RFORMANCE: SIMULAT	OR X PLANT	CONTROL ROOM
REFERENCES/PROG	CEDURES NEEDED: 3	-AOI-85-2, REV 6	
VALIDATION TIME: CONTROL ROOM: 11:00 LOCAL:			
MAX. TIME ALLOWED: (Completed for Time Critical JPMs only)			
PERFORMANCE TIM	ME:	CONTROL ROOM	LOCAL
COMMENTS:			
Additional com	ment sheets attach	ned? YES	NO
RESULTS:	SATISFACTORY	UNSATISFACTORY	
SIGNATURE:	EXAMINER	DATE:	=

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

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

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

INITIAL CONDITIONS: You are an Operator. Unit 3 is in the startup mode withdrawing control rods in RWM Group 1. Control rod 02-23 was withdrawn from 00 to position 48 and has just been checked for coupling integrity. CONTROL ROD OVERTRAVEL annunciator (3-XA-55-5A, Window 14) is in alarm and control rod 02-23 has been verified to be uncoupled.

INITIATING CUES: The UNIT SUPERVISOR has directed you to respond to the uncoupled control rod as directed by 3-AOI-85-2.

AND INSERT THE UNCOU	UP IC WITHDRAWING RODS TO POSITION 48 PLED MALFUNCTION FOR ROD 02-23 AND ION 48 TO GENERATE THE DRIFT AND ORS.
********	************
Performance Step:	Critical Not Critical_X
when requested by a procedure.	EXAMINER identify/obtain copy of required
Standard:	
IDENTIFIED OR OBTAI	INED copy of 3-AOI-85-2.
SATN/A	A COMMENTS:
	·

4.0	OPERATOR ACTIONS
4.1	Immediate Actions
****	************
Perfo	rmance Step: Critical X Not Critical
	4.1.1 STOP all control rod withdrawal.
Stand	ard:
	DID NOT ATTEMPT further rod withdrawal.
SAT	UNSATN/ACOMMENTS:
4.2	Subsequent Actions
****	************
Perfo	rmance Step: Critical Not Critical X
	4.2.1 NOTIFY Reactor Engineer to evaluate the uncoupled control rod for its impact on core thermal limits and rod worth.
Stand	ard:
	NOTIFIED Reactor Engineer to evaluate the rod for its impact on core thermal limits and rod worth.
SAT	UNSATN/ACOMMENTS:

CUE: [WHEN REACTOR ENGINEER ASKED] NO THERMAL LIMIT OR ROD WORTH PROBLEMS AS LONG AS NO OTHER RODS BEYOND THIS ROD IN THE SEQUENCE ARE WITHDRAWN PAST POSITION 00.

4.2.2	ADJUST the rod pattern as directed by the
	Reactor Engineer throughout the performance
	of this procedure.

4.2.3 **IF** the control rod drive is at position 48 and with Reactor Engineer concurrence, **THEN** 

**PERFORM** the following:

CUE: THE REACTOR ENGINEER AGREES THAT STEP 4.2.3 SHOULD BE PERFORMED TO RECOUPLE THE CONTROL ROD.

erformance Step :	Critical X Not Critical
4.2.3.1	NOTCH INSERT the control rod drive to position 46 to attempt to couple the control rod.
tandard:	
NOTCHED control rod	drive in to notch 46.
SAT UNSAT N/A	COMMENTS:
*******	*******
	Critical Not Critical_X
Performance Step :	Critical Not Critical_X  RESET associated annunciators.
Performance Step : 4.2.3.2	
Performance Step: 4.2.3.2 Standard:	

********	*********
Performance Step :	Critical_X_ Not Critical
4.2.3.3	NOTCH WITHDRAW the control rod drive to position 48.
Standard:	
NOTCH WITHDREW the	affected control rod to position 48.
SATN/	A COMMENTS:
	*******
Performance Step :	Critical X Not Critical
4.2.3.4	<b>PERFORM</b> a coupling check.
Standard:	
withdrawal signal. observing CONTROL	integrity check by giving another notch  VERIFIED control rod still uncoupled by ROD OVERTRAVEL and CONTROL ROD DRIFT alarms l rod position indication.
SATN/	A COMMENTS:
-	

JPM 1	10		81
REV.	N	).	8
PAGE	9	OF	12

*********	**********
Performance Step :	Critical_X Not Critical
4.2.3.5	IF coupling integrity check fails, THEN
	CONTINUOUSLY INSERT control rod to position 00 to attempt to latch control rod with control rod drive mechanism.
Standard:	
CONTINUOUSLY INSER	TED the affected control rod to 00.
SAT UNSAT N/A	A COMMENTS:
******	*********
Performance Step :	Critical X Not Critical
4.2	.3.5.1 <b>RESET</b> associated annunciators.
Standard:	
RESET CONTROL ROD ( annunciators on Par	OVERTRAVEL and CONTROL ROD DRIFT nel 3-9-5.
SAT UNSAT N/A	A COMMENTS:

NOTE: HAVE CONSOLE OPERATOR DELETE ROD UNCOUPLED MALFUNCTION.

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

CUE: REACTOR ENGINEERING HAS EVALUATED THERMAL LIMITS AND ROD WORTH AND RECOMMENDS THAT CONTROL ROD 02-23 BE CONTINUOUSLY WITHDRAWN FROM 00 TO 48. WE UNDERSTAND NOTCH WITHDRAWAL IS REQUIRED PER 3-AOI-85-2. FOR EXPEDIENCY WE WOULD LIKE TO USE "RONOR" TO WITHDRAW THE ROD. UNIT SUPERVISOR DIRECTS YOU TO RONOR CONTROL ROD 02-23 TO POSITION 48.

-			
Performance Step :		Critical X	Not Critical
		OTCH WITHDRAW to	
Standard:			
NOTCH WITHDREW	the affected	d control rod to	position 48.
SATUNSAT	N/A	COMMENTS:	
*******	******	******	*****
<u>Performance Step</u> :		Critical <u>X</u>	Not Critical
	4.2.3.5.3 P	ERFORM a coupli:	ng check.
Standard:			
<b>DETERMINED</b> cont	rol rod now	coupled by pres	eted control rod. sence of control rod ted annunciators.
SATUNSAT	N/A	COMMENTS:	
NOTE: COUPLING INTEG			TCH OVERRIDE SWITCH

END OF TASK

# GENERIC WORK PRACTICES

*********	********
Performance Step:	Critical Not Critical_X
<b>PERFORMER</b> demonstrated th	ne use of SELF CHECKING during this
Standard:	
PERFORMER verified applic CHECKING in accordance wi	cable components by utilizing SELF th plant standards.
SAT UNSAT N/A	COMMENTS:
********	***********
Performance Step:	Critical Not Critical X
<b>PERFORMER</b> demonstrated th this JPM.	ne use of 3-WAY COMMUNICATION during
Standard:	
<b>PERFORMER</b> utilized 3-WAY plant standards.	COMMUNICATION in accordance with
SAT UNSAT N/A	COMMENTS:

\*

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

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

INITIAL CONDITIONS: You are an Operator. Unit 3 is in the startup mode withdrawing control rods in RWM Group 1. Control rod 02-23 was withdrawn from 00 to position 48 and has just been checked for coupling integrity. CONTROL ROD OVERTRAVEL annunciator (3-XA-55-5A, Window 14) is in alarm and control rod 02-23 has been verified to be uncoupled.

INITIATING CUES: The UNIT SUPERVISOR has directed you to respond to the uncoupled control rod as directed by 3-AOI-85-2.

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

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

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

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INITIATING CUES: The UNIT SUPERVISOR has directed you to respond to the uncoupled control rod as directed by 3-AOI-85-2.



# **Browns Ferry Nuclear Plant**

# Unit 3

# **Abnormal Operating Instruction**

### 3-AOI-85-2

# **Uncoupled Control Rod**

Revision 0006

**Quality Related** 

Level of Use: Continuous Use

Effective Date: 05-24-2005

Responsible Organization: OPS, Operations

Prepared By: Donald R. Heard

Approved By: Jeffrey A. Kimberlin

BFN	Uncoupled Control Rod	3-AOI-85-2
Unit 3	-	Rev. 0006
		Page 2 of 7

# **Current Revision Description**

Pages Affected:

ΑII

Type of Change: ENHANCEMENT

Tracking Number: 007

This procedure was converted from Word 95 to Word 2002 (XP) using Rev 5.

Changed the Level of Use from Reference Use to Continuous Use (PCR 05001200)

BFN	Uncoupled Control Rod	3-AOI-85-2
Unit 3	·	Rev. 0006
		Page 3 of 7

#### 1.0 PURPOSE

This abnormal operating instruction provides symptoms, automatic actions and operator actions for an uncoupled control rod.

#### 2.0 SYMPTOMS

#### **NOTE**

If a control rod is uncoupled and being withdrawn to any position other than position 48, the Rod Position Information System will display normal control rod movement. Power must be monitored to determine if the control rod is following its associated drive.

- Nuclear instrumentation does NOT respond to control rod movement.
- CONTROL ROD OVERTRAVEL annunciator (3-XA-55-5A, Window 14) in alarm.
- Digital display and red backlighting for the uncoupled control rod on the full core display is extinguished.

#### 3.0 AUTOMATIC ACTIONS

None

BFN	Uncoupled Control Rod	3-AOI-85-2
Unit 3	<u>.</u>	Rev. 0006
		Page 4 of 7

# 4.0 OPERATOR ACTIONS

4.1	lmm	ediate A	actions	
	[1]	STOP	all control rod withdrawal.	
4.2	Sub	sequent	Actions	
	[1]		FY Reactor Engineer to evaluate the suspect uncoupled of rod for its impact on core thermal limits and rod worth.	
	[2]		ST the rod pattern as directed by the Reactor Engineer hout the performance of this procedure.	
	[3]		control rod drive is at position 48 <b>AND</b> with Reactor eer concurrence, <b>THEN</b>	
		PERF	ORM the following:	
	[3	-	NOTCH INSERT the control rod drive to position 46 to attempt to couple the control rod.	
	[3	3.2]	RESET associated annunciators.	
	[3	3.3]	NOTCH WITHDRAW the control rod drive to position 48.	
	[3	3.4]	PERFORM a coupling check.	
	[3	3.5]	IF coupling integrity check fails, THEN	
			CONTINUOUSLY INSERT control rod drive to position 00 to attempt to latch control rod with control rod drive mechanism.	
		[3.5.1]	RESET associated annunciators.	
		[3.5.2]	NOTCH WITHDRAW control rod to position 48.	
		[3.5.3]	PERFORM a coupling check.	

BFN	Uncoupled Control Rod	3-AOI-85-2
Unit 3	•	Rev. 0006
		Page 5 of 7

# 4.2 Subsequent Actions (continued)

[4] **IF** the control rod drive is at any position other than notch 48 **AND** with Reactor Engineer concurrence, after thorough evaluation of the reactor core conditions, **THEN** 

	evaluation of the reactor core conditions, <b>THEN</b>							
	<b>PERFORM</b> one of the following sub-steps as directed by the Reactor Engineer:							
[4.	-		PT to latch control rod by fully inserting control ollows:					
	[4.1.1]	pos	NTINUOUSLY INSERT control rod drive to sition 00 to attempt to latch control rod with atrol rod drive mechanism.	_				
	[4.1.2]	NO						
	[4.1.3]	PERFORM a coupling check.						
	[4.1.4]	IF coupling integrity check fails, THEN						
		pos	NTINUOUSLY INSERT control rod drive to sition 00 to attempt to latch control rod with otrol rod drive mechanism.					
		A.	RESET associated annunciators.					
		B.	NOTCH WITHDRAW control rod to position 48.					

C. **PERFORM** a coupling check.

BFN	Uncoupled Control Rod	3-AOI-85-2
Unit 3	•	Rev. 0006
		Page 6 of 7

			Page 6 of 7			
4.2	Subseque	ent Action	s (continued)			
			<b>PT</b> to latch control rod by insertir ch as follows:	ng control rod		
	[4.2	•	<b>NOTCH INSERT</b> the control rod drive one notch to attempt to couple the control rod.			
	[4.2	-	TCH WITHDRAW the control rostition 48.	d drive to □		
	[4.2	2.3] <b>PE</b>	PERFORM a coupling check.			
	[4.2	2.4] <b>IF</b>	coupling integrity check fails, THI	EN		
		pos	NTINUOUSLY INSERT control in sition 00 to attempt to latch control rod drive mechanism.			
		A.	RESET associated annunciato	rs.		
		В.	NOTCH WITHDRAW control reposition 48.	od to		
			C. <b>PERFORM</b> a coupling check.			
			CAUTION			
Technic drive.	al Specific	cation 3.1.3	applies to a control rod which <u>C</u>	ANNOT be coupled to its		
I		coupling in ried out, <b>T</b>	tegrity check fails after above act	ions have been		
	[5.1]	position control	NUOUSLY INSERT control rod do 00 AND REMOVE the associate unit from service until corrective and REFER TO 3-OI-85.	ed hydraulic		

**RESET** associated annunciators.

[5.2]

BFN	Uncoupled Control Rod	3-AOI-85-2	
Unit 3		Rev. 0006	
		Page 7 of 7	

#### 5.0 REFERENCES

### 5.1 Technical Specifications

Section 3.1, Reactivity Control Systems

Section 5.4, Procedures

Section 5.5, Programs and Manuals

### 5.2 Final Safety Analysis Report

Section 3.4, Reactivity Control Mechanical Design

Section 13.6, Normal Operations

#### 5.3 Plant Instructions

3-ARP-9-5, Panel 9-5 Annunciator Response Procedure

3-OI-85, Control Rod Drive System

### 5.4 Plant Drawings

45N620-6, Wiring Diagram Annunciator

3-47E610-85-1, Mechanical Control Diagram CRD Hydraulic System

104B2506 Sheet 2, Connection Diagram Position Indicator Probe

730E321 Sheet 10, Elementary Diagram Reactor Manual Control System

#### 5.5 Vendor Manuals

GEK-32539B in GEK-779-A, Volume 3, Part 2, Book 3, General Electric, Rod Position Information System, Contract 90744 BFN-CVM-2105

#### 6.0 ILLUSTRATIONS/ATTACHMENTS

None

JPM NUMBER:	55	
TITLE:	2-EOI APPENDIX-13 - EMERGENCY VENTI CONTAINMENT	NG PRIMARY
TASK NUMBER:	U-000-EM-63	
SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TRAINING	DATE:
PLANT CONCURR	ENCE:OPERATIONS	DATE:
* Examination JP	Ms Require Operations Training Manager Approval or D	Designee Approval and

Plant Concurrence

# **REVISION LOG**

Revision	Effective	Pages	Description
Number	Date	Affected	Of Revision
5	11/15/99	All	Procedure revision, added 3-way comm.
6	09/08/02	3,4	Delete SS#, delete safety statement
7	01/05/06	All	General revision
8	07/29/07	All	Update
9	06/20/08	All	General revision
10	03/27/09	All	General revision & re-format

OPERATOR:			******	· · · · · · · · · · · · · · · · · · ·	
RO	SRO			DATE:	
JPM NUMBER:	55				
TASK NUMBER:	U-000-EM-63				
TASK TITLE:	2-EOI APPENE CONTAINMEN		RGENC	Y VENTING PRII	MARY
K/A NUMBER:	295024EA1.14	K/A RAT	ING:	RO <u>3.4</u>	SRO <u>3.5</u>
**************************************	: PERFORM CO	NTROL ROO	и орег		IRED TO
PERFORMANCE I	LOCATION:	SIMULATOR	X PLA	NT CONTRO	L ROOM
REFERENCES/PR	OCEDURES NE	EDED: 2-	EOI Ap	pendix-13, Rev 6	
VALIDATION TIME	: s	IMULATOR:	5:00	LOCAL:	
MAX. TIME ALLOW	/ED:	(FOR TI	ME CRI	ITICAL JPMs ON	LY)
PERFORMANCE T	IME:	***************************************			
COMMENTS:					
	***************************************				
ADDITIONAL COM	MENT SHEETS	ATTACHED?		YES	NO
RESULTS:	SATISFACTOR	RY	l	JNSATISFACTO	RY
EXAMINER SIGNA	TURE:			DATE:	

\*

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

INITIAL CONDITIONS: You are an Operator. A large leak inside primary

containment has developed on Unit 2. The reactor

scrammed and several control rods are still not fully inserted to 00 and primary containment pressure is approaching 55 psig and rising. The US is performing EOI-2 at PC/P-15.

**INITIATING CUES:** The Unit Supervisor directs you to emergency vent primary

containment as directed by 2-EOI Appendix-13.

JPM NO. 55 REV. NO. 10 PAGE 5 of 12

START TIME			
**************************************		**************************************	
When requested by examiner identify	//obtain copy of r	equired procedure.	
STANDARD:			
Obtained copy of 2-EOI Appendix-13			
SAT N	I/A	COMMENTS:	
**************************************		**************************************	
NOTIFY Shift Manager / SED	of the following:		
<ul><li>Emergency Venting of Prima</li><li>Off-Gas Release Rate Limits</li></ul>			
CUE: [Shift Manager/SED acknowl venting is in progress and Off-Gas in	edges] Emerger release rate limit	ncy Primary Containment s will be exceeded.	
STANDARD:			
Notified Shift Manager/SED by voice	contact with exar	niner.	
SAT N	/A	COMMENTS:	

JPM NO. 55 REV. NO. 10 PAGE 6 of 12

PERFOR	MANCE STEP:	CRITICAL	NOT CRITICAL X					
2. <b>VE</b>	NT the Suppression Chamb	er as follows (Pane	9-3):					
a.	IFEITHER of	the following exists:						
	Suppression Pool water		determined to be below 20 ft,					
	• Suppression Chamber CANNOT be vented,							
	THENCONTINUE in this procedure at Step 3.							
STANDAF	RD:							
	uppression Pool Level belov EVEL and/or ICS.	w 20 ft using 2-LI-64	-159A, SUPPR POOL					
SAT	SAT UNSAT N/A COMMENTS:							
			MMA:::::::::::::::::::::::::::::::::::					
	Washington Control of the Control of							
*****	*********	******	**********					
PERFORM	MANCE STEP:	CRITICAL	X NOT CRITICAL					
b.	PLACE keylock switch 2 VENT OUTBD PERMIS		DENED SUPPR CHBR					
STANDAR	RD:							
Placed 2-F	HS-64-222B in the PERM po	osition.						
SAT	UNSAT N/	'A CO	MMENTS:					
	**************************************							

JPM NO. 55 REV. NO. 10 PAGE 7 of 12

**************************************								
PERFORMA	NCE STEP:	CRITIC	AL	NOT CRITICAL	X			
C.	c. <b>CHECK</b> blue indicating light above 2-HS-64-222B, HARDENED SUPPR CHBR VENT OUTBD PERMISSIVE, illuminated.							
STANDARD	<u>:</u>							
Verified BLU	E indicating lam	p above 2-HS-64-22	2B Illuminate	ed.				
SAT	_ UNSAT _	N/A	СОММ	ENTS:				
-								
******	*******	*******	******	*******	*****			
PERFORMA	NCE STEP:	CRITIC	ALX_	NOT CRITICAL				
d.	OPEN 2-FCV-6 VLV.	4-222, HARDENED	SUPPR CHI	BR VENT OUTBD I	SOL			
STANDARD	<u>.</u>							
	Placed 2-HS-64-222A in the OPEN position (critical) and Verified illuminated RED valve position indicating lamp above associated hand switch (not critical).							
SAT	_ UNSAT _	N/A	COMM	ENTS:				
		***************************************						

JPM NO. 55 REV. NO. 10 PAGE 8 of 12

*****	********	*****************	*****	********			
PERFORMA	NCE STEP:	CRITICAL	X_	NOT CRITICAL			
e.	PLACE keylock swit VENT INBD PERMIS		HARDEN	ED SUPPR CHBR			
STANDARD	<u>.</u> <u>.</u>						
Placed 2-HS	Placed 2-HS-64-221B in the PERM position.						
SAT UNSAT N/A COMMENTS:							
	374404	······································					
******	*******	******	*****	********			
PERFORMA	NCE STEP:	CRITICAL	<del></del>	NOT CRITICAL X			
f.	CHECK blue indicati CHBR VENT INBD F	ng light above 2-H PERMISSIVE, illum	S-64-221E iinated.	3, HARDENED SUPPR			
STANDARD							
Verified BLU	E indicating lamp abo	ve 2-HS-64-221B I	Illuminated	<b>1</b> .			
SAT	UNSAT	N/A	СОММЕ	NTS:			
····							

JPM NO. 55 REV. NO. 10 PAGE 9 of 12

******	******	*****	**** <del>***</del>	*****	******	*****
PERFORMA	NCE STEP:		CRITICAL	. <u>X</u>	NOT CRITICAL	
g.	OPEN 2-FCV-0 VLV.	64-221, HAR	DENED SU	JPPR CHE	BR VENT INBD IS	OL
STANDARD	<u>:</u>					
	-64-221A in the cating lamp abov				ed illuminated RE tical).	D valve
SAT	_ UNSAT _	N/A	· · · · · · · · · · · · · · · · · · ·	СОММ	ENTS:	
*****	******	*****	*****	*****	******	*****
PERFORMA	NCE STEP:		CRITICAL		NOT CRITICAL	X_
h.	CHECK Drywe	ll and Suppre	ession Cha	mber Pres	sure lowering.	
STANDARD:						
	ell and suppres rumentation and		r pressure l	owering b	y available contai	nment
SAT	_ UNSAT _	N/A _	···········	COMME	ENTS:	
		***************************************				

JPM NO. 55 REV. NO. 10 PAGE 10 of 12

PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X		
i. <b>MAINTAIN</b> Primary Contain 222, HARDENED SUPR CONTAINS SRO.				
STANDARD:				
None.				
SAT N/A	COMME	ENTS:		
	- 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4			
CUE: [When Drywell Pressure lowering] That completes this task.				

JPM NO. 55 REV. NO. 10 PAGE 11 of 12

PERFORMANCE STEP:		NOT CRITICAL			
PERFORMER demonstrated the use of SELF CHECKING during this JPM					
STANDARD:					
PERFORMER verified applicable components by utilizing SELF CHECKING in accordance with plant standards.					
SAT UNSAT	_ N/A CO	OMMENTS:			
**************************************		NOT CRITICAL			
PERFORMER demonstrated the use of 3-WAY COMMUNICATION during this JPM					
STANDARD:					
PERFORMER utilized 3-WAY COMMUNICATION in accordance with plant standards.					
SAT UNSAT	_ N/A CC	DMMENTS:			
	The state of the s	Managari e d			
END OF TASK					
STOP TIME:					

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** 

You are an Operator. A large leak inside primary containment has developed on Unit 2. The reactor scrammed and several control rods are still not fully inserted to 00 and primary containment pressure is approaching 55 psig and rising. The US is performing EOI-2 at PC/P-15.

**INITIATING CUES:** 

The Unit Supervisor directs you to emergency vent primary containment as directed by 2-EOI Appendix-13.

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

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containment has developed on Unit 2. The reactor

scrammed and several control rods are still not fully inserted to 00 and primary containment pressure is approaching 55 psig and rising. The US is performing EOI-2 at PC/P-15.

**INITIATING CUES:** 

The Unit Supervisor directs you to emergency vent primary

containment as directed by 2-EOI Appendix-13.

#### TENNESSEE VALLEY AUTHORITY

#### **BROWNS FERRY NUCLEAR PLANT**

# **EOI PROGRAM MANUAL SECTION IX** 2-EOI APPENDIX-13 **EMERGENCY VENTING PRIMARY CONTAINMENT**

# **REVISION 6**

PREPARED BY: M. Morrow

PHONE: 3708

RESPONSIBLE ORGANIZATION: Operations

APPROVED BY: Tony Elms

EFFECTIVE DATE: 04/24/2008

LEVEL OF USE: REFERENCE USE

EOI VALIDATION DATE: 04/03/1993

**QUALITY-RELATED** 

# HISTORY OF REVISION/REVIEW 2-EOI APPENDIX-13

REV. <u>NO.</u>	REVISED PAGES	REASON FOR CURRENT REVISION
6	6	Attachment 3: Revised figure to show locked open valves 1-64-737 and 3-64-737.

# 2-EOI APPENDIX-13

# **EMERGENCY VENTING PRIMARY CONTAINMENT**

LOCATIO	N: Unit 2 Control Room	
ATTACH	MENTS: 1.Tools and Equipment 2.Vent System Overview 3.Hardened Vent Flow Path	(✓)
1. <b>NO</b>	TIFY Shift Manager / SED of the following:	
	Emergency Venting of Primary Containment is in progress. Off-Gas Release Rate Limits will be exceeded.	
2. <b>VEI</b>	NT the Suppression Chamber as follows (Panel 9-3):	
a.	IF <u>EITHER</u> of the following exists:	
	<ul> <li>Suppression Pool water level <u>CANNOT</u> be determined to be below 20 ft,</li> </ul>	
	<ul><li>OR</li><li>Suppression Chamber <u>CANNOT</u> be vented,</li></ul>	
	THENCONTINUE in this procedure at Step 3.	
b.	<b>PLACE</b> keylock switch 2-HS-64-222B, HARDENED SUPPR CHBR VENT OUTBD PERMISSIVE, in PERM.	<u></u>
C.	<b>CHECK</b> blue indicating light above 2-HS-64-222B, HARDENED SUPPR CHBR VENT OUTBD PERMISSIVE, illuminated.	
d.	<b>OPEN</b> 2-FCV-64-222, HARDENED SUPPR CHBR VENT OUTBD ISOL VLV.	
e.	<b>PLACE</b> keylock switch 2-HS-64-221B, HARDENED SUPPR CHBR VENT INBD PERMISSIVE, in PERM.	
f.	CHECK blue indicating light above 2-HS-64-221B, HARDENED SUPPR CHBR VENT INBD PERMISSIVE, illuminated.	
g.	<b>OPEN</b> 2-FCV-64-221, HARDENED SUPPR CHBR VENT INBD ISOL VLV.	
		,

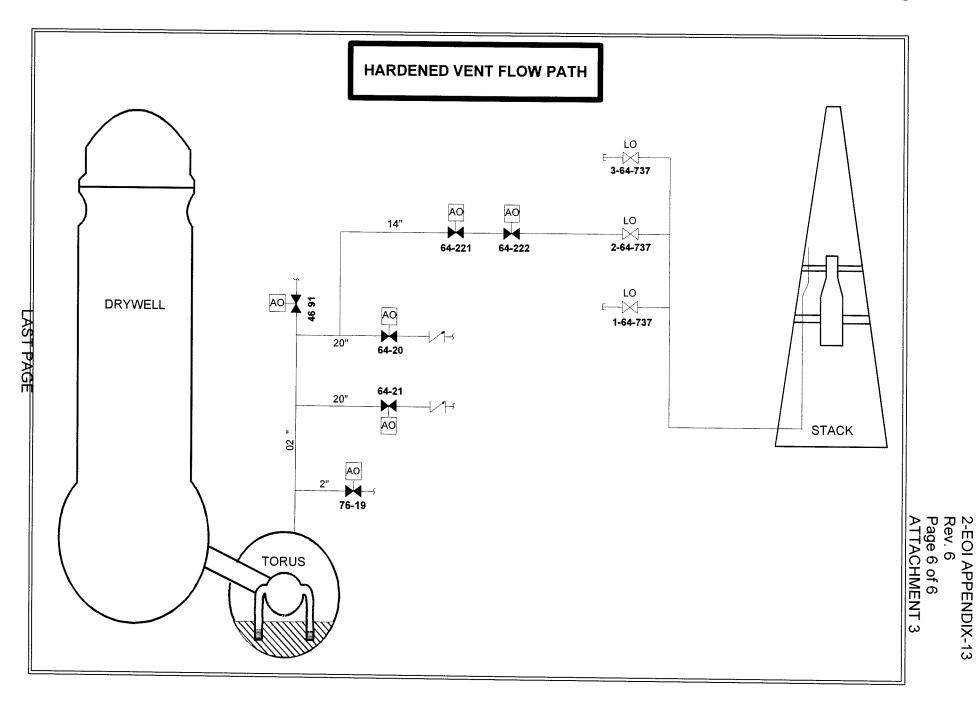
2.	(cor	ntinued from previous page)
	h.	CHECK Drywell and Suppression Chamber Pressure lowering.
	i.	MAINTAIN Primary Containment Pressure below 55 psig using 2-FCV-64-222, HARDENED SUPR CHBR VENT OUTBD ISOL VLV, as directed by SRO.
3.		Suppression Chamber vent path is <u>NOT</u> available, EN <b>VENT</b> the Drywell as follows:
	a.	NOTIFY Shift Manager / SED that Secondary Containment integrity failure is possible.
	b.	NOTIFY Radiation Protection that Reactor Building is being evacuated due to imminent failure of Primary Containment vent ducts.
	C.	EVACUATE ALL Reactor Buildings using P.A. System.
	d.	START ALL available SGTS trains.
	e.	VERIFY CLOSED 2-FCV-64-36, DW/SUPPR CHBR VENT TO SGT (Panel 9-3).
	f.	VERIFY OPEN the following dampers (Panel 9-25):
		<ul> <li>2-FCO-64-40, REACTOR ZONE EXH TO SGTS</li> <li>2-FCO-64-41, REACTOR ZONE EXH TO SGTS.</li> </ul>
	g.	VERIFY CLOSED 2-FCV-64-29, DRYWELL VENT INBD ISOL VALVE (Panel 9-3 or Panel 9-54).
	h.	<b>DISPATCH</b> personnel to Unit 2 Auxiliary Instrument Room to perform the following:
		<ol> <li>REFER TO Attachment 1 and OBTAIN one 12-in. banana jack jumper from EOI Equipment Storage Box.</li> <li>LOCATE terminal strip DD in Panel 9-43, Front.</li> <li>JUMPER DD-76 to DD-77 (Panel 9-43).</li> <li>NOTIFY Unit Operator that jumper for 2-FCV-64-30, DRYWELL VENT OUTBD ISOLATION VLV, is in place.</li> </ol>
	i.	VERIFY OPEN 2-FCV-64-30, DRYWELL VENT OUTBD ISOLATION VLV (Panel 9-3).

3. (	continued from previous page)
******	**************************************
******	<ul> <li>The following step will fail ductwork inside Secondary Containment and may fail Secondary Containment Integrity.</li> <li>Off-Gas Release Rate Limits will be exceeded.</li> </ul>
	j. <b>PLACE</b> keylock switch 2-HS-84-36, SUPPR CHBR/DW VENT ISOL BYP SELECT, to DRYWELL (Panel 9-54).
44.4.4.0007.7	k. <b>VERIFY OPEN</b> 2-FCV-64-29, DRYWELL VENT INBD ISOL VALVE (Panel 9-54).
	I. CHECK Drywell and Suppression Chamber pressure lowering.
	m. <b>MAINTAIN</b> Primary Containment pressure below 55 psig using 2-FCV-64-29, DRYWELL VENT INBD ISOL VALVE, as directed by SRO.

**END OF TEXT** 

LOCATION:
Unit 2 Auxiliary Instrument Room, EOI Equipment Storage Box.

2-EOI APPENDIX-13
Rev. 6
Page 5 of 6
ATTACHMENT 2



# **BROWNS FERRY NUCLEAR PLANT** JOB PERFORMANCE MEASURE

JPM NUMBER:	104F	
TITLE:	TIE D/G TO 4kV SHUTDOWN BOARD AT PA	ANEL 9-23
TASK NUMBER:	U-082-NO-07	
SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TRAINING	DATE:
PLANT CONCURR	ENCE:	DATE:

Examination JPMs Require Operations Training Manager Approval or Designee Approval and Plant Concurrence

# **REVISION LOG**

Revision	Effective	Doggo	D
Number	Date	Pages Affected	Description
			Of Revision
0	09/20/01	All	Initial issue
1	08/21/03	All	Format, Editorial, Procedure revision
2	10/06/05	All	Procedure revision
3	06/02/07	All	Procedure revision
4	03/20/09	All	Procedure revision and re-format
	L		

OPERATOR:	St. Commission of the Commissi			***************************************
RO	SRO	D	ATE:	and the same of th
JPM NUMBER:	104F			
TASK NUMBER:	U-082-NO-07			
TASK TITLE:	TIE D/G TO 4kV SHUTDO	WN BOARD AT	PANEL 9-2	3
K/A NUMBER:	264001A4.04	K/A RATING:	RO <u>3.7</u>	SRO <u>3.7</u>
*******	*********	******	******	*****
	PERFORM OPERATIONS DIESEL GENERATOR WI AS DIRECTED BY 0-01-82	NECESSARY 1 TH OFFSITE PO	O PARALLI OWER AT PA	EL A
PERFORMANCE L	OCATION: SIMULATO	R X PLANT _		ROOM
REFERENCES/PRO	OCEDURES NEEDED:	0-OI-82, Rev 10	00	
VALIDATION TIME:	SIMULATOR	: <u>15:00</u>		
MAX. TIME ALLOW	/ED:(FOR	TIME CRITICAL	. JPMs ONL	Y)
PERFORMANCE T	IME:			
COMMENTS:				
ADDITIONAL COM	MENT SHEETS ATTACHE	O? YE	S	NO
RESULTS:	SATISFACTORY	UNSA	TISFACTOR	Υ
EXAMINER SIGNAT	ΓURE:	DA	\TE:	

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** 

You are a Unit Operator. Unit 2 is operating at 100% power. Diesel Generator 'A' is running for special testing in accordance with Section 5.0. of 0-OI-82. Diesel Generator Phase Voltages 1-2, 2-3, and 3-1 at Diesel Generator Protective Relay Cabinet, have been verified to be within 10% of each other. The Operations Superintendent's permission has been received for performing the test. ALL P & L's have been reviewed.

**INITIATING CUES:** 

The Unit Supervisor directs you to parallel Diesel Generator 'A' with the system as directed by 0-OI-82. The diesel generator is to be loaded to  $2600 \pm 50$  Kw.

JPM NO. 104F REV. NO. 4 PAGE 5 of 19

START TIM	1E	<u></u>		. 7.02 0 01 1	Ü
	**************************************	CRITIC		**************************************	
When reque	ested by examiner	identify/obtain copy	of required	procedure.	
STANDARI	<u>D:</u>				
Identified or	Obtained copy of	0-OI-82.			
SAT	UNSAT	N/A	COMM	IENTS:	
******	*****	*******	ر و در		
	ANCE STEP:			NOT CRITICAL	
8.1 Parallel	with System Ope	eration at Panel 9-2	3		
[1]	VERIFY the follow	wing initial condition	s:		
	A. All Precautions	s and Limitations in	Section 3.0	) have been reviewe	ed
	B. Diesel Genera	itor A(B,C,D) is opei	ating in acc	cordance with Section	on 5.0
	C. 4-kV Shutdow power source	n Board A(B,C,D) is	being supp	olied power from an	offsite
	D. Diesel Genera Protective Rel	itor Phase Voltages lay Cabinet, are with	1-2, 2-3, ar in 10% of e	nd 3-1 at Diesel Ger each other	nerator
STANDARD	<u>):</u>				
illuminated o	on START switch. <b>\</b> d light illuminated o	imitations. VERIFIE VERIFIED normal su on breaker control s	upply break	er to 4kV Shutdown	Board
SAT	_ UNSAT	N/A	COMM	ENTS:	
			P		

PERFORMANCE STEP:	CAUTION  A failure of a PT Transformer may cause the associated DG to overspeed when paralleled with the System.				
[2] PLACE the associated Diesel Generator breaker synchronizing switch in ON  Diesel Instrument Name Instrument No. Panel  A DG A BKR 1818 SYNC 0-25-211-A/22A 0-9-23-7  B DG B BKR 1822 SYNC 0-25-211-B/4A 0-9-23-7  C DG C BKR 1812 SYNC 0-25-211-C/4A 0-9-23-8  D DG D BKR 1816 SYNC 0-25-211-D/20A 0-9-23-8  STANDARD:  Placed 0-25-211-A/22A SYNC switch in the ON position					
A DG A BKR 1818 SYNC 0-25-211-A/22A 0-9-23-7  B DG B BKR 1822 SYNC 0-25-211-B/4A 0-9-23-7  C DG C BKR 1812 SYNC 0-25-211-C/4A 0-9-23-8  D DG D BKR 1816 SYNC 0-25-211-D/20A 0-9-23-8  STANDARD:  Placed 0-25-211-A/22A SYNC switch in the ON position		PLACE the associated D	<del></del>	_	******
B DG B BKR 1822 SYNC 0-25-211-B/4A 0-9-23-7 C DG C BKR 1812 SYNC 0-25-211-C/4A 0-9-23-8 D DG D BKR 1816 SYNC 0-25-211-D/20A 0-9-23-8  STANDARD: Placed 0-25-211-A/22A SYNC switch in the ON position	Diesel	Instrument Name	Instrument No.	Panel	
C DG C BKR 1812 SYNC 0-25-211-C/4A 0-9-23-8 D DG D BKR 1816 SYNC 0-25-211-D/20A 0-9-23-8  STANDARD: Placed 0-25-211-A/22A SYNC switch in the ON position	Α	DG A BKR 1818 SYNC	0-25-211-A/22A	0-9-23-7	
D         DG D BKR 1816 SYNC         0-25-211-D/20A         0-9-23-8           STANDARD:           Placed 0-25-211-A/22A SYNC switch in the ON position	В	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7	
STANDARD: Placed 0-25-211-A/22A SYNC switch in the ON position	С	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8	
Placed 0-25-211-A/22A SYNC switch in the ON position	D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8	

JPM NO. 104F REV. NO. 4 PAGE 7 of 19

**************************************							
<u>PERFORMA</u>	PERFORMANCE STEP: CRITICAL NOT CRITICAL						
[3] <b>CHECK</b> that 4-kV Shutdown Board A(B,C,D) voltage is between 3950 VOLTs and 4400 VOLTs and <b>NOT</b> undergoing abnormal voltage transients							
STANDARD	<u>:</u>						
Verified 4kV	Shutdown Bd A volt	age 3950-4400 vo	ts and stat	ole			
SAT	UNSAT	_ N/A	COMM	ENTS:			
			and the second s		APRILLED		
******	*******	*******	*****	******	*****		
PERFORMANCE STEP: CRITICAL NOT CRITICAL							
[4] CHECK SYSTEM SYNC FREQUENCY is between 59 Hertz and 61 Hertz and NOT undergoing abnormal frequency transients							
STANDARD	2						
Verified Syst	tem Sync Frequency	59-61 Hz and stal	ole				
SAT UNSAT N/A COMMENTS:							
CAUTION  DO NOT parallel the Diesel Generators with an unstable offsite source or during inclement weather (e.g., lightning, because index)							
inclement weather (e.g., lightning, heavy winds)							

************	********	********	*****
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL	X

- [5] **IF** 4-kV Shutdown Board A(B,C,D) is experiencing abnormal voltage/frequency transients, **THEN PERFORM** the following:
  - [5.1] **PLACE** the associated Diesel Generator breaker synchronizing switch in OFF

Diesel	Instrument Name	Instrument No.	Panel
Α	DG A BKR 1818 SYNC	0-25-211-A/22A	0-9-23-7
В	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
С	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

- [5.2] **TRANSFER** the 4-kV shutdown board to a stable offsite source. REFER TO 0-OI-57A
- [5.3] **WHEN** the 4-kV shutdown board has been transferred to a stable offsite power source, **THEN**

PLACE Diesel Generator synchronizing switch in ON

N/A – System is	s stable at this tim  UNSAT	COMMENTS:	

#### **CAUTION**

Only one Unit 1 and 2 Diesel Generator at a time is allowed to be operated in parallel with system

******	******** <del>*************</del>	*********	*********	******
<b>PERFORM</b>	IANCE STEP:	CRITICAL	X NOT CRITICA	۸L
[6]	PULL and PLACE the in PARALLELED WIT		el Generator mode selec	tor switch
Diesel	Handswitch Name	Handswitch No.	Panel	
Α	DG A MODE SELECT	0-HS-82-A/5A	0-9-23-7	
В	DG B MODE SELECT	0-HS-82-B/5A	0-9-23-7	
С	DG C MODE SELECT	0-HS-82-C/5A	0-9-23-8	
D	DG D MODE SELECT	0-HS-82-D/5A	0-9-23-8	
STANDAR	<u>D:</u> on 0-HS-82-A/5A and Pla	ced in Parallel Wi	th System	
			ar Cyclom	
SAT	UNSAT	N/A	COMMENTS:	
				******

# **CAUTION**

Failure of the PARALLELED WITH SYSTEM light to illuminate in the following step could indicate that the DG is still in SINGLE UNIT operation and result in overload when the DG output breaker is closed

JPM NO. 104F REV. NO. 4 PAGE 10 of 19

PERFORM	MANCE STEP: CR	ITICAL N	NOT CRITICAL X					
[7]	RELEASE the Diesel Generator PARALLELED WITH SYSTEM		tch <b>and OBSERVE</b>					
STANDAR	STANDARD:							
Released t	he Operation Mode Selector switch nated	n and Verified RED	Parallel with System					
SAT	UNSAT N/A	COMMEN	TS:					
	ADJUST Diesel Generator frequence Generator governor control swit rotation of one revolution every	ITICAL X Number A Num	NOT CRITICAL sociated Diesel nroscope needle					
Diesel	Instrument Name	Instrument No.	Panel					
Α	DG A GOVERNOR CONTROL	0-HS-82-A/3A	0-9-23-7					
В	DG B GOVERNOR CONTROL	0-HS-82-B/3A	0-9-23-7					
С	DG C GOVERNOR CONTROL	0-HS-82-C/3A	0-9-23-8					
D	DG D GOVERNOR CONTROL	0-HS-82-D/3A	0-9-23-8					
STANDARD:  Adjusted frequency using 0-HS-82-A/3A to obtain one revolution every 15-20 seconds in the clockwise direction  SAT UNSAT N/A COMMENTS:								
		<del></del>						

JPM NO. 104F REV. NO. 4 PAGE 11 of 19

[9]	USE the associated Diesel General		-
Diesel	match Diesel Generator and Syster  Instrument Name	Instrument	Panel
A	DG A VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	0-HS-82-A/2A 0-EI-82-AB 0-EI-211-AB	0-9-23-7
В	DG B VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	0-HS-82-B/2A 0-EI-82-AB 0-EI-211-AB	0-9-23-7
С	DG C VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	0-HS-82-C/2A 0-EI-82-CD 0-EI-211-CD	0-9-23-8
D	DG D VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	0-HS-82-D/2A 0-EI-82-CD 0-EI-211-CD	0-9-23-8
STANDAF			<u>. 1</u>
Adjusted ( SAT	0-HS-82-A/2A to match 0-EI-82-AB and UNSAT N/A	0-EI-211-AB readir COMMENTS:	

JPM NO. 104F REV. NO. 4 PAGE 12 of 19

*****	*******	********	*****	*******	
PERFORMANCE STEP:		CRITICAL	X NOT C	CRITICAL	
[10]	hand side of the 12	scope needle is appro o'clock position, <b>THE</b> ited Diesel Generator	N		
Diesel	Handswitch Name	Handswitch No.	Panel		
Α	DG A BKR 1818	0-HS-211-A/22A	0-9-23-7		
В	DG B BKR 1822	0-HS-211-B/4A	0-9-23-7		
С	DG C BKR 1812	0-HS-211-C/4A	0-9-23-8		
D	DG D BKR 1816	0-HS-211-D/20A	0-9-23-8		
STANDARD:  When synchroscope needle approximately 2 minutes to left of 12 0'clock position, Placed 0-HS-211-A/22A in the Close position					

SAT \_\_\_\_\_ UNSAT \_\_\_\_ N/A \_\_\_\_ COMMENTS:\_\_\_\_\_

PERFORMANCE STEP: CRITICAL NOT CRITICAL				X	
[11] <b>PLACE</b> the associated Diesel Generator breaker synchronizing switch in OFF					
Diesel	Instrument Name	Instrument No.	Panel		
Α	DG A BKR 1818 SYNC	0-25-211-A/22A	0-9-23-7		
В	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7		
С	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8		
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8		
STANDARD: Placed 0-25-211-A/22A in the OFF position					
SAT UNSAT N/A COMMENTS:					

#### NOTE

Lagging VARs should be maintained when adjusting kW load (rising or lowering). This may require kW load adjustment to be stopped periodically to allow for adjusting kVAR load. Once desired kW load is achieved, Illustration 1 should be referred to for determination of kVAR loading required to obtain a power factor (pf) of 0.8 lagging. Diesel generator kVAR load should then be adjusted to obtain a 0.8 pf lagging. **IF** system conditions will not permit the kVAR loading required to obtain a 0.8 pf lagging, **THEN** kVAR load should be adjusted to the maximum kVAR lagging the system will allow

JPM NO. 104F REV. NO. 4 PAGE 14 of 19

**************************************					
[12] <b>USE</b> the associated Diesel Generator's governor control switch and voltage regulator control switch to obtain desired kW and kVAR load					
Diesel	Instrument Name	Instrument No.	Panel		
A	DG A GOVERNOR CONTROL DG A VOLT REGULATOR CONT	0-HS-82-A/3A 0-HS-82-A/2A	0-9-23-7		
В	DG B GOVERNOR CONTROL DG B VOLT REGULATOR CONT	0-HS-82-B/3A 0-HS-82-B/2A	0-9-23-7		
С	DG C GOVERNOR CONTROL DG C VOLT REGULATOR CONT	0-HS-82-C/3A 0-HS-82-C/2A	0-9-23-8		
D	DG D GOVERNOR CONTROL DG C VOLT REGULATOR CONT	0-HS-82-D/3A 0-HS-82-D/2A	0-9-23-8		
STANDARD:  Adjusted 0-HS-82-A/3A to obtain 2600 ±50 Kw. Determined KVAR loading to be 1950 ± 50 from Illustration 1. Adjusted 0-HS-82-A/2A to obtain 1950 ±50 KVAR					
SAT	UNSAT N/A	_ COMMENTS:			

JPM NO. 104F REV. NO. 4 PAGE 15 of 19

PERFORMANCE STEP:	CRITICAL	_ NOT CRITICAL <u>X</u>
[13] <b>RECORD</b> time/date I	loaded on Illustration 2	
CUE: Another Operator is perfo	rming Illustration 2	
STANDARD:		
Acknowledges another Operator is	s performing Illustration 2	and continues to [14]
SAT UNSAT	N/A COM	MENTS:
		- MARINE
Simulator driver should Insert G	rid Instability Now	
Cimulator arrect should insert o	ind instability NOW	Villago Ediffue II. 8, 8, 8 Electric
PERFORMANCE STEP:		**************************************
EXAMINERS NOTE: ALTERNATE		
[14] MONITOR the offsite STANDARD:	E PATH STARTS HERE:	
[14] <b>MONITOR</b> the offsite	E PATH STARTS HERE:	with the Diesel Generator
[14] <b>MONITOR</b> the offsite STANDARD:	e source that is paralleled	with the Diesel Generator

JPM NO. 104F REV. NO. 4 PAGE 16 of 19

************	*****	*****	*******	*****
PERFORMANCE STEP:	CRITICAL	X	NOT CRITICAL	

- [15] **IF** abnormal voltage or frequency transients are experienced, **THEN PERFORM** the following:
  - [15.1] **VERIFY OPEN** DG A(B,C,D) Output Bkr 1818(1822,1812,1816)
  - [15.2] **PULL UP and RELEASE** the associated Diesel Generator control switch in NORMAL to initiate the shutdown sequence

Diesel	Handswitch Name	Handswitch No.	Panel
Α	DG A CONTROL	0-HS-82-A/1A	0-9-23-7
В	DG B CONTROL	0-HS-82-B/1A	0-9-23-7
С	DG C CONTROL	0-HS-82-C/1A	0-9-23-8
D	DG D CONTROL	0-HS-82-D/1A	0-9-23-8

### **STANDARD**:

	nload D/G control s			t Breaker 1818	and, Pulls up and
SAT	 UNSAT	 N/A _	***************************************	COMMENTS:	
*******		 			

JPM NO. 104F REV. NO. 4 PAGE 17 of 19

************	******	*****	******	*****
PERFORMANCE STEP:	CRITICAL		NOT CRITICAL _	X
[15.3] <b>REFER TO</b> Se Diesel Generat		NTINUE w	ith Shutting down th	ne
STANDARD:				
Refers to section 7.1 of 0-OI-82 to o	continue shutdow	n of diesel	generator	
SAT UNSAT	N/A	СОММЕ	NTS:	
	***************************************			
CLIE: Another Operator will cont	الغديم طفانية ماميطفانه	day 4	h- Dissel that	
CUE: Another Operator will cont completes this task	unue with shutur	ig down t	ne Diesei, that	

JPM NO. 104F REV. NO. 4 PAGE 18 of 19

PERFORMANCE STEP:		NOT CRITICAL	<u>X</u>
PERFORMER demonstrated the use of SELF CHECKING during this JPM			
STANDARD:  PERFORMER verified applicable of accordance with plant standards.	components by utilizi	ng SELF CHECKING in	
SAT UNSAT		COMMENTS:	
**************************************		NOT CRITICAL	
PERFORMER demonstrated the u	ise of 3-WAY COMM	UNICATION during this JI	⊃M
STANDARD:			
PERFORMER utilized 3-WAY COI	MMUNICATION in ac	ccordance with plant stand	lards.
SAT UNSAT	N/A	COMMENTS:	·····
		MAA	
CTOD TIME.	END OF TASK		
STOP TIME:			

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

\*

**INITIAL CONDITIONS:** 

You are a Unit Operator. Unit 2 is operating at 100% power. Diesel Generator 'A' is running for special testing in accordance with Section 5.0. of 0-OI-82. Diesel Generator Phase Voltages 1-2, 2-3, and 3-1 at Diesel Generator Protective Relay Cabinet, have been verified to be within 10% of each other. The Operations Superintendent's permission has been received for performing the test. ALL P & L's have been reviewed.

**INITIATING CUES:** 

The Unit Supervisor directs you to parallel Diesel Generator 'A' with the system as directed by 0-Ol-82. The diesel generator is to be loaded to  $2600 \pm 50$  Kw.

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

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You are a Unit Operator. Unit 2 is operating at 100% power. Diesel Generator 'A' is running for special testing in accordance with Section 5.0. of 0-OI-82. Diesel Generator Phase Voltages 1-2, 2-3, and 3-1 at Diesel Generator Protective Relay Cabinet, have been verified to be within 10% of each other. The Operations Superintendent's permission has been received for performing the test. ALL P

& L's have been reviewed.

**INITIATING CUES:** 

The Unit Supervisor directs you to parallel Diesel Generator 'A' with the system as directed by 0-OI-82. The diesel generator is to be loaded to 2600 ± 50 Kw.



# **Browns Ferry Nuclear Plant**

# Unit 0

**Operating Instruction** 

## 0-OI-82

# **Standby Diesel Generator System**

Revision 0100

**Quality Related** 

Level of Use: Continuous Use

Effective Date: 03-27-2009

Responsible Organization: OPS, Operations

Prepared By: David A. Lee
Approved By: John T. Kulisek

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 2 of 178

#### **Current Revision Description**

**Pages** 

177,178

Tracking Number: 148

Type of Change:

Corrective Action/Enhancement

**PERs** 

155176

**PCRs** 

09001033, 09001102

Page 177- PER 155176 adresses timeliness issues associated with the proper engineering review of diesel run data. The ICE FAX number on Illustration 2 has been updated. The original Illustration 2 data is attached to the SR and is now sent to the Diesel Generator System Engineer vice Operations Support, for review. This change is a corrective action for PER 155176. (PCR 09001033)

Page 178- Revised the Governor Oil Level Limits from "Between the marks in the sightglass to "Min/Max Level Visible in the sightglass. (PCR 09001102)

## THIS REVISION DOES NOT AFFECT SYSTEM STATUS

BFN Unit 0

# **Standby Diesel Generator System**

0-OI-82 Rev. 0100 Page 3 of 178

# **Table of Contents**

1.0	PURPOSE	7
2.0	REFERENCES	7
2.1	Technical Specifications	7
2.2	Technical Requirements Manual-TRM	7
2.3	Final Safety Analysis Report	7
2.4	Plant Instructions	7
2.5	Plant Drawings	8
2.6	Vendor Manuals	S
2.7	Miscellaneous Documents	9
3.0	PRECAUTIONS AND LIMITATIONS	10
4.0	PRESTARTUP/STANDBY READINESS REQUIREMENTS	17
4.1	Common DG Prestartup/Standby Readiness Requirements	17
4.2	DG A Prestartup/Standby Readiness Requirements	19
4.3	DG B Prestartup/Standby Readiness Requirements	22
4.4	DG C Prestartup/Standby Readiness Requirements	25
4.5	DG D Prestartup/Standby Readiness Requirements	28
5.0	STARTUP	31
5.1	Automatic Start	31
5.2	Manual Fast Start at Panel 9-8	36
5.3	Manual Fast Start at Panel 9-23	37
5.4	Manual Fast Start at 4-kV Shutdown Board	41
5.5	Manual Slow Start at Diesel Engine Control Cabinet	46
5.6	Diesel Generator Rolling	51
6.0	SYSTEM OPERATIONS	55
7.0	SHUTDOWN	56
7.1	Shutdown at Panel 9-23	56
7.2	Shutdown at 4-kV Shutdown Board	58
7.3	Shutdown at Diesel Engine Control Cabinet	60
7.4	Emergency Shutdown at Panel 9-23	63
7.5	Emergency Shutdown at Diesel Engine	66

BFN Unit 0

# **Standby Diesel Generator System**

0-OI-82 Rev. 0100 Page 4 of 178

# **Table of Contents (continued)**

8.0	INFREQUENT OPERATIONS	70
8.1	Parallel with System Operation at Panel 9-23	70
8.2	Separating 4-kV Shutdown Board from Offsite Power at Panel 9-23	78
8.3	Restoring Offsite Power to 4-kV Shutdown Board at Panel 9-23	81
8.4	Transfer of Diesel Generator Control to 4-kV Shutdown Board	90
8.5	Parallel with System Operation at 4-kV Shutdown Board	93
8.6	Separating 4-kV Shutdown Board from Offsite Power at 4-kV Shutdown Board	104
8.7	Restoring Offsite Power to 4-kV Shutdown Board at 4-kV Shutdown Board	107
8.8	Transfer of Diesel Generator Control to Panel 9-23	117
8.9	Bypassing DG A Right Bank Air Dryer Assembly	120
8.10	Bypassing DG A Left Bank Air Dryer Assembly	122
8.11	Bypassing DG B Right Bank Air Dryer Assembly	124
8.12	Bypassing DG B Left Bank Air Dryer Assembly	126
8.13	Bypassing DG C Right Bank Air Dryer Assembly	128
8.14	Bypassing DG C Left Bank Air Dryer Assembly	130
8.15	Bypassing DG D Right Bank Air Dryer Assembly	132
8.16	Bypassing DG D Left Bank Air Dryer Assembly	134
8.17	Returning Bypassed DG A Right Bank Air Dryer Assembly to Service	136
8.18	Returning Bypassed DG A Left Bank Air Dryer Assembly to Service	138
8.19	Returning Bypassed DG B Right Bank Air Dryer Assembly to Service	140
8.20	Returning Bypassed DG B Left Bank Air Dryer Assembly to Service	142
8.21	Returning Bypassed DG C Right Bank Air Dryer Assembly to Service	144
8.22	Returning Bypassed DG C Left Bank Air Dryer Assembly to Service	146
8.23	Returning Bypassed DG D Right Bank Air Dryer Assembly to Service	148
8.24	Returning Bypassed DG D Left Bank Air Dryer Assembly to Service	150
8.25	DG A Right/Left Bank Air Compressor Crosstie Operation	152
8.26	DG B Right/Left Bank Air Compressor Crosstie Operation	153
8.27	DG C Right/Left Bank Air Compressor Crosstie Operation	154
8.28	DG D Right/Left Bank Air Compressor Crosstie Operation	155
8.29	Returning DG A Right/Left Bank Air Compressor to Standby Readiness from Crosstie Operation	156

BFN Standby Diesel Generator System 0-OI-82
Rev. 0100
Page 5 of 178

# **Table of Contents (continued)**

8.30		DG B Right/Left Bank Air Compressor to Standby Readiness	157
8.31	Returning	DG C Right/Left Bank Air Compressor to Standby Readiness stie Operation	
8.32		DG D Right/Left Bank Air Compressor to Standby Readiness stie Operation	159
8.33	Manual C	ontrol of DG A Air Compressors and Dryers	160
8.34	Manual C	ontrol of DG B Air Compressors and Dryers	161
8.35	Manual C	ontrol of DG C Air Compressors and Dryers	162
8.36	Manual C	ontrol of DG D Air Compressors and Dryers	163
8.37	Draining \	Nater from Diesel Generator A Expansion Tank	164
8.38	Draining V	Nater from Diesel Generator B Expansion Tank	165
8.39	Draining V	Nater from Diesel Generator C Expansion Tank	166
8.40	Draining V	Nater from Diesel Generator D Expansion Tank	167
8.41	Returning	DG A to Standby Readiness After Maintenance	168
8.42	Returning	DG B to Standby Readiness After Maintenance	170
8.43	Returning	DG C to Standby Readiness After Maintenance	172
8.44	Returning	DG D to Standby Readiness After Maintenance	174
Illustr	ation 1:	DG kW vs. kVAR Loading	176
Illustr	ation 2:	Diesel Generator Operating Log	177

BFN	Standby Diesel Generator System	0-OI-82
Unit 0	•	Rev. 0100
		Page 6 of 178

# **Table of Contents (continued)**

# **ATTACHMENTS**

Attachment 1A:	Standby Diesel Generator A Valve Lineup Checklist, Unit 0
Attachment 1B:	Standby Diesel Generator B Valve Lineup Checklist, Unit 0
Attachment 1C:	Standby Diesel Generator C Valve Lineup Checklist, Unit 0
Attachment 1D:	Standby Diesel Generator D Valve Lineup Checklist, Unit 0
Attachment 2:	Standby Diesel Generator Common Panel Lineup Checklist, Unit 0
Attachment 2A:	Standby Diesel Generator A Panel Lineup Checklist, Unit 0
Attachment 2B:	Standby Diesel Generator B Panel Lineup Checklist, Unit 0
Attachment 2C:	Standby Diesel Generator C Panel Lineup Checklist, Unit 0
Attachment 2D:	Standby Diesel Generator D Panel Lineup Checklist, Unit 0
Attachment 3:	Standby Diesel Generator Common Electrical Lineup Checklist, Unit 0
Attachment 3: Attachment 3A:	Standby Diesel Generator Common Electrical Lineup Checklist, Unit 0 Standby Diesel Generator A Electrical Lineup Checklist, Unit 0
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Attachment 3A:	Standby Diesel Generator A Electrical Lineup Checklist, Unit 0
Attachment 3A: Attachment 3B:	Standby Diesel Generator A Electrical Lineup Checklist, Unit 0 Standby Diesel Generator B Electrical Lineup Checklist, Unit 0
Attachment 3A: Attachment 3B: Attachment 3C:	Standby Diesel Generator A Electrical Lineup Checklist, Unit 0 Standby Diesel Generator B Electrical Lineup Checklist, Unit 0 Standby Diesel Generator C Electrical Lineup Checklist, Unit 0
Attachment 3A: Attachment 3B: Attachment 3C: Attachment 3D:	Standby Diesel Generator A Electrical Lineup Checklist, Unit 0 Standby Diesel Generator B Electrical Lineup Checklist, Unit 0 Standby Diesel Generator C Electrical Lineup Checklist, Unit 0 Standby Diesel Generator D Electrical Lineup Checklist, Unit 0
Attachment 3A: Attachment 3B: Attachment 3C: Attachment 3D: Attachment 4A:	Standby Diesel Generator A Electrical Lineup Checklist, Unit 0 Standby Diesel Generator B Electrical Lineup Checklist, Unit 0 Standby Diesel Generator C Electrical Lineup Checklist, Unit 0 Standby Diesel Generator D Electrical Lineup Checklist, Unit 0 Standby Diesel Generator A Instrument Inspection Checklist, Unit 0

BFN Unit 0	Standby Diesel Generator System	0-OI-82 Rev. 0100
Omit 0		Page 7 of 178

#### 1.0 PURPOSE

This instruction provides precautions and limitations, prestartup/standby readiness requirements, and procedural steps for operation of the Standby Diesel Generator System.

#### 2.0 REFERENCES

### 2.1 Technical Specifications

Section 3.8.1, AC Sources-Operating

Section 3.8.2, AC Sources-Shutdown

Section 3.8.3, Diesel Fuel Oil, Lube Oil, and Starting Air

Section 3.3.8.1, Loss of Power Instrumentation

## 2.2 Technical Requirements Manual-TRM

TRM Section 3.8.1, Diesel Generators

## 2.3 Final Safety Analysis Report

Section 8.5, Standby A-C Power Supply and Distribution

#### 2.4 Plant Instructions

1/2-ARP-9-23, Alarm Response Procedure

Browns Ferry Nuclear Plant Switchyard Operation Procedure, Station No. 6055

1-EOI-1, Reactor Control

2-EOI-1-Flowchart, RPV Control

0-OI-18, Fuel Oil System

0-OI-30F, Common and Diesel Generator Building Ventilation

0-OI-39, Carbon Dioxide System

0-OI-57A, Switchyard and 4160V Electrical System

0-OI-57B, 480V/240V AC Electrical System

0-OI-57C, 208V/120V AC Electrical System

BFN	Standby Diesel Generator System	0-OI-82	
Unit 0		Rev. 0100	
		Page 8 of 178	

#### 2.4 Plant Instructions (continued)

0-OI-57D, DC Electrical System

0-OI-67, Emergency Equipment Cooling Water System

0-SR-3.8.3.1, Diesel Generator Fuel Oil Quantity

0-SIMI-18A, Fuel Oil System Index

0-SIMI-18B, System Instrument Maintenance Index Fuel Oil System Scaling and Setpoint Documents

0-SIMI-82A, Standby Diesel Generator System Index

0-SIMI-86A, Standby Diesel Generator Starting Air System Index

1/2-SIMI-82B, Standby Diesel Generator Scaling and Setpoint Documents

1/2-SIMI-86B, Standby Diesel Generator Starting Air System Scaling Setpoint Documents

OPDP-1, Conduct of Operations

SPP-6.2, Preventive Maintenance

SPP-10.3, Verification Program

#### 2.5 Plant Drawings

0-15E500-1, Key Diagram of Standby Auxiliary Power System

0-45E724-1, 2, 3, 4; Wiring Diagram 4160V Shutdown Board A, B, C, D Single Line

0-45E732-2, Wiring Diagram 480V Diesel Auxiliary Bd A Single Line

0-45E732-3, Wiring Diagram 480V Diesel Auxiliary Bd B Single Line

45E765-1 through 3, 8 through 19, 22 through 29; Wiring Diagrams 4160V Shutdown Auxiliary Power Schematic Diagram

0-45E767-1, 2, 3, 4; Wiring Diagrams Diesel Generators Schematic Diagrams

0-45E771-1, 3, 4, 6; Wiring Diagram 480V Diesel Aux Power Schematic Diagram

0-47E610-18-1, Mechanical Control Diagram Fuel Oil System

0-47E840-3, Flow Diagram Fuel Oil System

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 9 of 178

## 2.5 Plant Drawings (continued)

0-47E861-1, 2, 3, 4; Flow Diagram Diesel Starting Air System Diesel Generator A, B, C, D

0-47E861-5, 6, 7, 8; Flow Diagram Cooling System and Lubricating Oil System Standby Diesel Generator A, B, C, D

0-731E718-1, 2, 3, 4; Diesel Generator Protective Relaying and Metering

0-731E761-(Series), Emergency Equipment

#### 2.6 Vendor Manuals

Emergency Diesel and Generators for Units 1, 2, & 3, BFN-VTM-P318-0010

#### 2.7 Miscellaneous Documents

ECN-P7114

DCN-F1594A

DCN-H2735A

INPO SOER 83-001, Diesel Generator failures

SQN II-S-91-004

Tech Spec Assessment Report (TSAR) Item D-63, Diesel Generator day tanks should be verified to contain a minimum level of fuel

Diesel Generator Performance Evaluation submitted to the NRC, RIMS B22 890117 010

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 10 of 178

#### 3.0 PRECAUTIONS AND LIMITATIONS

- A. Diesel Generator should be shut down prior to reaching 208°F engine jacket water outlet temperature. This temperature will be reached approximately 30 seconds after loss of cooling water to a fully loaded operating Diesel Generator and approximately 3 minutes after a Diesel Generator is started from standby readiness without cooling water and is loaded to a fully loaded condition. [NRC/C] Cooling water flow may be checked by cooling water valve position, the presence of flow noise in the cooling water piping, or by the presence of proper operating temperatures when the diesel is running. [LER 296-88007]
- B. Continuous operation of Diesel Generators at loads below 550 kW should be avoided to prevent oil and soot accumulation in exhaust system, air box, cylinders, and injection nozzles. If Diesel Generator idle time exceeds 8 hours, or if diesel operates greater than 4 1/2 hours at full speed (900 RPM) at less than 550 kW load, the diesel should be loaded greater than 1100 kW for at least 30 minutes prior to engine shutdown. This will allow the engine to clean out any oil accumulations from the exhaust manifolds.
- C. Fast starts during the time period of 15 minutes to 3 hours after shutdown should be avoided except in an emergency condition. However, manual slow starts from the Engine Control Cabinet are allowed during this time period. This minimizes the possibility of damage to the turbocharger thrust bearing.
- D. Engine oil level should be checked with engine hot and running at idle speed. Lube oil reservoir should not be overfilled with engine stopped.
- E. Anytime the position of an EECW cooling water supply throttle valve to the Diesel Generators is changed, the valve should be repositioned for normal operation using 0-OI-67 valve line up checklist. Verify the outlet valve is open before setting the inlet valve.
- F. The applicable control Panel and Diesel Generator room will normally be manned prior to starting diesels. They will be manned as soon as possible after diesels are started as a result of a condition which required the diesels to be available for immediate loading.

BFN	Standby Diesel Generator System	0-OI-82
Unit 0	-	Rev. 0100
		Page 11 of 178

G. Standby Diesel Generators are required to be operated at or below the following ratings:

Rating	Description	Time
Engine - Short-Time 2860/2800 kW*	Maximum steady-state active power output (running kW)	0 - 2 hours
Engine - Continuous 2600/2550*kW	Maximum steady-state active power output (running kW)	greater than 2 hours
Engine - Instantaneous (Cold) 2850/2815 kW**	Maximum instantaneous active power output (running kW + starting kW)	0 - 3 minutes after start from cold conditions
Engine - Instantaneous (Hot) 3050/3025 kW**	Maximum instantaneous active power output (running kW + starting kW)	greater than 3 minutes after cold start or immediately after hot start
Generator - Short-Time 3575 kVA	Maximum steady-state apparent power output (running kVA) I(amps) X V(volts) X 1.732	0 - 2 hours
Engine - Continuous 3250 kVA	Maximum steady-state apparent power output (running kVA) I(amps) X V(volts) X 1.732	greater than 2 hours

<sup>\*</sup> Reduced rating applies for engine cooling water outlet temperature exceeding 190°F in conjunction with combustion air (outside air) exceeding 90°F.

H. If plant conditions allow, both local and remote Diesel Generator operating parameters should be recorded once every 15 minutes during the first hour of operation at rated speed and once every 30 minutes thereafter on Illustration 2.

<sup>\*\*</sup> Reduced rating applies when combustion air (outside air) exceeds 90°F, regardless of engine cooling water outlet temperature.

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 12 of 178

- I. Each Diesel Generator has three pressure switches that sense main bearing oil pressure. One switch feeds an audible annunciator and one feeds DG A(B,C,D) LOW-LOW OIL PRESSURE light on Panel 9-23. If a low lube oil pressure condition exists after the diesel is started, the audible annunciator will not alarm for 2 minutes due to an associated time delay relay. However, DG A(B,C,D) LOW-LOW OIL PRESSURE light only has a 5.5 second time delay relay and will illuminate after this time period if a low lube oil pressure condition exists. If this light illuminates continuously, shutdown the D/G in accordance with Section 7.4 unless continued operation is absolutely required.
- J. Diesel Generator frequency indication is not available unless the associated synchroscope switch is placed in the ON position. When observing generator frequency, the synchroscope switch should only be placed in the ON position long enough to obtain a reading, then placed back in the OFF position.
- K. Operation of Diesel Generators in parallel with off site sources other than for surveillance testing is an abnormal operation and shall only be done under the following conditions:
  - 1. The explicit permission of the Operations Superintendent must be granted.
  - 2. The operation must be conducted in accordance with an approved test.
  - 3. **DO NOT** parallel the Diesel Generators with an unstable offsite source or with any offsite source during inclement weather (e.g., lightning, heavy wind), except momentarily to transfer load to the diesel or to the system.
  - 4. Only one Unit 1/2 Diesel Generator at a time is allowed to be operated in parallel with the system under any circumstances.
  - 5. A Diesel Generator running in parallel with the system for any reason except surveillance testing or load transfer shall be considered to be inoperable with respect to the Technical Specifications. Required LCO actions are required to be taken prior to the operation.
  - 6. Be aware of Tech Spec LCO concerning SBGT if U-1 & 2 D and U-3 3ED D/Gs are run at the same time.
  - 7. [II/C] Starting 4kV loads while a Diesel Generator is in parallel with offsite sources may result in operation of the Diesel Generator overload relays. [BFPER 951098]
- L. Diesel Generator Fuel Pressure Abnormal annunciation may alarm momentarily on D/G start. REFER TO 0-ARP-21-41A-D as applicable, to determine if any operator actions are required.

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 13 of 178

- M. Personnel working in the D/G rooms should remain aware that the possibility exists of CO<sub>2</sub> discharge into the room. Upon CO<sub>2</sub> initiation, an alarm will sound. Personnel then have 20 seconds to evacuate the area before CO<sub>2</sub> is dispensed. For detection purposes, a wintergreen odor is injected into CO<sub>2</sub> discharge.
- N. [NER/C] When the breakers feeding the D/G air dryers (LC-31, bkrs 8, 9, 10 & 11) are opened, the D/G air compressor auto-starts are inhibited. [II-S-91-004]
- O. Environmental calculations assume DG battery ambient temperatures are within 40°F to 110°F.
- P. When the D/G is the only feed to the shutdown board and in single unit operations, starting an RHR Pump with other 4kV motor loads running on the associated board may result in D/G overload.
- Q. After operation of 4160V breakers, the charging spring is required to be verified to have recharged by verifying locally the breaker closing spring target indicates charged and the amber breaker spring charged light is on to ensure future breaker operation.
- R. Diesel Generators will automatically start, as follows:
  - 1. Degraded voltage <u>or</u> undervoltage on 4-kV Shutdown Board A, B, C, or D will start its associated Diesel Generator.
  - A Pre-Accident Signal (Reactor Vessel Low Low Low water level <u>OR</u> High Drywell pressure) on Unit 1, Unit 2 or Unit 3 will start all eight Diesel Generators.
- S. Under normal conditions, <u>any</u> of the following will auto trip the Diesel Generator output breaker:
  - 1. Differential overcurrent
  - 2. Timed overcurrent
  - 3. Reverse power
  - 4. Loss of field
  - Overspeed
  - 6. Common Accident Signal (Low Low Low Reactor water level <u>OR</u> Low Reactor pressure in conjunction with High Drywell pressure on Unit 1, 2 or Unit 3.)

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 14 of 178

- T. With a Common Accident Signal present, all Diesel Generator output breaker trips are defeated except for the following:
  - 1. Differential overcurrent
  - 2. Overspeed
- U. Following an initiation of a Common Accident Signal (which trips the diesel breakers), a second diesel breaker trip on a "unit priority" basis is provided to ensure that the diesel supplied S/D Boards are stripped prior to starting the RHR pumps and other ECCS loads.
  - When an accident signal trip of the diesel breakers is initiated from one unit (from CASA or CASB), subsequent CAS trips of all eight diesel breakers are blocked by the actuation of the diesel breaker TSCRN relay, except if the need for a unit priority re-trip exists.
  - 2. An RHR initiation signal with Diesel Generator voltage available will actuate Unit Priority Re-Trip relays.
  - 3. The Unit Priority Re-Trip relays remove the block of subsequent accident signal trips by de-energizing the affected diesel breaker's TSCRN relay. This allows the existing sealed-in CASA (or CASB) signal to re-trip the DG breakers on the unit where the RHR initiation signal originated.
  - 4. When the diesel breaker is tripped, the TSCRN relay is re-energized (to block CASA and CASB) and subsequent diesel breaker Unit Priority Re-Trips on the affected unit are also blocked. The <u>non-accident</u> unit's diesel breakers will be unaffected by this RHR logic initiated trip.
- V. [III/C] Avoid adjusting the load tap changer or selecting a different unit station service transformer winding while a Diesel Generator is operating in the parallel with system mode. Adjusting the load tap changer or selecting a different transformer winding while a Diesel Generator is operating parallel with the system may result in tripping of the shutdown board normal supply breaker. [BFPER 950311]

BFN	Standby Diesel Generator System	0-OI-82
Unit 0	- -	Rev. 0100
		Page 15 of 178

W. The following is a table providing information on the Diesel Generator lube oil storage tank.

MARKS ON DIPSTICK	USABLE OIL (GALLONS)
LOW -12	
-11	15.64
-10	33.82
-9	53.61
-8	72.86
-7	89.97
-6	112.70
-5	127.61
-4	151.00
-3	169.18
-2	197.53
-1	218.65
FULL 0	236.16

- X. All manipulations of the Diesel Generator Logic Breaker are required to be logged in the Narrative Log.
- Y. Placing the Diesel Generator Air Compressor control switches out of "AUTO" will disable the Local manual Field Flash push button circuit and trigger "D/G TROUBLE" alarm in the Control Room.

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 16 of 178

- Z. The following is a list of conditions required to "AUTOMATICALLY" close the generator output breaker (single unit).
  - 1. Generator speed > 870 rpm.
  - 2. All other 4 kV feeder breakers OPEN.
  - 3. No lockouts on the 4 kV shutdown board.
  - 4. No lockouts on the normal or alternate feeder breakers.
  - 5. No Diesel Generator lockout.
  - 6. An under voltage condition exists on the 4 kV board.
- AA. [OE] When performing the Diesel Generator roll to ensure no fluid is ejected from the engine cylinders, any abnormalities noted (hard to turn or spinning freely) in the cycling of the test valves should be brought to the attention of the Unit Supervisor. Operating Experience has shown that fire has resulted from a broken test valve which was not able to be closed after it was opened during fluid observation testing. The valve had a broken stem which allowed the valve to remain open, unknown to the operators. The valve may become very loose or unusually difficult to operate.[OE 14401]
- BB. If a lube oil circulating pump is not running, the affected D/G will still perform its intended function. The lube oil circulating pump provides oil to the turbocharger bearing area and circulates warmed oil through the engine, then back to the sump. This action minimizes wear during startup. Even though the turbocharger bearings and engine components will wear faster without this prelube system, the affected D/G could still start and load, as intended, and would still be operable. Following DG shutdown, the lube oil circulating pump should be checked to ensure that it is running. If the affected D/G starts with its lube oil circulating pump out of service, an additional evaluation of the resultant wear may be required. [PER 63411]
- CC. Following a Diesel Generator run, a 3 hour wait is required before the tagging out the Diesel Generator. This allows the lube oil circulation pump (soakback pump) to cool the bearings and lube oil to near prestart conditions.
- DD. When the synchroscope is turned on for any Unit 1/2 DG, the system voltage appears for all other Diesel Generators also.

BFN	Standby Diesel Generator System	0-OI-82	ĺ
Unit 0		Rev. 0100	l
		Page 70 of 178	

# 8.0 INFREQUENT OPERATIONS

8.1	Parallel with	System C	peration	at Panel	9-23
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[1]	VE	RIFY the following initial conditions:	
	A.	All Precautions and Limitations in Section 3.0 have been reviewed.	
	B.	Diesel Generator A(B,C,D) is operating in accordance with Section 5.0.	
	C.	4-kV Shutdown Board A(B,C,D) is being supplied power from an offsite power source.	
	D.	Diesel Generator Phase Voltages 1-2, 2-3, and 3-1 at Diesel Generator Protective Relay Cabinet, are within 10% of each other	

## **CAUTION**

A failure of a PT Transformer may cause the associated DG to overspeed when paralleld with the System.

[2] **PLACE** the associated Diesel Generator breaker synchronizing switch in ON.

Diesel	Instrument Name	Instrument No.	Panel
А	DG A BKR 1818 SYNC	0-25-211-A/22A	0-9-23-7
В	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
С	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

[3]	<b>CHECK</b> that 4-kV Shutdown Board A(B,C,D) voltage is between 3950 VOLTs and 4400 VOLTs and <b>NOT</b> undergoing abnormal voltage transients.	
[4]	CHECK SYSTEM SYNC FREQUENCY is between 59 Hertz and 61 Hertz and NOT undergoing abnormal frequency transients.	П

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 71 of 178

#### **CAUTION**

**DO NOT** parallel the Diesel Generators with an unstable offsite source or during inclement weather (e.g., lightning, heavy winds).

[5] **IF** 4-kV Shutdown Board A(B,C,D) is experiencing abnormal voltage/frequency transients, **THEN** 

## **PERFORM** the following:

[5.1] **PLACE** the associated Diesel Generator breaker synchronizing switch in OFF.

Diesel	Instrument Name	Instrument No.	Panel
Α	DG A BKR 1818 SYNC	0-25-211-A/22A	0-9-23-7
В	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
С	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

[5.2]	<b>TRANSFER</b> the 4-kV shutdown board to a stable offsite source. REFER TO 0-OI-57A.	
[5.3]	<b>WHEN</b> the 4-kV shutdown board has been transferred to a stable offsite power source, <b>THEN</b>	
	PLACE Diesel Generator synchronizing switch in ON.	

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 72 of 178

#### **CAUTION**

Only one Unit 1 and 2 Diesel Generator at a time is allowed to be operated in parallel with system.

[6] **PULL and PLACE** the associated Diesel Generator mode selector switch in PARALLELED WITH SYSTEM.

Diesel	Handswitch Name	Handswitch No.	Panel
Α	DG A MODE SELECT	0-HS-82-A/5A	0-9-23-7
В	DG B MODE SELECT	0-HS-82-B/5A	0-9-23-7
С	DG C MODE SELECT	0-HS-82-C/5A	0-9-23-8
D	DG D MODE SELECT	0-HS-82-D/5A	0-9-23-8

#### CAUTION

Failure of the PARALLELED WITH SYSTEM light to illuminate in the following step could indicate that the DG is still in SINGLE UNIT operation and result in overload when the DG output breaker is closed.

- [7] **RELEASE** the Diesel Generator mode selector switch **and OBSERVE** PARALLELED WITH SYSTEM light illuminated.
- [8] ADJUST Diesel Generator frequency using the associated Diesel Generator governor control switch to obtain a synchroscope needle rotation of one revolution every 15 to 20 seconds in the FAST direction.

Diesel	Handswitch Name	Handswitch No.	Panel
Α	DG A GOVERNOR CONTROL	0-HS-82-A/3A	0-9-23-7
В	DG B GOVERNOR CONTROL	0-HS-82-B/3A	0-9-23-7
С	DG C GOVERNOR CONTROL	0-HS-82-C/3A	0-9-23-8
D	DG D GOVERNOR CONTROL	0-HS-82-D/3A	0-9-23-8

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 73 of 178

# 8.1 Parallel with System Operation at Panel 9-23 (continued)

[9] **USE** the associated Diesel Generator voltage regulator control switch to match Diesel Generator and System voltages.

Diesel	Instrument Name	Inst No.	Panel
	DG A VOLT REGULATOR CONT	0-HS-82-A/2A	
А	GEN SYNC REF VOLTAGE	0-EI-82-AB	0-9-23-7
	SYSTEM SYNC REF VOLTAGE	0-EI-211-AB	
	DG B VOLT REGULATOR CONT	0-HS-82-B/2A	
В	GEN SYNC REF VOLTAGE	0-EI-82-AB	0-9-23-7
	SYSTEM SYNC REF VOLTAGE	0-EI-211-AB	
	DG C VOLT REGULATOR CONT	0-HS-82-C/2A	
С	GEN SYNC REF VOLTAGE	0-EI-82-CD	0-9-23-8
	SYSTEM SYNC REF VOLTAGE	0-EI-211-CD	
	DG D VOLT REGULATOR CONT	0-HS-82-D/2A	
D	GEN SYNC REF VOLTAGE	0-EI-82-CD	0-9-23-8
	SYSTEM SYNC REF VOLTAGE	0-EI-211-CD	

[10] **WHEN** the synchroscope needle is approximately 2 minutes on the left hand side of the 12 o'clock position, **THEN** 

**PLACE** the associated Diesel Generator breaker handswitch in CLOSE.

Diesel	Handswitch Name	Handswitch No.	Panel
А	DG A BKR 1818	0-HS-211-A/22A	0-9-23-7
В	DG B BKR 1822	0-HS-211-B/4A	0-9-23-7
С	DG C BKR 1812	0-HS-211-C/4A	0-9-23-8
D	DG D BKR 1816	0-HS-211-D/20A	0-9-23-8

BFN	Standby Diesel Generator System	0-OI-82
Unit 0	_	Rev. 0100
		Page 74 of 178

[11] **PLACE** the associated Diesel Generator breaker synchronizing switch in OFF.

Diesel	Instrument Name	Instrument No.	Panel
А	DG A BKR 1818 SYNC	0-25-211-A/22A	0-9-23-7
В	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
С	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

#### NOTE

Lagging VARs should be maintained when adjusting kW load (rising or lowering). This may require kW load adjustment to be stopped periodically to allow for adjusting kVAR load. Once desired kW load is achieved, Illustration 1 should be referred to for determination of kVAR loading required to obtain a power factor (pf) of 0.8 lagging. Diesel generator kVAR load should then be adjusted to obtain a 0.8 pf lagging. **IF** system conditions will not permit the kVAR loading required to obtain a 0.8 pf lagging, **THEN** kVAR load should be adjusted to the maximum kVAR lagging the system will allow.

[12] **USE** the associated Diesel Generator's governor control switch and voltage regulator control switch to obtain desired kW and kVAR load.

Diesel	Instrument Name	Instrument No.	Panel
Α	DG A GOVERNOR CONTROL	0-HS-82-A/3A	0.0.00.7
	DG A VOLT REGULATOR CONT	0-HS-82-A/2A	- 0-9-23-7
В	DG B GOVERNOR CONTROL	0-HS-82 B/3A	0.000.7
В	DG B VOLT REGULATOR CONT	0-HS-82-B/2A	0-9-23-7
С	DG C GOVERNOR CONTROL	0-HS-82-C/3A	0.000
O	DG C VOLT REGULATOR CONT	0-HS-82-C/2A	- 0-9-23-8
D	DG D GOVERNOR CONTROL	0-HS-82-D/3A	0.0000
	DG D VOLT REGULATOR CONT	0-HS-82-D/2A	0-9-23-8

[13]	RECORD time/date loaded on Illustration 2.	
[14]	<b>MONITOR</b> the offsite source that is paralleled with the Diesel Generator.	

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 75 of 178

[15] **IF** abnormal voltage or frequency transients are experienced, **THEN** 

## **PERFORM** the following:

- [15.1] **VERIFY OPEN** DG A(B,C,D) Output Bkr 1818(1822,1812,1816).
- [15.2] **PULL UP and RELEASE** the associated Diesel Generator control switch in NORMAL to initiate the shutdown sequence.

Diesel	Handswitch Name	Handswitch No	Panel
Α	DG A CONTROL	0-HS-82-A/1A	0-9-23-7
В	DG B CONTROL	0-HS-82-B/1A	0-9-23-7
С	DG C CONTROL	0-HS-82-C/1A	0-9-23-8
D	DG D CONTROL	0-HS-82-D/1A	0-9-23-8

- [15.3] **REFER TO** Section 7.1 and **CONTINUE** with Shutting down the Diesel Generator.
- [15.4] REFER TO 0-OI-57A and **TRANSFER** the 4-kV shutdown bus to a stable offsite source as deemed appropriate by US.

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 76 of 178

[16] WHEN Parallel with System operation is no longer desired, THEN

**UNLOAD** the Diesel Generator as follows:

#### **CAUTION**

[III/C] When unloading the Diesel Generator, failure to slowly approach the 100 kW/100 kVAR limit may result in a reverse power trip of the Diesel Generator output breaker. [II-92-055]

[16.1] [II/C] **USE** the associated Diesel Generator's governor control switch and voltage regulator control switch to reduce generator load to approximately 100 kW and 100 kVAR. [II-92-055]

Diesel	Instrument Name	Instrument No.	Panel
	DG A GOVERNOR CONTROL	0-HS-82-A/3A	
A	DG A VOLT REGULATOR CONT	0-HS-82-A/2A	0.000.7
	DG A KILOWATTS	0-JI-82-A/A	0-9-23-7
	DG A KILOVARS	0-VAR-82-A/A	
	DG B GOVERNOR CONTROL	0-HS-82 B/3A	
В	DG B VOLT REGULATOR CONT	0-HS-82-B/2A	0.000.7
Р	DG B KILOWATTS	0-JI-82-B/A	- 0-9-23-7
	DG B KILOVARS	0-VAR-82-B/A	
	DG C GOVERNOR CONTROL	0-HS-82-C/3A	
С	DG C VOLT REGULATOR CONT	0-HS-82-C/2A	
	DG C KILOWATTS	0-JI-82-C/A	0-9-23-8
	DG C KILOVARS	0-VAR-82-C/A	
D	DG D GOVERNOR CONTROL	0-HS-82-D/3A	
	DG D VOLT REGULATOR CONT	0-HS-82-D/2A	
	DG D KILOWATTS	0-JI-82-D/A	0-9-23-8
	DG D KILOVARS	0-VAR-82-D/A	

BFN Unit 0	Standby Diesel Generator System	0-OI-82 Rev. 0100
		Page 77 of 178

[16.2] **PLACE** the associated Diesel Generator breaker control switch in TRIP.

Diesel	Handswitch Name	Handswitch No.	Panel
Α	DG A BKR 1818	0-HS-211-A/22A	0-9-23-7
В	DG B BKR 1822	0-HS-211-B/4A	0-9-23-7
С	DG C BKR 1812	0-HS-211-C/4A	0-9-23-8
D	DG D BKR 1816	0-HS-211-D/20A	0-9-23-8

[16.3] **PULL and PLACE** the associated Diesel Generator mode selector switch in SINGLE UNIT.

Diesel	Handswitch Name	Handswitch No.	Panel
Α	DG A MODE SELECT	0-HS-82-A/5A	0-9-23-7
В	DG B MODE SELECT	0-HS-82-B/5A	0-9-23-7
С	DG C MODE SELECT	0-HS-82-C/5A	0-9-23-8
D	DG D MODE SELECT	0-HS-82-D/5A	0-9-23-8

[16.4]	and OBSERVE the SINGLE UNIT light illuminated.	
[16.5]	RECORD the time/date unloaded on Illustration 2.	
[16.6]	DISPATCH personnel to visually inspect the Diesel Generator output breaker to verify the closing springs are fully charged. Both the amber light and mechanical flag should be checked to indicate a charged spring.	

#### **CAUTION**

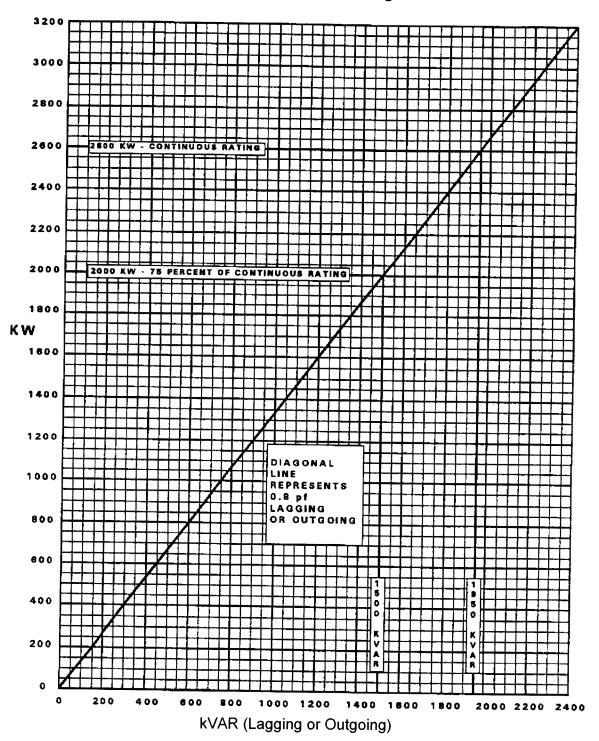
Continuous operation of Diesel Generators at loads below 550 kW should be avoided to prevent oil and soot accumulation in exhaust system, air box, cylinders, and injection nozzles.

[17] **IF** operation of the Diesel Generator is no longer required, **THEN** 

**REFER TO** Section 7.0 and **SHUT DOWN** the Diesel Generator.

BFN Unit 0 Standby Diesel Generator System 0-OI-82 Rev. 0100 Page 176 of 178

Illustration 1 (Page 1 of 1) DG kW vs. kVAR Loading



BFN Standby Diesel Generator System 0-OI-82
Rev. 0100
Page 177 of 178

# Illustration 2 (Page 1 of 2)

# **Diesel Generator Operating Log**

Date			iatoi Op		_	esel Ge	enerato	or	
Log all manipulations of [	Diesel Generator	LOGIC BRE	AKER in th	e Narrativ	e Log.				
STARTS/LOAD RUNS					ου	T OF SE	RVICE .	ГІМЕ	
Reason for Start:		Time/Date	Removed	from Serv	rice:		,		
(Test, Auto Start)			Reason Taken Out of Service:						
<sup>3</sup> Slow Starts/Load Runs	1								
<sup>3</sup> Fast Starts/Load Runs	/		Time/Date	Returned t	to Service	ı.			
Time/Date Started:	/	······································	Comments			*******			
Time/Date Loaded:	/				o a				
Time/Date Unloaded:				***************************************					
Time/Date Stopped:	/					- 1111111111111111111111111111111111111			
SR AND send to the Diesel Board depending on D/G co rated speed and once every	introl location. Re	eadings are in	nitiated once	every 15	minutes d	uring the	e first h	our of o	peration at
TIME Generator Frequency					-				
(59 - 61 HERTZ) <sup>1</sup>									
Generator Voltage <sup>5</sup>									
(3950 - 4400 VOLTs) Generator Watts <sup>2,4</sup>		ļ							
(550 - 2850 kW)									
Generator VARs <sup>2,4</sup>							··		
(400 - 2100 kVAR) Generator amps (less than									
495 amps)						İ			
ÍNITIALS					<u> </u>				
<ol> <li>Only indicated if one of the switch should only be plant</li> <li>The lower limit specified for the switch should only be plant</li> </ol>	ced in ON long enou or Generator Watts	ugh to obtain a and the limits:	reading, and	then placed	d back in O	FF.			
tne only source of power	to the shutdown boa	ard.							cherator is
<ul><li>Number of each type of s</li><li>The upper limits specified</li></ul>	tart/number of times	load was app	lied either au	omatically o	or manually	after ead	ch type o	of start.	A((4040
kVar for the remaining 22	hours of the DG 24	hour run surve	eillance.						
5 This voltage is based on t be 4250 to 4400 volts.	he Diesel Generato	r being loaded	. For a Diese	l Generator	which is ru	ınning un	loaded t	he voltag	je should
Performed by:	Name (Print)		Initials		Nam	e (Print)			Initials
Review by the US signifies of been attached to the SR if the the Diesel Generator System	ne D/G was run to	2 has been I support an S	FAX'd to ICI	E FAX @ 8 se, place th	3164 and a	AND the	origina STA box	al Illustra k for deli	ation 2 has every to
	Rev	viewed by:					···		
			ŧ	Jnit Superv	/isor Signa	ature			Date

BFN	Standby Diesel Generator System	0-OI-82
Unit 0		Rev. 0100
		Page 178 of 178

# Illustration 2 (Page 2 of 2)

# **Diesel Generator Operating Log**

Date D	esel Generator	ELAPSED	TIME INDICATOR	Initial	Final	
CHECK Lube Oil Circulating Pump is running following DG Shutdown, and for <u>DG-D</u> VERIFY the turbocharger oil pressure is between 10-35 psig as indicated on DG-D TURBOCHARGER COMP BEARING LUBE OIL PRESS INDR, 0-PI-082-1000D.						
	s of Diesel Generator L		R in the Narrative Lo	oa.		
Readings are taken to Operating Readings (i once every 30 minutes	cally in DG Room. Idle F 885-915 rpm) are initiated s thereafter. Enter the ac d reason and action taken	Readings (440-46 I once every 15 Itual time that ea	60 rpm) are recorded minutes during the fir	within 10 minute st hour of opera	tion at rated speed and	
	440-460 rpm	900 RPM				
TIME						
RPM (885-915)						
PRIMING FUEL PRESS DG (20-56 psig)	A-D					
NORMAL FUEL PRESS DG (20-56 psig)	A-D					
MAIN BEARINGS LUBE OIL (45-125 psig) (note 3)	PRESS					
(DG D ONLY) TURBOCHA COMP BEARING LUBE OIL (45-125 psig) (note 3)						
LUBE OIL FILTER INLET PI (8-40 psig) (note 4)	RESS					
ENGINE CLG WTR OUTLE (100-190°F)	T TEMP					
LO CLR CLG WTR OUTLET (100-190°F)						
LO CLR LUBE OIL OUTLET (100-190°F)	TEMP					
Engine Lube Oil Level (-4-0 inote 1)						
Governor Fuel Rack Position (.62 - 1.96)						
Governor Oil Level-(Min/Max visible in the sightglass)						
FUEL TANK LEVEL GAUGE (260-500 gallons)						
EXPANSION TANK WATER LEVEL (RUNNING LOW-RU FULL)		e e e e e e e e e e e e e e e e e e e				
7 Day Tank Level (83% - 92%) (note 2)						
INITIALS						
oil level if it lowers	naintenance to restore lube of to $\leq$ -3" while the Diesel Eng	ine is running.				
2 Notify Unit Supervi	sor if 7 day tank fuel oil level	iso $\leq$ 83%. Tech	Spec LCO is required w	hen fuel oil level is	s less than 81%.	
3 Idle Speed value fo	or Main Bearing Lube Oil Pre	ssure is > 20 psig	obtained at a minimum	of 30 seconds foll	owing engine start.	
4 Idle Speed value for	r Lube Oil Filter Inlet Pressu	re is > 3 psig obta	ined at a minimum of 3 i	minutes following	engine start.	
Remarks:						
	Dd-	ena a el la co	Name (P	rint)	Initials	
		rmed by:				
	Revie	wed by:			·····	
			Unit Supervisor	· Signature	Date	

JPM NUMBER:	390F	
TITLE:	RESPOND TO OFF-GAS POST-TREATM HI-HI-HI	IENT RADIATION
TASK NUMBER:	U-066-AB-02	
SUBMITTED BY: VALIDATED BY: APPROVED BY:	TRAINING	DATE: DATE: DATE:
PLANT CONCURR	ENCE:	DATE:

**OPERATIONS** 

<sup>\*</sup> Examination JPMs Require Operations Training Manager Approval or Designee Approval and Plant Concurrence

# **REVISION LOG**

Revision Number	Effective Date	Pages Affected	Description Of Revision
0	12/29/07	All	Initial issue
1	08/02/08	All	General revision & re-format

OPERATOR:		**************************************		
RO	SRO		DATE:	
JPM NUMBER:	390F			
TASK NUMBER:	U-066-AB-02			
TASK TITLE:	RESPOND TO OF HI-HI-HI	F-GAS POST-TF	REATMENT RADIA	ATION
K/A NUMBER:	271000A2.04	K/A RATING:	RO 3.7	SRO <u>4.1</u>
******	*******	*******	**********	******
TASK STANDARD	: RESPOND TO OFF HI-HI-HI PER 3-AR			TION
PERFORMANCE	LOCATION:		SIMULA	TOR X
REFERENCES/PR	OCEDURES NEEDI		-4C/35, Rev 29, 6-2 Rev 10	
VALIDATION TIME	: SIMU	LATOR: 15:0	0 LOCAL:	
MAX. TIME ALLOV	VED:	_ (FOR TIME CF	RITICAL JPMs ONI	LY)
PERFORMANCE 1	TIME:	_		
COMMENTS:	-1000			***************************************
			***************************************	
ADDITIONAL COM	IMENT SHEETS AT	TACHED?	YES	NO
RESULTS:	SATISFACTORY		UNSATISFACTO	RY
EXAMINER SIGNA	TURE:		DATE:	

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

\*\*\*\*\*<del>\*</del>

**INITIAL CONDITIONS:** 

You are a Unit 3 Operator. Unit 3 is at 100% power.

**INITIATING CUES:** 

The Unit Supervisor directs you to respond to annunciator

3-9-4C window 35, "OFF-GAS POST-TREATMENT

RADIATION HI-HI-HI."

JPM NO. 390F REV. NO. 1 PAGE 5 of 14

START TIME		
**************	*********	*********
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X
1. When requested by examiner identif	y/obtain copy of require	d procedure.
STANDARD:		
Obtained copy of 3-ARP-9-4C window	35 and/or 3-AOI-66-2.	
SAT UNSAT N/A	A COMME	ENTS:
		<del></del>
Examiner Note: If candidate goes di performance steps 2 & 3 and continu (Page 7)	rectly to 3-AOI-66-2, Sues at performance ste	kip the following ep 4. [4.1 of 3-AOI-66-2]

JPM NO. 390F REV. NO. 1 PAGE 6 of 14

******	*******************************						
PERFORMANCE STEP:			CRITICA		NOT CRITICAL	X	
2. 3-ARP-9-4C window 35							
<ul> <li>A. VERIFY alarm condition on the following</li> <li>OFFGAS POST-TREATMENT RADIATION recorder, 3-RR-90-265 on Panel 3-9-2.</li> <li>OG POST-TREATMENT CHAN A RAD MON RTMR radiation monitor, 3-RM-90-266A on Panel 3-9-10.</li> <li>OG POST-TREATMENT CHAN B RAD MON RTMR radiation monitor, 3-RM-90-265A on Panel 3-9-10.</li> </ul>							
STANE	DARD:						
NOTE: Candidate may elect to CLOSE 3-FCV-66-28 based on "Automatic Actions" that did not occur per ARP 3-9-4C W35. OPDP-1 allows actions to be taken that should have automatically happened. Page 9 step 7 would now be satisfied.							
Verified	d alarm	condition on 3	3-RR-90-26	5 and 3-RM-	90-265 & 2	266.	
SAT	·······	UNSAT _	N/A		COMME	ENTS:	

JPM NO. 390F REV. NO. 1 PAGE 7 of 14

PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X						
3. B. REFER to 3-AOI-66-2.								
STANDARD:	STANDARD:							
Refers to 3-AOI-66-2.								
SAT UNSAT N/A	COMN	IENTS:						
		WANTE DE LA CONTRACTOR DE						
***************								
PERFORMANCE STEP:	CRITICAL X	NOT CRITICAL						
4. <b>4.1 Immediate Actions</b>								
[1] <b>IF</b> scram has <b>NOT</b> o	ccurred, <b>THEN</b>							
PERFORM the follow	wing:							
[1.1] <b>IF</b> core flow is above	60%, <b>THEN</b>							
REDUCE core flow t	o between 50-60%.							
STANDARD:								
Reduced core flow to between 50-60% with recirc system. Initiates <b>EITHER</b> a Core Flow Runback [3-HS-68-44] <b>OR</b> reduces with Recirc Master Control [3-HS-68-35] on panel 3-9-5.								
SAT N/A N/A	COMM	ENTS:						
·								
***************************************								

JPM NO. 390F REV. NO. 1 PAGE 8 of 14

PERI	FORMAN	**************************************	******	CRITICAL	<u> </u>	NOT CRITICAL _	******	
5.	[1.2]	MANUALI	Y SCRAM th	ne Reactor. <b>R</b>	EFER TO	<b>3</b> -AOI-100-1.		
STAN	STANDARD:							
	Manually Scrammed the Reactor and referred to 3-AOI-100-1. (Referring to 3-AOI-100-1 is NOT CRITICAL.)							
SAT	SAT UNSAT N/A COMMENTS:							
<del></del>			· · · · · · · · · · · · · · · · · · ·			1 - 1745 - 1844 - 1844 - 1844 - 1844 - 1844 - 1844 - 1844 - 1844 - 1844 - 1844 - 1844 - 1844 - 1844 - 1844 - 1		
		ndy to d	1-4			e de la companya del companya de la companya de la companya del companya de la co		
CUE	[After l	Performer ha	as scrammed	d the reactor	and give	en the scram repor	t.]	
Anot		ator will per				dure, continue in yo		
-								
		**************************************	******			NOT CRITICAL		
FLIXI	OKWAN	ICE STEF.		CRITICAL	***************************************	NOT CRITICAL _		
6.	4.2	Subsequent	Actions					
	[1]					-FCV-066-0028 has nditions, <b>THEN</b>	been	
	<b>DISENGAGE</b> 3-FCV-066-0028 mechanical restraint by rotating the restraining handwheel fully in the counterclockwise direction, locally at the stack (otherwise)							
CUE:	If aske	d, 3-FCV-66-	28 is Not me	chanically re	strained		1-11-4	
STAN	IDARD:							
Dispatches AUO locally to verify valve Not restrained and continues to the next step.								
SAT		UNSAT	N/A		COMME	NTS:		
						-		
	*****						<del></del>	
						***************************************		

JPM NO. 390F REV. NO. 1 PAGE 9 of 14

**********	*****	*****	*******				
PERFORMANCE STEP:	CRITICAL	X	NOT CRITICAL				
EXAMINERS NOTE: ALTERNATE	PATH STARTS	HERE:					
7. [2] <b>VERIFY CLOSED</b> OFFGAS SYSTEM ISOLATION VALVE, 3-FCV-66-28 on Panel 3-9-53 or locally.							
STANDARD:							
NOTE: 3-FCV-66-28 may have bee 3-9-4C W35 "Automatic Actions." have automatically happened. Se	OPDP-1 allows	actions t	o be taken that should				
Performer Verified that 3-FCV-66-28 failed to automatically close on OFF-GAS POST-TREATMENT HI-HI-HI radiation. Performer places 3-HS-66-28 in close on Panel 3-9-53 ( <b>Critical</b> ) and verifies green lamp illuminated above HS ( <b>Not Critical</b> ).							
SAT UNSAT	N/A	COMME	ENTS:				
**************************************			**************************************				
8. [3] <b>MONITOR</b> area radiat	8. [3] <b>MONITOR</b> area radiation levels at Panel 3-9-11.						
STANDARD:							
Monitors radiation levels at Panel 3-9-11.							
SAT UNSAT	N/A	COMME	ENTS:				

JPM NO. 390F REV. NO. 1 PAGE 10 of 14

**********	********************	***************	*****
PERFORMANCE STEP:	CRITICA	L NOT CRITICAL	Х
		assification level and response.	
CUE: The Shift Manager is	implementing EPIP-	1 Classification.	
STANDARD:  Continues to the next step.			
SAT UNSAT	N/A	COMMENTS:	

**************************************	****** ANCE	**************************************	**************************************	****************	**************************************	******
PERFORMANCE STEP:		CRITICA	· L	NOT CRITICAL	X_	
9. [5]	[5] MONITOR the following parameters:					
	A.	MAIN STEA	M LINE RADIATIO	)N, 3-RR-9	90-135, Panel 3-9-2	
	B.	OFFGAS PI Panel 3-9-2	RETREATMENT R	ADIATION	N, 3-RR-90-157,	
	C.	OFFGAS Po Panel 3-9-2	OST-TREATMENT	RADIATIO	ON, 3-RR-90-265,	
	D.	STACK GAS	S RADIATION, 0-R	R-90-147,	on Panel 1-9-2.	
CUE: [Whe Report] S	en Car TACK	didate calls t GAS RADIAT	Jnit 1 Operator for ION, 0-RR-90-147	r a readin IS READI	g on 0-RR-90-147, NG 6 x 10 <sup>6</sup> cps	
STANDARE	<u>D:</u>			3111		
		135, 157, 265 0-147, Unit 1 l		-9-2 and c	alled Unit 1 Operato	r for a
SAT	_ U	NSAT	N/A	COMM	ENTS:	

JPM NO. 390F REV. NO. 1 PAGE 12 of 14

*****	*********	*******	**********
<b>PERFORM</b>	PERFORMANCE STEP: CRITICAL X NOT CRITICAL		
10. [6]	less than 6 x 10 <sup>5</sup> cps as ind <b>CLOSE</b> all Main Steam Iso Valves, 3-FCV-001-0055 a	licated on 3-RR-9 lation Valves and nd 0056	Post Treatment activity is <b>NOT</b> 0-265 on Panel 3-9-2, <b>THEN</b> Main Steam Line Drain
CUE: The	Unit has been scrammed fo	or 5 minutes.	
CLOSES A	<u>):</u> that the OFF-GAS POST TF LL Main Steam Isolation Valv CV-1-55 and 56. (Not Critical	es (Critical) and M	
SAT	UNSAT N/A	CO	MMENTS:
CUE: That	completes this task.		

JPM NO. 390F REV. NO. 1 PAGE 13 of 14

PERFORMANCE STEP:	CRITICAL	NOT CRITICAL	X		
11. PERFORMER demonstrated the use	of SELF CH	IECKING during this JPM			
STANDARD:					
PERFORMER verified applicable compor accordance with plant standards.	nents by utiliz	zing SELF CHECKING in			
SAT N/A _		COMMENTS:			
**************************************		**************************************			
12. PERFORMER demonstrated the us JPM	e of 3-WAY	COMMUNICATION during th	nis		
STANDARD:					
PERFORMER utilized 3-WAY COMMUNI	CATION in a	accordance with plant standa	ırds.		
SAT UNSAT N/A _	<del></del>	COMMENTS:			
	, , , , , , , , , , , , , , , , , , , ,				
END OF TASK STOP TIME:					

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** 

You are a Unit 3 Operator. Unit 3 is at 100% power.

**INITIATING CUES:** 

The Unit Supervisor directs you to respond to annunciator

3-9-4C window 35, "OFF-GAS POST-TREATMENT

RADIATION HI-HI-HI."

BFN Unit 3

Panel 9-4 3-XA-55-4C 3-ARP-9-4C Rev. 0029 Page 45 of 45

OG POST TRTMT RAD MONITOR HI HI HI/INOP Sensor/Trip Point:

3-RM-90-265A

6.2 x 10<sup>5</sup> CPS

3-RM-90-266A

6.2 x 10<sup>5</sup> CPS

3-RA-90-265C

SOLID MAGENTA 35

(Page 1 of 1)

Sensor

3-RE-090-0265

Panel 3-25-94 Off-Gas Building,

Location:

3-RE-090-0266

Elevation 538.5

Probable

A. Resin trap failure (RWCU or Condensate demins).

Cause:

B. Fuel damage.

Automatic Action:

OFFGAS SYSTEM ISOLATION VALVE 3-FCV-66-28 closes after a 5 second time

delay

Operator Action:

A. **VERIFY** alarm condition on the following:

OFFGAS POST-TREATMENT RADIATION recorder,

3-RR-90-265 on Panel 3-9-2

lel 3-9-2 □

OG POST-TREATMENT CHAN A RAD MON RTMR radiation

monitor, 3-RM-90-266A on Panel 3-9-10

OG POST-TREATMENT CHAN B RAD MON RTMR radiation

monitor, 3-RM-90-265A on Panel 3-9-10

B. **REFER TO** 3-AOI-66-2.

References:

3-45E620-4

3-45E614-2

0-47E610-90-2

GE 3-729E814-6

FSAR Sections 1.6.4.4.6, 7.12.2.2, 7.12.2.3, 7.12.3.3, 9.5.4, and 13.6.2

3-SIMI-90B



# **Browns Ferry Nuclear Plant**

## Unit 3

# **Abnormal Operating Instruction**

## 3-AOI-66-2

# Offgas Post Treatment Radiation Hi Hi Hi

Revision 0010

**Quality Related** 

Level of Use: Continuous Use

Effective Date: 04-15-2008

Responsible Organization: OPS, Operations

Prepared By: Michael K Teggins
Approved By: James A McCrary

BFN Unit 3

#### Offgas Post Treatment Radiation Hi Hi Hi

3-AOI-66-2 Rev. 0010 Page 2 of 9

#### **Current Revision Description**

Type of Change:

**DESIGN CHANGE** 

Tracking Number:

011

DCN

63290A, 51109

**PCRs** 

05001777, 07001721

DCN 63290A installs a manual handwheel on 3-FCV-66-28, OFF-GAS SYSTEM ISOLATION VALVE. This valve can now be mechanically restrained open, if it fails closed for some reason. This will prevent having to shutdown due to this failure.

Added the following information to the AUTOMATIC ACTION Section 3.0B: 3-FCV-66-28, OFF-GAS SYSTEM ISOLATION VALVE will not perform it's design function to automatically close, when it is Mechanically Restrained OPEN due to plant conditions.

Deleted Step 4.2[1] instructing the entry into the EOIs when an EOI entry condition is met. EOIs are entered any time an entry condition is met, no step instructing entry is needed.

Added Step 4.2[1] to disengage 3-FCV-066-0028 mechanical restraint by rotating the restraining handwheel fully in the counterclockwise direction, if previously restrained open due to plant conditions.

Updated nomenclature for 0-RR-90-147. This was relabeled by DCN 51109.

BFN Unit 3

# Offgas Post Treatment Radiation Hi Hi Hi

3-AOI-66-2 Rev. 0010 Page 3 of 9

# **Table of Contents**

1.0	PURPOSE	4
2.0	SYMPTOMS	
3.0	AUTOMATIC ACTIONS	5
4.0	OPERATOR ACTIONS	6
4.1	Immediate Actions	6
4.2	Subsequent Actions	6
5.0	REFERENCES	8
5.1	Technical Specifications	8
5.2	Offsite Dose Calculation Manual	8
5.3	Final Safety Analysis Report	8
5.4	Technical Requirements Manual	8
5.5	Plant Instructions	8
5.6	Plant Drawings	9
6.0	ILLUSTRATIONS/ATTACHMENTS	9

E	31	F	N	
U	n	it	t :	3

#### Offgas Post Treatment Radiation Hi Hi Hi

3-AOI-66-2 Rev. 0010 Page 4 of 9

#### 1.0 PURPOSE

This abnormal operating instruction provides symptoms, automatic actions and operator actions for a High-High-High radiation condition in the Offgas System.

#### 2.0 SYMPTOMS

- A. Annunciators in alarm will include, but are **NOT** limited to, the following:
  - 1. OG POST TRTMT RADIATION HIGH (3-XA-55-4C, Window 33) at ≥ 1030 cps (Ch 265) or 960 cps (Ch 266).
  - 2. OG POST TRTMT RADIATION HIGH-HIGH (3-XA-55-4C, Window 34) at 5630 cps.
  - 3. OG POST TRTMT RAD MONITOR HI-HI-HI/INOP (3-XA-55-4C, Window 35) at 6 x 10<sup>5</sup> cps.
  - 4. OG PRETREATMENT RADIATION HIGH (3-XA-55-3A, Window 5) at 1690 MR/HR.
  - 5. STACK GAS RADIATION HIGH (3-XA-55-3A, Window 13) at 949 CPS.
  - 6. STACK GAS RADIATION HIGH-HIGH (3-XA-55-3A, Window 6) at 1148 CPS.
  - 7. OG AVG ANNUAL RELEASE LIMIT EXCEEDED (3-XA-55-4C, Window 27) at 845 MR/HR.
  - 8. OFFGAS ISOLATION VALVE CLOSED (3-XA-55-7A, Window 4).
- B. Increased activity on OFFGAS PRETREATMENT RADIATION recorder, 3-RR-90-157, Panel 3-9-2.
- C. Increased activity on OFFGAS POST TREATMENT RADIATION recorder, 3-RR-90-265, Panel 3-9-2.
- D. Increased activity on STACK GAS/CONT RM RADIATION recorder, 0-RR-90-147, located on Panel 1-9-2.

BFN	Offgas Post Treatment	3-AOI-66-2
Unit 3	Radiation Hi Hi Hi	Rev. 0010
		Page 5 of 9

#### 3.0 AUTOMATIC ACTIONS

- A. If the OFFGAS TREATMENT SELECT handswitch, 3-XS-66-113, Panel 3-9-53, is in AUTO when High radiation condition exists it will automatically align, or ensure alignment of, the charcoal adsorbers to the treatment mode, i.e., the charcoal inlet valve will receive an open signal and the charcoal bypass valve will receive a close signal.
- B. OFFGAS SYSTEM ISOLATION VALVE, 3-FCV-066-0028, automatically closes on any combination of Off Gas Post Treatment Hi Hi, downscale, or inop simultaneously in both channels of the O.G. post treatment radiation monitoring system after 5 seconds. 3-FCV-066-0028 will not perform it's design function to automatically close, when it is mechanically restrained open due to plant conditions.

Offgas Post Treatment Radiation Hi Hi Hi BFN 3-AOI-66-2 Rev. 0010 Page 6 of 9 Unit 3

4.0	OPERATOR ACTIONS					
4.1	lmm	ediat	te Actions			
	[1] IF scram has NOT occurred, THEN					
		PE	RFORM the following:			
	[1	1.1]	IF core flow is above 60%, THEN			
			REDUCE core flow to between 50-60%.			
	[1	1.2]	MANUALLY SCRAM the Reactor. REFER TO 3-AOI-100-1.	0		
4.2	Subs	sequ	ent Actions			
	[1]	has	OFFGAS SYSTEM ISOLATION VALVE, 3-FCV-066-0028 s been mechanically restrained open due to plant additions, <b>THEN</b>			
		rota	SENGAGE 3-FCV-066-0028 mechanical restraint by ating the restraining handwheel fully in the counterclockwise ection, locally at the stack (otherwise).			
	[2]		RIFY CLOSED OFFGAS SYSTEM ISOLATION VALVE, CV-66-28 on Panel 3-9-53 or locally.			
	[3]	MC	NITOR area radiation levels at Panel 3-9-11.			
	[4]		<b>FER TO</b> EPIP-1 for emergency classification level and ponse.			
	[5]	MC	NITOR the following parameters:			
		A.	MAIN STEAM LINE RADIATION, 3-RR-90-135, Panel 3-9-2			
		B.	OFFGAS PRETREATMENT RADIATION, 3-RR-90-157, Panel 3-9-2			
		C.	OFFGAS POST-TREATMENT RADIATION, 3-RR-90-265, Panel 3-9-2			
		D.	STACK GAS RADIATION/CONT RM RADIATION, 0-RR-90-147, on Panel 1-9-2.			

BFN	Offgas Post Treatment	3-AOI-66-2	
Unit 3	Radiation Hi Hi	Rev. 0010	
		Page 7 of 9	

# 4.2 Subsequent Actions (continued)

[6] **IF** after five minutes from scram the Offgas Post Treatment activity is **NOT** less than 6 x 10<sup>5</sup> cps as indicated on 3-RR-90-265 on Panel 3-9-2, **THEN** 

**CLOSE** all Main Steam Isolation Valves and Main Steam Line Drain Valves, 3-FCV-001-0055 and 0056.

#### **NOTE**

Placing additional Stack Dilution Air Fans in service should keep 0-RM-90-147 and -148 on scale.

[7]	PLACE STACK DILUTION FAN SEL control switch, 3-XS-66-29, Panel 3-9-8, in OFF.	
[8]	<b>START</b> standby STACK DILUTION FAN 3B(3A) using control switch, 3-HS-66-31A(29A), Panel 3-9-8.	
[9]	<b>REQUEST</b> Unit 1 and Unit 2 operators to start standby Stack Dilution Air Fans.	
[10]	<b>REQUEST</b> Chemistry perform 0-SI-4.8.B.2-8, Airborne Effluent Analysis - Stack Noble Gas, to determine activity.	
[11]	REQUEST Chemistry sample reactor water for radioactivity.	

BFN Unit 3

#### Offgas Post Treatment Radiation Hi Hi Hi

3-AOI-66-2 Rev. 0010 Page 8 of 9

#### 5.0 REFERENCES

#### 5.1 Technical Specifications

Section 5.5.8, Explosive Gas and Storage Tank Radioactivity Monitoring Program

#### 5.2 Offsite Dose Calculation Manual

Section 1/2.2.2 Gaseous Effluents

#### 5.3 Final Safety Analysis Report

Section 9.5, Gaseous Radwaste System

Section 14.6, Analysis of Design Basis Accidents

#### 5.4 Technical Requirements Manual

TRM Section 3.3.9, Offgas Hydrogen Analyzer Instrumentation

TRM 3.7.2, Airborne Effluents

#### 5.5 Plant Instructions

0-SI-4.8.B.2-8, Airborne Effluent Analysis - Stack Noble Gas

EPIP-1, Emergency Plan Classification Logic

3-GOI-100-1A, Unit Startup and Power Operation

3-AOI-100-1, Reactor Scram

3-OI-66, Offgas System

3-SI-4.6.B.1-4, Reactor Coolant Chemistry

OPDP-8, Limiting Conditions for Operation Tracking

BFN Unit 3

#### Offgas Post Treatment Radiation Hi Hi Hi

3-AOI-66-2 Rev. 0010 Page 9 of 9

# 5.6 Plant Drawings

3-47E610-90-2, Mechanical Control Diagram Radiation Monitoring System

3-47E610-66-1, Mechanical Control Diagram Offgas System

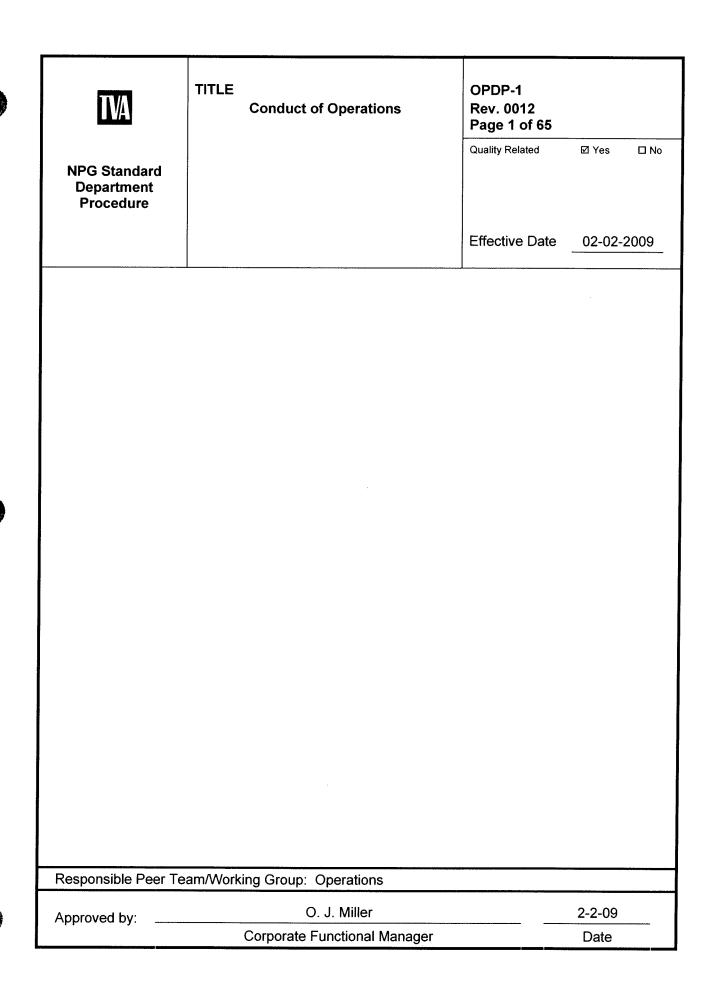
45E614-2, Wiring Diagrams 120V AC/250V DC VALVES & MISC. Schematic Diagram

45E620-3, Wiring Diagrams Annunciator System Key Diagram

729E814 series, Process Radiation Mon Sys

#### 6.0 ILLUSTRATIONS/ATTACHMENTS

None



NPG Standard	Conduct of Operations	OPDP-1	
Department		Rev. 0012	
Procedure		Page 8 of 65	

#### 3.2 Conservative Decision Making (continued)

- Do not allow production and cost to override safety.
- Do not challenge the safe operating envelope.
- Question, verify and validate available information.
- Use all available resources, including people off site as necessary. Ref. OPDP-9
- Do not proceed in the face of uncertainty.
- If time allows develop and implement a plan that includes critical parameters, control bands, contingencies and compensatory measures, and trigger value(s).
- Establish a plan based on operating procedures, rate of degrading trend, uncertainty in indication and capability of current resources.
- The crew assigns roles, and continuously evaluates the plan for changing conditions.
- Human Performance (HU) tools (advocating your position, peer checking, oversight, questioning attitude, etc.) are utilized and traps (group think, etc.) are avoided when reaching operating decisions.
- D. When the control room team identifies or is made aware of a slowly degrading trend the principles of operational decision making are applied. Shift Management will request an Operational Decision-Making Issue (ODMI) in accordance with BP-255 and the corrective action program. The issue is tracked by station management until resolved or a plan to correct the issue is in place. The crew is provided guidance, in a timely manner consistent with the degrading condition rate of change, a plan to cope with the potential consequences of the issue and guidance on actions to take should the rate of degradation change or predefined limits are reached including when to remove the component or system from service, maneuver the plant or shut the reactor down.

#### 3.3 Expectations for Inserting a Manual Scram or Manual Reactor Trip

Licensed operators shall without hesitation insert a manual scram/manual reactor trip whenever any of the following conditions occurs:

- Safety of the reactor is in jeopardy.
- Operating parameters exceed any of the reactor protection setpoints and an automatic shutdown does not occur.
- Operators shall take no manual action that will result in an automatic scram.
- Core thermal hydraulic instability is observed and mitigating actions are ineffective (BWR).
- As directed by plant procedures.
- When a pre-determined trigger value is reached.

#### 3.4 Manual Control of Automatic Systems

A. If an automatic control is confirmed to have malfunctioned take prompt actions to place that control in manual.

NPG Standard	Conduct of Operations	OPDP-1	
Department		Rev. 0012	
Procedure		Page 9 of 65	

#### 3.4 Manual Control of Automatic Systems (continued)

- B. When operating in manual mode, the Unit Supervisor will specify the frequency of monitoring, control bands and trigger values as appropriate.
- C. When manual operation is no longer required or the automatic function is restored, return systems to automatic or standby mode.
- D. When practical, before placing controls in manual for activities which require manual control, review system response and actions to be taken during potential off normal events.

#### 3.5 Reactivity Management

#### **NOTE**

It is acceptable to utilize another SRO to perform the Unit Supervisor Reactivity Management function described below for significant reactivity changes such as start-up, shutdown, etc.

- A. The onshift crew is responsible for the following:
  - No actions are allowed that would intentionally raise core thermal power above
    the licensed thermal power limit for any period of time. Small, short-term
    fluctuations in power that are not under the direct control of a licensed reactor
    operator (e.g., fluctuations caused by bi-stable flow in some boiling water reactors
    and secondary-side control valve oscillations for PWRs) are not considered
    intentional.
  - 2. Closely monitor thermal power during steady state power operation with the goal of maintaining the one-hour thermal power average at or below the licensed thermal power limit. If the core thermal power average for a one-hour period is found to exceed the licensed thermal power limit, take prompt (typically no more than 10 minutes from point of discovery) action to ensure that thermal power is less than or equal to licensed thermal power limit.
  - 3. The core thermal power average for a shift is not to exceed the licensed thermal power limit. For the purpose of this guidance, a rolling eight-hour average is maintained.
  - 4. For pre-planned evolutions that could affect primary or secondary temperatures, pressures, or flows; and may be expected to cause a transient increase in reactor power that could exceed the licensed thermal power limit value, prudent action based on prior performance or evaluations should be taken to reduce power prior to performing the evolution.
- B. The Unit Supervisor is responsible for all manipulations that affect reactivity and is charged to:
  - 1. Giving permission to Unit Operators to make reactivity changes. Personally oversee all reactivity changes or assign another SRO to oversee the reactivity change if unable to give his/her undivided attention.

NPG Standard Department	Conduct of Operations	OPDP-1 Rev. 0012	
Procedure		Page 13 of 65	

### 4.1 Control Board Monitoring (continued)

- D. The Unit Supervisor walks down the main control room panels once each shift prior to the mid-shift brief and once prior to end-of-shift turnover with a focus on critical parameters with one of those walk downs being a paired observation with a unit operator. The Shift Manager should perform an end of shift main control room board walk down. The walk down is not a component by component walk down but should concentrate on Safety-Related controls manipulated during the shift.
- E. When equipment/plant status is changing, all applicable indications will be monitored until the equipment/plant stabilizes.
- F. During plant operations diverse indications will be used to monitor equipment/plant performance, determine trends and ensure plant response during evolutions is as expected and correct for conditions.
- G. During periods such as watchstation turnover, shift turnover or pre-job briefings, the Unit Supervisor should ensure one operator maintains the OATC role.

#### 4.2 Equipment Manipulations and Status Control

- A. All equipment manipulations are performed by qualified personnel in accordance with procedures and/or other documents such as work orders or clearances approved by shift supervision.
- B. The control of plant equipment status is governed by procedures, work orders, TACFs or tagging. These processes contain specific direction relative to status control.
- C. In situations where a component is required to be placed in a position differing from its normal alignment, the configuration change must be performed in accordance with approved plant specific processes unless the configuration change is immediately necessary to protect personnel, equipment or the public.
- D. Whenever an activity or evolution is interrupted, ensure affected equipment is placed in a stable condition as soon as practicable.
- E. Self-Checking must be used for manipulating plant components. Procedure "in-hand" use during self-checking is expected for normal operating activities that require procedures unless it is impractical or unsafe. Each site will develop a list approved by the Operations Manager of site specific routine tasks such as changing chart recorders, nulling controllers, or acknowledging annunciators that do not require a procedure to be "in-hand."
- F. The control room can verbally direct the performance of simple actions (i.e., a single switch or valve manipulation) in the field. Three way communications shall be used to ensure understanding of the operator in the field.
- G. Do not manipulate plant equipment using two-handed operation (simultaneous operation of different components) for convenience or unnecessary haste. Each site will designate those actions where two-handed operation are required and permitted.

JPM NUMBER:	346	
TITLE:	PLACING STANDBY STEAM JET AIR EJE	CTOR IN OPERATION
TASK NUMBER:	U-066-NO-07	
Completed copy of	Appendix A required to be given to Candidate	e (Last page of JPM)
SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TDAINING	DATE:
	TRAINING	DATE
FLAINT CONCURR	ENCE:OPERATIONS	DATE:

Examination JPMs Require Operations Training Manager Approval or Designee Approval and

Plant Concurrence

# **REVISION LOG**

Revision Number	Effective	Pages Affected	Description Of Revision
	Date	Allected	Of Revision
0	03/27/09	All	Initial issue
L			

OPERATOR:				
RO	SRO		DATE:	
JPM NUMBER:	346			
TASK NUMBER:	U-066-NO-07			
TASK TITLE:	PLACING STA	ANDBY STEAM JET	AIR EJECTOR IN	OPERATION
K/A NUMBER:	239001A2.08	K/A RATING:	RO <u>3.6</u>	SRO <u>3.6</u>
*******	******	*******	********	******
TASK STANDARD:	PERFORM CO PLACE THE S		NIPULATIONS RE	EQUIRED TO
PERFORMANCE L	OCATION:	SIMULATOR X P	LANT CONTRO	OL ROOM
REFERENCES/PRO	OCEDURES NE	EEDED: 3-OI-66	6, Rev 57	
VALIDATION TIME:	: S	SIMULATOR: 10	:00 LOCAL	•
MAX. TIME ALLOW	'ED:	(FOR TIME C	RITICAL JPMs ON	NLY)
PERFORMANCE T	IME:			
COMMENTS:				
			The state of the s	
ADDITIONAL COMMENT SHEETS ATTACHED? YES NO			_NO	
RESULTS:	SATISFACTOR	RY	UNSATISFACTO	)RY
EXAMINER SIGNAT	EXAMINER SIGNATURE:DATE:			

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** You are an Operator. Unit 3 is at 100% power. 3A steam jet

air ejector is in service in accordance with Section 5.9 of 3-OI-66. 3A steam jet air ejector is to be removed from service for maintenance and 3B steam jet air ejector is to be placed

into operation. HWC is shutdown per 3-OI-4.

INITIATING CUES: Remove 3A steam jet air ejector from service and place 3B

steam jet air ejector into operation.

JPM NO. 346 REV. NO. 0 PAGE 5 of 22

JPM NO. 346 REV. NO. 0 PAGE 6 of 22

PERFORM	ANCE STEP:	CRITICAL	NOT CRITICAL X			
[2]	IF determined nece	ssary by Unit Supervi	sor, <b>THEN</b> (Otherwise N/A)			
	NOTIFY Radiation Protection that an RPHP exists for the impending action to place the standby SJAE (3A or 3B) in service. RECORD time Radiation Protection notified in the NOMS Narrative Log. [BFN PER 126211]					
			atures recorded on Appendix A structions [Tech Spec 5.7, SOER 01-1,			
CUE: Give	copy of completed	Appendix A to Cand	idate. (Last page of JPM)			
STANDARE	<u>):</u>					
SIANDAIL						
	acknowledges that a R	PHP (Appendix A) ha	as been completed.			
	acknowledges that a R UNSAT	,	as been completed.			
Candidate a		,	·			
Candidate a		,	·			

JPM NO. 346 REV. NO. 0 PAGE 7 of 22

PERFORM.	ANCE	STEP:			NOT CRITICAL	
[3]	VER	<b>IFY</b> the followir	ng initial conditior	s have bee	n met:	
	A.		tem is in service, <b>N</b> HWC System.			
	B. SJAEs are in operation. (REFER TO Section 5.9).					
STANDARD:						
N/A – given	in the	initial condition	S.			
SAT UNSAT N/A COMMENTS:						
*******	,					
		and a second				
					*********	
PERFORMA	ANCE S	STEP:	CRITICA	\L	NOT CRITICAL	<u> X</u>
[4]	VERI	FY OPEN the f	following valves a	nt Panel 3-9	-6:	
	A.	SJAE 3B(3A)	CNDS INLET V	ALVE, using	3-HS-2-31A(36A).	
	B.	SJAE 3B(3A)	CNDS OUTLET	VALVE, us	ing 3-HS-2-35A(41A	).
STANDARD	<u>):</u>					
At Panel 3-9-6, Verified illuminated RED valve position indicating lamps above 3-HS-2-31A and 3-HS-2-35A.						
SAT	_ U	NSAT	N/A	COMME	ENTS:	

JPM NO. 346 REV. NO. 0 PAGE 8 of 22

***********	*****	**********	*************	********	******
PERFORMANCE STEP:		CRITIC	AL	NOT CRITICAL	X
		DENSATE FROM SJA is greater than 60 psi			
CUE: [When	contacted] :	3-PI-2-34, Condensate	from SJAE	B, indicates 90	psig.
STANDARD:					
Called Outside B, Panel 25-10		nine reading from 3-PI	-2-34, CON <b>[</b>	DENSATE FROM	SJAE
SAT	UNSAT	N/A	COMME	ENTS:	
- William Andrews		**************************************			

PERFORM	IANCE	STEP:	С	RITICAL		NOT CRITICAL	Χ		
[6]	<b>VER</b> setp	<b>VERIFY</b> manual/hand loader output pressure and pressure controller setpoints at Panel 25-105, are adjusted as follows:							
	A.	Setpoint f set for ap housing).	proximately 22	SJAE B(A) S 25 psig (dial I	STAG ocate	E I & II, 3-PC-1-152 d inside controller	2(150)		
	B.	Manual/Hand loader for STEAM TO SJAE B(A) STAGE I & II, 3-PC-1-152(150) set for approximately 14 psig.							
	C.	Setpoint f set for ap housing).	or STEAM TO proximately 22	SJAE B(A) \$ 25 psig (dial l	STAG ocate	E III, 3-PC-1-167(16 d inside controller	36)		
	D.	Manual/hand loader for STEAM TO SJAE B(A) STAGE III, 3-PC-1-167(166), set for approximately 12 psig.							
CUE: [Who	en call 25 psi	ed] The Se g. (inside co	tpoint for ste	am to SJAE sing).	B sta	ges I and II, 3-PC-	1-152		
Manual ha	nd load	der for SJA	E B stage I ar	nd II is set at	14 ps	sig.			
Setpoint fo	r stear nousin	n to SJAE I g).	B, stage III, 3-	PC-1-167 is	set fo	or 225 psig. (inside			
Manual ha	nd load	ler for stea	m to SJAE B,	stage III, 3-I	PC-1-	167 is set for 12 ps	ig.		
<u>STANDARI</u>	<u>D:</u>					2112411			
Directed US	to per	form/verify s	steps 8.4[6]A t	hrough 8.4[6]	JD.				
SAT	U	NSAT	N/A	cc	MME	NTS:			
	**********								

JPM NO. 346 REV. NO. 0 PAGE 10 of 22

PERFORM	ANCE S	STEP:			**************************************	
[7]	<b>VERI</b> of par	<b>FY</b> both SJAE nel 25-105) ar		pressure r	 nodifiers (located at the	
	A.	MS SJAE B	(A) PRESS MOI	DIFIER, 3-	XM-1-152(150).	
	B.	MS SJAE B	(A) PRESS MOI	DIFIER, 3-	XM-1-167(166).	
CUE: [Whe mid-position	n calle n.	d] Both SJA	E dilution stea	m pressu	re modifiers are adjus	ted to
STANDARD	<u>):</u>					
Directed US position.	to perf	orm/verify bot	th SJAE dilution	steam pre	ssure modifiers are in r	nid-
SAT	_ UN	NSAT	N/A	COM	MENTS:	
						***************************************
PERFORMA					**************************************	
[8]	VERI	Y OPEN both	h SJAE Inlet Val	ves at Par	nel 3-9-8, using the follo	wing:
	A.	SJAE 3A INL	LET VALVE, 3-H	IS-66-11.		
	B.	SJAE 3B INL	ET VALVE, 3-H	IS-66-15.		
STANDARD						
Verified 3-HS	S-66-11	and 3-HS-66	3-15 in the OPEN	N position.		
SAT	_ UN	ISAT	_ N/A	СОМ	MENTS:	
		***************************************	- 1977	1		

JPM NO. 346 REV. NO. 0 PAGE 11 of 22

******	*******	******	******	********
PERFORMA	NCE STEP:	CRITICAL	X	NOT CRITICAL
[9]	PLACE the STEAM TO S CLOSE at Panel 3-9-7.	JAE 3A(3B) h	andswitch	n, 3-HS-1-155A(156A), in
STANDARD	<u>:</u>			
Placed 3-HS	-1-155A in the CLOSE pos	ition.		
SAT	_ UNSAT N/A	·	COMME	NTS:
******	*********	*****	*****	*********
PERFORMA	NCE STEP:	CRITICAL	X	NOT CRITICAL
[10]	<b>PLACE the</b> SJAE 3A(3B) 3-HS-1-150(152), in CLOS			R handswitch,
STANDARD	<u>:</u>			
Placed 2-HS	-1-150 in the CLOSE positi	on.		
SAT	_ UNSAT N/A		СОММЕ	NTS:

JPM NO. 346 REV. NO. 0 PAGE 12 of 22

*****	*********	*****	******	*********
PERFORM	ANCE STEP:	CRITICAL	X	NOT CRITICAL
[11]	At Panel 3-9-8, <b>PLACE</b> the 3-HS-66-14(18) in CLOSE.		3) OG OU	TLET VALVE using
STANDARD	<u>):</u>			
Placed 3-HS	S-66-14 IN CLOSE position.			
SAT	_ UNSAT N/A		СОММЕ	NTS:
				4444
******	*********	******	*****	********
PERFORMA	NCE STEP:	CRITICAL	X	NOT CRITICAL
[12]	PLACE in OPEN/AUTO the 3-HS-66-18(14) at panel 3-		A) OG OL	JTLET VALVE using,
STANDARD	<u>:</u>			
Placed 3-HS	-66-18 in the OPEN/AUTO μ	osition.		
SAT	UNSAT N/A		COMME	NTS:
****	Annual An			

JPM NO. 346 REV. NO. 0 PAGE 13 of 22

**************************************
PERFORMANCE STEP: CRITICAL X NOT CRITICAL
[13] PLACE the STEAM TO SJAE 3B(3A) handswitch, 3-HS-1-156A(155A), in OPEN at panel 3-9-7.
STANDARD:
Placed 3-HS-1-156A in OPEN position.
SAT UNSAT N/A COMMENTS:
***************************************
PERFORMANCE STEP: CRITICAL X NOT CRITICAL
[14] <b>PLACE</b> the STEAM TO SJAE 3B(3A)PRESS CONTROLLER handswitch, 3-HS-1-152(150), in OPEN at Panel 3-9-7.
STANDARD:
Placed 3-HS-1-152 in the OPEN position.
SAT UNSAT N/A COMMENTS:
NOTE
It may be necessary to return 3-HS-1-152(150) to the CLOSE position, then back to OPEN in order to open the SJAE steam supply valves. This will reset the logic sequence.

PERFORMA	ANCE STEP: CRITICAL	. X NOT CRITICAL			
[15]	ADJUST manual/hand loaders at Pane pressure is indicating approximately 19 indications:				
	A. STEAM TO SJAE B(A) STAGE I & II, 3-PI-001-0152(0150)				
	B. STEAM TO SJAE B(A) STAGE	III, 3-PI-001-0167(0166)			
CUE: [Whe	en called] 3-PI-1- 152 & 3-PI-1-167 are	adjusted to 200 psig.			
STANDARD	<u>):</u>				
Directed US	S to adjust 3-PI-1- 152 & 3-PI-1-167 to 19	0 – 220 psig.			
SAT	UNSAT N/A	COMMENTS:			
Examiner No	lote: [If desired to save time, when co	ntacted for step [15] - report]			
Steps [15] th	through [20] are completed locally.				
[Then you c	can skip down to step [21] on page 19				

	-	-	_	
		 Γ.	£	=
14			r	_

It is possible in the next step to fully close the modifiers, while trying to obtain stable steam pressure. A swing of 2-3 psig is considered stable. If this occurs the indicated pressure will slowly drop to zero. Adjusting the pressure to the point where there is a swing of 2-3 psig, will indicate the modifier is **NOT** closed.

swing of 2-3	psig, will	indicate tl	ne modifie	er is <b>NOT</b>	closed.		
******	*****	*****	*****	*****	****	~	****
PERFORMA	NCE ST	<u> </u>		CRITICA	L <u>X</u>	NOT CRITICAL	
[16]	<b>ADJUST</b> the SJAE dilution steam pressure modifiers (located at of panel 25-105) as necessary to obtain stable steam pressure i on the following instruments.						
	A S	JAE B(A)	PRESS N	ODIFIER	R, 3-XM-1-1	52(150)	
	B. S	JAE B(A)	PRESS N	ODIFIER	R, 3-XM-1-16	67(166)	
OUE DA		- VIII 1 1					
pressure in	n called] dication.	3-XM-1-1	52 & 3-X	M-1-167 a	idjusted to	obtain a stable	
STANDARD	• <b>:</b>						
Directed US indication.	to adjust	modifiers	3-XM-1-1	52 & 3-XN	Л-1-167 to o	btain a stable pressur	е
SAT	_ UNS	ΑT	N/A _		СОММЕ	NTS:	

******	******	******	*****	**************************************
<u>PERFORMA</u>	NCE STEP:	CRITICAL	. <u>X</u>	NOT CRITICAL
[17]	<b>TRANSFER</b> SJAE STA loader to the pressure following:			trol from the manual/hand , by performing the
		set for approxin		(A) STAGE I & II, 3-PC- psig (dial located inside
				STEAM TO SJAE B(A)  ig to approximately 14
	[17.3] <b>VERIFY</b> stable STEAM TO SJA			ure is maintained on -001-0152(0150).
CUE: [Whe loader for 3	n called] 3-PC-1-152 a -PC-1-152 raised to 14	djusted for 200 psig & 3-PI-1-1	psig and 52 is stab	the manual/hand le.
STANDARD				
	to adjust 3-PC-1-152 to d Verify 3-PI-1-152 is st		C-1-152 m	anual/hand loader to
SAT	TASNU	N/A	СОММЕ	NTS:

*****	*** <del>*******</del>	******	*****	********
PERFORMANCE STEP:		CRITICAL	X	NOT CRITICAL
[18]	<b>TRANSFER</b> SJAE STAGE III pressure control from the manual/hand loader to the pressure controller at panel 25-105, by performing the following:			
	[18.1] <b>ADJUST</b> setpoint 3-PC-001-0167(0 inside controller h	166) set for ap		(A) STAGE III, ely 200 psig (dial located
	[18.2] <b>SLOWLY RAISE</b> STAGE III, 3-PC-			STEAM TO SJAE B(A) to approximately 12 PSI
	[18.3] <b>VERIFY</b> stable S. STEAM TO SJAE			
CUE: [Whe loader for 3	en called] 3-PC-1-167 ad 3-PC-1-167 raised to 12 p	justed for 200 sig & 3-PI-1-1	psig and 67 is stat	the manual/hand ble.
STANDARD	<u>):</u>	110001		
Directed US ~ 12 psig, a	to adjust 3-PC-1-167 to ~ nd Verify 3-PI-1-167 is sta	200 psig, 3-Poble.	C-1-167 m	nanual/hand loader to
SAT	UNSAT N/	Α	COMME	ENTS:
		***************************************	WWW.	

PERFORM/	ANCE STEP:	CRITICA	\L <u>X</u>	NOT CRITICAL	********* 
[19]	VERIFY both SJAE removed from serv (modifiers are local	rice are adjusted to	approximat	ely mid-position.	<u>=</u>
	A. MS SJAE A	(B) PRESS MODIF	FIER, 3-XM-	001-0150(0152)	
	B. MS SJAE A	(B) PRESS MODIF	FIER, 3-XM-	001-0166(0167)	
CUE: [Whe	n called] 3-XM-1-1	50 & 3-XM-001-01	66 are adju	sted to mid-pos	ition.
STANDARD	<u>:</u>				
	to Verify both SJAE m service are adjust				
SAT	UNSAT	_ N/A	COMME	NTS:	
**************************************	**************************************		**************************************	**************************************	*****
[20]	VERIFY SJAE TRA SJAE selected for S	AIN PERMISSIVE 3 Standby operation	B-HS-001-03 SJAE A(SJA	375 in the position AE B).	n for the
CUE: [Whe SJAE A.	n called] SJAE TR/	AIN PERMISSIVE,	3-HS-001-0	375, is selected	for
STANDARD					
Directed US the Standby	to Verify SJAE TRAI SJAE (3A).	IN PERMISSIVE, 3	3-HS-001-03	75, is in the posit	ion for
SAT	UNSAT	N/A	COMME	NTS:	
www					

JPM NO. 346 REV. NO. 0 PAGE 19 of 22

******	*********	*****	*****	*******	*****
<b>PERFORMA</b>	ANCE STEP:	CRITICAL		NOT CRITICAL	X
[21]	MONITOR hotwell pressure PRESS recorder, 3-XR-2-2			WELL TEMP AND	
STANDARD	<u>:</u>				
Monitored ho	otwell pressure.				
SAT	N/A		СОММЕ	NTS:	
					,
*****	***********	******	*****	******	*****
PERFORMA	NCE STEP:	CRITICAL _		NOT CRITICAL	X_
[22]	PERFORM the following at	Panel 3-9-53:			
	[22.1] <b>VERIFY</b> Off Gas Hyd <b>TO</b> Section 8.25.	drogen Analyz	er in ma	nual operation. <b>RE</b>	FER
	[22.2] <b>MONITOR</b> Off Gas H HYDROGEN ANALY conditions are stable	ŹER 3-H2R-6			AS
CUE: [When Analyzer in	n addressed] Another Ope service and monitor H2 lev	rator will plac	ce the C	ff Gas Hydrogen	
CHE. That					
CUE: Inat	completes this task.				

JPM NO. 346 REV. NO. 0 PAGE 20 of 22

PERFORMANCE STEP:		NOT CRITICAL	
PERFORMER demonstrated the use of	SELF CHECK	ING during this JPM	
STANDARD:			
PERFORMER verified applicable composition accordance with plant standards.	onents by utiliz	ing SELF CHECKING in	
SAT N/A		COMMENTS:	
**************************************		**************************************	
PERFORMER demonstrated the use of	3-WAY COMM	MUNICATION during this J	РМ
STANDARD:			
PERFORMER utilized 3-WAY COMMUN	NICATION in a	ccordance with plant stand	dards.
SAT N/A		COMMENTS:	
			****
ENI STOP TIME:	O OF TASK		

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge

"That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** 

You are an Operator. Unit 3 is at 100% power. 3A steam jet air ejector is in service in accordance with Section 5.9 of 3-Ol-66. 3A steam jet air ejector is to be removed from service for maintenance and 3B steam jet air ejector is to be placed into operation. HWC is shutdown per 3-Ol-4.

**INITIATING CUES:** 

Remove 3A steam jet air ejector from service and place 3B

steam jet air ejector into operation.

# Appendix A (Page 2 of 2)

Date:
RPHP Required by OI?X_(Y)(N) RPHP Required For GOI?(Y)X_(N)  RCI-17 Controls Necessary?X_(Y)(N)  Radiation Protection Supervisor Signature for Release
RCI-17 Controls Necessary? X (Y) (N)  Radiation Protection Supervisor Signature for Release  Joe Neutron Date: Today Time: Now
Radiation Protection Supervisor Signature for Release
Joe Neutron Date: <u>Today</u> Time: <u>Now</u>
Comments: For swapping SJAE from 3A to 3B
Name Of Radiation Protection Person Notified:
Date: <u>Today</u> Time: <u>Now</u>
Step#8.14[1] Procedure: 3-OI-66 (if not this procedure) Rev: Current
RPHP Required by OI? X (Y) (N) RPHP Required For GOI? (Y) X (N)
RCI-17 Controls Necessary? X (Y) (N)
Radiation Protection Supervisor Signature for Release
Joe Neutron Date: <u>Today</u> Time: <u>Now</u>
Comments: Contingency in case 3B SJAE fails to swap back to 3A

**FORWARD** copies of completed Appendix pages to Radiation Protection Supervisor.

**IN-SIMULATOR:** I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

INITIAL CONDITIONS: You are an Operator. Unit 3 is at 100% power. 3A steam jet

air ejector is in service in accordance with Section 5.9 of 3-Ol-66. 3A steam jet air ejector is to be removed from service for maintenance and 3B steam jet air ejector is to be placed

into operation. HWC is shutdown per 3-OI-4.

INITIATING CUES: Remove 3A steam jet air ejector from service and place 3B

steam jet air ejector into operation.

# Appendix A (Page 2 of 2)

Name Of Radiation Protection Person Notified: <u>Joe Neutron</u>
Date:TodayTime:Now
Step#8.4[2] Procedure:3-OI-66 (if not this procedure) Rev: Current_
RPHP Required by OI? X (Y) (N) RPHP Required For GOI? (Y) X (N)
RCI-17 Controls Necessary? X (Y) (N)
Radiation Protection Supervisor Signature for Release
Joe Neutron Date: <u>Today</u> Time: <u>Now</u>
Comments: For swapping SJAE from 3A to 3B
Name Of Radiation Protection Person Notified:
Date: Today Time: Now
Step# 8.14[1] Procedure: 3-OI-66 (if not this procedure) Rev: Current
RPHP Required by OI? X (Y) (N) RPHP Required For GOI? (Y) X (N)
RCI-17 Controls Necessary? X (Y) (N)
Radiation Protection Supervisor Signature for Release
Joe Neutron Date: <u>Today</u> Time: <u>Now</u>
Comments: Contingency in case 3B SJAE fails to swap back to 3A

**FORWARD** copies of completed Appendix pages to Radiation Protection Supervisor.



#### Browns Ferry Nuclear Plant

#### Unit 3

Operating Instruction

3-OI-66

Off-Gas System

Revision 0057

**Quality Related** 

Level of Use: Continuous Use

Effective Date: 03-10-2009

Responsible Organization: OPS, Operations

Prepared By: William Wambsgan @ 6360

Approved By: John T. Kulisek

BFN Off-Gas System 3-OI-66
Unit 3 Rev. 0057
Page 2 of 119

#### **Current Revision Description**

Type of Change: Enhancement

Tracking Number: 062

PERs 156353-005, 155018, 155579

PCRs 08003038, 09000711, 09000482, 08004562, 08004607, 08003975, 08003361,

08001567, 07003894, 09000743

affected pages 19, 25, 26, 47, 55, 57, 59, 62, 81, 84, 88, 92, 93, 94, 106, 110, 111, 113, 114

PCR 08003038, This revision makes all of the associated procedure attachments standalone external attachments that are revised and issued independent of the parent document for all future revisions. No changes are made to the procedure that affects operator activities. This change is administrative in nature.

PCR 09000711, 08004159, pages 25,26,110,111, Added note and steps to drain the mechanical vacuum pumps Separator.

PCR 09000482, page 84 added panel UNID's step 8.14, [2][9][10]

PCR 08004562, page 57, added new step 7.1[22] to open recombiner drain valves.

PCR 08004607, page 88, corrected caution to state amps increase when valve is throttled open. page 106, reworded step to open valves and release caution order.

PCR 08003975, corrected note to state correct direction to turn regulator

PCR 08003361, page 47, 55, 81, revised steps 5.10 [4][5] and 7.1[10][11][14] to operate valves in breezeway

PCR 08001567, page 92, 93, Section 8.18, added steps for manual control of 3-LIC-66-93(94)

PCR 07003894, page 19, 59, 113, 114, Added new section 8.27 to allow leads lifted to stop relays K2A and K2B from chattering. Added 4.0[1.2] to land leads and 7.1[27] to lift. PCR 09000743, page 94, Section 8.19[3] added note 4, Jumper installation is intended to be used during periods of high heat sink (river) temperature or to support maintenance activities.

#### THIS REVISION AFFECTS SYSTEM STATUS

BFN Unit 3

#### Off-Gas System

3-OI-66 Rev. 0057 Page 3 of 119

#### **Table of Contents**

1.0	PURPOSE	6
2.0	REFERENCES	6
2.1	Technical Specifications	6
2.2	Technical Requirements Manual	. 6
2.3	Offsite Dose Calculation Manual	. 6
2.4	Final Safety Analysis Report	. 6
2.5	Plant Instructions	. 6
2.6	Plant Drawings	. 8
2.7	Vendor Manuals	. 9
2.8	Miscellaneous Documents	. 9
3.0	PRECAUTIONS AND LIMITATIONS	11
3.1	Radiation Protection Notifications and Radiological Protection Hold Points (RPHPs) [SOER 01-1, BFN PER 126211, PER 961778, PER 116666]	17
4.0	PRESTARTUP/STANDBY READINESS REQUIREMENTS	19
5.0	STARTUP	23
5.1	Establishing Off-Gas Stack Air Flow	
5.2	Placing Mechanical Vacuum Pump in Service2	25
5.3	Placing Glycol Cooling in Service	28
5.4	Placing Chilled Water System in Service	0
5.5	Restoring Off-Gas Treatment Building Sump Loop Seal	3
5.6	Dry Air Purge and Recombiner Warmup3	4
5.7	Steam Warming of Off-Gas System from SJAEs	8
5.8	Placing SJAEs in Service with Auxiliary Boiler Steam	1
5.9	Transfer of SJAEs from Aux Boiler Steam to Main Steam4	3
5.10	Transfer of Preheaters from Aux Boiler Steam to Main Steam4	7
5.11	Aligning Charcoal Filters for Parallel Flow49	9
6.0	SYSTEM OPERATIONS50	0
6.1	Recombiner Performance Evaluation	
6.2	Monthly Seal Air Flow Checks During Normal Operation	2
7.0	SHUTDOWN53	3

# BFN Off-Gas System 3-OI-66 Unit 3 Rev. 0057 Page 4 of 119

#### **Table of Contents (continued)**

	rabio di Continuo (Continuou)	
7.1	Shutting Down the Off-Gas System	53
8.0	INFREQUENT OPERATIONS	60
8.1	Hydrogen Analyzer Trouble-Shooting	60
8.2	Purging Off-Gas System	63
8.3	Placing Standby Recombiner in Operation	65
8.4	Placing Standby SJAE in Operation	67
8.5	Placing Standby Cooler Condenser in Operation	72
8.6	Standby Stack Dilution Fan Operation	73
8.7	Placing Standby Prefilters in Operations	74
8.8	Placing Standby Afterfilters in Operation	75
8.9	Placing Standby Filter Cubicle Exhaust Fan in Operation	76
8.10	Aligning Charcoal Beds in Series	77
8.11	Placing Charcoal Beds in Parallel with Another Unit	78
8.12	Swapping SJAEs and Preheaters from MS to Aux Boiler Steam	80
8.13	Establishing or Re-Establishing SJAE Loop Seal	82
8.14	Returning a SJAE to Service	83
8.15	Using U-2 Off-Gas Chiller to Supply Chilled Water to U-3	86
8.16	Restoring U-2 Off-Gas Chiller Lineup from U-3 to U-2	89
8.17	Using the Purge Air System for Dilution Air Flow	91
8.18	System Operation With Malfunctioning Off Gas Condenser Drain Valve Controllers 3-LIC-66-093 and 3-LIC-66-094. [SEOPR 96-03-066-002]	92
8.19	Dual Recombiner Room Cooling Coil Operation	94
8.20	Placing Standby Recombiner Room Cooling Coil in Operation	100
8.21	Placing Alternate Glycol Chiller in Service	101
8.22	Unit 3 Operation Without Off-Gas Chiller	102
8.23	Dual Unit Operation With a Shared Off-Gas Chiller	104
8.24	Swapping Glycol Pumps	107
8.25	Manual Operation of Hydrogen Analyzer	108
8.26	Condenser Purge using Mechanical Vacuum Pumps	110
8.27	System Shutdown Off-Gas Condenser relay K2A, K2B Chatter	113
Illustr	ation 1: Recombine Performance Evaluation - ∆T to Reactor Power	115

BFN Unit 3	Off-Gas System	3-OI-66 Rev. 0057
		Page 5 of 119

#### **Table of Contents (continued)**

	rable of Contents (continued)	
Illustration 2:	Steam Packing Exhauster Breaker Interface Plaque11	16
Illustration 3:	Recombiner Room Cooling Fan Breaker Interface Plaque 11	17
Appendix A:	Radiation Protection Notifications 11	18
ATTACHMENTS	S	
Attachment 1:	Off-Gas System Valve Lineup Checklist	
Attachment 2:	Off-Gas System Panel Lineup Checklist	
Attachment 3:	Off-Gas System Electrical Lineup Checklist	
Attachment 4:	Off-Gas System Instrument Inspection Lineup Checklist.	
Attachment 5:	Off-Gas System Monthly Seal Air Flow Checklist.	

BFN	Off-Gas System	3-OI-66
Unit 3		Rev. 0057
		Page 6 of 119

#### 1.0 PURPOSE

The purpose of this procedure is to provide instruction for operation of the Off-Gas (OG) System. Operation of the following subsystems and components are included: Steam Jet Air Ejector (SJAE)-Recombiner Trains, Glycol Cooler, Charcoal Adsorber, Mechanical (Condenser) Vacuum Pump, and Hydrogen Analyzers.

#### 2.0 REFERENCES

#### 2.1 Technical Specifications

Section 5.4, Procedures

Section 5.5, Programs and Manuals

Section 5.5.8, Explosive Gas and Storage Tank Radioactivity Monitoring Program

#### 2.2 Technical Requirements Manual

Section 3.3.9, Offgas Hydrogen Analyzer Instrumentation

Section 3.7.2, Airborne Effluents

#### 2.3 Offsite Dose Calculation Manual

Section 1/2.2.2, Gaseous Effluents

#### 2.4 Final Safety Analysis Report

Section 9.5, Gaseous Radwaste System

Section 10.23, Hydrogen Water Chemistry System

Section 13.0, Conduct of Operations

#### 2.5 Plant Instructions

3-AOI-47-3, Loss of Condenser Vacuum Abnormal

3-AOI-66-1, Off-Gas H<sub>2</sub> High Abnormal

3-AOI-66-2, Off-Gas Post-Treatment Radiation HI-HI-HI Abnormal

3-OI-1, Main Steam System

3-OI-2, Condensate System

BFN	Off-Gas System	3-OI-66	
Unit 3	•	Rev. 0057	ļ
		Page 7 of 119	

#### 2.5 Plant Instructions (continued)

0-OI-2C, Demineralized Water System

3-OI-4, Hydrogen Water Chemistry System

0-OI-12, Auxiliary Boilers System

3-OI-24, Raw Cooling Water System

0-OI-25, Raw Service Water System

SPP-5.3, Chemistry Control

3-OI-30C, Turbine Building Ventilation System

0-OI-32, Control Air System

0-OI-33, Service Air System

3-OI-37, Gland Seal Water System

3-OI-47, Turbine Generator System

3-OI-47C, Seal Steam System

0-OI-57B, 480V/240V AC Electrical System

0-OI-57C, 208V/120V AC Electrical System

0-OI-57D, DC Electrical System

1-, 2-, 3-OI-90, Radiation Monitoring System

3-OI-99, Reactor Protection System

3-GOI-100-1A, Unit Startup from Cold Shutdown to Power Operation and Return to Full Power From Power Reductions

3-GOI-100-12A, Unit Shutdown from Power Operation to Cold Shutdown and Reductions in Power During Power Operations

3-ARP-9-7, Alarm Response Procedure

3-SI-4.2.K-5(A) and (B), Off-Gas Hydrogen Analyzer A and B Calibration

BFN	Off-Gas System	3-OI-66	
Unit 3		Rev. 0057	
		Page 8 of 119	

#### 2.5 Plant Instructions (continued)

15N711-1, 480V Auxiliary Power

2912402, Piping & Instrument Diagram - Glycol Cooler

2912463, Glycol Cooler

#### 2.6 Plant Drawings

2912471, Glycol Cooler

45N602-7, Turbo-Generator Auxiliary

3-47E610-1-4, Main Steam System

3-47E610-2-1B, Condensate System

3-47E610-4, Mechanical Instrument and Control Diagram Hydrogen Water Chemistry System

47W610-6 series, Heater Drains and Vents

3-47E610-66 series, Off-Gas System

45N614 series, 120V AC/250V DC Valves & Misc

0-15E701-1, 480V Motor Control Center A

0-15E701-2, 480V MCC B

7-45E732-3, 480V Diesel Auxiliary Bd B

0-45E736-1, 480V Control Bay Vent Bd A

3-45E747-1, 480V Unit Board 3A

3-45E747-2, 480V Unit Board 3B

3-45E753-1, 480V Turbine MOV Bd 3A

3-45E753-3, -4, 480V Turbine MOV Bd 3B

3-45E753-5, -6, 480V Turbine MOV Bd 3C

45N777 series, 480-V Unit Auxiliary Power

3-47E801 series, Main Steam

3-47E805 series, Heater Drains and Vents

BFN	Off-Gas System	3-OI-66
Unit 3		Rev. 0057
		Page 9 of 119

#### 2.6 Plant Drawings (continued)

3-47E809-5, Flow Diagram Offgas Sample Panel

3-47E809 series, Off-Gas System

3-47E815 series, Auxiliary Boiler System

3-47E866-6, Recombiner Room & Off-Gas Dehumidification System

3-105E2602, Offgas Monitor Panel Elementary Diagram

#### 2.7 Vendor Manuals

GEK-45765, Off-Gas System, BFN-CVM-0041, BFN-VTM-G080-9280

Cosmodyne Glycol Coolers, BFN-VTM-C650-0010, Contract # 84698, 90744, and 91750

ACME Freon Refrigeration Compressors (Chilled Water), Contract #91167, BFN-CVM-1139, BFN-VTM-A035-0010

Air Correction Division (Gen. Instr. Catalytic Recombiners), Contract #90744, BFN-CVM-1146, BFN-VTM-CA28-0010

Process Equipment Co. Instruction Manual (Moisture and Water

Separators), Contract #90744, BFN-CVM-1600, BFN-VTM-P400-0010

Foster Wheeler Operating Instructions (Precooler and SJAE), Contract #90744 and 91750, BFN-VTM-F175-0040

MSA Research Corporation (HEPA Filters), Contract #90744 and 91750, BFN-CVM-0622

Cosmodyne Glycol Coolers, BFN-VTM-C650-0010, Contract #'s 84698, 90744 and 91750

GEK-105901, General Electric Offgas Monitor Panel

#### 2.8 Miscellaneous Documents

GE SIL 150R2, Ignition Prevention for Recombiner/Charcoal Adsorber Off-Gas Systems

GE SIL 497, Hydrogen Ignition in Off-Gas System

INPO SOER 82-013, Intrusion of Resin, Lubricating Oils, and Organic Chemicals Into Reactor Coolant Water

BFN	Off-Gas System	3-OI-66	
Unit 3		Rev. 0057	
		Page 10 of 119	

#### 2.8 Miscellaneous Documents (continued)

EWR No 97-0-066-077, Operation of Unit 2 and/or 3 With Off-Gas Dehumidification Chiller Out Of Service

SEOPR 96-03-066-002 Off Gas Condenser Level Controller System

SEOPR 96-02-066-004, Isolating RCW to Off Gas Precooler

BFPER 960835 Recombiner Room Parallel Cooler Operation

T. F. Van Natta, Jr. To J. D. Shaw, Use of Auxiliary Boiler Steam for Steam Jet Air Ejectors (SJAE) Above 10% Reactor Power, January 6, 1997

EWR No. 96-0-066-006, Use of Auxiliary Boiler Steam for the Steam Jet Air Ejectors (SJAE), 1/9/97

BFN	Off-Gas System	3-OI-66
Unit 3		Rev. 0057
		Page 11 of 119

#### 3.0 PRECAUTIONS AND LIMITATIONS

- A. [NER/C] Chemical contamination of the Off-Gas Building floor drains with glycol is to be avoided since the substance can pass through the Radwaste System process and eventually be injected to the reactor via the Condensate System. [INPO SER 82-013]
- B. The recombiner is required to be warmed to greater than 240°F and purged with dry air prior to admitting process gas. Recombiner is NOT to be operated with inlet temperature less than 240°F.
- C. Reference to Technical Specifications, Technical Requirements Manual and the ODCM is required if the Off-Gas Post-Treatment Radiation Monitor, Off-Gas Hydrogen Analyzer, or Mechanical Vacuum Pump is made or found to be inoperable.
- D. Seal air to Off-Gas System valves is required to be maintained to prevent off-gas leakage through valve packing.
- E. Glycol coolant refrigeration machine crankcase heaters should be on at least 2 hours before starting glycol unit.
- F. The following stack dilution fan operational requirements should be observed:
  - One Unit 3 Stack Dilution Fan is required to remain in operation to provide dilution air flow when Unit 3 Off Gas System is required for unit operation. This requirement provides dilution flow to any potential hydrogen concentration in Off Gas flow.
  - 2. The required flow for stack gas 0-FI-90-271 is 16,366 scfm. To preclude receiving erroneous alarms, optimum flow is 18,500. Either one or both Stack Gas Dilution Fans may be placed in service to satisfy these requirements. This could require 4 Stack Dilution fans (total for the plant) to be placed in service. This requirement provides minimum main stack flow for clear and accurate isokinetic radioactive release rate sampling and monitoring. Any two Stack Dilution Fans from separate Units and one Filter Cubicle Exhaust Fan as a minimum in service could meet this flow rate.
  - 3. When all SBGT Trains are secured and any evolution has the potential to discharge radioactive effluents through the main stack, one Unit 2 and one Unit 3 Stack Dilution Fan should remain in operation. This requirement provides clean air flow through the dilution cross-tie to SBGT ducts. This prevents the potential back flow of radioactive effluents through the SBGT duct work.
- G. Following startup, while still at low power, recombiner performance and hydrogen concentration should be closely monitored.

BFN	Off-Gas System	3-01-66	
Unit 3		Rev. 0057	
		Page 12 of 119	

- H. Off-Gas System valves are potentially spark-producing when operated; therefore, when hydrogen concentration is suspected of being greater than 4%, NO action is allowed to be taken that will change off-gas valve positions until after the unit is shut down except for the SJAE's, which may be started following an isolation, and alternated if required with greater than 4% hydrogen. SJAE's have non-sparking valve seats, and hydrogen flammability lower limit is NOT a concern in a saturated steam environment.
- The mechanical vacuum pump is NOT be used to purge the main condenser if hydrogen concentration is suspected of being present.
- J. The mechanical vacuum pumps is NOT be used when reactor power is greater than 5% unless being electrically rotated for Preventive Maintenance.

The mechanical vacuum pump(s) may be electrically rotated for Preventive Maintenance if the suction valve(s) are closed and the seal water in service to prevent seizing. This requires the automatic trip to be defeated by a step text Work Order. [BFPER 00-003819-000] [BFPER 02-014849-000]

- K. Charcoal bed alignment during power operation is NOT to be changed. Any major change in off-gas flow will disturb bed equilibrium and result in a temporary (8 to 12 days) rise in stack discharge activity.
- L. Charcoal bed prefilter and afterfilter differential pressure is NOT to exceed 10" H2O. Switching to standby filters is recommended when filter differential pressure reaches 8"  $H_2O$ .
- M. The mechanical vacuum pumps will auto trip under any of the following conditions:
  - 1. Hotwell pressure is equal to or below -26" HG, or
  - Hotwell pressure is equal to or below -22" HG, with reactor pressure greater than or equal to 600 psig (vacuum pumps suction valves also auto close), or
  - 3. Main Steam Line radiation is greater than or equal to 3 times normal background at full load (vacuum pumps suction valves also close), or
  - 4. Seal water pump trips, or
  - 5. Undervoltage.
- N. During SJAE operation, steam supply pressure is to be maintained between 190 and 225 psig. Insufficient steam pressure will result in improper dilution of hydrogen. Excessive steam pressure causes water droplet carryover which reduces recombiner efficiency.

BFN	Off-Gas System	3-OI-66
Unit 3		Rev. 0057
		Page 13 of 119

- O. During power operation above 25% power, the discharge of the SJAEs is to be routed through the charcoal adsorber.
- P. Mechanical vacuum pumps will NOT start unless a seal water pump is running and hotwell pressure is above -26" Hg.
- Q. OFF-GAS SYSTEM ISOLATION VALVE, 3-FCV-066-0028:
  - Off-Gas System auto isolation (closure of 3-FCV-066-0028) will occur on any combination of HI-HI-HI, downscale, or inoperable trip simultaneously in both trip channels of the post-treatment Radiation Monitoring System after a five second time delay.
  - 2. Off-Gas System Isolation Valve, 3-FCV-066-0028, is an air-to-open against spring pressure, diaphragm operated valve. The valve is designed to faill closed on loss of Control Air Supply; or with loss of power to the solenoid operated valves that supply air to the valve.
  - 3. A handwheel is attached to the valve that can be engaged to mechanically restrain the valve open against spring pressure. Rotating the handwheel clockwise restrains the valve in the open position, overriding all automatic closures. Rotating the handwheel to the fully counter-clockwise position allows the valve to operate normally and to close with spring pressure. The handwheel will only be used to open the valve in the event of a failure during Unit power operation. Manually opening the valve is only allowed in the event of a Control Air, power, solenoid, or diaphragm failure.
- R. Dehumidifier drain 66-19, and Holdup volume drain 66-23 will auto close on high pressure in the Holdup Volume (10 psig).
- S. After auto isolation, 3-HS-90-155 is to be placed to RESET and then AUTO to place system back in service when initiating conditions clear.
- T. During operations with valid CONDENSER A, B, OR C VACUUM LOW 3-PA-47-125 alarm, and condensate temperature of 136 F or greater at the inlet of the SJAE (ICS point 2-28), reduced SJAE First Stage performance (stalling) could occur. This condition will cause reduced Off Gas flow and a loss of vacuum/turbine trip. [BFPER 02-016091-000]

BFN	Off-Gas System	3-OI-66
Unit 3		Rev. 0057
		Page 14 of 119

- U. To place an individual SJAE in service (manually), the following conditions are required:
  - 1. Inlet and outlet condensate valves open and condensate pressure greater than or equal to 60 psig.
  - 2. Main Steam Supply pressure 173 psig and rising (Aux. Steam Supply pressure 165 psig and rising) (30 second time delay). (disabled for the SJAE selected by 3-HS-001-0375)
- V. Individual SJAE shutdown (PCV closure) is caused by:
  - 1. Condensate pressure less than 60 psig or inlet/outlet condensate valve fully closed.
  - 2. Main Steam or Aux Steam pressure 155 psig and lowering.
- W. Air purging of an isolated SJAE is required prior to and during maintenance of the SJAE and associated piping in order to eliminate the buildup of combustible gases.
- X. Pressure switch 3-PS-012-0080A(B) allows operation of the SJAEs on auxiliary boiler steam by opening valves 3-FCV-066-0014(0018) SJAE discharge valve and 3-FCV-001-0150(0152) SJAE intercondenser drain valves when auxiliary steam pressure is 165 psig rising. These valves will close at 155 psig lowering.
- Y. Placing handswitch 3-HS-001-0150(0152) to OPEN will:
  - 1. Shut off auxiliary boiler steam to both SJAEs after a 60 second time delay.
  - Close the main steam pressure control valves, 3-PCV-001-0151(0153) and 3-PCV-001-0166(0167) if at least 173 psig main steam supply pressure is NOT achieved within 30 seconds. (disabled for the SJAE selected by 3-HS-001-0375)
- Z. Once the SJAE is placed in service on main steam and the bypass switch is NOT selected for the operating SJAE, if steam supply pressure to the SJAE falls below 155 psig for 5 seconds to either the 1st, 2nd, or 3rd stage, the following valves will close:
  - 3-FCV-066-0014(0018), SJAE 3A(3B) OUTLET
  - 3-FCV-001-0150(0152), SJAE A(B) INTERCONDENSER DRAIN
  - 3-PCV-001-0166(0167), STEAM TO SJAE A(B) STAGE III
  - 3-PCV-001-0151(0153), STEAM TO SJAE A(B) STAGE I & II

BFN	Off-Gas System	3-OI-66
Unit 3		Rev. 0057
		Page 15 of 119

- AA. Just prior to establishing condenser vacuum, the CNDS DEMIN SAMPLE TO CRW VLV, 3-DRV-043-1061 and the HOTWELL SAMPLE DR TO FL DR, 3-DRV-043-1019 should be closed to prevent loss of vacuum.
- BB. [NER/C] Low point drains are required to be maintained in the open position during startup to reduce the likelihood of recombiner quenching. [GE SIL 497]
- CC. [NER/C] At least one of the hydrogen monitors is required to be placed in the manual mode during any Off-Gas System transient to ensure continuous availability of monitoring. [GE SIL 497]
- DD. A hydrogen analyzer is to be declared inoperable if no flow can be established.
- EE. Lowering recombiner temperature is a direct indication of moisture carryover. Therefore, recombiner temperature should be monitored during SJAE transfers.
- FF. Chemistry notification is required when any system changes are made that could affect the chilled water system volume (additions to or draining from, crossties between units, etc.).
- GG. [SEOPR] RCW may be isolated to the Off Gas Precooler for a maximum of 8 hours. During this time, SJAE suction pressures is to be closely monitored for the first 15 minutes that the RCW is isolated.
  - If either SJAE suction pressure changes by greater than 1" hg, then RCW flow is to be restored to the Precooler.[96-02-066-004]
- HH. The presence of any available oxygen in the effluent of the Off-gas recombiners indicates that sufficient oxygen is present for complete recombination of the hydrogen entering the recombiner.
  - The Hydrogen Water Chemistry System should be adjusted to maintain oxygen at the effluent of the recombiner at 21%, complete recombination of all hydrogen entering the recombiner does NOT require 21% oxygen to be present.
- II. Securing Hydrogen injection to the Condensate System could result in a small net RISE or FALL in the amount of hydrogen leaving the reactor, depending upon the initial hydrogen injection rate.
  - Performing an immediate shutdown of the Hydrogen Water Chemistry (HWC) System in response to a High Off-gas hydrogen concentration is NOT recommended unless a failure in the HWC System is found.

BFN Unit 3	Off-Gas System	3-OI-66 Rev. 0057	
		Page 16 of 119	

JJ. The net amount of hydrogen leaving the reactor when operating at certain hydrogen injection rates (without Noble Metal Coating Injection) in the Hydrogen Water Chemistry System could be less than the hydrogen released by the radiolysis reaction when NOT using HWC.

A drop in recombiner temperatures could occur when the HWC system is in service at an injection rate just sufficient to minimize the radiolysis. Raising hydrogen injection rates to values above the rate which yields minimum radiolysis would cause recombiner temperatures to rise again due to additional hydrogen recombination.

- KK. Isolation of the Steam Jet Air Ejectors (both 3-FCV-66-14 and 66-18 closed), will result in the HWC System, if in service, having an automatic trip which immediately isolates both Hydrogen and Oxygen injection. This situation will result in rising Hydrogen concentration in the Offgas System due to very little recombination taking place. The duration of this transient will depend on the injection rate and when the SJAE is placed back in service. The duration of this transient should be less than 15 minutes from the time Offgas flow is re-established through the SJAE.
- LL. An automatic shutdown of the HWC system occurs if the Off-gas oxygen concentration either exceeds 40% or falls below 5% oxygen.
- MM. No automatic shutdown of the HWC system occurs as a result of high hydrogen levels in the Off-gas system.
- NN. The HWC system should be shut down prior to intentional swapping of SJAEs to prevent receipt of the automatic shutdown of the HWC system that will occur when both SJAE DISCHARGE VALVES 3-FCV-66-14 and 18 are closed.
- OO. The off-gas H2/O2 analyzers perform an auto calibration check every 12 hours. A WO should be initiated if the analyzer fails to perform this auto calibration check.
- PP. DCN 50884A \modified the SJAE control circuits to remove the steam block valve position interlocks between the inservice SJAE PCVs(PCV-1-151,153,166,167) and the standby SJAE steam block valves (FCV-1-155,156,172,173).

This DCN also installed a switch which bypasses the steam pressure requirement (>170psig) for the SJAE, it is normally selected to bypass the SJAE in standby.

BFN	Off-Gas System	3-OI-66
Unit 3	·	Rev. 0057
		Page 17 of 119

- QQ. Due to being electrically interlocked, if the breaker for one Steam Packing Exhauster is racked out, then the other SPE will NOT run.
- RR. Due to being electrically interlocked, if the breaker for one Recombiner Room Cooling Coil is racked out, then the other Recombiner Room Cooling Coil will NOT run.

### Radiation Protection Notifications and Radiological Protection Hold Points (RPHPs) [SOER 01-1, BFN PER 126211, PER 961778, PER 116666]

To reduce the probability that this procedure might cause unintended radiation exposures, the following controls are established:

A. Radiological Protection Hold Points (RPHPs) steps are contained in this procedure to allow Radiation Protection to implement RCI requirements. These steps clearly state that an RPHP is in effect. When notifying Radiation Protection, it should be made clear as to the procedure being used and that an RPHP is in effect. An Appendix titled "Radiation Protection Notification Record" is provided to record Radiation Protection notifications with RPHPs, and the release of RPHPs. The instructions with the appendix provides directions for completion. The procedure cannot be continued beyond the RPHP step until the appendix is signed by the Radiation Protection Supervisor to release the RPHP.

If, at any time while performing this procedure, or while performing a support procedure, Radiation Protection personnel or other knowledgeable shift member identifies the need for a RPHP when not identified by a procedure, then the following is performed:

- 1. "RPHP" is written to the left of the affected procedure step number. If the RPHP is identified for a support procedure, then RPHP is placed to the left of the step in this OI that initiates the support procedure and at the appropriate step in the support procedure.
- 2. The appropriate notifications are made to Radiation Protection personnel.
- 3. The instructions for Appendix L is to be used to identify the appropriate required logging of Radiological Protection entries.
- B. Any Radiation Protection notification steps <u>not</u> identified as RPHP steps are considered courtesy notification steps. Most require an entry be made into the NOMS narrative log. These courtesy notification steps <u>DO NOT</u> require a hold in the procedure <u>OR</u> the Appendix completed unless Radiation Protection identifies an RPHP may be necessary at some point after the notification is made.

BFN	Off-Gas System	3-OI-66
Unit 3	•	Rev. 0057
		Page 18 of 119

## 3.1 Radiation Protection Notifications and Radiological Protection Hold Points (RPHPs) [SOER 01-1, BFN PER 126211, PER 961778, PER 116666] (continued)

- C. All Radiation Protection notification steps are written based on normal operating conditions existing. If any Radiation Protection notification step is in line with actions being taken in response to a transient, then the Unit Supervisor will determine if the Notification is actually required before continuing.
- D. All Radiation Protection notification steps have an initial line to ensure the step is not inadvertently missed. These initial lines, by themselves, do not imply any retention is required for the associated procedure pages. An (R) placed in the step initial line, means these steps <u>CANNOT</u> be omitted <u>unless</u>:
  - the action associated with the step is not performed, OR
  - 2. the Radiation Protection notification requirements are currently satisfied for the action, OR
  - 3. the step allows the notification to be N/A'd as determined by the Unit Supervisor.
- E. Removal of any Radiation Protection <u>Notification</u> from this procedure requires Operations Management and Radiation Protection Management approval unless the action(s) related to the notification is also removed.

Removal or addition of any procedure <u>actions</u> that require Radiation Protection notification, requires that Radiation Protection be notified.

BFN	Off-Gas System	3-OI-66
Unit 3		Rev. 0057
		Page 67 of 119

#### 8.4 Placing Standby SJAE in Operation

			NOTES	
1)	Panel 2	25-10	05 located in Unit 3 Turbine Bldg. El 586' T12-C.	
2)	receipt	of th	ystem is shut down prior to intentional swapping of SJAEs e automatic trip of the HWC system that will occur when be VALVES 3-FCV-66-14 and 18 are closed.	s to prevent both SJAE
	[1]	RI	<b>EVIEW</b> all Precautions and Limitations in Section 3.0.	
	[2]	IF	determined necessary by Unit Supervisor, THEN (Otherw	vise N/A)
		pla	OTIFY Radiation Protection that an RPHP exist for the impace the standby SJAE (3A or 3B) in service. RECORD time to tection notified in the NOMS Narrative Log. [BFN PER 126211	e Radiation
				(R)
				Initials
	[2	2.1]	VERIFY appropriate data and signatures recorded on accordance with Appendix A Instructions [Tech Spec 5.7, State of the Per 126211]	• •
				(R)
	501			Initials
	[3]	VE	RIFY the following initial conditions have been met:	
		Α.	IF HWC System is in service, THEN (Otherwise N/A)	
			SHUT DOWN HWC System. REFER TO 3-0I-4.	
		B.	SJAEs are in operation. <b>REFER TO</b> Section 5.9.	
	[4]	VE	RIFY OPEN the following valves at Panel 3-9-6, :	
		A.	SJAE 3B(3A) CNDS INLET VALVE, using 3-HS-2-31A(36A)	
		B.	SJAE 3B(3A) CNDS OUTLET VALVE, using 3-HS-2-35A(41A)	
	[5]		RIFY CONDENSATE FROM SJAE B(A) pressure, PI-2-34(40), is greater than 60 psig at Panel 25-105,	

BFN	Off-Gas System	3-OI-66
Unit 3		Rev. 0057
		Page 68 of 119

#### 8.4 Placing Standby SJAE in Operation (continued)

		5	, continuou,	
	[6]	CO	RIFY manual/hand loader output pressure and pressure ntroller setpoints at panel 25-105, are adjusted as follows:	
		A.	Setpoint for STEAM TO SJAE B(A) STAGE I & II, 3-PC-001-0152(0150) set for approximately 225 psig (dial located inside controller housing).	
		B.	Manual/Hand loader for STEAM TO SJAE B(A) STAGE I & II, 3-PC-001-0152(0150) set for approximately 14 psig.	
		C.	Setpoint for STEAM TO SJAE B(A) STAGE III, 3-PC-001-0167(0166) set for approximately 225 psig (dial located inside controller housing).	
		D.	Manual/hand loader for STEAM TO SJAE B(A) STAGE III, 3-PC-001-0167(0166), set for approximately 12 psig.	
	[7]	at t	RIFY both SJAE dilution steam pressure modifiers (located he rear of panel 25-105).are adjusted to approximately l-position	
		A.	MS SJAE B(A) PRESS MODIFIER, 3-XM-001-0152(0150)	
		B.	MS SJAE B(A) PRESS MODIFIER, 3-XM-001-0167(0166)	
	[8]	<b>VEI</b> the	RIFY OPEN both SJAE Inlet Valves at panel 3-9-8, using following:	
		A.	SJAE 3A INLET VALVE, 3-HS-66-11	
		B.	SJAE 3B INLET VALVE, 3-HS-66-15	
	[9]	<b>PLA</b> 3-H	ACE the STEAM TO SJAE 3A(3B) handswitch, S-1-155A(156A), in CLOSE at panel 3-9-7.	
[	[10]	<b>PLA</b> 3-H	ACE the SJAE 3A(3B) PRESS CONTROLLER handswitch, S-1-150(152), in CLOSE at panel 3-9-7	
[	[11]	At P	anel 3-9-8, <b>PLACE</b> the SJAE 3A(3B) OG OUTLET VALVE g 3-HS-66-14(18) in CLOSE.	
]	12]	<b>PLA</b> VAL	CE in OPEN/AUTO the SJAE 3B(3A) OG OUTLET VE using, 3-HS-66-18(14) at panel 3-9-8.	
]	13]	PLA 3-HS	CE the STEAM TO SJAE 3B(3A) handswitch, S-1-156A(155A), in OPEN at panel 3-9-7	П

BFN Unit 3			Off-Gas System	3-OI-66 Rev. 0057 Page 69 of 119	
8.4	Plac	ing (	Standby SJAE in Operation (continue	ed)	
	[14]	<b>PL</b> ha	ACE the STEAM TO SJAE 3B(3A)PREINDEN and switch, 3-HS-1-152(150), in OPEN and switch and subject to the subject	ESS CONTROLLER t Panel 3-9-7 [	
	· · · · · · · · · · · · · · · · · · ·		NOTE		·
It ma order	y be ne	cess n the	ary to return 3-HS-1-152(150) to CLOS SJAE steam supply valves. This will re	E position, then back to OPEN set the logic sequence.	in
	[15]	ste	OJUST manual/hand loaders at Panel 26 eam pressure is indicating approximately e following indications:	5-105, until dilution v 190 to 220 psig on	
		A.	STEAM TO SJAE B(A) STAGE I & II, 3-PI-001-0152(0150)		ם ב
		B.	STEAM TO SJAE B(A) STAGE III, 3-F	PI-001-0167(0166)	]
		<del>V </del>	NOTE		
pressi slowly	ure. A s / drop to	wing zero	e next step to fully close the modifiers, we of 2-3 psig is considered stable. If this of Adjusting the pressure to the point woodifier is <b>NOT</b> closed.	occurs the indicated pressure of	Misse
	[16]	at th	JUST the SJAE dilution steam pressure ne rear of panel 25-105):as necessary am pressure indication on the following i	to obtain stable	
		A.	SJAE B(A) PRESS MODIFIER, 3-XM-	1-152(150)	
		B.	SJAE B(A) PRESS MODIFIER, 3-XM-	1-167(166)	

BFN	Off-Gas System	3-OI-66
Unit 3		Rev. 0057
		Page 70 of 119

		•	
[17]	ma	RANSFER SJAE STAGE I and II pressure control from the anual/hand loader to the pressure controller at Panel 25-105, performing the following:	
[	17.1]	<b>ADJUST</b> setpoint for STEAM TO SJAE B(A) STAGE I & II, 3-PC-001-0152(0150) set for approximately 200 psig (dial located inside controller housing).	
[	17.2]	<b>SLOWLY RAISE</b> manual/hand loader for STEAM TO SJAE B(A) STAGE I & II, 3-PC-001-0152(0150) setting to approximately 14 psig.	
[1	17.3]	<b>VERIFY</b> stable SJAE dilution steam pressure is maintained on STEAM TO SJAE B(A) STAGE I & II, 3-PI-001-0152(0150).	
[18]	ma	ANSFER SJAE STAGE III pressure control from the inual/hand loader to the pressure controller at panel 25-105, performing the following:	
[1	8.1]	<b>ADJUST</b> setpoint for STEAM TO SJAE B(A) STAGE III, 3-PC-001-0167(0166) set for approximately 200 psig (dial located inside controller housing).	
[1	8.2]	<b>SLOWLY RAISE</b> manual/hand loader for STEAM TO SJAE B(A) STAGE III, 3-PC-001-0167(0166) setting to approximately 12 PSIG.	
[1	8.3]	<b>VERIFY</b> stable SJAE dilution steam pressure is maintained on STEAM TO SJAE B(A) STAGE III, 3-PI-001-0167(0166).	
[19]	SJA	RIFY both SJAE dilution steam pressure modifiers for the AE removed from service are adjusted to approximately -position.(modifiers are located at the rear of Panel 25-105)	
	A.	MS SJAE A(B) PRESS MODIFIER, 3-XM-001-0150(0152)	
	B.	MS SJAE A(B) PRESS MODIFIER, 3-XM-001-0166(0167)	

BFN	Off-Gas System	3-01-66
Unit 3		Rev. 0057
		Page 71 of 119

		1 age 71 Of 113	
8.4	Placi	ing Standby SJAE in Operation (continued)	
	[20]	<b>VERIFY</b> SJAE TRAIN PERMISSIVE 3-HS-001-0375 in the position for the SJAE selected for Standby operation SJAE A(SJAE B).	
	[21]	<b>MONITOR</b> hotwell pressure as indicated on HOTWELL TEMP AND PRESS recorder, 3-XR-2-2 at Panel 3-9-6.	
	[22]	PERFORM the following at Panel 3-9-53:	
	[2	VERIFY Off Gas Hydrogen Analyzer in manual operation. REFER TO Section 8.25.	
	[2	MONITOR Off Gas Hydrogen concentration using the OFF GAS HYDROGEN ANALYZER 3-H2R-66-96 at Panel 3-9-53 until conditions are stable	
	[23]	WHEN stable SJAE operation has been confirmed, THEN	
		The HWC System may be placed back in service at the direction of the Unit Supervisor. REFER TO 3-OI-4, HWC System (N/A if HWC System is unavailable).	

JPM NUMBER:	113	
TITLE:	SHIFT CRD STABILIZING VALVES	
TASK NUMBER:	U-085-NO-04	
Provide a copy of 2	-OI-85, Section 6.4 (include 2-OI-85, Section 3	.1)
SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TRAINING	DATE:
PLANT CONCURR	ENCE:OPERATIONS	DATE:
* Examination JF	Ms Require Operations Training Manager Approval or D	esignee Approval and

Plant Concurrence

#### **REVISION LOG**

Revision	Effective	D	Description
1	1	Pages	Description
Number	Date	Affected	Of Revision
2	12/08/94	1,2,3,4	Re-format
3	10/26/95	All	General revision
4	08/07/97	All	General revision, add non-critical steps on Touch
			STAAR, Safety, 3-way comm
5	08/07/98	3,4,7,9	Procedure revision
6	11/14/01	All	Procedure revision
7	06/08/06	All	Procedure revision
8	03/15/09	All	General revision & re-format

OPERATOR:				
RO	SRO		DATE:	
JPM NUMBER:	113			
TASK NUMBER:	U-085-NO-04			
TASK TITLE:	SHIFT CRD STABILIZ	ING VALVES		
K/A NUMBER:	201001A3.01 K/	A RATING:	RO <u>3.0</u>	SRO <u>3.0</u>
******	*******	******	*******	******
TASK STANDARD:	SIMULATE PERFORM FROM 'A' SET OF CRI			
PERFORMANCE L	OCATION: SIMUL	ATOR PL	ANT <u>X</u> CONTROL	. ROOM
REFERENCES/PR	OCEDURES NEEDED:	2-OI-85,	Rev 116	
VALIDATION TIME	CONTROL ROC	OM: 9:00	LOCAL: _	6:00
MAX. TIME ALLOW	'ED:(F	OR TIME CR	ITICAL JPMs ONL	Y)
PERFORMANCE T	IME:			
COMMENTS:	-			
ADDITIONAL COM	MENT SHEETS ATTAC	HED?	YES	NO
RESULTS:	SATISFACTORY		UNSATISFACTOR	Y
EXAMINER SIGNA	ΓURE:		DATE:	

IN-PLANT: I will explain the initial conditions and state the task to be performed. <u>ALL STEPS WILL BE SIMULATED</u>. Do <u>NOT</u> operate any plant equipment. SELF CHECKING may be carried out to the point of touching a label. If it becomes necessary to physically touch a control switch, use a non-conductive pointing device. Observe ALL plant radiological and safety precautions. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's correct" (or That's incorrect", if applicable). When you have completed your assigned task, you will say, "My task is complete" and I will acknowledge that your task is complete.

INITIAL CONDITIONS: You are an Operator. Unit 2 is at 100% power. The 'A' set of

control rod drive system stabilizing valves are to be removed from service for solenoid maintenance. The Control Rod Drive Hydraulic System is in operation according to 2-OI-85, Section 5.1, Control Rod Drive Hydraulic System Startup.

**INITIATING CUES:** The Unit 2 Operator directs you to shift from the 'A' set of

CRD stabilizing valves to the 'B' set in accordance with 2-OI-

85, Section 6.4.

**CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!** 

JPM NO. 113 REV. NO. 8 PAGE 5 of 12

STA	RT TIM	E	<del></del>				
****	******	******	******	******	*****	******	******
PER	FORM/	ANCE STEP:		CRITICAL		NOT CRITICAL	X_
Whe	n reque	ested by exami	ner, identify/c	btain copy of	f required	procedure.	
Exar	niner N ılator, 1	lote: Applicar herefore, just	nt has demo hand him/h	nstrated obt er the proce	aining pr dure.	ocedures on the	
	NDARE						
ldent	ified or	obtained copy	of 2-OI-85.				
SAT	<del></del>	_ UNSAT	N/A		COMM	ENTS:	
		**************************************	*******			**************************************	
6.4	Shift	ing CRD Stabi	lizing Valve	Sets			
	[1]	VERIFY Conf REFER TO S		e Hydraulic S	ystem in o	operation.	
STAI	NDARD	<u>:</u>					
N/A -	- Given	in initial condit	ions.				
SAT		_ UNSAT	N/A		COMME	ENTS:	
***	***************************************						

JPM NO. 113 REV. NO. 8 PAGE 6 of 12

PERFORMA	NCE STEP:		NOT CRITICAL _	
[2]	REVIEW all Precaution	ons and Limitations in	Section 3.1.	
STANDARD	<u>:</u>			
Reviewed Se	ection 3.1.			
SAT	_ UNSAT	N/A CC	MMENTS:	
******	*******	*******	*********	****
PERFORMA	NCE STEP:	CRITICAL	X_ NOT CRITICAL _	···
[3]	<b>PERFORM</b> the following service:	ing for Stabilizing Valv	e set being brought into	
		LV FCV-85-20 A & B(I SHV-085-0580(0578).	FCV-85-21 A & B), INLET	
	[3.2] <b>OPEN</b> STAB V SHUTOFF, 2-S	LV FCV-85-20 A & B(I 3HV-085-0581(0579).	FCV-85-21 A & B), OUTLE	ΕT
CUE: [As ea	ach valve is correctly Open.	Simulated] The hand	lwheel is turning, (PAUS	E)
STANDARD:				
Simulated open	ening 2-SHV-085-0578 n the Counterclockwise	and 2-SHV-085-0579 direction.	by turning the valve	
SAT	UNSAT	N/A CO	MMENTS:	

JPM NO. 113 REV. NO. 8 PAGE 7 of 12

*****	******	*********************************** <b>*</b>	**************	**
<b>PERFORM</b>	ANCE STEP:	CRITICA	AL NOT CRITICAL X	
[4]	A(B) to selec 2-9-5.	t the Stabilizing valve set	ERVICE SELECT, 2-XS-85-20, in et being brought into service on Pane	<u>.</u>
CUE: [Who	en requested]	2-XS-85-20 has been pl	laced in the 'B' position.	
STANDARI	<u>):</u>			
Simulated r 2-9-5.	equesting Unit	2 operator to place 2-XS-	S-85-20 in the 'B' position on Panel	
SAT	UNSAT	N/A	COMMENTS:	

JPM NO. 113 REV. NO. 8 PAGE 8 of 12

*****	*****	*****	********	******** <del>******</del>	*****
PERFORM	ANCE S	STEP:	CRITICAL	NOT CRITICAL	X_
[5]	PERF service		owing for stabilizing v	alve set being removed fro	m
	[5.1]	CLOSE STA SHUTOFF, 2	AB VLV FCV-85-20 A 2-SHV-085-0580(057	& B(FCV-85-21 A & B), IN 8).	LET
	[5.2]		AB VLV FCV-85-20 A 2-SHV-085-0581(0579	& B(FCV-85-21 A & B), Ol 9).	JTLET
CUE: [As e The valve is	ach va s Close	lve is correc	tly Simulated] The h	andwheel is turning, (PA	USE)
STANDARD	<u>):</u>	1,00			
Simulated cl handwheels	losing 2 in the 0	?-SHV-085-05 Clockwise dire	80 and 2-SHV-085-0ถ ection.	581 by turning the valve	
SAT	_ UN	NSAT	_ N/A	COMMENTS:	
***************************************	· · · · · · · · · · · · · · · · · · ·				
**************************************				**************************************	
[6]	<b>VERII</b> appro	FY CRD STAE ximately 6 gpi	BILIZING FLOW, 2-FI m.	-85-22, on 2-LPNL-925-00	18B is
CUE: When	locate	ed on local pa	anel, 2-FI-85-22 indic	ates 6 gpm.	
STANDARD	) <u>:</u>				
Verified stab	ilizing f	low of approxi	imately six gpm on 2-	FI-85-22.	
SAT	_ UN	ISAT	N/A	COMMENTS:	
			COLUMN TO THE TOTAL THE TOTAL TO AL TO THE T	The state of the s	
	*******				

JPM NO. 113 REV. NO. 8 PAGE 9 of 12

PERFORM	ANCE STEP:	CRIT	CAL	NOT CRITICAL	<u>X</u>
[7]	VERIFY CRD [gpm on Panel 2		LOW, 2-FI	-85-15A, is approximat	ely 0
CUE: 2-FI-	85-15A indicate	s 0 gpm.			
STANDARD	<u>):</u>				
Simulated c		rol room to verify th	at CRD dri	ve water header flow is	•
SAT	_ UNSAT _	N/A	COM	MMENTS:	
		A A A A A			
******	*******	********	*****	*******	*****
PERFORMA	ANCE STEP:	CRITI	CAL	NOT CRITICAL	X
[8]	IF CRD Stabiliz	ing Flow adjustmer	nt is necess	ary, <b>THEN</b>	
	REQUEST Ted stabilizer needl	hnical Support to p e valve settings.	erform 0-TI	-20 in order to adjust	
CUE: Flow	adjustment is r	ot necessary. Tha	t complete	es this task.	
STANDARD	<u>):</u>				
N/A					
SAT	_ UNSAT _	N/A	COM	IMENTS:	
		***			
***************************************	100000	**************************************	120000		

JPM NO. 113 REV. NO. 8 PAGE 10 of 12

PERFORMANCE STEP:	CRITICAL	NOT CRITICAL _
PERFORMER complied with all sa	fety rules and regulation	ons
STANDARD:		
PERFORMER complied with all safe sideshields, and hearing protection	ety rules and regulation was worn AS REQUIRI	s (hardhat, safety glasses ED.)
ELECTRICAL SAFETY was also ad such as rings, metal wristwatches, be employees within reaching distance or greater.	racelets, and metal ned	cklaces shall not be worn
SAT UNSAT	N/A CC	MMENTS:
**************************************	CRITICAL	NOT CRITICAL _
PERFORMER demonstrated proper	radiological practices <i>i</i>	AS REQUIRED
STANDARD:		
	ogical practices, AS RE	QUIRED, during JPM
PERFORMER applied proper radiole		· ·

JPM NO. 113 REV. NO. 8 PAGE 11 of 12

PERFORMANCE STEP:	CRITICAL _	NOT CRITICAL	X
PERFORMER demonstrated the use of SELF CHECKING during this JPM			
STANDARD:			
PERFORMER verified applicable components by utilizing SELF CHECKING in accordance with plant standards.			
SAT UNSAT N/A	<i>A</i> C	OMMENTS:	·
**************	*************	*******	*****
PERFORMANCE STEP:	CRITICAL _	NOT CRITICAL	X
PERFORMER demonstrated the use of 3-WAY COMMUNICATION during this JPM			
STANDARD:			
PERFORMER utilized 3-WAY COMMUNICATION in accordance with plant standards.			
SAT UNSAT N/A COMMENTS:			
END OF TASK			
STOP TIME:			

IN-PLANT: I will explain the initial conditions and state the task to be performed. <u>ALL STEPS WILL BE SIMULATED</u>. Do <u>NOT</u> operate any plant equipment. SELF CHECKING may be carried out to the point of touching a label. If it becomes necessary to physically touch a control switch, use a non-conductive pointing device. Observe ALL plant radiological and safety precautions. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's correct" (or That's incorrect", if applicable). When you have completed your assigned task, you will say, "My task is complete" and I will acknowledge

that your task is complete.

INITIAL CONDITIONS: You are an Operator. Unit 2 is at 100% power. The 'A' set of

control rod drive system stabilizing valves are to be removed from service for solenoid maintenance. The Control Rod Drive Hydraulic System is in operation according to 2-OI-85, Section 5.1, Control Rod Drive Hydraulic System Startup.

**INITIATING CUES:** The Unit 2 Operator directs you to shift from the 'A' set of

CRD stabilizing valves to the 'B' set in accordance with 2-OI-

85, Section 6.4.

**CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!** 

**IN-PLANT:** I will explain the initial conditions and state the task to be performed. <u>ALL STEPS WILL BE SIMULATED</u>. Do <u>NOT</u> operate any plant equipment. SELF CHECKING may be carried out to the point of touching a label. If it becomes necessary to physically touch a control switch, use a non-conductive pointing device. Observe ALL plant radiological and safety precautions. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's correct" (or That's incorrect", if applicable). When you have completed your assigned task, you will say, "My task is complete" and I will acknowledge that your task is complete.

INITIAL CONDITIONS: You are an Operator. Unit 2 is at 100% power. The 'A' set of

control rod drive system stabilizing valves are to be removed from service for solenoid maintenance. The Control Rod Drive Hydraulic System is in operation according to 2-OI-85, Section 5.1, Control Rod Drive Hydraulic System Startup.

Section 5.1, Control Rod Drive Hydraulic System Startup.

**INITIATING CUES:** The Unit 2 Operator directs you to shift from the 'A' set of

CRD stabilizing valves to the 'B' set in accordance with 2-OI-

85, Section 6.4.

CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!



# **Browns Ferry Nuclear Plant**

#### Unit 2

**Operating Instruction** 

#### 2-01-85

# **Control Rod Drive System**

Revision 0116

**Quality Related** 

Level of Use: Continuous Use

Effective Date: 03-25-2009

Responsible Organization: OPS, Operations

Prepared By: Michael K Teggins
Approved By: John T. Kulisek

BFN Control Rod Drive System 2-OI-85
Unit 2 Rev. 0116
Page 2 of 219

#### **Current Revision Description**

Pages Affected:

34, 50, 58-60, 67, 69, 159, 173, 174, 185, 204;

Attachment Pages 18

Type of Change:

Enhancement

Tracking Number 149

**PERs** 

**PCRs** 

08003363, 09000021, 09000556, 09000674, 09000936

Page 159: Removed duplicate steps for placing and holding the CRD Notch Override switch and the CRD Control switch.

Revised Section 6.6.4, Continuous Rod Withdrawal, to include instruction for performing control rod coupling integrity checks while simultaneously maintaining the CRD Notch Override Switch in the Override position and the CRD Control Switch in the Rod Out Notch position. This addresses PCR 09000674.

Revised Section 6.6.4 to denote simultaneously operating the CRD Notch Override Switch in the Override position and the CRD Control Switch in the Rod Out Notch position. This addresses PCR 09000556.

Added an inclusion for Illustration 9 being used to signify successful control rod integrity checks for rods withdrawn to position 48 during the performance of Sections 8.21.1 and 8.21.2.

Replaced operating band for CRD Cooling Water Flow from "approximately 20 psid" to a specific band of 10 psid to 20 psid. This change was made throughout the procedure. This addresses PCR 09000021.

Revised Attachment 1 by changing the required position for 2-SHV-85-516A to CLOSED/OPEN with a note explaining that the valve can be closed with the system shutdown or open with the system in operation. Placed all notes in Attachment 1 on the last page of the attachment. These changes address PCRs 08003363 and 09000936.

#### THIS REVISION AFFECTS SYSTEM STATUS on ATTACHMENT 1

BFN Unit 2

# **Control Rod Drive System**

2-OI-85 Rev. 0116 Page 3 of 219

# **Table of Contents**

1.0	PURPO	DSE	8
2.0	REFER	RENCES	8
2.1		cal Specifications	
2.2		afety Analysis Report	
2.3	Plant Ir	nstructions	8
2.4	Plant D	Prawings	10
2.5	Vendor	Manuals	10
2.6	Miscell	aneous Documents	11
3.0	PRECA	AUTIONS AND LIMITATIONS	13
3.1	Control	Rod Drive Hydraulic (CRDH) System	13
3.2	Reacto	r Manual Control System	17
3.3	Rod W	orth Minimizer (RWM)	18
3.4	Require	ements for Moving Control Rods in Modes 3, 4 or 5	22
3.5	Points (	on Protection Notifications and Radiological Protection Hold (RPHPs) [SOER 01-1, BFN PER 126211, PER 961778, PER ]	24
4.0		ARTUP/STANDBY READINESS REQUIREMENTS	
5.0		UP	
5.1		Rod Drive Hydraulic System Startup	
5.2		orth Minimizer Startup	
5.3		CRD Pump for Standby Service	
	5.3.1	Aligning 1B CRD Pump for Standby Service For Unit 2	
	F 2 0	operation.	
	5.3.2	Aligning 2A CRD Pump for Standby Service.	41
6.0		M OPERATIONS	
6.1		CRD Pumps From 2A To 1B	
6.2		CRD Pumps From 1B To 2A	
6.3		CRD Flow Control Valves	
6.4		CRD Stabilizing Valve Sets	
6.5	Shifting	Drive Water Filters	52
6.6	Control	Rod Withdrawal	53

BFN Control Rod Drive System 2-OI-85
Unit 2 Rev. 0116
Page 4 of 219

# **Table of Contents (continued)**

	6.6.1	Initial Conditions prior to withdrawing Control Rods	53
	6.6.2	Actions Required during and Following Control Rod Withdrawal	54
	6.6.3	Control Rod Notch Withdrawal	55
	6.6.4	Continuous Rod Withdrawal	57
	6.6.5	Return to Normal after Completion of Control Rod Withdrawal	60
6.7	Control	Rod Insertion	61
6.8	Operati	ions with Rod Worth Minimizer Insert/Withdraw Errors	64
6.9	Reacto Operati	r Vessel Level Instrumentation System (RVLIS) Backfill System	66
6.10	CRD P	ump Operation At Elevated Flow	67
7.0	SHUTE	OOWN	70
7.1		Rod Drive Hydraulic System Shutdown	
8.0		QUENT OPERATIONS	
8.1		and Venting the CRD Hydraulic System	
8.2		rging Hydraulic Control Unit Accumulators	
8.3	Reduci	ng HCU Accumulator Nitrogen Pressure	83
8.4	Rechar	ging Hydraulic Control Unit Accumulators	86
8.5	Draining	g Hydraulic Control Unit Accumulators	92
8.6	Remov	ing a Hydraulic Control Unit from Service	94
8.7	Returni	ng a Hydraulic Control Unit to Service	102
8.8	Venting	a Hydraulic Control Unit	106
8.9	Timing.	Adjustment of Control Rods	111
8.10	CRD In	ternal Ball Check Valve Flush	114
8.11	Conder	sate Purge Alignment of CRD Hydraulic System	118
8.12	Securin	g Condensate Purge Alignment of CRD Hydraulic System	122
8.13	Rod Dri	ft Alarm Test	124
8.14	Reactor	Manual Control System Timer Test and Operational Check	126
8.15	Control	Rod Difficult to Withdraw	128
8.16	Control	Rod Difficult to Insert	135
8.17		Bypass of the Rod Worth Minimizer	
8.18		lization of the Rod Worth Minimizer	

BFN Control Rod Drive System 2-OI-85
Unit 2 Rev. 0116
Page 5 of 219

# **Table of Contents (continued)**

		rable of Johnship (Committee)	
8.19	Control	Rods Which Fail to FULLY INSERT After Scram	140
8.20	CRD FI	ush and Exercise During Outages	148
8.21	CRD FI	ush and Exercise Prior to Startup	151
	8.21.1	First Pass - CRD Flush and Exercise Prior to Startup	152
	8.21.2	Second Pass - CRD Flush and Exercise Prior to Startup	157
	8.21.3	Continuous CRD Flush and Exercise Prior to Startup	162
8.22	Unit fro	e Procedure for Removing and Restoring a Hydraulic Control m Service, or Back to Service, when no Fuel is in the Reactor	165
8.23		Actuation of the ATWS (ARI/RPT)	
8.24		Operation of 2-FCV-85-11A(B) Using 2-PCV-85-11	
8.25		ater Pressure Control Valve (2-PCV-85-23) Bypass Operation	
8.26		neup for Suction Filter Cartridge Removal	
8.27		neup to Support Maintenance	
8.28		Rod Drive Hydraulic System Startup Using 1B CRD Pump	
8.29		ushing to Un-block Restricted Cooling Water Flow	
	8.29.1	FLUSHING rods at Position 48.	
	8.29.2	FLUSHING Rods At Positions Other Than 48.	
8.30		ng a failed "Full-in" Position on RPIS buffer card	
8.31	Isolating	the Scram Discharge Volume for Maintenance With the CRD Service	
8.32		ng the Scram Discharge Volume to service	
8.33	AUTOM	ATIC/MANUAL operation of 2-FIC-85-11	193
8.34	Throttlin During (	g Upstream Isolation Valve for Stable Operation of 2-FIC-85-11 Outage/Refuel Conditions	194
Illust	ration 1:	Accumulator Precharge Nitrogen Pressure Versus Ambient Temperature	196
Illusti	ration 2:	HCU Isolation Valve Torque Requirements	197
Illusti	ration 3:	Control Rod Exercise Data Sheet	198
Illusti	ation 4:	Core Position Map	199
lllustı	ation 5:	CRD Module	200
Illusti	ation 6:	Removal and Replacement of RPS Scram Solenoid Fuses	201

BFN	Control Rod Drive System	2-OI-85
Unit 2		Rev. 0116
		Page 6 of 219

# **Table of Contents (continued)**

Illustration 7:	HCU Location Map	. 202
Illustration 8:	HCU Location Map	. 203
Illustration 9:	Data Sheets for CRD Flush and Exercise Prior to Startup	. 205
Appendix A:	Radiation Protection Notifications	. 218

BFN Control Rod Drive System 2-OI-85
Unit 2 Rev. 0116
Page 7 of 219

#### **Table of Contents (continued)**

#### **ATTACHMENTS**

Attachment 1: CRD Hydraulic System Valve Lineup Checklist

Attachment 2: CRD Hydraulic System Panel Lineup Checklist

Attachment 2A: RMCS Panel Lineup Checklist

Attachment 2B: ROD WORTH MINIMIZER Panel Lineup Checklist

Attachment 3: CRD Hydraulic System Electrical Lineup Checklist

Attachment 4: CRD Hydraulic System Instrument Inspection Checklist

Attachment 5: Jumper Installation for CRD Exercise - Core Off Loaded.

Attachment 6: Reactor Manual Control System Jumper Removal Following CRD

Exercise - Core Off Loaded.

Attachment 7: Control Rod Drive Hydraulic System Timing Adjustment of All Control

Rods

Attachment 8: Control Rod Drive Hydraulic System Timing Adjustment of Individual

Control Rods

BFN Unit 2	Control Rod Drive System	2-OI-85 Rev. 0116
		Page 8 of 219

#### 1.0 PURPOSE

This instruction provides precautions and limitations, prestartup/standby requirements, and procedural steps for operation of the Control Rod Drive Hydraulic System (CRDHS), Reactor Manual Control System (RMCS), and the Rod Worth Minimizer (RWM).

#### 2.0 REFERENCES

#### 2.1 Technical Specifications

Section 3.1, Reactivity Control Systems.

Section 3.3, Instrumentation.

Section 3.9, Refueling Operations.

Section 3.10, Special Operations.

Section 5.4, Procedures.

Section 5.5, Programs and Manuals.

# 2.2 Final Safety Analysis Report

Section 3.4, Reactivity Control Mechanical Design.

Section 7.7, Reactor Manual Control System.

Section 13.6, Normal Operations.

#### 2.3 Plant Instructions

2-EOI-1, Flowchart, RPV Control.

2-AOI-85-1, Rod Drop Accident.

2-AOI-85-2, Uncoupled Control Rod.

2-AOI-85-3, CRD System Failure.

2-AOI-85-4, Loss of RPIS.

2-AOI-85-5, Rod Drift In.

2-AOI-85-6, Rod Drift Out.

2-AOI-85-7, Mispositioned Control Rod.

BFN	Control Rod Drive System	2-OI-85	
Unit 2		Rev. 0116	
		Page 9 of 219	

#### 2.3 Plant Instructions (continued)

- 2-AOI-100-1, Reactor Scram.
- 2-GOI-100-1A, Unit Startup from Cold Shutdown to Power Operation.
- 0-OI-2B, Condensate Storage and Transfer System.
- 2-OI-24, Raw Cooling Water System.
- 0-OI-32, Control Air System.
- 0-OI-57A, Switchyard and 4160V Electrical System.
- 0-OI-57B, 480V/240V AC Electrical System.
- 0-OI-57C, 208V/120V AC Electrical System.
- 0-OI-57D, DC Electrical System.
- 2-OI-68, Reactor Recirculation System.
- 2-OI-69, Reactor Water Cleanup System.
- 2-OI-99, Reactor Protection System.
- 2-SR-3.1.3.2, Control Rod Exercise Tests For Fully Withdrawn and Fully Inserted Control Rods.
- 2-SR-3.1.3.3, Control Rod Exercise Tests For Partially Withdrawn Control Rods.
- 2-SR-3.3.2.1.7, RWM Program Verification)
- 2-SR-3.1.3.5(B), CRD Coupling Integrity Check After Refueling or Maintenance.
- SII-2-F-085-0763, Rx Water Level Reference Leg Backfill System
- Form SPP-6.4-5, M&TE USAGE LOG.
- SPP-6.4, Measuring and Test Equipment.
- SPP-10.4, Reactivity Management.
- OPDP-1, Conduct of Operations.
- SPP-10.3, Verification Program.
- 0-TI-20, Control Rod Drive System Testing and Troubleshooting.

BFN	Control Rod Drive System	2-OI-85	
Unit 2		Rev. 0116	
		Page 10 of 219	

#### 2.4 Plant Drawings

2-47E610-85-1 & -4, Mechanical Control Diagram CRDH System.

47W610-85-5, Mechanical Control Diagram CRD Hydraulic System.

0-47E820-1 Flow Diagram Control Rod Drive Hydraulic System.

2-47E820-2, 7, Flow Diagram Control Rod Drive Hydraulic System.

2-47E818-1, Flow Diagram Condensate Storage and Supply System.

2-47E2847-1&7, Flow Diagram Control Air System.

0-45N763-4, 4160V Unit Aux Power Schematic Diagram.

2-45E763-19, 20, 4160 Unit Aux Power Schematic Diagram.

45N765-6, 4160V Shutdown Aux Power Schematic Diagram.

2-45E2647-2 through -6, Unit Control Board Panel 9-9.

45N779-8 & -17, 480V Shutdown Aux Power Schematic Diagram.

2-45N620-6, Annunciator System Key Diagram.

729E857 series, Rod Worth Minimizer System Elementary Diagram.

730E321 series, Reactor Manual Control System Elementary Diagram.

729E895 series, Feedwater Control System Elementary Diagram.

791E201 series, CRD Hydraulic Instr System Elementary Diagram.

729E499 series, Control Rod Drive Hydraulic System.

2-730E557, RCIC Panel 9

#### 2.5 Vendor Manuals

Worthington, WT Pumps GE Contract 205-H0803 VFP 2299-47-1, BFN-VTM-W318-0010.

General Electric, Hydraulic Control Unit GEK 9582A (9582C) Contract 90744, BFN-VTM-G080-1010.(BFN-VTD-G080-1420)

General Electric, CRD System Contract 90744, GEK 9585/9586 in GEK-779A, Volume III, Part 4, Book 1 (BFN-CVM-2105).

BFN-VTM-W121-0010, Westinghouse Reactor Control Rod Type CR-82M-1

BFN	Control Rod Drive System	2-OI-85
Unit 2		Rev. 0116
		Page 11 of 219

#### 2.6 Miscellaneous Documents

INPO SOER 80-006, Partial Failure of Control Rods to Insert.

INPO SOER 84-002, Control Rod Mispositioning.

INPO SER 90-009, Failure of Two Control Rods to Insert During Scram Time Testing.

GE SIL 66, Interior Surfaces of CRD HCU Accumulators.

GE SIL 139, Control Rod Drive Collet Retainer Tube Cracking.

GE SIL 294, HCU Accumulator Piston Seal Maintenance.

GE SIL 536, HCU Liquid Level Switch Malfunction.

GE SIL 538, CRD Cooling Water Orifices.

GE SIL 419, CRD HCU Isolation Valves.

GE SIL 427, CRD Lay UP Procedures for an Extended Outage.

NRC IR 84-02, Define Use of the ROD OUT NOTCH Override (RONOR) Switch.

Technical Specifications Assessment Report (TSAR) Item D-16. A stuck rod should be hydraulically isolated versus electrical.

TSAR Item D-17. Require inoperable rods to be fully inserted if **NOT** stuck prior to disarming.

TSAR Item D-22. Anytime a control rod is fully withdrawn, a coupling check shall be performed.

TSAR Item D-25. Control rod scram time testing should be required prior to declaring a rod operable after maintenance which could affect its scram time.

BFPER961434, Control Rod misposition event.

BFPER960792, Control Rod misposition event.

BFPER950743, Control Rod coupling event.

BFPER960610, SDV vents and drains misposition event.

Memo from Louis C. Eichenberger to Steve Lawson concerning operation with elevated CRD flow. RIMS R69 980415 805

NEDC-32751P, Power Uprate Safety Analysis for the Browns Ferry Nuclear Plant (RIMS R08-980316-888)

BFN Unit 2	Control Rod Drive System	2-OI-85
Oint 2		Rev. 0116 Page 12 of 219

#### 2.6 Miscellaneous Documents (continued)

TVA-BFN-TS-384, Technical Specification(TS) Change TS-384 - Request For License Amendment For Power Uprate Operation (RIMS R08-980316-888)

GE-NE-B13-01866-39, Summary of System Evaluations and Proposed Changes to Design Criteria Documents (RIMS W79-980827-003)

ND-Q0068-980014, Anticipated Transient Without Scram (ATWS) (RIMS R14-980423-104)

TVAN Calculation, 2/3-F-78A & 78B (RIMS R14-981104-113)

TVAN Calculation, ED-N0001-980035 (RIMS R14-981202-106)

GE SC07-08, Inadvertent CRD Rod Withdrawal

INPO SEN 264, Unplanned BWR Control Rod Withdrawals While Shut Down

OE27698, Unplanned Loss of Shutdown Cooling While Placing CRD System in Service at the Monticello Nuclear generating System.

BFN Unit 2	Control Rod Drive System	2-OI-85 Rev. 0116
		Page 13 of 219

#### 3.0 PRECAUTIONS AND LIMITATIONS

#### 3.1 Control Rod Drive Hydraulic (CRDH) System

- A. A Control Rod Drive pump should remain in operation at all times to preclude the possibility of air entering the system.
- B. Shutdown of the CRDH System when reactor moderator is at rated temperature and pressure, the reactor is critical, or when a Recirculation or Reactor Water Cleanup pump is operating, may result in equipment damage.
- C. A Control Rod Drive Hydraulic pump trips as a result of any of the following:
  - 1. Pump low suction pressure (18" Hg. absolute after 6 sec. T.D.).
  - 2. Pump motor overload (electrical fault protection).
  - 3. Bus undervoltage.
- D. Water draining from the Control Rod Drive Hydraulic System is potentially contaminated and should be handled accordingly.
- E. The Control Rod Drive System flow and differential pressures should be maintained in accordance with this instruction. Excessive throttling of system flow produces a low flow, high D/P situation resulting in damage to the flow control valve.
- F. [NER/C] When the reactor is shutdown, the Control Rod Drive Hydraulic System should remain in service and, whenever possible, the CRD mechanisms cycled at least one notch weekly. This provides a continuous flow of water to the control rod drive mechanisms to prevent crud buildup and minimize corrosion. For outages with a duration greater than 28 days and CRD System unavailable, alternate methods should be evaluated to assist in minimizing corrosion and crud buildup. [GE SIL 427]
- G. CRD EXH/RTN LINE ISOLATION VALVE, 2-FCV-85-50, should remain closed except under conditions requiring CRD makeup, as specified in 2-EOI-1 Flowchart, RPV Control, or if it is used to vent CRD System during system startup, or to vent control rod drives.
- H. Reactor Water Cleanup System or other Water Reject Path may be required when Control Rod Drive Hydraulic System is in service.
- I. [NER/C] CRDs that do NOT insert with normal system drive pressures may be inoperable (Tech Spec 3.1.3). However, if rod motion is observed, but the CRD fails to notch, drive water pressure may be raised to compensate for excessive under-piston leakage. [GE SIL 139 and 538]

BFN	Control Rod Drive System	2-OI-85
Unit 2		Rev. 0116
		Page 14 of 219

- J. Tools may be required to perform 2-OI-85. The following should be available, as necessary:
  - 1. Four inch and ten inch adjustable wrenches.
  - 2. Torque wrench with fork end tool for valves and socket for caps.
  - 3. Adapted wrench to operate riser vent valves.
  - 4. Calibrated Thermometer for N<sub>2</sub> pressure compensation.
  - 5. Allen wrench for adjusting control rod drive speed.
  - 6. "SNOOP" for leak checking.
- K. When CRD System or HCU is to be removed from service, Shift Manager/Unit Supervisor should be notified to check the impact on Technical Specifications requirements and other systems, such as Reactor Water Cleanup or Reactor Recirculating Pump seals.
- L. [NER/C] Activities that can directly affect core reactivity are of a critical nature. Strict procedural compliance and conservative actions are required to be followed. [INPO SOER-84-002]
- M. Tech Specs should be reviewed for actions required when a control rod becomes inoperable.
- N. [NER/C] **DO NOT** "cool" a hot CRD by giving it repeated drive signals. After checking for possible discharge scram valve leakage, a CRD with a high temperature alarm should be left "hot". Schedule such a CRD for maintenance during the next refueling outage. [GE SIL 139]
- O. HCU valving sequences should not deviate from those listed in this instruction, otherwise serious damage to the CRD could result.
- P. [TSAR/C] A stuck control rod should be hydraulically isolated. Stuck rods could be severely damaged from ΔP forces on a scram signal if NOT hydraulically isolated. [Item D16]
- Q. [NER/C] [TSAR/C] Inoperable control rods should always be inserted (if NOT stuck) prior to disarming. Rods inoperable due to excessive scram times need NOT be disarmed, but should be included in the control rod exercise test (2-SR-3.1.3.2 / 2-SR-3.1.3.3). [Item D17] [INPO SER 90-009]

BFN	Control Rod Drive System	2-OI-85
Unit 2		Rev. 0116
		Page 15 of 219

- R. When opening or closing HCU isolation valves, the following guidelines are required to be adhered to:
  - 1. HCU valves should only be opened or closed hand tight unless there is a need to apply additional torque to ensure leak tightness. The torque values provided in Illustration 2 are required to be used when torquing is required. Ordinarily, hand tightness is all that is necessary to provide an adequate isolation boundary. Repeated torquing to maximum values can cause breaking of the "ears" on the wedges in the Hancock gate valves used on the HCUs. This results in the wedge becoming stuck in the seat.
  - 2. [NER/C] If a maximum torque value from Illustration 2 is exceeded, a WO is required to be initiated and the System Engineer is to be notified. [GE SIL 419]
- S. [TSAR/C] Prior to declaring a rod operable, after maintenance that could affect its scram time, Control Rod Scram Time Testing is required. [Item D25]
- T. The ATWS/ARI/RPT is activated by either two low levels (≤ -45 in) or two high pressures (1148 psig) or manual initiation pushbutton.
  - Manual initiation from either A or B trip channel will only initiate the ARI portion of the system. The RPT will NOT trip from manual initiation.
  - 2. An automatic signal from either A or B trip channel causes two actions:
    - a. Opens one of the two RPT breakers on each of the two recirc pumps,

#### AND

- b. Energizes one of the two identical sets of four ATWS/ARI/RPT valves.
- U. The ARI system auto initiation can be reset after a 30 sec time delay, only when all initiation signals are reset.
- V. [NER/C] Exercising the piston seal per 0-TI-20, Section 7.12, may reduce seal leakage rate and make maintenance unnecessary. [GE SIL 294]
- W. [NER/C] Failure to flush any accumulator exposed to high chloride **OR** low pH water with condensate water within a few days may result in corrosion of accumulator. [GE SIL-066]
- X. To ensure operability of 4160V Breakers after closing, the charging spring should be verified to have recharged by verifying locally, breaker closing spring charged amber light is on and closing spring target indicating charged.

BFN	Control Rod Drive System	2-OI-85
Unit 2		Rev. 0116
		Page 16 of 219

- Y. The injection of air, OR the over pressurization of RVLIS reference legs via CRD backfill to RVLIS System, could cause ESF initiations.
- Z. The CRD System should be filled, vented, and placed in service prior to valving in RVLIS. Placing the CRD System in service (CRD pump start) with RVLIS already valved in can result in a pressure surge propagating through the system to the reference legs of the Reactor Vessel level instruments. This situation could result in ESF initiations.
- AA. Venting of the insert and withdraw lines when the reactor is greater than atmospheric pressure is NOT required, since any air in these lines is compressed into solution. Additionally, venting of these lines when the reactor is pressurized could be hazardous.
- BB. Care is required to be exercised when changing the operating mode, or any system parameter, to prevent the introduction of sediment/dirt into the reactor cavity or SFSP that could reduce water clarity. Contact the Refuel floor SRO prior to initiating any system alterations that could potentially introduce sediment/dirt into the reactor cavity and affect water clarity.
- CC. Control Rod Drive Hydraulic Pump 1B should normally be lined up as Unit 1 standby.
- DD. The operating mechanism spring in the HCU liquid level switch (2-LS-85-34/HCU) can be damaged during accumulator charging/discharging if the differential pressure is too high. [GESIL 536]
- EE. When re-attaching amphenol pigtails to the Control Rod Drive Directional Control Valves, the pigtails should be checked to ensure they do not interfere with the scram inlet or outlet limit switch striker plate.
- FF. If, at any time while driving a Control Rod, a control rod unexpectedly moves more than two notches from its intended position, notification the Control Room Unit Supervisor, Reactor Engineer, and Shift Manager is required prior to continuously inserting the Control Rod using the "EMERGENCY IN" switch. If rod insertion to Position 00 is required and core thermal power is ≤ 10%, entry into LCO 3.1.6 may be required.
- GG. If a Control Rod was declared "Inoperable" or "Slow" solely due to High Temperatures, the Control Rod may be declared "Operable" or no longer "slow" when the temperatures have lowered back below the High Temp Setpoint. Alarms may have to be re-enabled if the alarm was previously disabled and ICS reset. REFER TO OI-55 and 2-TI-393. Reactor Engineering can reset the ICS Screen.

BFN	Control Rod Drive System	2-OI-85
Unit 2		Rev. 0116
		Page 17 of 219

- HH. When releasing clearances on the Control Rod Drive Hydraulic Control Units (CRD HCUs), verification is required to ensure the Scram Discharge Volume is available for use as a drain path to accommodate any leaking HCUs. If the Scram discharge Volume flow path is NOT available, leakage into the SDV has been known to reach the scram initiation level [reference BFN PER 01-003454-000].
- II. CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, may be transferred and operated in manual if erratic system operation is observed. This may occur during outage conditions, and operations with low reactor pressure.
- JJ. The possibility of unexpected rod movements can occur during either isolation or restoration of multiple hydraulic control units (HCUs). With a Control Rod Drive (CRD) pump running and the majority of the HCUs isolated, CRD system pressures can increase to the point at which some control rods can withdraw from the core when the associated HCU isolation valves are manipulated. The isolation of multiple HCUs with Control Rod Drive pumps in operation can cause higher than normal cooling and exhaust header pressures that may be a precursor to inadvertent rod motion. Operators should monitor control rod drive system pressures, rod positions and associated annunciators during these evolutions. [BFN PER 126933, INPO SEN 264, GE SC07-08]

#### 3.2 Reactor Manual Control System

- A. With the reactor mode switch in the Refuel mode, it is necessary to hold the CRD Notch Override switch in NOTCH OVERRIDE until the desired control rod position is attained. If rod movement is stopped prior to attaining the desired position, further rod withdrawal is blocked and the rod is required to be reinserted and the process repeated.
- B. During a hot startup (During a startup from Mode 3) following a reactor scram from power (Mode 1), extremely high rod notch worth's can exist due to peak xenon with no moderator voids.
- C. During reactor shut down, plant cooldown should be coordinated with control rod drive insertion to prevent an inadvertent criticality.
- D. [TSAR/C] Anytime a control rod is fully withdrawn a coupling check is required to be performed by checking that the control rod does NOT reach the overtravel position. [Item D22]
- E. When four doublings from initial rod pull are observed on the SRMs rod movement should be restricted to single notch withdrawal.

BFN Unit 2	Control Rod Drive System	2-OI-85 Rev. 0116
		Page 18 of 219

#### 3.2 Reactor Manual Control System (continued)

- F. [NER/C] Use of scram timing equipment for rod insertion is prohibited unless authorized by an approved plant procedure for testing purposes or emergency use. [INPO SOER-84-002]
- G. [NER/C] Activities that can directly affect core reactivity are of a critical nature. Strict procedural compliance and conservative actions are required to be followed. [INPO SOER-84-002]
- H. Prior to loading fuel into the Reactor Vessel, Attachment 6, Reactor Manual Control System Jumper Removal Following CRD Exercise <u>Core Off Loaded</u>, is required to be performed.
- I. [NER/C] Withdrawing control rods is required to be performed in a deliberate, carefully controlled manner, while closely monitoring the Reactor's response. [INPO SOER-96-001]
- J. Whenever there is fuel in the vessel, a peer check verification is required on all control rod selections, identification of final position, and verification of final position following movement, except as governed by the AOIs and/or EOIs. Peer check verification is required to be performed by an SRO, RO, STA, or Reactor Engineer.
- K. While driving a Control Rod, if at any time a control rod moves unexpectedly more than two notches from its intended position, the control rod should be continuously inserted using the "EMERGENCY IN" switch. Notify the Control Room Unit Supervisor, Reactor Engineer, and obtain the Shift Manager's permission prior to resuming rod movement. If rod insertion to Position 00 is required and core thermal power is ≤ 10%, entry into LCO 3.1.6 may be required.

#### 3.3 Rod Worth Minimizer (RWM)

- A. The RWM System Rod Test/Touch screen function allows any one rod to be selected and moved to any position only if all other control rods are fully inserted. To get out of the rod test, the pushbutton needs to be depressed again (otherwise any single rod in any group can be selected and withdrawn).
- B. [NER/C] When the RWM is bypassed, a second licensed operator, or other qualified member of the technical staff, is required to verify the Control Rod Sequence is followed. [INPO SOER-84-002]
- C. 2-SR-3.3.2.1.7 is used to document independent verification of the RWM whenever the reactor is in startup or run, below 10% power.
- D. [NER/C] Activities that can directly affect core reactivity are of a critical nature. Strict procedural compliance and conservative actions are required to be followed. [INPO SOER-84-002]

BFN Unit 2	Control Rod Drive System	2-OI-85 Rev. 0116
		Page 19 of 219

E. For RWM to enforce, Total Feedwater Flow or Total Steam Flow is required to be < 24%. To take RWM out of service automatically, Low Power Set Point (LPSP), Total Steam Flow AND Total Feedwater Flow is required to be > 24%.

The Low Power Alarm Point (LPAP) for the RWM is 27%, as sensed by Total Steam Flow. When the RWM is operating in the transition zone, between the LPSP (24%) and the LPAP (27%), no rod blocks are applied as a result of insert or withdraw errors, but the RWM will continue to provide alarm indications and error displays.

The monitoring functions of the RWM are automatically bypassed at power levels above the LPAP.

- F. All the RWM blocks are applied in the event of a system hardware or software failure, when power is below the LPAP. At any Rx power, when a loss of ICS 2A occurs, a select block occurs due to the loss of power and cannot be bypassed using the RWM Bypass key.
- G. An insert error occurs if:
  - A rod in the currently latched group is inserted past the insert limit for this group.
  - 2. A rod in a group lower than the one that is presently latched is inserted past the withdraw limit for the lower group.
- H. A withdraw error occurs if:
  - 1. A rod in the currently latched group is withdrawn past the withdraw limit for the group.
  - 2. A rod in a group lower than the one currently latched is withdrawn past the withdraw limit for its group.
  - 3. A rod in a group higher than the one currently latched is withdrawn past the insert limit for its group.
- I. A select error occurs if:
  - With the reactor operating below the LPAP, a rod other than one contained in the currently latched group is selected, unless conditions for latching up or down are met.
  - 2. With a rod block applied, any rod other than an error rod is selected.
  - 3. When operating in the Sequence Control Mode, a rod is skipped.

BFN	Control Rod Drive System	2-OI-85
Unit 2		Rev. 0116
		Page 20 of 219

- J. An insert block occurs if:
  - 1. With two insert errors existing, a rod is moved to cause a third insert error.
  - 2. A withdraw error has been made, a withdraw block applied, and a rod other than the withdraw error rod is selected
- K. A withdraw block occurs if:
  - 1. A withdraw error is made.
  - 2. With three insert errors existing and an insert block present, a rod other than one of the insert errors is selected.
- L. A select block occurs if:
  - The RWM Bypass Switch is in normal and the RWM program is NOT running; i.e., following return to normal from bypass and the program has NOT been initialized.
  - 2. The RWM Bypass Switch is in normal and the program stops due to software error.
- M. For group limits only, RWM recognizes the Nominal Limits only. The Nominal Limit is the insert or withdraw limit for the group assigned by RWM. The Alternate Limit is no longer recognized by the RWM as an Acceptable Group Limit.
- N. During RWM latching, the latched group will be the highest numbered group with 2 or less insert errors and having at least 1 rod withdrawn past its insert limits. With Sequence Control ON, latching occurs as follows. (Normally, startups are performed with Sequence Control ON).
  - RWM will latch down when all rods in the presently latched group have been inserted to the group insert limit and a rod in the next lower group is selected.
  - 2. RWM will latch up when a rod within the next higher group is selected, provided that no more than two insert errors result.
    - With Sequence Control OFF, latching occurs as follows:
  - 3. For non-repeating groups, latching occurs as described above.
  - 4. For repeating groups, latching occurs to the next setup or set down based on rod movement as opposed to rod selection.

BFN	Control Rod Drive System	2-OI-85
Unit 2		Rev. 0116
		Page 21 of 219

- O. Latching occurs at:
  - 1. System initialization.
  - 2. Following a "System Diagnostic" request.
  - 3. When operator demands entry or termination of "Rod Test."
  - 4. When power drops below LPAP.
  - 5. When power drops below LPSP.
  - 6. Every five seconds in the transition zone.
  - 7. Following any full control rod scan when power is below LPAP.
  - 8. Upon demand by the Operator (Scan/Latch Request function).
  - 9. Following correction of insert or withdraw errors.
- P. The INOP/Reset red light is used for alarming and troubleshooting RWM. The alarm light may be reset by pushing the button after the problem has been corrected. The alarm conditions are:
  - RWM: This lamp illuminates in conjunction with either the COMP or the PROGR lamp. The RWM lamp indicates that the RWM is no longer operating.
  - 2. PROGR: This lamp indicates that the RWM program is inoperative; i.e., whenever the program has been aborted and has NOT been reinitialized, or when the RWM is manually bypassed.
  - 3. COMP: This lamp illuminates whenever the RWM computer data acquisition functions are suspended for any reason.
  - 4. BUFF: This lamp indicates that the three computer inputs to the majority voter circuits for any one of the select, insert, or withdraw permissive functions are NOT all in the same state.
- Q. The system Diagnostic pushbutton tests the block, permissive functions, and the scan function. It applies all blocks, applies all permissives, blank display, unlatches any sequence, scans, and attempts to latch a requested sequence; in that order.
- R. [QA/C] SPP-10.4 requires approval of the Plant Manager or his designee prior to any planned operation with the RWM bypassed unless bypassing of the RWM is specifically allowed within approved procedures. [ISE-NPS-92-R01]

BFN	Control Rod Drive System	2-OI-85	
Unit 2		Rev. 0116	
		Page 22 of 219	

- S. [NER/C] Never pull control rods except in a deliberate, carefully controlled manner, while closely monitoring the Reactor's response. [INPO SOER-96-001]
- T. Whenever there is fuel in the vessel, a peer check verification is required on all control rod selections, identification of final position, and verification of final position following movement, except as governed by the AOIs and/or EOIs. Peer check verification is required to be performed by an SRO, RO, STA, or Reactor Engineer.

#### 3.4 Requirements for Moving Control Rods in Modes 3, 4 or 5

- A. Technical Specifications 3.10, Special Operations, establishes requirements and limitations for rod movement when in Modes 3, 4, or 5. These requirements and limitations are addressed by the procedures, listed below, and the appropriate procedure should be used to verify that all necessary requirements are established PRIOR TO moving any control rod while in Modes 3, 4, or 5.
  - 1. 2-SR-3.10.3, Verification of Surveillance Requirements for Single Control Rod Withdrawal Hot Shutdown.

This procedure verifies the requirements of LCO 3.10.3 (Single Control Rod Withdrawal - Hot Shutdown) are met to allow the Reactor Mode Switch position for Mode 3 to include the Refuel position, allowing the withdrawal of a single control rod during Hot Shutdown.

 2-SR-3.10.4(A), Verification of Surveillance Requirements for Single Control Rod Withdrawal - Cold Shutdown (Single Rod Maintenance or Testing)

This procedure verifies that the requirements of LCO 3.10.4 (Single Control Rod Withdrawal While In Cold Shutdown) are met when it is desired to withdraw one control rod for maintenance or testing. This procedure is intended to be used when a control rod is withdrawn for an extended period, or when the associated control rod drive is to be removed.

BFN	Control Rod Drive System	2-OI-85
Unit 2		Rev. 0116
		Page 23 of 219

# 3.4 Requirements for Moving Control Rods in Modes 3, 4 or 5 (continued)

 2-SR-3.10.4(B), Verification of Surveillance Requirements for Single Control Rod Withdrawal - Cold Shutdown (Multiple Rod Maintenance or Testing)

This procedure verifies that the requirements of LCO 3.10.4 (single control rod withdrawal while in cold shutdown) are met when it is desired to withdraw several control rods, one at a time, in short succession. This procedure is intended to be used during control rod testing, such as that required by 0-TI-20 following a refueling outage. 2-SR-3.10.4(A) should be used when only one control rod is to be withdrawn for an extended period for maintenance or testing. 2-SR-3.10.4(A) must be used if a control rod is withdrawn and the associated control rod drive is to be removed.

This surveillance also verifies each withdrawn Control Rod Scram accumulator pressure is ≥ 940 psig. This will satisfy Technical Specification SR 3.9.5.2. per LCO 3.10.4.c.1.

4. 2-SR-3.10.5, Verification of Surveillance Requirements for Single Control Rod Drive (CRD) Removal - Refueling

This procedure verifies that the requirements of LCO 3.10.5 are met to allow the removal of a single control rod drive (CRD) associated with a control rod withdrawn from a core cell containing one or more fuel assemblies.

5. 2-SR-3.10.6, Verification of Surveillance Requirements for Multiple Control Rod Withdrawal - Refueling

This procedure verifies that the requirements of LCO 3.10.6 are met to allow the withdrawal of multiple control rods, and/or the removal of associated control rod drives (CRDs).

BFN	Control Rod Drive System	2-OI-85
Unit 2	·	Rev. 0116
		Page 24 of 219

# 3.4 Requirements for Moving Control Rods in Modes 3, 4 or 5 (continued)

B. Only 2-SR-3.10.6 establishes conditions for having more than one control rod withdrawn at the same time. 2-SR-3.10.6 requires the fuel cells containing the control rods to be withdrawn to be unloaded of fuel, prior to withdrawing the control rod, and all control rods associated with fuel cells with one or more bundles, are fully inserted.

All other procedures require verification that all control rods, other than the control rod being withdrawn, are fully inserted. A number of other conditions are checked by SRs for these procedures to ensure rod movement is allowed, which may include:

- Mode switch in refuel interlocks.
- 2. IRM functional tests
- 3. Scram discharge volume water level interlocks
- 4. RPS test switches
- 5. CRD accumulator pressure.

# Radiation Protection Notifications and Radiological Protection Hold Points (RPHPs) [SOER 01-1, BFN PER 126211, PER 961778, PER 116666]

To reduce the probability that this procedure might cause unintended radiation exposures, the following controls are established by this procedure:

A. Radiological Protection Hold Points (RPHPs) steps are contained in this procedure to allow Radiation Protection to implement RCI requirements. These steps clearly state that an RPHP is in effect. When notifying Radiation Protection, it should be made clear as to the procedure being used and that an RPHP is in effect. An Appendix titled "Radiation Protection Notification Record" is provided to record Radiation Protection notifications with RPHPs, and the release of RPHPs. The instructions with the appendix provides directions for completion. The procedure cannot be continued beyond the RPHP step until the appendix is signed by the Radiation Protection Supervisor to release the RPHP.

If, at any time while performing this procedure, or while performing a support procedure, Radiation Protection personnel or other knowledgeable shift member identifies the need for a RPHP when not identified by a procedure, then the following is performed:

BFN	Control Rod Drive System	2-OI-85
Unit 2		Rev. 0116
		Page 25 of 219

# Radiation Protection Notifications and Radiological Protection Hold Points (RPHPs) [SOER 01-1, BFN PER 126211, PER 961778, PER 116666] (continued)

- 1. "RPHP" is written to the left of the affected procedure step number. If the RPHP is identified for a support procedure, then RPHP is placed to the left of the step in this OI that initiates the support procedure and at the appropriate step in the support procedure.
- 2. The appropriate notifications are made to Radiation Protection personnel.
- 3. The instructions for Appendix A is to be used to identify the appropriate required logging of Radiological Protection entries.
- B. Any Radiation Protection notification steps <u>not</u> identified as RPHP steps are considered courtesy notification steps. Most require an entry be made into the NOMS narrative log. These courtesy notification steps <u>DO NOT</u> require a hold in the procedure <u>OR</u> the Appendix completed unless Radiation Protection identifies an RPHP may be necessary at some point after the notification is made.
- C. All Radiation Protection notification steps are written based on normal operating conditions existing. If any Radiation Protection notification step is in line with actions being taken in response to a transient, then the Unit Supervisor will determine if the Notification is actually required before continuing.
- D. All Radiation Protection notification steps have an initial line to ensure the step is not inadvertently missed. These initial lines, by themselves, do not imply any retention is required for the associated procedure pages unless otherwise required the procedure. An (R) placed in the step initial line, means these steps <u>CANNOT</u> be omitted unless:
  - 1. the action associated with the step is not performed, OR
  - 2. the Radiation Protection notification requirements are currently satisfied for the action, OR
  - 3. the step allows the notification to be N/A'd as determined by the Unit Supervisor.
- E. Removal of any Radiation Protection <u>Notification</u> from this procedure requires Operations Management and Radiation Protection Management approval unless the action(s) related to the notification is also removed.

Removal or addition of any procedure <u>actions</u> that require Radiation Protection notification, requires that Radiation Protection be notified.

BFN Control Rod Drive System 2-OI-85
Unit 2 Rev. 0116
Page 51 of 219

#### 6.4 Shifting CRD Stabilizing Valve Sets [1] **VERIFY** Control Rod Drive Hydraulic System in operation. **REFER TO** Section 5.1. [2] **REVIEW** all Precautions and Limitations in Section 3.1. **PERFORM** the following for Stabilizing Valve set being [3] brought into service: **OPEN** STAB VLV FCV-85-20 A & B(FCV-85-21 A & B), [3.1] INLET SHUTOFF, 2-SHV-085-0580(0578). [3.2] **OPEN** STAB VLV FCV-85-20 A & B(FCV-85-21 A & B). OUTLET SHUTOFF, 2-SHV-085-0581(0579). PLACE CRD STABILIZER VLV INSERVICE SELECT, [4] 2-XS-85-20, in A(B) to select the Stabilizing valve set being brought into service on Panel 2-9-5. [5] **PERFORM** the following for stabilizing valve set being removed from service: [5.1] **CLOSE** STAB VLV FCV-85-20 A & B(FCV-85-21 A & B), INLET SHUTOFF, 2-SHV-085-0580(0578). **CLOSE** STAB VLV FCV-85-20 A & B(FCV-85-21 A & B), [5.2] OUTLET SHUTOFF, 2-SHV-085-0581(0579). [6] VERIFY CRD STABILIZING FLOW, 2-FI-85-22, on

2-LPNL-925-0018B is approximately 6 gpm.

approximately 0 gpm on Panel 2-9-5.

adjust stabilizer needle valve settings.

[7]

[8]

VERIFY CRD DRIVE WTR HDR FLOW, 2-FI-85-15A, is

IF CRD Stabilizing Flow adjustment is necessary, THEN

**REQUEST** Technical Support to perform 0-TI-20 in order to

JPM NUMBER:	308F	
TITLE:	PLACE ± 24V NEUTRON BATTERY CHARG APPLICABLE BATTERY BOARD	ER IN SERVICE TO
TASK NUMBER:	S-57D-NO-08	
Provide a copy of 0-	-OI-57D, Section 5.13 (include 0-OI-57D, Section	on 3.0)
SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TRAINING	DATE:
PLANT CONCURRE	ENCE:OPERATIONS	DATE:
* Examination JPI	Ms Require Operations Training Manager Approval or De	esignee Approval and

Plant Concurrence

# **REVISION LOG**

Revision Number	Effective Date	Pages Affected	Description Of Revision
0	03/20/09	All	Initial issue
			Tritical location
	+		
·			

OPERATOR:		
RO	SRO	DATE:
JPM NUMBER:	308F	
TASK NUMBER:	S-57D-NO-08	
TASK TITLE:	PLACE ± 24V NEUTRON BATTE APPLICABLE BATTERY BOARD	ERY CHARGER IN SERVICE TO
K/A NUMBER:	263000K1.02 K/A RATING	: RO <u>3.2</u> SRO <u>3.3</u>
********	**************	************
TASK STANDARD:	SIMULATE PLACING B2-3 ± 24\ BATTERY CHARGER IN SERVIO	/ NEUTRON MONITORING CE TO BATTERY BOARD 3.
PERFORMANCE L	OCATION: SIMULATOR I	PLANT X CONTROL ROOM
REFERENCES/PRO	OCEDURES NEEDED: 0-OI-5	7D, Rev 121
VALIDATION TIME	CONTROL ROOM:	LOCAL: <u>15:00</u>
MAX. TIME ALLOW	ED:(FOR TIME	CRITICAL JPMs ONLY)
PERFORMANCE T	IME:	
COMMENTS:		
ADDITIONAL COM	MENT SHEETS ATTACHED?	YESNO
RESULTS:	SATISFACTORY	UNSATISFACTORY
EXAMINER SIGNAT	ΓURE:	DATE:

IN-PLANT: I will explain the initial conditions and state the task to be performed. <u>ALL STEPS WILL BE SIMULATED</u>. Do <u>NOT</u> operate any plant equipment. SELF CHECKING may be carried out to the point of touching a label. If it becomes necessary to physically touch a control switch, use a non-conductive pointing device. Observe ALL plant radiological and safety precautions. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's correct" (or That's incorrect", if applicable). When you have completed your assigned task, you will say, "My task is complete" and I will acknowledge that your task is complete.

INITIAL CONDITIONS: You are an Operator. Unit 3 is at 100% power. ± 24V

Neutron Monitoring Battery B is in service in accordance with Section 5.10 of 0-OI-57D. ± 24V Neutron Monitoring Battery Charger B2-3 was temporarily taken out of service for maintenance and is now ready for return to service.

**INITIATING CUES:** 

The Shift Manager directs you to return Unit  $3 \pm 24V$  Neutron Monitoring Battery Charger B2-3 to service to  $\pm 24V$  Neutron Monitoring Battery B.

**CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!** 

JPM NO. 308F REV. NO. 0 PAGE 5 of 15

START TIM	1E	·····								
******	******	*****	*****	*****	******	******	*****	*******	*****	*****
<u>PERFORM</u>	<u>ANCE</u>	STEP:			CRITICA	AL		NOT C	RITICAI	L <u>X</u>
When reque	ested b	oy exami	iner, idei	ntify/obt	ain copy	of require	ed pı	rocedur	e.	
Examiner N simulator,	Note: theref	Applica ore, just	nt has o	lemons iim/her	trated o	btaining edure.	proc	cedure	s on the	9
STANDARD	<u>):</u>									
Identified or	obtain	ed copy	of 0-OI-	57D.						
SAT	_ U	NSAT		N/A		СОМ	MEN	ITS:	····	THE THIRD LINE
- Alleria - Alleria -		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·				•			
								3W1		
*******	*****	******	*****	*****	*****	*****	****	*****	******	*****
PERFORMA	NCE	STEP:		(	CRITICA	L	_ ^	NOT CF	RITICAL	X
5.13		ng Unit : ervice to	3 ± 24V Battery l	Neutron Board 3	Monitor	ing Batte	ry A(	B) Cha	rgers	
	[1]	VERIF service	Y the ±	24V Ne ordance	utron Mo with Sec	nitoring E ction 5.10	Batte	ry A(B)	is in	
STANDARD	<u>:</u>									
N/A – given	in the	initial co	nditions							
SAT	_ U	NSAT		N/A		COM	ΛEN.	TS:	****	
			····							
				*****		····-			····	

JPM NO. 308F REV. NO. 0 PAGE 6 of 15

*******	********	********	**********			
PERFORMANCE	STEP:	CRITICAL	NOT CRITICAL X			
[2]	REVIEW Precautions	s and Limitations.				
	REFER TO Section 3	3.0.				
STANDARD:						
Reviewed Section 3.0						
SAT U	JNSAT N/A _	COMME	ENTS:			

TABLE 3

CHANNEL A CHARGERS	POWER SUPPLY
A1-3 & A2-3	Batt Board 3, Breaker 1201
CHANNEL B CHARGERS	POWER SUPPLY
B1-3 & B2-3	Batt Board 3, Breaker 1221

Steps 5.13[4] thro Battery Charger A	ugh 5.13[10] a (B) located in	NOTE are performed fro Battery Board R	om the ± 24\ 00m 3.	/ Neutron Monitoring
**************************************			************ CAL X	**************************************
[3]	Table 3 abo	24V DC CHARGE	RS (applica BD 3, BKR	uble charger, see 1201 Ch. A (1221
CUE: [When cor	rectly simula	ted] Breaker 122	21 is closed	
STANDARD: In Battery Board R	loom 3, Simul	ated placing bkr	1221 in the	ON position
SAT U				
INSTRUCTOR'S N	OTE: DO NO	OT ALLOW THE	EXAMINEE G BATTER	TO OPEN THE FRONT

(Next Page)

COVER OF THE ± 24V NEUTR	OT ALLOW THE EXAMING BATT	IEE TO OPEN THE FRONT ERY CHARGER.
HAND THE CANDIDATE	ATTACHMENT 1.	
***********	************	**************
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X
Charger to output circu	front cover of the ± 24V Ne be placed in service and V uit breaker by placing it in t	ERIFY CLOSED the DC he ON Position.
CUE: [When correctly simula breaker is in the ON position	ted] The B2-3 <u>+</u> 24V Batte	ery Charger DC output
STANDARD:		
In Battery Board Room 3, Stated Monitoring Battery Charger and	d would open the front cov Verify Closed the DC outp	er of B2-3 <u>+</u> 24V Neutron out breaker.
SAT UNSAT	N/A COI	MMENTS:
***********		
PERFORMANCE STEP:	CRITICAL X	NOT CRITICAL
[5] CLOSE the Battery Cha	AC CIRCUIT BREAKER or lirger by placing the breake	n Neutron Monitoring r in ON.
CUE: [When correctly simulat AC Circuit Breaker is in the Ol	N nocition	oring Battery Charger B2-3
STANDARD:		
Simulated placing B2-3 ± 24V Note the ON position.	eutron Monitoring Battery (	Charger AC circuit breaker in
SAT UNSAT	_ N/A CON	MENTS:

JPM NO. 308F REV. NO. 0 PAGE 9 of 15

PERFORMANCE S	TEP:		NOT CRITICAL X
[6]	DEPRESS OVERVO being placed in servi	DLTAGE RESET push ce.	n-button on chargers
CUE: [When correc	ctly simulated], pusl	nbutton has been de	enressed
STANDARD:			picosou
	ng overvoltage reset p	oushbutton on B2-3 <u>+</u>	24V Neutron Monitoring
SAT UN	SAT N/A _	COMME	ENTS:
*******	*******	******	*******
PERFORMANCE S	TEP:		NOT CRITICAL X
[7]	CHECK the following applicable ± 24V Neu	indications of norma itron Monitoring Batte	l operation on the ery Charger:
	A. DC Voltage gr	eater than 24 Volts	
	B. DC Voltage les	ss than 29 Volts	
CUE: [When correct	ctly indicated] DC vo	oltage is reading 25	volts.
STANDARD:			
Locates and reads th	ne voltmeter on the B	2-3 charger.	
SAT UNS	SAT N/A _	COMME	NTS:

JPM NO. 308F REV. NO. 0 PAGE 10 of 15

****************	*****	*****	********	*****			
PERFORMANCE STEP:	CRITICAL		NOT CRITICAL	X			
[8] VERIFY the NORM							
CUE: [When correctly indicated] The	Normal/Eq	ualize sw	itch is in Normal.				
STANDARD:							
Locates and verifies the Normal/Equaliz	ze switch is ir	Normal.					
SAT N/A		COMME	ENTS:				
				·			
****				*******			
**************************************			NOT CRITICAL				
[9] VERIFY the EQUA	[9] VERIFY the EQUALIZE HOURS timer is set to zero.						
CUE: [When correctly indicated] The	timer indica	ates zero.					
STANDARD:							
Locates and verifies the Equalize Hours Timer is reading zero.							
SAT UNSAT N/A COMMENTS:							

# EXAMINER NOTE: ALTERNATE PATH STARTS HERE: candidate should perform the actions in the "CAUTION"

	CI	LITION		
cnarger, see Table	ction occurs the AC Ci 1) Tie to Bat Bd 1(2,3) position and the Unit S	. BKR 1201 Ch	n. A (1221 Ch. I	R) should be
*******	********	******	******	***********
PERFORMANCE S		CRITICAL		
[10]	CHECK the following applicable ± 24V Neu	indications of r tron Monitoring	normal operation Battery Charg	on on the ger:
	<ul> <li>DC Voltage green</li> <li>DC Voltage less</li> <li>DC Amperes less</li> <li>Chargers are son</li> <li>DC amps grean</li> </ul>	ss than 29 Volts ess than 50 am upplying power	s ps	dicated by
CUE: [As each is i reading 80 amps.	indicated] DC Voltage	now reading	20 volts, DC	Amperes is
STANDARD:				
Locates and reads t CUE, performs actio	he voltmeter and amp ons in "Caution" above.	meter on the B	2-3 charger. W	hen given the
OPENS the AC Circ Supervisor immedia	uit Breaker and Tie to tely. (Opening the brea	Bat Bd 3 bkr 12 akers is Critical,	221 and Notifie , not notifying t	es the Unit the US)
SAT UN	SAT N/A _	co	OMMENTS:	
CUE: [When the A	C Circuit breaker and	Tie to BB 3 b	kr 1221 are Ol	PEN] This ends

JPM NO. 308F REV. NO. 0 PAGE 12 of 15

PERFORMANCE STEP:		NOT CRITICAL <u>X</u>
PERFORMER complied with all safe	ety rules and regul	ations
STANDARD:		
PERFORMER complied with all safet sideshields, and hearing protection was	y rules and regulat as worn AS REQU	ions (hardhat, safety glasses, IRED.)
ELECTRICAL SAFETY was also adhesuch as rings, metal wristwatches, braemployees within reaching distance or greater.	acelets, and metal	necklaces shall not be worn by
SAT UNSAT N	V/A	COMMENTS:
*************		
PERFORMANCE STEP:	CRITICAL _	NOT CRITICAL X
PERFORMER demonstrated proper ra	adiological practice	s AS REQUIRED
STANDARD:		
PERFORMER applied proper radiolog performance.	ical practices, AS	REQUIRED, during JPM
SAT N	I/A (	COMMENTS:

JPM NO. 308F REV. NO. 0 PAGE 13 of 15

PERFORMANCE STEP:		**************************************
PERFORMER demonstrated the	use of SELF CHECKING	G during this JPM
STANDARD:		
PERFORMER verified applicable accordance with plant standards.	components by utilizing	SELF CHECKING in
SAT UNSAT	_ N/A CO	MMENTS:
************		
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X
PERFORMER demonstrated the	use of 3-WAY COMMUN	IICATION during this JPM
STANDARD:		
PERFORMER utilized 3-WAY CO	MMUNICATION in acco	rdance with plant standards.
SAT UNSAT	_ N/A COI	MMENTS:
	END OF TASK	
STOP TIME:		

IN-PLANT: I will explain the initial conditions and state the task to be performed. <u>ALL STEPS WILL BE SIMULATED</u>. Do <u>NOT</u> operate any plant equipment. SELF CHECKING may be carried out to the point of touching a label. If it becomes necessary to physically touch a control switch, use a non-conductive pointing device. Observe ALL plant radiological and safety precautions. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's correct" (or That's incorrect", if applicable). When you have completed your assigned task, you will say, "My task is complete" and I will acknowledge that your task is complete.

INITIAL CONDITIONS: You are an Operator. Unit 3 is at 100% power. + 24V

Neutron Monitoring Battery B is in service in accordance with Section 5.10 of 0-OI-57D. ± 24V Neutron Monitoring Battery Charger B2-3 was temporarily taken out of service for maintenance and is now ready for return to service.

**INITIATING CUES:** The Shift Manager directs you to return Unit 3 <u>+</u> 24V Neutron

Monitoring Battery Charger B2-3 to service to ± 24V Neutron

Monitoring Battery B.

**CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!** 

IN-PLANT: I will explain the initial conditions and state the task to be performed. <u>ALL STEPS WILL BE SIMULATED</u>. Do <u>NOT</u> operate any plant equipment. SELF CHECKING may be carried out to the point of touching a label. If it becomes necessary to physically touch a control switch, use a non-conductive pointing device. Observe ALL plant radiological and safety precautions. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's correct" (or That's incorrect", if applicable). When you have completed your assigned task, you will say, "My task is complete" and I will acknowledge that your task is complete.

INITIAL CONDITIONS: You are an Operator. Unit 3 is at 100% power. + 24V

Neutron Monitoring Battery B is in service in accordance with Section 5.10 of 0-Ol-57D. <u>+</u> 24V Neutron Monitoring Battery Charger B2-3 was temporarily taken out of service for

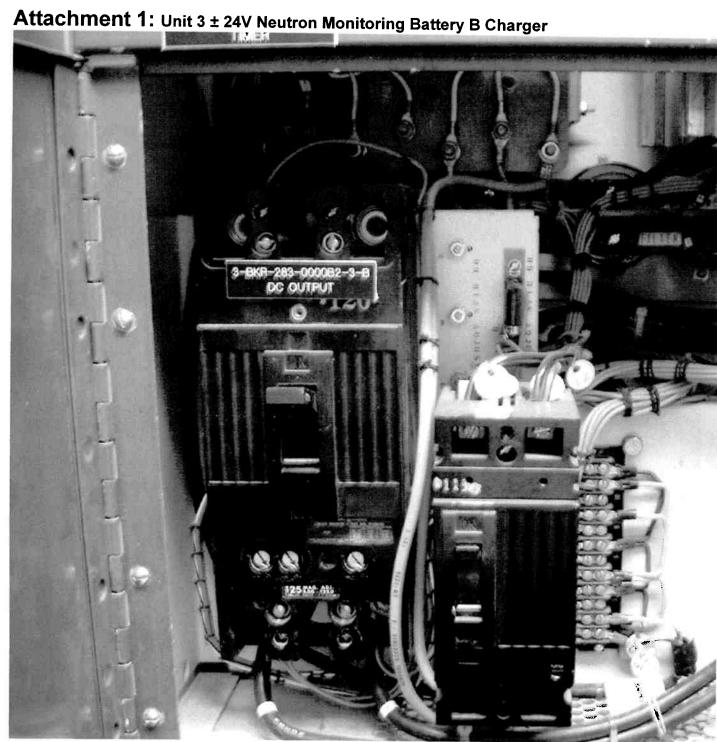
maintenance and is now ready for return to service.

**INITIATING CUES:** The Shift Manager directs you to return Unit 3 ± 24V Neutron

Monitoring Battery Charger B2-3 to service to ± 24V Neutron

Monitoring Battery B.

**CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!** 





# **Browns Ferry Nuclear Plant**

### Unit 0

**Operating Instruction** 

0-OI-57D

**DC Electrical System** 

Revision 0121

**Quality Related** 

Level of Use: Continuous Use

Effective Date: 11-06-2008

Responsible Organization: OPS, Operations

Prepared By: William Wambsgan @ 6360

Approved By: James A. McCrary

BFN Unit 0	DC Electrical System	0-OI-57D Rev. 0121 Page 2 of 249	- 1992
		Page 2 of 249	

# **Current Revision Description**

Type of Change: Enhancement

Tracking Number:

Affected Pages

228, 229, 234, 235

PCR 08004149: Step 8.15.3[3], 8.16.1[3], 8.15.4[3], 8.16.4[3] corrected panel numbers 2-LPNL-925-0716 and 2-LPNL-925-0717.

# THIS REVISION DOES NOT AFFECT SYSTEM STATUS

BFN Unit 0

# DC Electrical System

0-OI-57D Rev. 0121 Page 3 of 249

## **Table of Contents**

1.0	PURP	OSE	10
2.0	REFE	RENCES	10
2.1	Techn	ical Specifications	10
2.2	Final S	Safety Analysis Report	10
2.3		Instructions	
2.4	Plant I	Drawings	11
2.5	Vendo	or Manuals	13
2.6	Miscel	laneous Documents	13
3.0	PREC	AUTIONS AND LIMITATIONS	14
4.0	PRES	TARTUP/STANDBY READINESS REQUIREMENTS	21
5.0	STAR	TUP	24
5.1		g the 250V Batteries in Service	
	5.1.1	Placing the 250V Battery 1 in Service to Battery Board 1	
	5.1.2	Placing the 250V Battery 2 in Service to Battery Board 2	26
	5.1.3	Placing the 250V Battery 3 in Service to Battery Board 3	28
	5.1.4	Placing the 250V Battery 4 in Service to Battery Board 4	30
	5.1.5	Placing the 250V Battery 5 in Service to Battery Board 5	32
	5.1.6	Placing the 250V Battery 6 in Service to Battery Board 6	34
5.2	Placino	g the 250V Battery Chargers in Service	36
	5.2.1	Placing the 250V Battery Charger 1 in Service to Battery Board 1	36
	5.2.2	Placing the 250V Battery Charger 2A in Service to Battery Board 2	
	5.2.3	Placing the 250V Battery Charger 3 in Service to Battery Board 3	
	5.2.4	Placing the 250V Battery Charger 4 in Service to Battery Board 4	
	5.2.5	Placing the 250V Battery Charger 5 in Service to Battery Board 5	
	5.2.6	Placing the 250V Battery Charger 6 in Service to Battery Board 6	
5.3	Placing	the Diesel Generator 125V Normal Battery Chargers in Service	

BFN	DC Electrical System	0-OI-57D	
Unit 0		Rev. 0121	
		Page 4 of 249	

		· ····································	
	5.3.1	Placing Diesel Generator A 125V Normal Battery Charger A in Service	60
	5.3.2	Placing Diesel Generator B 125V Normal Battery Charger A in Service	
	5.3.3	Placing Diesel Generator C 125V Normal Battery Charger B in Service	
	5.3.4	Placing Diesel Generator D 125V Normal Battery Charger B in Service	
	5.3.5	Placing Diesel Generator 3A 125V Normal Battery Charger A in Service	
	5.3.6	Placing Diesel Generator 3B 125V Normal Battery Charger A in Service	
	5.3.7	Placing Diesel Generator 3C 125V Normal Battery Charger B in Service	
	5.3.8	Placing Diesel Generator 3D 125V Normal Battery Charger B in Service	
5.4	Placing	the 48V Annunciator Batteries in Service	
	5.4.1	Placing 48V Annunciator Battery A in Service to Battery Board 1	
	5.4.2	Placing 48V Annunciator Battery B in Service to Battery Board 3	
5.5	Placing	the 48V Annunciator Battery Chargers in Service	
	5.5.1	Placing 48V Annunciator Battery Charger A in Service	
	5.5.2	Placing 48V Annunciator Battery Charger B in Service	
5.6	Placing	the 48V Telephone Battery in Service	
5.7	Placing	the 48V Telephone Battery Charger in Service	79
5.8	Placing Battery I	Unit 1 ± 24V DC Neutron Monitoring Battery A(B) in Service to Board 1	82
5.9	Placing	Unit 2 $\pm$ 24V DC Neutron Monitoring Battery A(B) in Service to Board 2	
5.10	Placing I	Unit 3 $\pm$ 24V DC Neutron Monitoring Battery A(B) in Service to Board 3	
5.11	Placing I	Unit 1 $\pm$ 24V Neutron Monitoring Battery A(B) Chargers in to Battery Board 1	
5.12	Placing l	Unit 2 $\pm$ 24V Neutron Monitoring Battery Chargers in Service to Board 2	

BFN Unit 0

## **DC Electrical System**

0-OI-57D Rev. 0121 Page 5 of 249

5.13	Placin Servic	g Unit 3 $\pm$ 24V Neutron Monitoring Battery A(B) Chargers in to Battery Board 3	101
5.14		g the 24V Microwave Battery in Service	
5.15		g the 24V Microwave Battery Charger 1(2) in Service	
5.16	Placin	g the 4kV Shutdown Board 250V Battery Charger SB-A(B)(C)(D)	
5.17	Placin Servic	g the 4kV Shutdown Board 250V Battery Charger SB-3EB in	108
5.18	Placin	g the Diesel Generator 125V Battery Charger in Service	109
6.0	SYSTI	EM OPERATIONS	111
6.1		al Operations	
7.0		DOWN	
7.1		ving the 250V Batteries from Service	
	7.1.1	Removing the 250V Battery 1 from Service	
	7.1.2	Removing the 250V Battery 2 from Service	
	7.1.3	Removing the 250V Battery 3 from Service	
	7.1.4	Removing the 250V Battery 4 from Service	
	7.1.5	Removing the 250V Battery 5 from Service	
	7.1.6	Removing the 250V Battery 6 from Service	
7.2	Remov	ring the 250V Battery Chargers from Service	
	7.2.1	Removing 250V Battery Charger 1 from Service	
	7.2.2	Removing 250V Battery Charger 2A from Service	
	7.2.3	Removing 250V Battery Charger 3 from Service	140
	7.2.4	Removing 250V Battery Charger 4 from Service	142
	7.2.5	Removing 250V Battery Charger 5 from Service	143
	7.2.6	Removing 250V Battery Charger 6 from Service	144
7.3	Remov	ring the 48V Annunciator Batteries from Service	145
	7.3.1	Removing 48V Annunciator Battery A from Service	145
	7.3.2	Removing 48V Annunciator Battery B from Service	
7.4		ing the 48V Annunciator Battery Chargers from Service	
	7.4.1	Removing 48V Annunciator Battery Charger A from Service	
	7.4.2	Removing 48V Annunciator Battery Charger B from Service	148

BFN DC Electrical System 0-OI-57D Rev. 0121 Page 6 of 249

	_		
7.5		ving the 48V Telephone Battery from Service	
7.6		ving the 48V Telephone Battery Charger from Service	
7.7	Remov	ving Unit 1 ±24V Neutron Monitoring Battery A(B) from Service	152
7.8	Remov	ving Unit 2 $\pm$ 24V Neutron Monitoring Battery A(B) from Service	154
7.9	Remov	ving Unit 3 $\pm$ 24V Neutron Monitoring Battery A(B) from Service	156
7.10	Remov A(B) fre	ving Unit 1 ± 24V Neutron Monitoring Battery Charger Channel om Service	158
7.11	Remov A(B) fro	ving Unit 2 $\pm$ 24V Neutron Monitoring Battery Charger Channel om Service	160
7.12	Remov	ring Unit 3 ± 24V Neutron Monitoring Battery Charger Channel	
	A(B) fro	om Service	
7.13		ring the 24V Microwave Battery from Service	
7.14		ring the 24V Microwave Battery Charger 1(2) from Service	166
7.15	Remov SB-A(E	ring the 4kV Shutdown Board 250V Battery Charger B)(C)(D) from Service	168
7.16	Remov from Se	ring the 4kV Shutdown Board 250V Battery Charger SB-3EB ervice	169
7.17		ring the Diesel Generator 125V Battery Chargers from Service	
	7.17.1	Removing Diesel Generator A 125V Battery Chargers from Service	170
	7.17.2	Removing Diesel Generator B 125V Battery Chargers from Service	
	7.17.3	Removing Diesel Generator C 125V Battery Chargers from Service	
	7.17.4	Removing Diesel Generator D 125V Battery Chargers from Service	
	7.17.5	Removing Diesel Generator 3A 125V Battery Chargers from Service	
	7.17.6	Removing Diesel Generator 3B 125V Battery Chargers from Service	
	7.17.7	Removing Diesel Generator 3C 125V Battery Chargers from Service	
	7.17.8	Removing Diesel Generator 3D 125V Battery Chargers from Service	
8.0	INFREC	QUENT OPERATIONS	

BFN	DC Electrical System	0-OI-57D
Unit 0		Rev. 0121
		Page 7 of 249

		rable of Contents (continued)	
8.1	Placing Service	the 250V BATTERY CHARGER 2B, 0-CHGA-248-0002B in to Battery Board 1(2,3,4,5,6)	178
8.2	Placing	the Spare 48V Battery Charger in Service to the Annunciator	
	8.2.1	Placing the Spare 48V Battery Charger in Service to Annunciator Bus A, Battery Board 1	
	8.2.2	Placing the Spare 48V Battery Charger in Service to Annunciator Bus B, Battery Board 3	
8.3	Placing Power I	the Spare 48V Battery Charger in Service to the Telephone Board	
8.4	4kV Sh	utdown Board A(B)(C)(D) Spare 250V Battery Charger	
	8.4.1	Placing the Spare 250V Battery Charger in Service to Distribution Panel SB-A(B)(C)(D)	
	8.4.2	Removing the 250V Spare Battery Charger from Service to Distribution Panel SB-A(B)(C)(D)	
8.5	Transfe	r of AC Sources to a Battery Charger	
8.6		r of AC Alternate Source to Battery Charger SB-C ONLY	
8.7		r of AC Normal Source to Battery Charger SB-C ONLY.	
8.8		r of 4kV Shutdown Board Control Power	
8.9		r of Power Supplies to 250V Reactor MOV Boards	
8.10	Transfe	r of Power Supplies to 250V Turbine Building Distribution (2,3)	
8.11	Placing	the Diesel Generator 125V Alternate Battery Chargers in	
	8.11.1	Placing Diesel Generator A 125V Alternate Battery Charger B in Service	204
	8.11.2	Placing Diesel Generator B 125V Alternate Battery Charger B in Service	
	8.11.3	Placing Diesel Generator C 125V Alternate Battery Charger A in Service	
	8.11.4	Placing Diesel Generator D 125V Alternate Battery Charger A in Service	
	8.11.5	Placing Diesel Generator 3A 125V Alternate Battery Charger B in Service	
	8.11.6	Placing Diesel Generator 3B 125V Alternate Battery Charger B in Service	

BFN DC Electrical System 0-OI-57D Rev. 0121 Page 8 of 249

	8.11.7	Placing Diesel Generator 3C 125V Alternate Battery Charger A in Service	216
	8.11.8	Placing Diesel Generator 3D 125V Alternate Battery Charger A in Service	
8.12	Transfe	er of 480V Shutdown Board Control Power	
8.13		utdown Board 3EB Spare 250V Battery Charger Operation	
	8.13.1	Placing the 250V Spare Battery Charger in Service to Distribution Panel SB-3EB	
	8.13.2	Removing the 250V Spare Battery Charger from Service to Distribution Panel SB-3EB	
8.14	Transfe	r of Power Supplies to Panel 9-24	
8.15		r ATWS Power Supply from Normal to Alternate	
	8.15.1	Transfer UNIT 1 ATWS Power Supply CH-A to Alternate	
	8.15.2	Transfer UNIT 1 ATWS Power Supply CH-B to Alternate	
	8.15.3	Transfer UNIT 2 ATWS Power Supply CH-A to Alternate	
	8.15.4	Transfer UNIT 2 ATWS Power Supply CH-B to Alternate	
	8.15.5	Transfer UNIT 3 ATWS Power Supply CH-A to Alternate	
	8.15.6	Transfer UNIT 3 ATWS Power Supply CH-B to Alternate	
8.16	Transfe	r ATWS Power Supply from Alternate to Normal	
	8.16.1	Transfer UNIT 1 ATWS Power Supply CH-A to Normal	
	8.16.2	Transfer UNIT 1 ATWS Power Supply CH-B to Normal	
	8.16.3	Transfer UNIT 2 ATWS Power Supply CH-A to Normal	
	8.16.4	Transfer UNIT 2 ATWS Power Supply CH-B to Normal	
	8.16.5	Transfer UNIT 3 ATWS Power Supply CH-A to Normal	
	8.16.6	Transfer UNIT 3 ATWS Power Supply CH-B to Normal	
8.17	Transfer	Unit 1 Panel 9-9 Cabinet 1 Power Supplies	238
8.18	Transfer	Unit 2 Panel 9-9 cabinet 1 Power Supplies	239
8.19		Unit 3 Panel 9-9 cabinet 1 Power Supplies	
Appei	ndix A:	Removing Loads From Battery Board 6	
Apper	ndix B:	Loading Battery Board 6	247

BFN Unit 0	DC Electrical System	0-OI-57D Rev. 0121 Page 9 of 249	
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## **Table of Contents (continued)**

### **ATTACHMENTS**

Attachment 1: None
Attachment 2: None

Attachment 3: DC Electrical System Electrical Lineup Checklist, Unit 0
Attachment 3A: DC Electrical System Electrical Lineup Checklist, Unit 1
Attachment 3B: DC Electrical System Electrical Lineup Checklist, Unit 2
Attachment 3C: DC Electrical System Electrical Lineup Checklist, Unit 3

Attachment 4: None

BFN DC Electrical System Unit 0	0-OI-57D Rev. 0121 Page 10 of 249
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#### 1.0 PURPOSE

[NER/C] This operating instruction provides precautions and limitations, prestartup/standby readiness requirements, and procedural steps for operation of the DC Electrical System. [INPO SOER 81-015]

### 2.0 REFERENCES

## 2.1 Technical Specifications

Section 3.8.4, DC Sources-Operating

Section 3.8.5, DC Sources-Shutdown

Section 3.8.6, Battery Cell Parameters

Section 3.8.7, Distribution Systems-Operating

Section 3.8.8, Distribution Systems-Shutdown

Section 5.4, Procedures

Section 5.5, Programs and Manuals

## 2.2 Final Safety Analysis Report

Section 8.6, 250-Volt D-C Power Supply and Distribution

Section 8.8, Auxiliary D-C Power Supply and Distribution

Section 8.4, Normal Auxiliary Power System

Section 8.5, Standby A.C. Power Supply and Distribution

Section 13.6, Normal Operations

BFN Unit 0	DC Electrical System	0-OI-57D Rev. 0121	
		Page 11 of 249	

#### 2.3 Plant Instructions

- 1-, 2-, 3-OI-90, Radiation Monitoring System
- 2-, 3-OI-47, Main Turbine Lube Oil System
- 0-OI-31, Control Bay and Off-Gas Treatment Building Air Conditioning
- 2-, 3-OI-47B, Main Turbine Lube Oil System
- 0-OI-57B, 480V/240V AC Electrical System
- 2-, 3-OI-92, Source Range Monitoring
- 0-OI-57C, 208V/120V AC Electrical System
- 2-, 3-OI-92A, Intermediate Range Monitoring
- 1-, 2-, 3-SR-3.8.4.1(1), (2), (3), Weekly Check for 250 Volt Main Bank Number 1(2,3) Battery Surveillance Instruction
- 0-SR-3.8.4.1(I), (II), Weekly Check for Shutdown Board A and B (C and D) Batteries Surveillance Instruction
- 3-SR-3.8.4.1(3EB), Weekly Check for Shutdown Board 3EB Battery Surveillance Instruction
- 1-SR-3.8.4.4(1), Main Bank 1 Battery Discharge Test
- 2-SR-3.8.4.4(2), Main Bank 2 Battery Discharge Test
- 3-SR-3.8.4.4(3), Main Bank 3 Battery Discharge Test
- EPI-0-248-BAT003, Main Bank 4 Battery Discharge Test
- 0-GOI-300-2, Electrical

### 2.4 Plant Drawings

- 0-45E701-1, -2, Wiring Diagram Battery BD 1, Panels 1-7(8-12) Single Line
- 0-45E702-1,-2,-3, Wiring Diagram Battery BD 2, Panels 1-7(8-11)(12-14) Single Line
- 0-45E703-1, -2, Wiring Diagram Battery BD 3, Panels 1-7(8-12) Single Line
- 0-45E704, Wiring Diagram Battery BD 4 Single Line
- 1-45E705, Wiring Diagram Turb Bldg 250V DC Distr BD 1 Single Line
- 2-45E706, Wiring Diagram 250V DC Turb Bldg Distr BD 2 Single Line

BFN Unit 0	DC Electrical System	0-OI-57D Rev. 0121	
		Page 12 of 249	

## 2.4 Plant Drawings (continued)

3-45E707, Wiring Diagrams Turb Bldg 250V Distr BD 3 Single Line

45W708-1, -7, -11, Wiring Diagrams Btry Boards, Chargers & MG Sets Connection Diagram

45N708-2 through -6, -8, -9, -10, Wiring Diagrams Battery Boards, Chargers & MG Sets Connection Diagram

4-45E709-1, Wiring Diagram Shutdown BDS 250V Btry & Chgr Single Line

3-45E709-2, Wiring Diagram Shutdown BDS 250V Btry & Chgr Single Line

45N712-1, Wiring Diagrams 250V Reactor MOV Bd 1A Single Line

1-45N712-series, Wiring Diagram 250V Reactor MOV Bd 1B(1C) Single Line

2-45E712-series, Wiring Diagram 250V Reactor MOV Bd 2A(B,C) Single Line

3-45E712-series, Wiring Diagram 250V Reactor MOV Bd 3A(B,C) Single Line

1-, 2-, 3-45E749-series, Wiring Diagram 480V Shutdown Bd 1(2,3) A(B) Single Line

1-, 2-, 3-45E751-series, Wiring Diagram 480V Reactor MOV Bd 1(2,3) A(B,C,D,E) Single Line

0-45E729-1, Wiring Diagram 480V Common Board 1 Single Line

0-45E736-1, -2, Wiring Diagram 480V Control Bay Vent Bd A(B) Single Line

0-45E732-series, Wiring Diagram 480V Diesel Auxiliary Bd A(B) Single Line

3-45E732-5, -6, Wiring Diagram 480V Diesel Aux Bd 3EA(EB) Single Line

55N715-series, Wiring Diagram Control Room D-C Board Single Line

55N2788-series, Communications 48V & 24V DC Power Distribution Application Schematic

731E700, Key Diagram of Plant DC & Instrum & Control AC Systems

0-761E580-1, 125V DC Single Line Diagram

3-C196Cl1017, 125V DC Single Line Diagram

BFN	DC Electrical System	0-OI-57D
Unit 0	-	Rev. 0121
		Page 13 of 249

#### 2.5 Vendor Manuals

C&D Installation, Operating, and Maintenance Instructions for Stationary Batteries, Contract No. 822407, BFN-VTM-C173-0010

LORAIN Products Corp., Model F100E25 Flotrol Rectifier, Contract No. 69-64520, BFN-VTM-L270-0010

General Electric, GEK 779 and GEK 779A Volume XI, Electrical Power Systems, Contract No. 90744, BFN-CVM-2105 and BFN-CVM-2244

GEK-31040, Regulated, Filtered 3 Phase Battery Charger 48 Volt, 100 Amp, Contract No. 90744, BFN-VTM-G080-1085

GEK-1249A, SCR Battery Chargers, Contract No. 90744, BFN-VTM-G080-6720

GEK-31041, Regulated, Filtered 3 Phase Battery Charger 250 volt, 300 amp, BFN-VTM-G080-7390

C&D Charger Power Systems 250V DC Shutdown Boards Battery Chargers, BFN-VTM-C173-0150

Southern Testing Services I/O/M Manual for 250 VDC Distribution Panel, Contract E19013, BFN-CVM-2659

General Electric Type AK POWER Circuit Breakers, BFN-VTM-G080-1020

Operation and Maintenance Manual for Power Conversion Product Three Phase SCRR Battery Charger, BFN-VD-5021

#### 2.6 Miscellaneous Documents

INPO SOER 81-015, Partial Loss of DC Power

LER 88021/25

II-B-91-056

CAQR BFP 880827

NRC IE Inspection Follow-up Item 86-40

DCN Q33440A Revise Battery Charger Vendor Manual

DCN T39994A, Revise Unit Battery and 250VDC RMOV Board Load Limits associated with FCV-73-44

BFN Unit 0	DC Electrical System	0-OI-57D Rev. 0121	
		Page 14 of 249	

#### 3.0 PRECAUTIONS AND LIMITATIONS

- A. In the event a Unit Battery System is removed from service or a 250VDC RMOV Board is transferred to the alternate supply, one or more of the limitations below may apply. If time permits, a Caution Order should be placed on the affected MOV handswitches prior to transfer of board to alternate to prevent violation of these safe shutdown restrictions.
  - 1. In the event any 250VDC RMOV Board is on its alternate supply, the following restrictions apply to DC motor operated valves that are supplied from a battery that is feeding any RMOV board alternate supply:
    - No DC MOV may be operated except as required to mitigate accident conditions, to obtain safe shutdown or to comply with Technical Specifications(i.e. to comply with LCO ACTIONS statements only).
    - Testing(including SI/SRs) that requires DC motor operated valve operation is NOT allowed. [Ref. Dwgs. 1-45E701-3, 2-45E702-4, 3-45E703-3]

DC MOVs that may NOT be operated except as required to mitigate accident conditions or to obtain safe shutdown or to comply with Technical Specifications(i.e. to comply with LCO ACTIONS statements only) with RMOV boards on alternate supply.

RMOV BOARD ON ALTERNATE	NORMAL SUPPLY BATTERY	ALTERNATE SUPPLY BATTERY	MAY NOT OPERATE MOVS SUPPLIED FROM RMOV BD (i.e. supplied from the alternate battery)
1A	1	2	1C, 2A, 3C, 1A
1B	3	1	1A, 2C, 3B, 1B
1C	2	1	1A, 2C, 3B, 1C
2A	2	3	1B, 2B, 3A, 2A
2B	3	1	1A, 2C, 3B, 2B
2C	1	2	1C, 2A, 3C, 2C
3A	3	2	1C, 2A, 3C, 3A
3B	1	3	1B, 2B, 3A, 3B
3C	2	3	1B, 2B, 3A, 3C

BFN Unit 0	DC Electrical System	0-OI-57D Rev. 0121
		Page 15 of 249

- If Battery System 1 is out of service or 250VDC RMOV Board 1A is on alternate supply, the following actions are required: [Ref. Dwg.: 1-45E701-3, 1-45E712-1]
  - a. If Battery System 1 is out of service, 1-FCV-073-0044, 2-FCV-73-44 and 3-FCV-73-44 and their supply circuit breakers must be open.
  - If 250V DC MOV Board 1A is transferred to alternate supply, 1-FCV-0073-0044 and 2-FCV-73-44 and their supply circuit breakers must be open.
- 3. If Battery System 2 is out of service or 250VDC RMOV Board 2A is on the alternate supply, the following additional actions and limitations are required: [Ref. Dwgs.: 2-45E702-4, 2-45E712-1]
  - If Battery System is out of service, valves 1-FCV-73-44, 2-FCV-73-44 and 3-FCV-73-44 and their associated supply circuit breakers must be opened.
  - b. If 250VDC RMOV Board 2A is transferred to the alternate supply, valves 2-FCV-73-44 and 3-FCV-73-44 and their associated supply circuit breakers must be opened.
- 4. If Battery System 3 is out of service or 250VDC RMOV Board 3A is on the alternate supply, the following additional actions and limitations are required: [Ref. Dwgs.: 3-45E703-3, 3-45E712-1]
  - a. If Battery System is out of service, valves 1-FCV-73-44, 2-FCV-73-44 and 3-FCV-73-44 and their associated supply circuit breakers must be opened.
  - b. If 250VDC RMOV Board 3A is transferred to the alternate supply, valves 3-FCV-73-44 and 2-FCV-73-44 and their associated supply circuit breakers must be opened.
- B. If Battery System 4, 5 or 6 becomes inoperable the emergency bearing oil pump motor must be started upon transfer to the alternate source. This action ensures D.C. system availability during design basis conditions.
- C. Prior to entry into Battery Room(s) ventilation fans to the Battery Room(s) should be in service.
- D. Extreme care should be used when deenergizing equipment while locating grounds to prevent interruption of power to vital and safeguard equipment. REFER TO 0-GOI-300-2, Electrical.

0-OI-57D Rev. 0121 Page 16 of 249

- E. All safety requirements concerning smoking, fires or sparks should be observed when in the Battery-Battery Board Rooms because of potential accumulation of hydrogen in flammable amounts.
- F. 250V Unit Battery Charger 1,2A,2B and 3 Emergency ON select switch bypasses battery charger emergency load shed contacts. Placing the select switch in Emergency ON reestablishes charger operations with an accident signal present and Diesel Generator voltage available. Battery Charger 4 supply breaker, 480V Shutdown Board 3B, Compt 6D, receives a trip signal from the load shed logic and the breaker must be manually re-closed after a 40 second time delay to restore the charger to service. The annunciation circuit for the 250V Unit Battery Charger 3 does NOT work when the EMER/OFF/ON Select Switch is in the EMER Position.
- G. [II/C] Neutron monitoring battery chargers are NOT stand alone power supplies and shall only be operated while connected to the neutron monitoring batteries. [BFPER 940862]
- H. Within 30 minutes after the loss of the normal charger to a 250V Unit Battery another charger shall be placed in service to that battery and load reduced so that the battery is NOT discharging.
- I. [NRC/C] Upon return to service of 24V DC Neutron Monitoring Battery A or B, Instrument Maintenance must perform functional tests on SRMs and IRMs that are powered from the affected battery board (In that the IRMs and SRMs are normally inoperable after entering RUN mode due to lack of testing, these tests are N/A for the IRMs and the SRMs if the Unit is in RUN Mode and the IRMs and SRMs are inoperable). Prior to calling the IRMs and SRMs operable, the tests have to be performed. [NRC IE Inspect Follow-up Item 86-40]
- J. To return equipment to service following a failure or trip, the shutdown section of this instruction should be performed on the equipment failed. The initial conditions may NOT be applicable in this case.
- K. [NRC/C] The transfer of 250VDC control power to a 4kV Shutdown Board with a diesel generator operating may cause an inadvertent start of a RHRSW pump. [LER 88021/25]

BFN Unit 0	DC Electrical System	0-OI-57D Rev. 0121 Page 17 of 249
		Page 17 of 249

- L. The 250 V DC RMOV boards have alternate power supplies from another 250 V Unit DC board. For a unit in MODES 1, 2, or 3, the boards are considered inoperable when powered from their alternate feeder breakers because a single failure of the power source could affect both divisions depending on the board alignment.
  - 1. The alternate battery that has been loaded due to the transfer may be considered operable if the controlled drawing restrictions as referenced in P&L 3.0Y are met.
  - 2. Transfer of individual loads required by the Technical Specifications on the Unit Batteries such as the RPT Logic should be considered inoperable if divisional separation cannot be proven. If transfer of such loads is performed solely due to an inoperable distribution board or source, then Technical Specification LCO 3.0.6 can apply to the loads, however, a distribution LCO must be entered.
  - 3. For a unit in MODE 4 or 5, the DC boards can be placed on their alternate feeder breakers and considered OPERABLE as long as the restrictions on the associated drawings are met.
- M. A 250V DC unit battery charger should NOT be considered operable if its safety related supply is NOT available. If normal power(safety related supply) is available but the charger is on its alternate supply it is still considered operable.
- N. When a 250V RMOV board is transferred to the alternate supply (except for 2B 250V DC RMOV Bd), both divisions (I and II) will be supplied from the same source.
- O. Battery Boards should be unloaded before removing Battery or Battery Charger from service, unless the evolution is of short duration (i.e. transferring battery chargers) or plant conditions warrant otherwise.
- P. A critical voltage for any cell is 2.13 volts. Prolonged operation of a cell below 2.13 volts will reduce its life expectancy. However it is NOT unusual for a replacement cell to measure 2.07 volts (on float charge) and to slowly rise in voltage over a 3 month period to normal float voltage ranges.
- Q. Any Battery suspected to have been discharged shall be recharged immediately to prevent battery damage.

BFN Unit 0	DC Electrical System	0-OI-57D Rev. 0121 Page 18 of 249	
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- R. The 125V DC Diesel Generator Batteries 0-BATB-254-A(B)(C)(D) and 3-BATB-254-3A(3B)(3C)(3D) are designed to normally operate with 60 cells. The batteries have sufficient capacity to maintain minimum acceptable voltages with one(1) cell jumpered out of service (Strapped Out). The cell SHALL BE jumpered out (Strapped Out) in accordance with Drawing 0-761E580-1 NOTE 9 or 3-C196C11017, NOTE 8, as applicable The plant SHALL NOTIFY the Site Engineering Manager prior to implementation. [see EDC 69382]
- S. The 250V DC Shutdown Boards Batteries 0-BATA-248-A(B)(C)(D) and 3-BATA-248-3EB are designed to normally operate with 120 cells. The batteries have sufficient capacity to maintain minimum acceptable voltages with two(2) cells jumpered out of service (Strapped Out). The cells SHALL BE jumpered out (Strapped Out) in accordance with Drawing 0-45E709-1 NOTE 10 or 3-45E709-2, NOTE 13, as applicable The plant SHALL NOTIFY the Site Engineering Manager prior to implementation. [see EDC 69382]
- T. The 250V spare battery charger shall be stored in the seismic restraint at all times unless the charger is being transported to another location.
- U. Battery Board 1 is the only EQ power supply to Unit 2 ADS valves 1-5 and 1-34. Valves 1-5 and 1-34 are still considered operable when on there alternate power supply.
- V. [III/F] To prevent the interruption of test equipment and chemical analyses, the Radiochemical Lab (RCL) shall be notified prior to transferring the power supply to Battery Board 2. [III-B-91-056]
- W. Environmental calculations assume battery ambient temperatures at 60° to 110°F for all batteries except Shutdown Board 3EB and DG batteries which are 40°F - 110°F.
- X. [CAQR/C] Unless the spare and normal 48V Annunciator battery chargers are operated in parallel, a discharged battery <u>CANNOT</u> be recharged within 12 hours while supplying normal loads. [CAQR BFP 880827]

BFN Unit 0	DC Electrical System	0-OI-57D
		Rev. 0121
		Page 19 of 249

Y. Plant controlled drawings document restrictions on Unit 1, 2, & 3 loads which could adversely affect Unit 1, 2, 3 Safe Shutdown capability based on Nuclear Engineering calculations for plant configurations. Due to these restrictions operators must check the restrictions on the associated prints prior to manipulating the following loads.

BOARD	Drawing No.
250V Battery Bd 1	1-45E701-3
250V Battery Bd 2	2-45E702-4
250V Battery Bd 3	3-45E703-3
250V Battery Bd 4	0-45E704
250V Battery Bd 5	0-45E704-1
250V Battery Bd 6	0-45E704-2
250V RMOV Bd 1A	1-45E712-1
250V RMOV Bd 1B	1-45E712-2
250V RMOV Bd 1C	1-45E712-3
250V RMOV Bd 2A	2-45E712-1
250V RMOV Bd 2B	2-45E712-2
250V RMOV Bd 2C	2-45E712-3
250V RMOV Bd 3A	3-45E712-1
250V RMOV Bd 3B	3-45E712-2
250V RMOV Bd 3C	3-45E712-3

BFN	DC Electrical System	0-OI-57D
Unit 0		Rev. 0121
		Page 20 of 249

Z. Plant controlled drawings document Technical Specification restrictions on Unit 1, 2, & 3 when a Shutdown Boards Control Power is transferred to its Alternate source. Due to these restrictions, operators must check the restrictions on the associated prints prior to transferring Control Power.

Shutdown Board	Norm Control Power	Transfer Switch	Drawing
4160V SD BD A	250V Battery SB-A	0-XSW-211-A	0-45E724-1
4160V SD BD B	250V Battery SB-B	0-XSW-211-B	0-45E724-2
4160V SD BD C	250V Battery SB-C	0-XSW-211-C	0-45E724-3
4160V SD BD D	250V Battery SB-D	0-XSW-211-D	0-45E724-4
4160V SD BD 3EA	250V Battery BD 1	3-XSW-211-3EA	3-45E724-6
4160V SD BD 3EB	250V Battery SB-3EB	3-XSW-211-3EB	3-45E724-7
4160V SD BD 3EC	250V Battery BD 3	3-XSW-211-3EC	3-45E724-8
4160V SD BD 3ED	250V Battery BD 2	3-XSW-211-3ED	3-45E724-9
480V SD BD 1A	250V Battery SB-A	1-XSW-231-1A	1-45E749-1
480V SD BD 1B	250V Battery SB-C	1-XSW-231-1B	1-45E749-2
480V SD BD 2A	250V Battery SB-B	2-XSW-231-2A	2-45E749-3
480V SD BD 2B	250V Battery SB-D	2-XSW-231-2B	2-45E749-4
480V SD BD 3A	250V Battery BD 1	3-XSW-231-3A/A	3-45E749-5
480V SD BD 3B	250V Battery BD 3	3-XSW-231-3B/A	3-45E749-6

BFN Unit 0	DC Electrical System	0-OI-57D Rev. 0121	
		Page 101 of 249	

5.13	Placing Unit 3 ± 24V Neutron Monitoring Battery A(B) Chargers
	in Service to Battery Board 3

[1]	<b>VERIFY</b> the ± 24V Neutron Monitoring Battery A(B) is in
	service in accordance with Section 5.10.

[2] **REVIEW** Precautions and Limitations. **REFER TO** Section 3.0.

### TABLE 3

CHANNEL A CHARGERS	POWER SUPPLY
A1-3 & A2-3	Batt Board 3, Breaker 1201
CHANNEL B CHARGERS	POWER SUPPLY
B1-3 & B2-3	Batt Board 3, Breaker 1221

## NOTE

Steps 5.13[4] through 5.13[10] are performed from the  $\pm$  24V Neutron Monitoring Battery Charger A(B) located in Battery Board Room 3.

[3]	lat	<b>OSE</b> $\pm$ 24V DC CHARGERS (applicable charger, see ple 3 above) TIE TO BAT BD 3, BKR 1201 Ch. A (1221 B), by placing breaker in the ON position.	
[4]	Cha	<b>EN</b> the front cover of the $\pm$ 24V Neutron Monitoring Battery arger to be placed in service and <b>VERIFY CLOSED</b> the DC put circuit breaker by placing it in the ON Position.	
[5]	CL( Bat	<b>OSE</b> the AC CIRCUIT BREAKER on Neutron Monitoring tery Charger by placing the breaker in ON.	
[6]	<b>DE</b> I	PRESS OVERVOLTAGE RESET push-button on chargers ng placed in service.	
[7]	<b>CHECK</b> the following indications of normal operation on the applicable $\pm$ 24V Neutron Monitoring Battery Charger:		
	A.	DC Voltage greater than 24 Volts	
	₿.	DC Voltage less than 29 Volts	



BFN Unit 0	DC Electrical System	0-OI-57D Rev. 0121 Page 102 of 249	
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5.13	Plac in S	Placing Unit 3 ± 24V Neutron Monitoring Battery A(B) Chargers in Service to Battery Board 3 (continued)		
	[8]	VERIFY the NORMAL/EQUALIZE switch is in NORMAL.		
	[9]	VERIFY the EQUALIZE HOURS timer is set to zero.		

## CAUTION

If a charger malfunction occurs the AC Circuit Breaker and  $\pm$  24V DC Chgs. (applicable charger, see Table 1) Tie to Bat Bd 1(2,3), BKR 1201 Ch. A (1221 Ch. B) should be placed to the OFF position and the Unit Supervisor informed immediately.

[10]	CHECK the following indications of normal operation on the
	applicable ± 24V Neutron Monitoring Battery Charger:

•	DC Voltage greater than 24 Volts	
•	DC Voltage less than 29 Volts	
•	DC Amperes less than 50 amps	
•	Chargers are supplying power to the bus, indicated by DC amps greater than zero	

JPM NUMBER:	323	
TITLE:	3-EOI APPENDIX-16A - BYPASS RC ISOLATION	IC LOW PRESSURE
TASK NUMBER:	U-000-EM-66	
Provide a copy of 3	3-EOI Appendix-16A	
SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TRAINING	DATE:
PLANT CONCURF	RENCE:OPERATIONS	DATE:
* Examination J	PMs Require Operations Training Manager App	roval or Designee Approval and

Plant Concurrence

## **REVISION LOG**

Revision	Effective	Pages	Description
Number	Date	Affected	Of Revision
0	10/20/95	All	Initial issue
1	10/16/00	All	Format change
2	08/12/03	All	Corrected KA, added generic criteria General revision & re-format
3	06/01/08	All	General revision & re-format
	]		
L.	<u> </u>		

OPERATOR:				
RO	SRO		DATE:	
JPM NUMBER:	323			
TASK NUMBER:	U-000-EM-66			
TASK TITLE:	3-EOI APPENDIX 10 ISOLATION	6A - BYPASS R	CIC LOW PRESS	URE
K/A NUMBER:	217000A2.03	K/A RATING:	RO <u>3.4</u>	SRO <u>3.3</u>
*******	*******	*******	*******	******
TASK STANDARD:	PERFORM OPERATE REACTOR PRESSUAPPENDIX-16A			
PERFORMANCE L	OCATION: SIMU	JLATOR PL	ANT <u>X</u> CONTRO	L ROOM
REFERENCES/PRO	OCEDURES NEEDE	D: 3-EOI Ap	pendix-16A, Rev	I
VALIDATION TIME:	CONTROL R	OOM:	LOCAL: <u>15:</u>	00
MAX. TIME ALLOWED: (FOR TIME CRITICAL JPMs ONLY)				
PERFORMANCE T	IME:			
COMMENTS:				
ADDITIONAL COM	MENT SHEETS ATT	ACHED?	YES	NO
RESULTS:	SATISFACTORY		UNSATISFACTO	RY
EXAMINER SIGNA	TURE:	- Constitution of the Cons	DATE:	

IN-PLANT: I will explain the initial conditions and state the task to be performed. <u>ALL STEPS WILL BE SIMULATED</u>. Do <u>NOT</u> operate any plant equipment. SELF CHECKING may be carried out to the point of touching a label. If it becomes necessary to physically touch a control switch, use a non-conductive pointing device. Observe ALL plant radiological and safety precautions. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's correct" (or That's incorrect", if applicable). When you have completed your assigned task, you will say, "My task is complete" and I will acknowledge that your task is complete.

\*

INITIAL CONDITIONS: You are an operator. The Unit 3 reactor has scrammed due to

a leak in primary containment and reactor level is -30". RCIC is isolated from the RPV due to low RPV pressure but is needed for RPV makeup. 3-EOI Appendix-5C, INJECTION

SYSTEM LINEUP - RCIC, is in progress.

INITIATING CUES: The Unit 3 Operator directs you to bypass RCIC Low Reactor

Pressure Isolation Interlocks as directed by 3-EOI Appendix-16A, "BYPASS RCIC LOW PRESSURE ISOLATION."

**CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!** 

JPM NO. 323 REV. NO. 3 PAGE 5 of 11

START TIME				
***********	*********	***********		
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X		
When requested by examiner, idea	When requested by examiner, identify/obtain copy of required procedure.			
Examiner Note: Applicant has dissimulator, therefore, just hand happlicant locates the EOI Equipment (Third floor in Reactor bldg)	im/her the procedure, I ment Storage Box (on v	nowever, Verify that vall behind pnl 25-31)		
STANDARD:				
Identified or obtained copy of 3-EC	Ol Appendix-16A.			
SAT UNSAT	N/A COM	IMENTS:		
**************************************	CRITICAL CONTINUE in this proce	NOT CRITICAL <u>X</u> dure.		
CUE: [As Unit 3 Operator] Ackn	owledge 3-EOI Append	ix-16A in progress.		
STANDARD:				
Simulated contacting Unit 3 Opera in progress.	tor and informed him/her	that 3-EOI Appendix-16A is		
SAT UNSAT	N/A COM	IMENTS:		
	14"	***************************************		

JPM NO. 323 REV. NO. 3 PAGE 6 of 11

**************	*********	********	
PERFORMANCE STEP:	CRITICAL N	OT CRITICAL X	
2. <b>REFER TO</b> Attachment 1 and <b>OB</b>			
CUE: [When simulated] You have plie	s, tape and screwdrive	or.	
STANDARD:			
Identified EOI storage box at Panel 3-25-holding screwdriver.	31 and Simulated obtain	ing pliers, tape and	
SAT N/A N/A	COMMENT	-S:	
***************	*******	*******	
PERFORMANCE STEP:	CRITICAL N	OT CRITICAL X	
3. <b>LOCATE</b> terminal strip DD inside Panel 3-25-31, Rear.			
STANDARD:			
Located terminal strip DD in Panel 3-25-3	1.		
SAT N/A N/A	COMMENT	'S:	
		······································	

JPM NO. 323 REV. NO. 3 PAGE 7 of 11

*************************	*******			
PERFORMANCE STEP: CRITICAL N	IOT CRITICAL X			
4. <b>LOCATE</b> red wire attached to terminal DD-48.				
STANDARD:				
Located red wire attached to terminal DD-48.				
SAT UNSAT N/A COMMEN	TS:			
************************	*******			
PERFORMANCE STEP: CRITICAL X N	IOT CRITICAL			
5. <b>REMOVE</b> terminal screw at terminal DD-48 <u>WHILE</u> holding the red wire with needle-nose pliers.				
CUE: [When correctly simulated] The terminal screw at DD-4	18 has been removed.			
STANDARD:				
Simulated removing terminal screw while holding wire with pliers.				
SAT UNSAT N/A COMMEN	TS:			

JPM NO. 323 REV. NO. 3 PAGE 8 of 11

PERFO	**************************************		CAL X	NOT CRITICAL	
6. <b>F</b>	REMOVE and TAPE lug	ged end of red wi	re lifted from	terminal DD-48.	
CUE: [\ DD-48	When correctly simulated and the second seco	ated] The lugged d taped.	end of the i	ed wire from term	inal .
STAND	ARD:				
Simulate	ed removing and taping	Jugged end of rec	d wire.		
SAT _	UNSAT	N/A	COMM	ENTS:	
***************************************				7, 87, 77, 77, 77, 77	
		TT-MANAGEMENT AND			
	**************************************				
PERFO	RMANCE STEP:	CRITIC	CAL	NOT CRITICAL	<u>X</u>
	IOTIFY Unit Operator to ypassed.	nat RCIC Low RP\	√ Pressure Is	solation Interlock is	
CUE: [\interloc	When simulated] Ope k is bypassed	rator acknowledg			olation
STANDA	ARD:				
Simulate bypasse	ed notifying Unit 3 Oper ed.	rator that RCIC Lo	w Pressure I	solation Interlock is	
SAT _	UNSAT	N/A	СОММ	ENTS:	
•	***************************************				
· · · · · · · · · · · · · · · · · · ·				TANAMININA .	
CUE: T	hat completes this ta	sk.			V 3811

JPM NO. 323 REV. NO. 3 PAGE 9 of 11

PERFORMANCE STEP:	CRITICAL NOT CRITICALX_		
PERFORMER complied with all safety ru	iles and regulations		
STANDARD:			
PERFORMER complied with all safety rul sideshields, and hearing protection was w	es and regulations (hardhat, safety glasses, orn AS REQUIRED.)		
ELECTRICAL SAFETY was also adhered to AS REQUIRED: Exposed conductive articles such as rings, metal wristwatches, bracelets, and metal necklaces shall not be worn by employees within <u>reaching distance</u> of exposed energized electrical conductors of 50 volts or greater.			
SAT	COMMENTS:		
***************	*****************		
PERFORMANCE STEP:	CRITICAL NOT CRITICAL _X_		
PERFORMER demonstrated proper radio	logical practices AS REQUIRED		
STANDARD:			
PERFORMER applied proper radiological performance.	practices, AS REQUIRED, during JPM		
SAT N/A	COMMENTS:		

JPM NO. 323 REV. NO. 3 PAGE 10 of 11

PERFORMANCE STEP:	CRITICAL		NOT CRITICAL	X
PERFORMER demonstrated the use of	SELF CHEC	KING dur	ing this JPM	
STANDARD:				
PERFORMER verified applicable comp accordance with plant standards.	onents by util	izing SEL	F CHECKING in	
SAT N/A	·	СОММЕ	ENTS:	
************	ر د د د د د د د د د د د د د د د د د د د			
PERFORMANCE STEP:			NOT CRITICAL	
PERFORMER demonstrated the use of	3-WAY COM	IMUNICA <sup>-</sup>	ΓΙΟΝ during this JF	PM
STANDARD:				
PERFORMER utilized 3-WAY COMMU	NICATION in	accordan	ce with plant stand	ards.
SAT N/A		СОММЕ	NTS:	
EN	D OF TASK			
STOP TIME:				

IN-PLANT: I will explain the initial conditions and state the task to be performed. <u>ALL STEPS WILL BE SIMULATED</u>. Do <u>NOT</u> operate any plant equipment. SELF CHECKING may be carried out to the point of touching a label. If it becomes necessary to physically touch a control switch, use a non-conductive pointing device. Observe ALL plant radiological and safety precautions. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's correct" (or That's incorrect", if applicable). When you have completed your assigned task, you will say, "My task is complete" and I will acknowledge that your task is complete.

**INITIAL CONDITIONS:** You are an operator. The Unit 3 reactor has scrammed due to

a leak in primary containment and reactor level is -30". RCIC is isolated from the RPV due to low RPV pressure but is needed for RPV makeup. 3-EOI Appendix-5C, INJECTION

SYSTEM LINEUP - RCIC, is in progress.

**INITIATING CUES:** The Unit 3 Operator directs you to bypass RCIC Low Reactor

Pressure Isolation Interlocks as directed by 3-EOI Appendix-

16A.

**CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!** 

IN-PLANT: I will explain the initial conditions and state the task to be performed. <u>ALL STEPS WILL BE SIMULATED</u>. Do <u>NOT</u> operate any plant equipment. SELF CHECKING may be carried out to the point of touching a label. If it becomes necessary to physically touch a control switch, use a non-conductive pointing device. Observe ALL plant radiological and safety precautions. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's correct" (or That's incorrect", if applicable). When you have completed your assigned task, you will say, "My task is complete" and I will acknowledge that your task is complete.

INITIAL CONDITIONS:

You are an operator. The Unit 3 reactor has scrammed due to a leak in primary containment and reactor level is -30". RCIC is isolated from the RPV due to low RPV pressure but is needed for RPV makeup. 3-EOI Appendix-5C, INJECTION SYSTEM LINEUP - RCIC, is in progress.

**INITIATING CUES:** 

The Unit 3 Operator directs you to bypass RCIC Low Reactor Pressure Isolation Interlocks as directed by 3-EOI Appendix-16A.

**CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!** 

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

### EOI PROGRAM MANUAL SECTION IX

### 3-EOI APPENDIX-16A

# BYPASSING RCIC LOW RPV PRESSURE ISOLATION INTERLOCKS

#### REVISION 1

PREPARED BY: M. Morrow PHONE: 3708

RESPONSIBLE ORGANIZATION: Operations

APPROVED BY: A. S. Bhatnagar

EFFECTIVE DATE: 10/26/00

LEVEL OF USE: REFERENCE USE

VALIDATION DATE: 01/08/92

QUALITY-RELATED

# HISTORY OF REVISION/REVIEW 3-EOI APPENDIX-16A

REV.	DATE:	REVISED PAGES	REASON FOR CURRENT REVISION
0	7/28/95	ALL	New procedure. Necessary to support implementation of BFNP Unit 3 EOIs.
1	10/26/00	All	Converted to MS-Word.

# 3-EOI APPENDIX-16A

# BYPASSING RCIC LOW RPV PRESSURE ISOLATION INTERLOCKS

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LOC	ATION: Unit 3 Reactor Building	
ATT	ACHMENTS: 1. Tools and Equipment	( 🗸 )
1.	NOTIFY Unit Operator and CONTINUE in this procedure.	
2.	REFER to Attachment 1 and OBTAIN necessary tools and equipment.	
3.	LOCATE terminal strip DD inside Panel 3-25-31, Rear.	(and the control of t
4.	LOCATE red wire attached to terminal DD-48.	***************************************
5.	<b>REMOVE</b> terminal screw at terminal DD-48 $\underline{\text{WHILE}}$ holding the red wire with needle-nose pliers.	
6.	<b>REMOVE</b> and <b>TAPE</b> lugged end of red wire lifted from terminal DD-48.	***************************************
7.	NOTIFY Unit Operator that RCIC Low RPV Pressure Isolation Interlock is bypassed.	
	END OF TEXT	

TOOLS AND EQUIPMENT:	LOCATION:
1. Needle-nose pliers.	Unit 3 RB NE, El 621 ft,
2. Electrical tape.	at Panel 3-25-31, EOI Equipment Storage Box.
3. Screwdriver.	