JPM NO. 347 REV. NO. 0 PAGE 1 of 12

## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER: 347

TITLE: 3-EOI APPENDIX 7D - ALTERNATE RPV INJECTION SYSTEM LINEUP - STANDBY COOLANT

TASK NUMBER: U-000-EM-39

SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TRAINING	DATE:
PLANT CONCURR		DATE:
	OPERATIONS	
* Examination JP Plant Concurre	PMs Require Operations Training Manager / nce	Approval or Designee Approval and

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# BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

# **REVISION LOG**

Revision Number	Effective Date	Pages Affected	Description Of Revision
0	3/28/09	All	Initial issue
	0,20,00	/ \//	

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# BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

OPERATOR:						49-41 - 1
RO	SRO		DATE	•	n	
JPM NUMBER:	347					
TASK NUMBER:	U-000-EM-39					
TASK TITLE:	3-EOI APPENDIX LINEUP - STANDE		e rpv inj	ECTIO	N SYS	TEM
K/A NUMBER:	203000A4.07	K/A RATING:	RO	<u>4.5</u>	SRO	<u>4.5</u>
	: PERFORM CORR REQUIRED TO IN BY 3-EOI APPENE	ECT EQUIPMEN JECT MAKEUP	IT MANIPU	LATIO	NS	
PERFORMANCE	LOCATION: SIM	IULATOR <u>X</u> PL	ANT C0	ONTRO	DL ROC	DM
REFERENCES/PR	OCEDURES NEED	ED: 3-EOI A	PPENDIX 7	D, RE	√2	
VALIDATION TIME	:: SIMU	LATOR: 10:00	L	.OCAL:		
MAX. TIME ALLOW	VED:	_ (FOR TIME CF	RITICAL JP	Ms ON	LY)	
PERFORMANCE T	IME:					
COMMENTS:						
ADDITIONAL COM	MENT SHEETS AT	TACHED?	YES		NO	
RESULTS:	SATISFACTORY		UNSATISF	АСТО	RY	<del></del>
EXAMINER SIGNA	TURE:		DATE			

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## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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."

			JPM NO. 347 REV. NO. 0 PAGE 5 of 12	
START TIME				
				*****
PERFORMANCE STEP:			NOT CRITICAL	<u>    X    </u>
When requested by exar	niner identify/obtain cop	by of required	procedure.	
STANDARD:				
Identified or obtained cop	y of 3-EOI Appendix-7D	۱.		
SAT UNSAT	N/A	СОММ	ENTS:	
		- <u></u>		
PERFORMANCE STEP:			NOT CRITICAL	
1. VERIFY RHR SYS (Unit 3, Panel 3-9-	STEM I available for Sta -3):	andby Coolant	t as follows	
a. VERIFY CL	<b>.OSED</b> the following va	lves:		
• 3-ECV-7	74-61, RHR SYS I DW S			
	74-60, RHR SYS I DW S	SPRAY OUTE	BD VLV	
	4-57, RHR SYS I SUP			
• 3-FCV-7				
<ul> <li>3-FCV-7</li> <li>3-FCV-7</li> <li>3-FCV-7</li> </ul>	74-58, RHR SYS I SUP 74-59, RHR SYS I SUP	PR CHBR SP PR POOL CL	RAY VALVE G/TEST VLV	
<ul> <li>3-FCV-7</li> <li>3-FCV-7</li> <li>3-FCV-7</li> </ul>	4-58, RHR SYS I SUP	PR CHBR SP PR POOL CL	RAY VALVE G/TEST VLV	
<ul> <li>3-FCV-7</li> <li>3-FCV-7</li> <li>3-FCV-7</li> </ul>	74-58, RHR SYS I SUP 74-59, RHR SYS I SUP	PR CHBR SP PR POOL CL	RAY VALVE G/TEST VLV	
<ul> <li>3-FCV-7</li> <li>3-FCV-7</li> <li>3-FCV-7</li> <li>3-FCV-2</li> </ul>	74-58, RHR SYS I SUP 74-59, RHR SYS I SUP 23-46, RHR HX 3B RHF FCV-74-60, 3-FCV-74-5	PR CHBR SP PR POOL CL RSW OUTLET 57, 3-FCV-74-	RAY VALVE G/TEST VLV <sup>-</sup> VLV 58, 3-FCV-74-59, and	
<ul> <li>3-FCV-7</li> <li>3-FCV-7</li> <li>3-FCV-7</li> <li>3-FCV-2</li> <li>STANDARD:</li> <li>Verifies 3-FCV-74-61, 3-F</li> <li>3-FCV-23-46 are closed</li> </ul>	74-58, RHR SYS I SUP 74-59, RHR SYS I SUP 23-46, RHR HX 3B RHF 5CV-74-60, 3-FCV-74-5 by observing illuminated	PR CHBR SP PR POOL CL RSW OUTLET 7, 3-FCV-74- d Green only I	RAY VALVE G/TEST VLV <sup>-</sup> VLV 58, 3-FCV-74-59, and ight above each	



					RE	M NO. 34 V. NO. 0
					PAC	GE 6 of 1
		**********				
PERFORMA	ANCE STEP:		CRITICA	\L	NOT CF	RITICAL
b.	VERIFY RHR F	Pumps 3A a	and 3C are	NOT runn	ing	
STANDARD	) <u>:</u>					
	and 3B RHR pun each handswitch		running by	observing	ı illuminate	d Green
SAT	UNSAT	N/A		COMM	IENTS:	
	NCE STEP:	****			NOT CF	
		-074-0100,	CRITICA RHR HTX	L <u>X</u> A-C DISCI	NOT CF	RITICAL D U-2) VL
C.	NCE STEP: PLACE 3-BKR- FCV-74-100 (M	-074-0100, 1010-171) to spatched, s	CRITICA RHR HTX O ON (480)	L <u>X</u> A-C DISCI / RMOV B	NOT CF H XTIE (TC oard 3B, C	RITICAL D U-2) VL compartm
C. C. Simulator d	NCE STEP: PLACE 3-BKR FCV-74-100 (M 19A) river: When dis aker closed for 3	-074-0100, 1010-171) to spatched, s	CRITICA RHR HTX O ON (480)	L <u>X</u> A-C DISCI / RMOV B	NOT CF H XTIE (TC oard 3B, C	RITICAL D U-2) VL compartm
C. C. Simulator d reports brea	NCE STEP: PLACE 3-BKR FCV-74-100 (M 19A) river: When dis aker closed for 3	-074-0100, 1010-171) to spatched, s 3-FCV-74-1	CRITICA RHR HTX O ON (480) simulator o	L X A-C DISCI RMOV B	NOT CF H XTIE (TC oard 3B, C	RITICAL D U-2) VL compartm

PERF	ORMANCE STEP:	CRITI	CAL X	NOT CRITICAL
2.	START RHRSW Pumps	B1 and B2		
<u>STAN</u>	DARD:			
Starts 19A/3 Critica	RHRSW pumps B1 and E respectively (Critical) and al)	32 using handswi I verifies Red only	tches 0-HS-23 y light above e	-15A/3 and 0-H ach handswitch
SAT	UNSAT	N/A	COMME	NTS:
	ORMANCE STEP:	CRITIC		NOT CRITICAL
PERF		CRITIC to <b>VERIFY CLOS</b>	CAL SED 1-FCV-23	NOT CRITICAL -46, RHR HEAT
<u>PERF</u> 3.	ORMANCE STEP: NOTIFY Unit 1 Operator	CRITIC to <b>VERIFY CLOS</b> VATER OUTLET	CAL SED 1-FCV-23 VLV (Unit 1, F	NOT CRITICAL -46, RHR HEAT Panel 1-9-3)
PERF 3. Simul	ORMANCE STEP: NOTIFY Unit 1 Operator EXCHANGER B COOL V	CRITIC to <b>VERIFY CLOS</b> VATER OUTLET	CAL SED 1-FCV-23 VLV (Unit 1, F	NOT CRITICAL -46, RHR HEAT Panel 1-9-3)
PERF 3. Simul	ORMANCE STEP: NOTIFY Unit 1 Operator EXCHANGER B COOL V ator driver: When conta	CRITIC to VERIFY CLOS VATER OUTLET Incted as Unit 1 C	CAL SED 1-FCV-23 VLV (Unit 1, F Operator, repo	NOT CRITICAL -46, RHR HEAT Panel 1-9-3)

4.	<b>NOTIFY</b> Unit 2 Operator to perform to a. <b>VERIFY CLOSED</b> 2-FCV-23-4	_	
Sim	ulator driver: When contacted as Un	nit 2 Operato	r, report 2-FCV-23-
<u>STA</u>	NDARD:		
Cont	tacts Unit 2 Operator to verify 2-FCV-23	3-46 closed	
SAT	UNSAT N/A	C(	OMMENTS:
*****	*****	****	
****	*****	RITICAL	
***** PER	FORMANCE STEP:	RITICAL	XNOT CRITIC
PER	E <u>FORMANCE STEP:</u> C b. <b>OPEN</b> 2-FCV-23-57, STANDE	RITICAL	XNOT CRITIC
PER Simu	EFORMANCE STEP: C b. OPEN 2-FCV-23-57, STANDE	RITICAL	XNOT CRITIC

				JPM NO. 347 REV. NO. 0 PAGE 9 of 12
******	********	*****	****	******
PERFOR	MANCE STEP:	CRIT	ICAL X I	NOT CRITICAL
5. <b>INJ</b>	ECT Standby Coolan	t into RPV as fo	llows (Unit 3, Par	nel 3-9-3):
a.	CLOSE 3-FCV-74	-52, RHR SYS	LPCI OUTBD IN	IJECT VALVE
<u>STANDAF</u>	<u>RD:</u>			
Closes 3-F handswitc	FCV-74-52 (Critical) a h (Not Critical)	nd verifies Gree	n only light illumi	nated above
SAT	UNSAT	N/A	COMMEN	TS:
	*****			
PERFORM	<u>MANCE STEP:</u>	CRIT	CAL X N	NOT CRITICAL
b.	OPEN 3-FCV-74-1	100, RHR SYS I	U-2 DISCH XTIE	Ξ
STANDAR	<u>RD:</u>			
Opens 3-F (Not Critica	CV-74-100 (Critical) a al)	and verifies Red	only light illumina	ated above handswite
SAT	UNSAT	N/A	COMMEN	TS:



		<u>ICE STEP:</u>	CRI	TICAL X	NOT CRITICAL
	с.	OPEN 3-FCV-74	4-53, RHR SYS I		
<u>STAN</u>	IDARD:				
Open: (Not C	s 3-FCV Critical)	-74-53 (Critical)	and verifies Red	only light illumi	nated above handswi
SAT		UNSAT	N/A	COMM	ENTS:
		• · · · · · · · · · · · · · · · · · · ·			
	·				
******	*****	*****	*****	والمحافظة والمحرفة والمحافة والمحافة والمحافة والمحافة والمحافة والمحافة والمحافة	******
		CE STEP:			NOT CRITICAL
		ALVE, to control	CV-74-52, RHR S ol injection	SYS I LPCI OUT	IBD INJECT
	DARD:				
<u>STAN</u>					
		3 ECV 74 E2 (	Critical) and varia	fine Ded embrille	h 4 111
Thrott	les Oper	1 3-FCV-74-52 ( opened fully) (N	Critical) and veri lot Critical) or Re	fies Red only lig	ht illuminated above
Thrott hands hrottle	les Oper witch (if ed) (Not	opened fully) (N Critical) and ver	lot Critical) or Re rifies flow to the F	d and Green lig Reactor vessel ι	hts illuminated (if ising 3-FI-74-50 and
Throttl hands hrottle	les Oper witch (if ed) (Not s level re	opened fully) (N Critical) and ver ecovering using	lot Critical) or Re rifies flow to the F 3-LI-3-58A or B o	d and Green lig Reactor vessel ι	ht illuminated above hts illuminated (if ising 3-FI-74-50 and from ICS computer
Throttl hands hrottle	les Oper witch (if ed) (Not s level re	opened fully) (N Critical) and ver	lot Critical) or Re rifies flow to the F 3-LI-3-58A or B o	d and Green lig Reactor vessel ι	hts illuminated (if ising 3-FI-74-50 and

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	>
PERFORMER demonstrated the	use of SELF CHECKING	during this JPM	
STANDARD:			
PERFORMER verified applicable accordance with plant standards.		SELF CHECKING in	
SAT UNSAT	_ N/A CO	MMENTS:	
		· · · · · · · · · · · · · · · · · · ·	
PERFORMANCE STEP:		NOT CRITICAL	
	CRITICAL	NOT CRITICAL	_>
PERFORMANCE STEP: PERFORMER demonstrated the	CRITICAL	NOT CRITICAL	_>
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL	_>
PERFORMANCE STEP: PERFORMER demonstrated the	CRITICAL	NOT CRITICAL	<u>)</u> PM
PERFORMANCE STEP: PERFORMER demonstrated the STANDARD: PERFORMER utilized 3-WAY CO	CRITICAL use of 3-WAY COMMUN	NOT CRITICAL	> ⊃M ards
PERFORMANCE STEP: PERFORMER demonstrated the STANDARD:	CRITICAL use of 3-WAY COMMUN	NOT CRITICAL	> ⊃M ards
PERFORMANCE STEP: PERFORMER demonstrated the STANDARD: PERFORMER utilized 3-WAY CO	CRITICAL use of 3-WAY COMMUN	NOT CRITICAL	> ⊃M ards
PERFORMANCE STEP: PERFORMER demonstrated the STANDARD: PERFORMER utilized 3-WAY CO	CRITICAL use of 3-WAY COMMUN	NOT CRITICAL	> ⊃M ards



## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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

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**INITIAL CONDITIONS:** Y

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:** 

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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



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

REV. <u>NO.</u>	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.



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3-EOI APPENDIX-7D Rev. 2 Page 1 of 2

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# 3-EOI APPENDIX-7D

# ALTERNATE RPV INJECTION SYSTEM LINEUP STANDBY COOLANT

LOCATION: Unit 3 Control Room

ATTACHMENTS: None

- VERIFY RHR SYSTEM I available for Standby Coolant as follows (Unit 3, Panel 3-9-3):
  - a. VERIFY CLOSED the following valves:
    - 3-FCV-74-61, RHR SYS I DW SPRAY INBD VLV
    - 3-FCV-74-60, RHR SYS I DW SPRAY OUTBD VLV
    - 3-FCV-74-57, RHR SYS I SUPPR CHBR/POOL ISOL VLV
    - 3-FCV-74-58, RHR SYS I SUPPR CHBR SPRAY VALVE
    - 3-FCV-74-59, RHR SYS I SUPPR POOL CLG/TEST VLV
    - 3-FCV-23-46, RHR HX 3B RHRSW OUTLET VLV.

b. VERIFY RHR Pumps 3A and 3C are NOT 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. START RHRSW Pumps B1 and B2.
- 3. NOTIFY Unit 1 Operator to VERIFY CLOSED 1-FCV-23-46, RHR HEAT EXCHANGER B COOL WATER OUTLET VLV (Unit 1, Panel 1-9-3).
- 4. **NOTIFY** Unit 2 Operator to perform the following (Unit 2, Panel 2-9-3):
  - a. VERIFY CLOSED 2-FCV-23-46, RHR HX 2B RHRSW OUTLET VLV
  - b. OPEN 2-FCV-23-57, STANDBY COOLANT VLV FROM RHRSW.

	3-EOI APPEN Rev. 2 Page 2 of 2	
5.	<b>INJECT</b> Standby Coolant into RPV as follows (Unit 3, Panel 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. <b>THROTTLE</b> 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE, to control injection.	

LAST PAGE



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## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER: 399

TITLE: 3-SR-3.3.2.1.2 RWM FUNCTIONAL TEST FOR STARTUP

TASK NUMBER: U-085-SU-02

Copy of 3-SR-3.3.2.1.2 required complete up thru step 7.0[3] (current REV) – give to Applicant (SR already in progress)

3-SR-3.1.3.5(A) Control Rod Movement Data Sheet needs to be open to Group 1

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

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

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# BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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## **REVISION LOG**

Revision Number	Effective Date	Pages Affected	Description Of Revision
0	03/13/09	All	Initial Issue

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# BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

OPERATOR:		
R0	SRO	DATE:
JPM NUMBER:	399	
TASK NUMBER:	U-085-SU-02	
TASK TITLE:	3-SR-3.3.2.1.2 RWM FUNCTIONA	L TEST FOR STARTUP
K/A NUMBER:	201006 A2.05 K/A RATING:	RO <u>3.1</u> SRO <u>3.5</u>
	: Perform 3-SR-3.3.2.1.2 RWM Fund	
PERFORMANCE	LOCATION: SIMULATOR X PL	_ANT CONTROL ROOM
REFERENCES/PR	OCEDURES NEEDED: 3-SR-3.	3.2.1.2, Rev 3, 3-OI-85, Rev 64
VALIDATION TIME	SIMULATOR:1	5:00 LOCAL:
MAX. TIME ALLOW	VED: (FOR TIME C	RITICAL JPMs ONLY)
PERFORMANCE T	IME:	
COMMENTS:	Copy of 3-SR-3.3.2.1.2 required co REV) – give to Applicant after SR f Control Rod Movement Data Shee	ound in Book. 3-SR-3.1.3.5(A)
ADDITIONAL COM	MENT SHEETS ATTACHED?	YES NOX
RESULTS:	SATISFACTORY	UNSATISFACTORY
EXAMINER SIGNA	TURE:	DATE:

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### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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 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 2 SP 2.2.2.4.2 "DWM Expedience! Test" for Startup at start

**ATING 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	9
START TIN	/IE			PAGE 5 of 1	7
***********	******	******	*******	******	******
PERFORM	ANCE STEP:	CRITICA	\L	NOT CRITICAL	<u> </u>
When requ	ested by examiner	identify/obtain copy o	of required	procedure.	
STANDAR	<u>D:</u>				
Locates SF	R in book in the Sim	ulator (then Examine	er hands co	opy to Candidate)	
SAT	UNSAT	N/A	COMM	1ENTS:	
	ANCE STEP:	CRITICA		NOT CRITICAL	
7.0 PROCE	DURE STEPS				
[4]		art date <b>AND</b> time, re			
		ANY pre-test remarks cedure Review Form			
STANDARI	<u>D:</u>				
Records sta	art date and time, re	eason for test (startur	o) on Attac	hment 1.	
SAT	UNSAT	N/A	COMM	ENTS:	
	99 Anna 1				
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NOTE

**ALL** operations are performed on Panel 3-9-5 in the main Control Room unless otherwise noted.



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		JPM NO. 399
		REV. NO. 0
		PAGE 6 of 17
**************	*****	**********
PERFORMANCE STEP:	CRITICAL _	X NOT CRITICAL
[5] <b>PLACE</b> the Control Rod momentarily to OFF <b>AN</b>		WER switch (3-HS-85-46) o ON.
STANDARD:		
Places 3-HS-85-46 to OFF and back t	o ON.	
SAT UNSAT N/	/A C	COMMENTS:
**************	*****	*******
PERFORMANCE STEP:	CRITICAL _	
[6] VERIFY ALL control rod	s are deselected	on the rod select matrix.
STANDARD:		
Verifies no rod selected.		
SAT UNSAT N/	A C	COMMENTS:

\$

PERFORMANCE STEP:		NOT CRITICAL
[7] <b>PERFORM</b> the RV	VM Functional Test as foll	
[7.1] VERIFY OR	<b>R PLACE</b> the RWM in ope	ration per 3-OI-85.
STANDARD:		
N/A – Given in initial conditions.		
SAT UNSAT	N/A CO	MMENTS:
SAT UNSAT	N/A CO	MMENTS:
SAT UNSAT	N/A CO	MMENTS:
SAT UNSAT	****	
PERFORMANCE STEP: [7.2] [NER/C] <b>REQU</b>	CRITICAL IEST Reactor Engineering 1.7 OR VERIFY performar	NOT CRITICAL _
PERFORMANCE STEP: [7.2] [NER/C] <b>REQU</b> 3-SR-3.3.2.2	CRITICAL IEST Reactor Engineering 1.7 OR VERIFY performar	NOT CRITICAL _
PERFORMANCE STEP: [7.2] [NER/C] <b>REQU</b> 3-SR-3.3.2.7 [INPO SOER 84-0	CRITICAL IEST Reactor Engineering 1.7 OR VERIFY performar	NOT CRITICAL _
PERFORMANCE STEP: [7.2] [NER/C] REQU 3-SR-3.3.2.7 [INPO SOER 84-0 STANDARD:	CRITICAL JEST Reactor Engineering 1.7 OR VERIFY performan	NOT CRITICAL _

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		JPM NO. 399 REV. NO. 0 PAGE 8 of 17
PERFORMANCE STEP:		
[7.3] <b>REFER</b> to the	e Control Rod Movemen (A) to identify a rod from	t Data Sheet from
STANDARD:		
Uses Control Room copy of 3-SR Sequence.	-3.1.3.5(A) to identify a (	Group 2 rod in the A2 Sta
SAT UNSAT	_ N/A CO	MMENTS:
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL
[7.4] RECORD bel	ow the rod chosen:	
Rod Number:		
Rod Number: <u>STANDARD:</u> Records identified rod (can be AN Sequence) – (02-31, 26-07, 58-23 47, 18-47, 18-15, 50-31, 34-47, 18	Y control rod from RWM 8, 42-55, 10-39, 42-07, 5	3-39, 26-55, 10-23, 50-15
<u>STANDARD:</u> Records identified rod (can be AN Sequence) – (02-31, 26-07, 58-23	Y control rod from RWM 42-55, 10-39, 42-07, 5 3-31, 34-15, 42-39, 26-39	3-39, 26-55, 10-23, 50-15 9, 26-23, 42-23, or 34-31)

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		REV. NO. 0 PAGE 9 of 17
		PAGE 9 01 17
***************************************		
PERFORMANCE STEP:	CRITICAL X	NOT CRITICAL
[7.5] <b>SELECT</b> the rod red	orded in Step 7.0[7.4].	
STANDARD:		
Selects rod from A2 Startup Sequence C	Froup 2.	
SAT UNSAT N/A	COMMEI	NTS:
*****	******	*****
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X
[7.6] <b>VERIFY</b> the SELEC in alarm (red backgr		on the RWM display is
STANDARD:		
Verifies Select Error in alarm.		
SAT UNSAT N/A	COMMEN	VTS:

JPM NO. 399



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	PAGE 10 of	17
******	***************************************	*****
PERFORMANCE STEP:	CRITICAL <u>X</u> NOT CRITICAL	
[7.7] NOTCH the se	elected rod to position 02.	
STANDARD:		
Notch withdraws selected rod to po	osition 02.	
SAT UNSAT	N/A COMMENTS:	
**********	***************************************	******
PERFORMANCE STEP:	CRITICAL NOT CRITICAL	<u> </u>
	ne rod moved to position 02 is identified as a on the RWM display.	
STANDARD:		
Verifies rod at position 02 has a wit	hdraw error on the display.	
Verifies rod at position 02 has a wit		

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PERFORMANC		CRITICAL <u>X</u> NOT CRITICAL
[7		ne CRD Control switch (3-HS-85-48) to ROD OUT AND VERIFY the following:
	[7.9.1]	The selected control rod does <b>NOT</b> withdraw.
<u>STANDARD:</u>		
Places control s NOT withdraw.	witch 3-HS-85	-48 to rod out notch and verifies the selected rod dc
SVI		
SAT	UNSAT	N/A COMMENTS:
	UNSAT	N/A COMMENTS:
****	****	N/A COMMENTS: CRITICAL NOT CRITICAL
	****	*******
*****	**************************************	CRITICAL NOT CRITICAL The WITHDRAW BLOCK status block on the
<u>PERFORMANC</u> STANDARD:	: <u>E STEP:</u> [7.9.2]	CRITICAL NOT CRITICAL The WITHDRAW BLOCK status block on the



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		REV. NO. 0 PAGE 12 of 17
PERFORMANCE STEP:		NOT CRITICAL <u>X</u>
[7.9.3]	RWM ROD BLOCK ( ALARM.	(3-XA-55-5B, Window 35) is in
STANDARD:		
Verifies RWM Rod Block alarr	n 3-XA-55-5B, window 35	5 is in alarm.
SAT UNSAT	N/A 0	COMMENTS:
	. Ang chi c	
*****	*****	*******
PERFORMANCE STEP:	CRITICAL _	X NOT CRITICAL
[7.10] <b>INSERT</b> t	he selected rod from pos	ition 02 to 00.
STANDARD:		
Inserts selected rod from posit	ion 02 to 00.	
SAT UNSAT	N/A 0	COMMENTS:

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******	******************	*****	*****	*******
PERFORMANCE STEP:	CRITICAL	·	NOT CRITICAL	<u> </u>
[7.11] <b>VERIFY</b> the is <b>NOT</b> in ala		K status ł	block on the RWM	display
STANDARD:				
Verifies the Withdraw Block statu	s block on the RWN	/I display	is NOT in alarm.	
SAT UNSAT	_ N/A	COMMI	ENTS:	
*****	*****	*****	*****	*******
PERFORMANCE STEP:	CRITICAL		NOT CRITICAL	X
[7.12] <b>VERIFY</b> RW	M ROD BLOCK (3-)	XA-55-5B	, Window 35) will F	RESET.
STANDARD:				
Verifies RWM Rod Block alarm 3-	-XA-55-5B, window	35 alarm	will reset.	
SAT UNSAT	_ N/A	COMME	ENTS:	
	************			·



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		JPM NO. 399 REV. NO. 0 PAGE 14 of 1
********		
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL
	e Control Rod Movemer identify a rod from RWN	nt Data Sheet from 3-SR- 1 Group 01.
STANDARD:		
Uses Control Room copy of 3-SR Sequence.	-3.1.3.5(A) to identify a	Group 1 rod in the A2 Sta
SAT UNSAT	N/A CC	MMENTS:
PERFORMANCE STEP:		NOT CRITICAL _
	CRITICAL	
PERFORMANCE STEP:	CRITICAL	
<u>PERFORMANCE STEP:</u> [7.14] <b>RECORD</b> bel Rod Number:	CRITICAL	
PERFORMANCE STEP: [7.14] RECORD bel	CRITICAL low the rod chosen:  IY control rod from RWN 3, 18-55, 50-39, 19-07, 0	NOT CRITICAL
PERFORMANCE STEP: [7.14] RECORD bel Rod Number: <u>STANDARD:</u> Records identified rod (can be AN Sequence) – (58-31, 34-07, 02-23	CRITICAL low the rod chosen:  IY control rod from RWN 3, 18-55, 50-39, 19-07, 0 2-31, 26-15, 18-39, 34-3	NOT CRITICAL 1 Group 1 (A2 Startup 12-39, 34-55, 50-23, 10-1 9, 34-23, 18-23, or 26-31



4 17 **4** 

[7.16] <b>VERIFY</b> that [7.16] <b>VERIFY</b> that RWM Panel. STANDARD: Verifies Select Error in alarm. SAT UNSAT	rod Group 01 is indic	NOT CRITICAL	o on the
[7.16] <b>VERIFY</b> that RWM Panel. <u>STANDARD:</u>			
[7.16] <b>VERIFY</b> that RWM Panel.			
[7.16] VERIFY that			
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL	. <u> </u>
SAT UNSAT	N/A	COMMENTS:	
Selects rod from A2 Startup Sequ	ence Group 1.		
STANDARD:			
[7.15] <b>SELECT</b> the	rod recorded in Step	0 7.0[7.14].	
PERFORMANCE STEP:	CRITICAL	X NOT CRITICAL	
	*******************	*****	*****
*****		PAGE 15 c	

1 3 5 E

			JPM NO. 3 REV. NO. PAGE 16 d
PERFORMANCE STEI			
PERFORMER demons			
STANDARD:			
PERFORMER verified accordance with plant s		nts by utilizino	g SELF CHECKING in
SAT UNSA	T N/A	C(	OMMENTS:
PERFORMANCE STEP			NOT CRITICAL
	<u></u> C	RITICAL	NOT CRITICAL
PERFORMANCE STEP	<u></u> C	RITICAL	NOT CRITICAL
PERFORMANCE STEF	<u>-:</u> C trated the use of 3-W	RITICAL	NOT CRITICAL
PERFORMANCE STEF PERFORMER demons STANDARD:	<u>P:</u> C trated the use of 3-W 3-WAY COMMUNIC	RITICAL /AY COMMU ATION in acc	NOT CRITICAL
PERFORMANCE STEF PERFORMER demons STANDARD: PERFORMER utilized 3	<u>P:</u> C trated the use of 3-W 3-WAY COMMUNIC	RITICAL /AY COMMU ATION in acc	NOT CRITICAL
PERFORMANCE STEF PERFORMER demons STANDARD: PERFORMER utilized 3	2: C trated the use of 3-W 3-WAY COMMUNIC/ T N/A	RITICAL /AY COMMU ATION in acc	NOT CRITICAL

### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

1.1

**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 JOB PERFORMANCE MEASURE

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**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.



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**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	<b>RWM</b> Functional Test for Startup	3-SR-3.3.2.1.2
Unit 3		Rev. 0003
		Page 2 of 10

#### **Current Revision Description**

Pages Affected: All

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.



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1.2	Scope	4
1.3	Frequency	4
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2.2	Updated Final Safety Analysis Report (UFSAR)	5
2.3	Drawings	5
2.4	Other Documents	5
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6.0		6
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Attac	hment 1: Surveillance Procedure Review Form1	0

BFN Unit 3	RWM Functional Test for Startup	3-SR-3.3.2.1.2 Rev. 0003 Page 4 of 10
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#### 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  $\leq$  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).



#### 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 Rev. 0003 Page 6 of 10	
4.0	PRE	REQUISITES	Date TOday
	[1]	This copy of 3-SR-3.3.2.1.2 is verified to be the most current revision.	uo

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

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

[3] The reactor is in Mode 2.

### 5.0 SPECIAL TOOLS AND EQUIPMENT RECOMMENDED

None

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#### 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:

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UO

- 1. 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.

	BFN Unit 3	Rev. 0	3.3.2.1.2 003 7 of 10
7.0	PRO	EDURE STEPS	Date Todoy
	[1]	VERIFY that the following initial conditions are satisfied	d:
	[1.	1] ALL precautions AND limitations in Section 3.0 I been reviewed.	nave UO
	[1.	2] <b>ALL</b> prerequisites in Section 4.0 are satisfied.	UD
	[2]	<b>OBTAIN</b> permission from Unit Supervisor (US) to perform this 3-SR-3.3.2.1.2 test procedure:	orm
		Us Signature Da	te Time
			40
	[3]	[NRC/C] <b>NOTIFY</b> Unit Operator (UO) before commencing this 3-SR-3.3.2.1.2 test procedure. [RPT 82-16, LER 259/8232].	
	[4]	<b>RECORD</b> the start date <b>AND</b> time, reason for test, plan conditions <b>AND ANY</b> 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.

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	BFN Unit 3	R	WM Functional Test for Startup	3-SR-3.3.2.1.2 Rev. 0003 Page 8 of 10	2	
					Date	
7.0	PROCEDU	JRE S	STEPS (continued)			
	[7] <b>PEF</b>	RFOR	<b>M</b> the RWM Functional Test as follow	/S:		
	[7.1]	VE	RIFY OR PLACE the RWM in operati	on per 3-01-85.		
	[7.2]	PE	[NER/C] <b>REQUEST</b> Reactor Engineering to <b>PERFORM</b> 3-SR-3.3.2.1.7 <b>OR VERIFY</b> performance of 3-SR-3.3.2.1.7. [INPO SOER 84-002]			
		0-0	11-0.0.2.1.7. [INPO SOER 64-002]		F	RE
	[7.3]	Dat	FER to the Control Rod Movement ta Sheet from 3-SR-3.1.3.5(A) to iden /M Group 02.	tify a rod from		
	[7.4]	RE	CORD below the rod chosen:			
		Ro	d Number:			
	[7.5]	SE	LECT the rod recorded in Step 7.0[7.4	4].	<u></u>	
	[7.6]		<b>VERIFY</b> the SELECT ERROR status block on the RWM display is in alarm (red background).			
	[7.7]	<b>NOTCH</b> the selected rod to position 02.				
	[7.8]		<b>RIFY</b> that the rod moved to position 0. a withdraw error on the RWM display.	2 is identified		
	[7.9]		ACE the CRD Control switch (3-HS-8 D OUT NOTCH AND VERIFY the foll	,		
	[7.9.	1]	The selected control rod does NOT	withdraw.		_(AC
	[7.9.	2]	The WITHDRAW BLOCK status blo RWM display is in alarm (red backgr			_(AC
	[7.9.	3]	RWM ROD BLOCK (3-XA-55-5B, W ALARM.	indow 35) is in		
	[7.10]	INS	ERT the selected rod from position 02	2 to 00.		
	[7.11]		<b>RIFY</b> the WITHDRAW BLOCK status M display is <b>NOT</b> in alarm.	block on the		
	[7.12]		<b>RIFY</b> RWM ROD BLOCK (3-XA-55-5E RESET.	3, Window 35)		

**\***) 4

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

Date \_\_\_\_\_

#### 7.0 PROCEDURE STEPS (continued)

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- [7.13] **REFER** 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] **VERIFY** that rod Group 01 is indicated as the latched group on the RWM Panel.
- [8] **RECORD** the appropriate test information on Attachment 1, Surveillance Procedure Review Form (located in Section 8.0) **AND COMPLETE** up to the Unit Supervisor review.
- [9] **NOTIFY** the UO that this SR test procedure is complete.
- [10] **NOTIFY** the US that this SR test procedure is complete.

#### 8.0 ILLUSTRATIONS/ATTACHMENTS

Attachment 1, Surveillance Procedure Review Form.

Acceptance Criteria Satisfied?  If the above answer is no, the Unit Supervisor shall determine if an LCO exists. UNIT SUPERVISOR Date IQR (OPS) Date SCHEDULING COORDINATOR Date	BFN Unit 3	RWM Functional Test for Startup	Rev.	8-3.3.2.1.2 0003 ∋ 10 of 10	
REASON FOR TEST:       DATE/TIME STARTED Today / A         Image: System Inoperable (Explain in Remarks)       DATE/TIME COMPLETED         Image: System Inoperable (Explain in Remarks)       PLANT CONDITIONS         Image: System Inoperable (Explain in Remarks)       PLANT CONDITIONS         Image: System Inoperable (Explain in Remarks)       PLANT CONDITIONS         PRE-TEST REMARKS:					
Image: Scheduled Surveillance       DATE/TIME COMPLETED         System Inoperable (Explain in Remarks)       PLANT CONDITIONS         Maintenance (WO No)       Other (Explain in Remarks)         PRE-TEST REMARKS:		Surveillance Procedure Revie	w Form		
PERFORMED BY:       Name (Print)         uo       Unit Openator (Test Dir/Lead Perf)         (Test Dir/Lead Perf)       Unit Openator (Test Dir/Lead Perf)         (Test Dir/Lead Perf)       Unit Openator (Test Dir/Lead Perf)	Scheduled Su System Inope Maintenance	urveillance DATE/ erable (Explain in Remarks) PLANT (WO No)	TIME CO	MPLETED	by In
Initials       Name (Print)       Name (Signature)         UO       Unit Openotor       (Test Dir/Lead Perf)       Unit Openotor         (Test Dir/Lead Perf)       (Test Dir/Lead Perf)       Unit Openotor       Unit Openotor         Image: Comparison of the compa		AKKS:			
Delays or Problems (If yes, explain in POST-TEST REMARKS)?       IYes         Delays or Problems (If yes, explain in POST-TEST REMARKS)?       IYes         Acceptance Criteria Satisfied?       IYes         If the above answer is no, the Unit Supervisor shall       IYes         determine if an LCO exists.       LCO         UNIT SUPERVISOR       Date         IQR (OPS)       Date         SCHEDULING COORDINATOR       Date	Initials <u>N</u>	Name (Print) Voit Cornston (Test Dir/Lead Perf)	ame (Sigi	nature)	
Acceptance Criteria Satisfied?			······		
Acceptance Criteria Satisfied?					
Acceptance Criteria Satisfied?					
Acceptance Criteria Satisfied?					
determine if an LCO exists.       LCO □Yes □N         UNIT SUPERVISOR          IQR (OPS)          SCHEDULING COORDINATOR	Acceptance Criter	ia Satisfied?	KS)?		
UNIT SUPERVISOR          IQR (OPS)          SCHEDULING COORDINATOR			LCO	□Yes	
IQR (OPS) Date SCHEDULING COORDINATOR Date	determine if				
SCHEDULING COORDINATOR Date				Date	
	UNIT SUPERVISO	OR			
	UNIT SUPERVISC	DR Date			
	UNIT SUPERVISC IQR (OPS) SCHEDULING CC	DR Date			
	UNIT SUPERVISC IQR (OPS) SCHEDULING CC	DR Date DORDINATOR			
	UNIT SUPERVISC IQR (OPS) SCHEDULING CC	DR Date DORDINATOR			
	UNIT SUPERVISC IQR (OPS) SCHEDULING CC	DR Date DORDINATOR			

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JPM NO. 43F REV. NO. 2 PAGE 1 of 17

### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER: 43F

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:
PLANT CONCURRENCE:	OPERATIONS	DATE:

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

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

### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

## **REVISION LOG**

Revision Number	Effective Date	Pages Affected	Description 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
<b>6</b>	03/21/09		

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### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

OPERATOR:			
RO	SRO DATE:		
JPM NUMBER:	43F		
TASK NUMBER:	U-000-EM-54		
TASK TITLE:	EOI APPENDIX-11B - ALTERNATE PRESSURE CONTROL – RCIC TEST MODE (FROM STANDBY)		
K/A NUMBER:	241000A4.02 K/A RATING: RO <u>4.1</u> SRO <u>4.1</u>		
	PERFORM OPERATIONS NECESSARY TO PLACE RCIC IN THE TEST MODE FROM STANDBY FOR ALTERNATE RPV PRESSURE CONTROL AS DIRECTED BY 2-EOI APPENDIX-11B		
PERFORMANCE	OCATION: SIMULATOR X PLANT CONTROL ROOM		
REFERENCES/PR	OCEDURES NEEDED: 2-EOI Appendix-11B, Rev 5		
VALIDATION TIME	SIMULATOR: <u>10:00</u> LOCAL:		
MAX. TIME ALLOV	(ED: (FOR TIME CRITICAL JPMs ONLY)		
PERFORMANCE TIME:			
COMMENTS:			
ADDITIONAL COM	MENT SHEETS ATTACHED? YES NO		
RESULTS:	SATISFACTORY UNSATISFACTORY		
EXAMINER SIGNA	TURE:DATE:		

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#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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.
	standby readiness.

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

***********	*******	*****
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL
When requested by examiner ide	ntify/obtain copy of requir	red procedure.
STANDARD:		
Obtained copy of 2-EOI Appendix	<-11B.	
SAT UNSAT	N/A CON	MMENTS:

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<ul> <li>CAUTION</li> <li>Operating RCIC turbine below 2100 rpm may result in unstable system operation and equipment damage.</li> <li>Elevated Suppression Chamber pressure may trip the RCIC turbine on high exhaust pressure.</li> <li>Operating RCIC Turbine with suction temperatures above 140°F may result in equipment damage.</li> </ul>
***************************************
PERFORMANCE STEP: CRITICAL NOT CRITICAL
1. IF Emergency RPV Depressurization is required, OR
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 depressurization and steam cooling are not required.
STANDARD:
determined <u>NOT</u> to execute EOI Appendix 16A or 16B.
SAT UNSAT N/A COMMENTS:

<u>PER</u>	FORMANCE	STEP:	(	CRITICAL		NOT CRITIC	AL _
2.	IF THEN	EXECUTI	E EOI Apper	ndix 16E co	oncurrent	ntained below 5 ly with this proc el Suction Tran	edure
<u>STAI</u>	NDARD:						
Dete	rmined Supp	ression Pool	level <5.25	inches and	d EOI App	pendix-16E not	requir
						ENTS:	•
						·	
		· · · · · · · · · · · · · · · · · · ·					
			*****	*****	******	****	*****
*****		*******				NOT CRITIC/	
****** PERI	FORMANCE	<u>STEP:</u> RCIC Turl	(	CRITICAL	IOT requi		4L _
****** PERI	FORMANCE IF THEN	<u>STEP:</u> RCIC Turl <b>ALIGN</b> RC	) bine is opera CIC in test m	CRITICAL ating and N lode as fol	IOT requi lows:	NOT CRITIC	4L _
*****	FORMANCE IF THEN a. OPE	<u>STEP:</u> RCIC Turl	( bine is opera CIC in test m -38, RCIC P	CRITICAL ating and N lode as fol UMP CST	IOT requi lows: TEST VL	NOT CRITIC/ red for RPV lev -V.	4L _
****** PERI	FORMANCE IF THEN a. OPE b. VER c. CLO	STEP: RCIC Turl ALIGN RC EN 2-FCV-71 RIFY OPEN 2 OSE 2-FCV-7	bine is opera CIC in test m -38, RCIC P 2-FCV-73-36 1-39, RCIC I	CRITICAL ating and N ode as fol UMP CST , HPCI/RC PUMP INJ	IOT requi lows: TEST VL IC CST T ECTION	NOT CRITIC/ red for RPV lev _V. _EST VLV.	4L _
****** PERI	FORMANCE IF THEN a. OPE b. VER c. CLO	STEP: RCIC Turl ALIGN RC EN 2-FCV-71 RIFY OPEN 2	bine is opera CIC in test m -38, RCIC P 2-FCV-73-36 1-39, RCIC I	CRITICAL ating and N ode as fol UMP CST , HPCI/RC PUMP INJ	IOT requi lows: TEST VL IC CST T ECTION	NOT CRITIC/ red for RPV lev _V. _EST VLV.	4L _
****** <u>PER</u> 3.	FORMANCE IF THEN a. OPE b. VER c. CLO	STEP: RCIC Turl ALIGN RC EN 2-FCV-71 RIFY OPEN 2 OSE 2-FCV-7	bine is opera CIC in test m -38, RCIC P 2-FCV-73-36 1-39, RCIC I	CRITICAL ating and N ode as fol UMP CST , HPCI/RC PUMP INJ	IOT requi lows: TEST VL IC CST T ECTION	NOT CRITIC/ red for RPV lev _V. _EST VLV.	4L _
3.	FORMANCE IF THEN a. OPE b. VER c. CLO d. CON NDARD:	STEP: RCIC Turl ALIGN RC EN 2-FCV-71 RIFY OPEN 2 OSE 2-FCV-7 NTINUE in th	bine is opera CIC in test m -38, RCIC P 2-FCV-73-36 1-39, RCIC I	CRITICAL ating and N ode as fol UMP CST , HPCI/RC PUMP INJ	IOT requi lows: TEST VL IC CST T ECTION	NOT CRITIC/ red for RPV lev _V. _EST VLV.	4L _
<u>PER</u> 3. <u>STAN</u>	FORMANCE IF THEN a. OPE b. VER c. CLO d. CON NDARD: - RCIC is Not	STEP: RCIC Turl ALIGN RC SN 2-FCV-71 RIFY OPEN 2 OSE 2-FCV-7 NTINUE in th t operating.	( bine is opera CIC in test m -38, RCIC P -FCV-73-36 1-39, RCIC I is procedure	CRITICAL ating and N ode as foll UMP CST , HPCI/RC PUMP INJ at Step 5.	IOT requi lows: TEST VL IC CST T ECTION	NOT CRITIC/ red for RPV lev _V. _EST VLV.	AL _



-1 (th)

		NCE STEP:				
					NOT CRITICAL	
4.	IF THEN	RCIC is in <b>START</b> R	n standby readiness, CIC as follows:			
	a.		<b>D</b> 2-FCV-71-39, RCI	C PUMP INJE	CTION VALVE.	
<u>STA</u>	NDARD:					
Verif	fied only (	GREEN valve po	sition indicating lamp	illuminated a	bove 2-HS-71-39	A.
SAT		UNSAT	N/A	COMMEN	TS	
SAT		UNSAT	N/A	COMMEN	TS:	
SAT		UNSAT	N/A	COMMEN	TS:	
SAT		UNSAT	N/A	COMMEN	TS:	
SAT		UNSAT	N/A	COMMEN	TS:	
****	******	****	****	******	*****	***
****	******		****	******		***
****	**************************************	NCE STEP:	****			***
****** PER	**************************************	NCE STEP: VERIFY RESET	CRITICA			***
***** <u>PER</u> <u>STA</u>	b. <u>NDARD:</u>	<u>VCE STEP:</u> <b>VERIFY RESET</b> VALVE RESET. CV-71-9 is tripped	CRITICA	L <u>X</u> N I-9, RCIC TUF FCV-71-9 (Cri	IOT CRITICAL	***



			JPM NO. 43F REV. NO. 2 PAGE 9 of 17
*****	*****	*****	******
PERFORMANCE STEP:	CRITI	CAL <u>X</u>	NOT CRITICAL
c. VERIFY OPEN the	following valves	S:	
• 2-FCV-71-38	8, RCIC PUMP	CST TEST VL	V
STANDARD:			
Held 2-HS-71-38A in the OPEN RED valve position indicating lan Critical).	position until val np illuminated al	ve is open (Cri pove associate	itical) and Verified only ed control switch (Not
SAT UNSAT	N/A	COMME	NTS:
****	****	*****	****
PERFORMANCE STEP:			NOT CRITICAL
• 2-FCV-71-25	5, RCIC LUBE C	OIL COOLING	WTR VLV
STANDARD:			
Placed 2-HS-71-25A in the OPEI	N position (Critic	al) and Verifie ated control sv	d only RED valve witch (Not Critical).
position indicating lamp illuminate			-
position indicating lamp illuminate			



		JPM NO. 43F REV. NO. 2 PAGE 10 of 17
**********	******	*******
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL
• 2-FCV-71-	34, RCIC PUMP MIN FLOW	/ VALVE
STANDARD:		
Placed 2-HS-71-34A in the OP indicating lamp illuminated abo		
SAT UNSAT	N/A COM	IMENTS:
PERFORMANCE STEP:		NOT CRITICAL
• 2-FCV-73-	36, HPCI/RCIC CST TEST	VLV.
• 2-FCV-73-3 <u>STANDARD:</u>	36, HPCI/RCIC CST TEST	VLV.
	EN position (Critical) and Ve	rified only RED valve
<u>STANDARD:</u> Placed 2-HS-73-36A in the OPl	EN position (Critical) and Ve ated above associated contr	rified only RED valve



				JPM NO. 43I REV. NO. 2 PAGE 11 of	
	************************				
PERFORMANCE ST	<u>=P:</u>	CRITICAL		NOT CRITICAL	<u>     X    </u>
d. PLACE	2-HS-71-31A, RCI	C VACUUM I	PUMP, ha	ndswitch in STAR	RT.
STANDARD:					
Placed 2-HS-71-31A	n the START posit	ion.			
SAT UNS	AT N/A		COMME	NTS:	
		WANNIEL .	·····		<u>.</u>
PERFORMANCE STI	**************************************			NOT CRITICAL	
e. <b>OPEN</b> 2 Turbine	-FCV-71-8, RCIC 1	URBINE ST	EAM SUP	PLY VLV, to start	RCIC
STANDARD:					
Placed 2-HS-71-8A in position indicating lan				Iluminated RED v	alve
SAT UNS	AT N/A		COMMEN	NTS:	<u></u>
		····			

				JPM NO. 43F REV. NO. 2 PAGE 12 of 17
******	******	*****	*****	******
PERFORMA	NCE STEP:	CR		NOT CRITICAL X
f.	VERIFY RC	IC Turbine speed a	ccelerates to ab	oove 2100 rpm.
STANDARD:				
Verified spee	d greater tha	an 2100 rpm indicate	ed on 2-SI-71-4	2A.
SAT	UNSAT	N/A		/ENTS:
*********************************** PERFORMAI				NOT CRITICAL
5. VERIF	Y proper RC	CIC minimum flow va	alve operation a	s follows:
	IF THEN		e 120 gpm, 2-FCV-71-34, I	RCIC PUMP MIN FLOW
STANDARD:				
		ated flow > 120 gpn d above 2-HS-71-34		GREEN valve position
SAT	UNSAT	N/A		1ENTS:





<u>PER</u>	FORM	ANCE STEP:	CRITICAL NOT CRITICAL _
	b.	IF	BOTH of the following exist:
		• RCIC Initia	ition signal is NOT present,
		• RCIC flow	AND is below 60 gpm,
		THEN	VERIFY OPEN 2-FCV-71-34, RCIC PUMP MIN FLOW VALVE.
<u>STAI</u>	NDARE	<u>):</u>	
			Not illuminated.
SAT	******	UNSAT	N/A COMMENTS:
SAT	FORM/	UNSAT	N/A COMMENTS:
SAT  <u>PER</u> 6.	FORM/	UNSAT	N/A COMMENTS: CRITICALXNOT CRITICAL -71-38, RCIC PUMP CST TEST VLV, to control RCIC pu
SAT <u>PER</u> 6. <u>STAI</u> Throf	FORM/ THR disch NDARD	UNSAT UNSAT <u>ANCE STEP:</u> DTTLE 2-FCV arge pressure <u>0:</u> 	N/A COMMENTS: CRITICALXNOT CRITICAL -71-38, RCIC PUMP CST TEST VLV, to control RCIC pu



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PERFORMANCE STEP:

CRITICAL X NOT CRITICAL \_\_\_\_

### **EXAMINERS NOTE: ALTERNATE PATH STARTS HERE:**

 ADJUST 2-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller to control RPV pressure.

#### STANDARD:

Candidate recognizes RCIC Flow Controller Failure and places 2-FIC-71-36A in <u>Manual</u> and adjusts the flow controller in conjunction with the 2-FCV-71-38, RCIC PUMP CST TEST VLV to obtain:

RCIC flow 120-600 gpm on 2-FIC-71-36A.

RCIC discharge pressure  $\leq$  1100 psig on 2-PI-71-35A.

RCIC speed > 2100 rpm on 2-SI-71-42A.

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

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PERI	FORMANCE STEP:		CRITICA	L	NOT CRITICAL	X	
8.	IF RCIC injection to THEN ALIGN RCIC to a. OPEN 2-FCV-71-39, F b. CLOSE 2-FCV-71-38, c. GO to EOI Appendix 5		jection to the RCIC to RP∖	e RPV bec / as follow	omes nece s:	ssary,	
			-71-38, RCI0				
CUE:	Injection to	the vess	el with RCIO	C is Not d	esired at t	his time.	
STAN	NDARD:						
N/A -	- Injection to v	essel not	required per	CUE.			
SAT	UI	NSAT _	N/A _		COMMI	ENTS:	
		10000000000000000000000000000000000000			· · · · · · · · · · · · · · · · · · ·		

CUE: That completes this task.

			JPM NO. 4 REV. NO. PAGE 16 o
**************************************			NOT CRITICAL
PERFORMER demonstrated the	use of SELF CHE	CKING dur	ing this JPM
STANDARD:			
PERFORMER verified applicable accordance with plant standards.	components by ι	ıtilizing SEL	F CHECKING in
SAT UNSAT	N/A	COMME	ENTS:
PERFORMANCE STEP:			NOT CRITICAL
	CRITICA	L	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated the u STANDARD:	CRITICA	L	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated the u	CRITICA use of 3-WAY CO	IL DMMUNICA in accordan	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated the u STANDARD: PERFORMER utilized 3-WAY CO	CRITICA use of 3-WAY CO	IL DMMUNICA in accordan	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated the u STANDARD: PERFORMER utilized 3-WAY CO	CRITICA use of 3-WAY CO	IL DMMUNICA in accordan	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated the u STANDARD: PERFORMER utilized 3-WAY CO	CRITICA use of 3-WAY CO	L DMMUNICA in accordan COMME	NOT CRITICAL



#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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

**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.

### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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>	<u>REVISED</u> <u>PAGES</u>	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 Rev. 5

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## 2-EOI APPENDIX-11B

ALTERNATE RPV PRESSURE CONTROL SYSTEMS RCIC TEST MODE

LOCATION: Unit 2 Control Room

ATTACHMENTS: None

#### 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.
- IF .... Emergency RPV Depressurization is required, OR

Steam Cooling is required,

- THEN ... **EXECUTE** EOI Appendix 16A and 16B as necessary to bypass RCIC Low RPV Pressure and Test Mode Isolation Interlocks.
- IF ..... Suppression Pool level <u>CANNOT</u> be maintained below 5.25 in.,

THEN ... **EXECUTE** EOI Appendix 16E concurrently with this procedure to bypass HPCI High Suppression Pool Level Suction Transfer Interlock.

- 3. IF ..... RCIC Turbine is operating and <u>NOT</u> required for RPV level control,
  - THEN ... ALIGN RCIC in test mode as follows:

a. OPEN 2-FCV-71-38, RCIC PUMP CST TEST VLV.

- b. **VERIFY OPEN** 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. IF .... RCIC is in standby readiness, THEN ... START RCIC as follows:
  - a. **VERIFY CLOSED** 2-FCV-71-39, RCIC PUMP INJECTION VALVE.
  - b. **VERIFY RESET** and **OPEN** 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. VERIFY RCIC Turbine speed accelerates to above
    2100 rpm.
- 5. **VERIFY** 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 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 ... **ALIGN** 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.

LAST PAGE

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### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER: 343F

TITLE: EOI APPENDIX-11B - ALTERNATE PRESSURE CONTROL – RCIC TEST MODE (FROM STANDBY)

TASK NUMBER: U-000-EM-54

Plant Concurrence

SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TRANING	DATE:
		DATE
PLANT CONCURRE	OPERATIONS	DATE:
* Examination JPM	ls Require Operations Training Manager App	proval or Designee Approval and

JPM NO. 343F REV. NO. 0 PAGE 2 of 17

## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

## **REVISION LOG**

Revision Number	Effective Date	Pages Affected	Description Of Revision
0	08/02/08	All	Initial issue
		7.41	
		-	

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## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

OPERATOR:						
RO	SRO		DATE:			
JPM NUMBER:	343F					
TASK NUMBER:	U-000-EM-54					
TASK TITLE:	EOI APPENDIX-11B - ALTERNATE PRESSURE CONTROL – RCIC TEST MODE (FROM STANDBY)					
K/A NUMBER:	241000A4.02	K/A RATING:	RO <u>4.1</u>	SRO <u>4.1</u>		
TASK STANDARD: PERFORM OPERATIONS NECESSARY TO PLACE RCIC IN THE TEST MODE FROM STANDBY FOR ALTERNATE RPV PRESSURE CONTROL AS DIRECTED BY 3-EOI APPENDIX-11B						
PERFORMANCE LOCATION: SIMULATOR X PLANT CONTROL ROOM						
REFERENCES/PROCEDURES NEEDED: 3-EOI Appendix-11B, Rev 3						
VALIDATION TIME: SIMULATOR: 10:00 LOCAL:						
MAX. TIME ALLOWED: (FOR TIME CRITICAL JPMs ONLY)						
PERFORMANCE TIME:						
COMMENTS:						
ADDITIONAL COMMENT SHEETS ATTACHED? YES			NO			
RESULTS:	SATISFACTORY	(	UNSATISFAC	TORY		
EXAMINER SIGNATURE:DATE:						

JPM NO. 343F REV. NO. 0 PAGE 4 of 17

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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 requires 71-9 tripped and failure of RCIC controller after time delay (trigger off of 71-8 valve).

CRITICAL \_\_\_\_\_ NOT CRITICAL \_\_X

When requested by examiner identify/obtain copy of required procedure.

**STANDARD:** 

PERFORMANCE STEP:

Obtained copy of 3-EOI Appendix-11B.

SAT	UNSAT	N/A	COMMENTS:	
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JPM NO. 343F REV. NO. 0 PAGE 6 of 17

<ul> <li>CAUTION</li> <li>Operating RCIC turbine below 2100 rpm may result in unstable system operation and equipment damage.</li> <li>Elevated Suppression Chamber pressure may trip the RCIC turbine on high exhaust pressure.</li> <li>Operating RCIC Turbine with suction temperatures above 140°F may result in</li> </ul>
equipment damage.
***************************************
PERFORMANCE STEP: CRITICAL NOT CRITICAL
1. IF Emergency RPV Depressurization is required, OR
Steam Cooling is required, THEN <b>EXECUTE</b> EOI Appendix 16A and 16B as necessary to bypass RCIC Low RPV Pressure and Test Mode Isolation Interlocks.
CUE: Emergency depressurization or steam cooling are not required.
STANDARD:
Determined <u>NOT</u> to execute EOI Appendix16A or 16B.
SAT UNSAT N/A COMMENTS:

	FORMANCE		CRIT				
2.	IF THEN	EXECUTE	on Pool level CA EOI Appendix ´ PCI High Suppre	6E concur	rently with this p	rocedur	
<u>STA</u>	NDARD:						
Dete	rmined Suppr	ression Pool	level < +5.25 inc	hes and E	OI Appendix-16E	E not rec	qui
SAT	U	NSAT	N/A	CO	MMENTS:		
	- 14 dan 1						
*****	*****	*****	*****		****	******	***
	FORMANCE			*****	NOT CRIT		
PER		<u>STEP:</u> RCIC Turb		ICAL	NOT CRIT		
	FORMANCE IF THEN a. OPE b. VER c. CLO	STEP: RCIC Turb ALIGN RC N 3-FCV-71- IFY OPEN 3- SE 3-FCV-7	CRIT	ICAL and NOT re as follows: CST TES CI/RCIC CS P INJECTI	NOT CRIT equired for RPV T VLV. ST TEST VLV.		
<u>PER</u> 3.	FORMANCE IF THEN a. OPE b. VER c. CLO	STEP: RCIC Turb ALIGN RC N 3-FCV-71- IFY OPEN 3- SE 3-FCV-7	CRIT ine is operating IC in test mode 38, RCIC PUMF FCV-73-36, HP 1-39, RCIC PUM	ICAL and NOT re as follows: CST TES CI/RCIC CS P INJECTI	NOT CRIT equired for RPV T VLV. ST TEST VLV.		
<u>PER</u> 3. <u>STAI</u>	FORMANCE IF THEN a. OPE b. VER c. CLO d. CON	STEP: RCIC Turb ALIGN RC N 3-FCV-71- IFY OPEN 3- SE 3-FCV-7 TINUE in this	CRIT ine is operating IC in test mode 38, RCIC PUMF FCV-73-36, HP 1-39, RCIC PUM	ICAL and NOT re as follows: CST TES CI/RCIC CS P INJECTI	NOT CRIT equired for RPV T VLV. ST TEST VLV.		



					JPM NO. 3 REV. NO. PAGE 8 of	0
*******	*******	*****	******	*****	*****	*******
PERFO	RMANCE S	STEP:	CRI	ICAL	NOT CRITICAI	_ <u>X</u>
		RCIC is in st START RCI	tandby readine C as follows:	ess,		
a	. VERI	FY CLOSED	3-FCV-71-39,	RCIC PUMP II	NJECTION VALV	E.
STAND/	<u>ARD:</u>					
Verified	only GREE	N valve positi	ion indicating	amp illuminate	d above 3-HS-71	-39A.
SAT _	UN	NSAT	N/A		ENTS:	
	RMANCE S				NOT CRITICAL	
b.		F <b>Y RESET</b> an E RESET.	nd <b>OPEN</b> 3-FC	V-71-9, RCIC <sup>-</sup>	TURB TRIP/THR	ОТ
<u>STANDA</u>	ARD:		_			
				ens FCV-71-9 3-ZI-71-9.(Not 0	(Critical) and Verif Critical)	ies
SAT _	UN	ISAT	N/A	COMM	ENTS:	



PERFORMANCE STEP:       CRITICALX_ NOT CRITICAL         c.       VERIFY OPEN the following valves:         ·       3-FCV-71-38, RCIC PUMP CST TEST VLV         STANDARD:         Held 3-HS-71-38A in the OPEN position until valve is open (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical).         SAT       UNSAT       N/A       COMMENTS:		JPM NO. 343F REV. NO. 0 PAGE 9 of 17
C. VERIFY OPEN the following valves:     3-FCV-71-38, RCIC PUMP CST TEST VLV  STANDARD: Held 3-HS-71-38A in the OPEN position until valve is open (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical). SAT UNSAT N/A COMMENTS: PERFORMANCE STEP: CRITICALX NOT CRITICAL PERFORMANCE STEP: CRITICALX NOT CRITICAL     3-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV  STANDARD: Placed 3-HS-71-25A in the OPEN position (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical).	*****	***************************************
S-FCV-71-38, RCIC PUMP CST TEST VLV  STANDARD: Held 3-HS-71-38A in the OPEN position until valve is open (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical). SAT N/A COMMENTS: PERFORMANCE STEP: CRITICALX NOT CRITICAL PERFORMANCE STEP: CRITICALX NOT CRITICAL 0.3-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV  STANDARD: Placed 3-HS-71-25A in the OPEN position (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical).	PERFORMANCE STEP:	CRITICAL X NOT CRITICAL
STANDARD:         Held 3-HS-71-38A in the OPEN position until valve is open (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical).         SAT	c. <b>VERIFY OPEN</b> the fo	ollowing valves:
Held 3-HS-71-38A in the OPEN position until valve is open (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical).         SAT	• 3-FCV-71-38,	RCIC PUMP CST TEST VLV
RED valve position indicating lamp illuminated above associated control switch (Not Critical).         SATUNSATN/ACOMMENTS:	STANDARD:	
PERFORMANCE STEP:       CRITICALX_ NOT CRITICAL         •       3-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV         STANDARD:       Placed 3-HS-71-25A in the OPEN position (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical).	RED valve position indicating lamp	• • •
PERFORMANCE STEP:       CRITICAL X NOT CRITICAL         • 3-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV         STANDARD:         Placed 3-HS-71-25A in the OPEN position (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical).	SAT UNSAT	N/A COMMENTS:
PERFORMANCE STEP:       CRITICAL X NOT CRITICAL         • 3-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV         STANDARD:         Placed 3-HS-71-25A in the OPEN position (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical).		
STANDARD: Placed 3-HS-71-25A in the OPEN position (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical).		
Placed 3-HS-71-25A in the OPEN position (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical).	• 3-FCV-71-25,	RCIC LUBE OIL COOLING WTR VLV
position indicating lamp illuminated above associated control switch (Not Critical).	STANDARD:	
SAT UNSAT N/A COMMENTS:		
	SAT UNSAT	N/A COMMENTS:



PERFORMANCE STEP:       CRITICAL NOT CRITICAL         • 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE         STANDARD:         Placed 3-HS-71-34A in the OPEN position and verified only RED valve position indicating lamp illuminated above associated control switch.         SAT	D. 343F O. 0 10 of 17
S-FCV-71-34, RCIC PUMP MIN FLOW VALVE  STANDARD:  Placed 3-HS-71-34A in the OPEN position and verified only RED valve position indicating lamp illuminated above associated control switch.  SAT UNSAT N/A COMMENTS: PERFORMANCE STEP: CRITICALX_ NOT CRITICAL     S-FCV-73-36, HPCI/RCIC CST TEST VLV.  STANDARD:  Placed 3-HS-73-36A in the OPEN position (Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical) and Verified only RED valve position indicating lamp illuminated above associated control switch (Not Critical)	
STANDARD:         Placed 3-HS-71-34A in the OPEN position and verified only RED valve positindicating lamp illuminated above associated control switch.         SAT	
indicating lamp illuminated above associated control switch.         SATUNSATN/ACOMMENTS:         PERFORMANCE STEP:         0         3-FCV-73-36, HPCI/RCIC CST TEST VLV.         STANDARD:         Placed 3-HS-73-36A in the OPEN position (Critical) and Verified only RED v         position indicating lamp illuminated above associated control switch (Not Critical)	
PERFORMANCE STEP:       CRITICAL X NOT CRITIC         •       3-FCV-73-36, HPCI/RCIC CST TEST VLV.         STANDARD:       Placed 3-HS-73-36A in the OPEN position (Critical) and Verified only RED v position indicating lamp illuminated above associated control switch (Not Critical)	tion
PERFORMANCE STEP:       CRITICALX_ NOT CRITICAL         • 3-FCV-73-36, HPCI/RCIC CST TEST VLV.         STANDARD:         Placed 3-HS-73-36A in the OPEN position (Critical) and Verified only RED ver	
<u>STANDARD:</u> Placed 3-HS-73-36A in the OPEN position (Critical) and Verified only RED v position indicating lamp illuminated above associated control switch (Not Cri	
Placed 3-HS-73-36A in the OPEN position (Critical) and Verified only RED v position indicating lamp illuminated above associated control switch (Not Cri	
position indicating lamp illuminated above associated control switch (Not Cri	
SAT UNSAT N/A COMMENTS:	



		JPM NO. 34 REV. NO. ( PAGE 11 of	)
*******	******	*******	******
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL	<u> </u>
d. <b>PLACE</b> 3-HS-71-3 <sup>-</sup>	1A, RCIC VACUUM PU	MP, handswitch in STAF	RT.
STANDARD:			
Placed 3-HS-71-31A in the STAF	RT position.		
SAT UNSAT	_ N/A C0	OMMENTS:	
e. <b>OPEN</b> 3-FCV-71-8, Turbine.	CRITICAL	XNOT CRITICAL	
STANDARD:			
Placed 3-HS-71-8A in the OPEN position indicating lamp above ha			alve
SAT UNSAT	_ N/A C0	OMMENTS:	
SAT UNSAT	N/A CO	JMMENTS:	



				JPM NO. 343F REV. NO. 0 PAGE 12 of 17	
*********	*****	******	******	******	****
PERFORMA	ANCE STEP:	CRIT	ICAL	_ NOT CRITICAL	<u>X</u>
f.	VERIFY RC	IC Turbine speed acc	elerates to a	bove 2100 rpm.	
STANDARD	) <u>:</u>				
Verified spe	ed areater tha	an 2100 rpm indicated	on 3-SI-71-4	124	
	-	·			
SAT	_ UNSAT	N/A		MENTS:	
PERFORMA	ANCE STEP: FY proper RC	CRIT	ICAL	_ NOT CRITICAL	
a.		RCIC flow is above VERIFY CLOSED 3 VALVE.		RCIC PUMP MIN FLOW	1
<u>STANDARD</u>	<u>:</u>				
		ated flow > 120 gpm, d above 3-HS-71-34A	•	GREEN valve position	
SAT	_ UNSAT	N/A	COM	MENTS:	



PERFORM	IANCE STEP:	CRITICAL	NOT CRITICAL
b.	IF	BOTH of the following exist:	
	• RCIC Initi	ation signal is NOT present,	
	RCIC flov	AND v is below 60 gpm,	
	THEN	<b>VERIFY OPEN</b> 3-FCV-71-34, F VALVE.	RCIC PUMP MIN FLOW
STANDAR	<u>D:</u>		
		gpm as indicated on 3-FIC-71-36A Not illuminated.	and/or RCIC Initiation
located abo	ove XS-71-52		
located abo	ove XS-71-52 UNSAT	Not illuminated.           N/A CO	MMENTS:
located abo SAT <u>PERFORM</u> 6. <b>THR</b>	OVE XS-71-52 UNSAT	Not illuminated.           N/A CO	MMENTS:
located abo SAT <u>PERFORM</u> 6. <b>THR</b>	OVE XS-71-52 UNSAT ANCE STEP: OTTLE 3-FC narge pressur	Not illuminated.       N/A CO         N/A CO         CRITICAL         V-71-38, RCIC PUMP CST TEST	MMENTS:
Iocated abo SAT PERFORM 6. THR discl STANDARI Throttled 3-	Dive XS-71-52 UNSAT UNSAT ANCE STEP: COTTLE 3-FC narge pressur D: FCV-71-38 to	Not illuminated.       N/A CO         N/A CO         CRITICAL         V-71-38, RCIC PUMP CST TEST	MMENTS: <u>KNOT CRITICAL</u> VLV, to control RCIC pr at or below 1100 psig. (6



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

***************************************

PERFORMANCE STEP:

CRITICAL X NOT CRITICAL

### **EXAMINERS NOTE: ALTERNATE PATH STARTS HERE:**

7. **ADJUST** 3-FIC-71-36A, RCIC SYSTEM FLOW/CONTROL, controller to control RPV pressure.

### STANDARD:

Candidate recognizes RCIC Flow Controller Failure and places 3-FIC-71-36A in <u>Manual</u> and adjusts the flow controller in conjunction with the 2-FCV-71-38, RCIC PUMP CST TEST VLV to obtain:

RCIC flow 120-600 gpm on 3-FIC-71-36A.

RCIC discharge pressure ≤ 1100 psig on 3-PI-71-35A.

RCIC speed > 2100 rpm on 3-SI-71-42A.

SAT	UNSAT	N/A	COMMENTS:
-----	-------	-----	-----------

JPM NO. 343F REV. NO. 0 PAGE 15 of 17 PERFORMANCE STEP: CRITICAL NOT CRITICAL X IF ..... 8. RCIC injection to the RPV becomes necessary, THEN ... ALIGN RCIC to RPV as follows: **OPEN 3-FCV-71-39, RCIC PUMP INJECTION VALVE.** a. CLOSE 3-FCV-71-38, RCIC PUMP CST TEST VLV. b. GO to EOI Appendix 5C. C. CUE: Injection to the vessel with RCIC is Not desired at this time. STANDARD: N/A – Injection to vessel not required per CUE. SAT \_\_\_\_\_ UNSAT \_\_\_\_\_ N/A \_\_\_\_\_ COMMENTS:\_\_\_\_\_ CUE: That completes this task.

			JPM NO. 343 REV. NO. 0 PAGE 16 of	
PERFORMANCE STEP:			NOT CRITICAL	
PERFORMER demonstrated the	ne use of SELF CHE	CKING dur	ing this JPM	
STANDARD:				
PERFORMER verified applicat accordance with plant standard		ilizing SEL	F CHECKING in	
SAT UNSAT	N/A	COMME	ENTS:	
	CRITICA		NOT CRITICAL	
PERFORMANCE STEP:	CRITICA		NOT CRITICAL	
PERFORMANCE STEP: PERFORMER demonstrated th STANDARD:	CRITICA	 MMUNICA	NOT CRITICAL	
PERFORMANCE STEP: PERFORMER demonstrated th	CRITICA ne use of 3-WAY CO COMMUNICATION i	 MMUNICA <sup>*</sup> n accordan	NOT CRITICAL TION during this Jf ce with plant stand	 ⊃N ar
PERFORMANCE STEP: PERFORMER demonstrated th <u>STANDARD:</u> PERFORMER utilized 3-WAY	CRITICA ne use of 3-WAY CO COMMUNICATION i	 MMUNICA <sup>*</sup> n accordan	NOT CRITICAL TION during this Jf ce with plant stand	 PN ar
PERFORMANCE STEP: PERFORMER demonstrated th <u>STANDARD:</u> PERFORMER utilized 3-WAY	CRITICA ne use of 3-WAY CO COMMUNICATION i	 MMUNICA <sup>*</sup> n accordan	NOT CRITICAL TION during this Jf ce with plant stand	 ⊃N



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### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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.

### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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 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.

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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>	<u>REVISED</u> <u>PAGES</u>	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 Rev. 3 Page 1 of 3

# 3-EOI APPENDIX-11B

## ALTERNATE RPV PRESSURE CONTROL SYSTEMS RCIC TEST MODE

LOCATION: Unit 3 Control Room

ATTACHMENTS : None

 $(\mathbf{\sqrt{}})$ 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. IF ..... Emergency RPV Depressurization is required, 1. OR Steam Cooling is required, THEN ... EXECUTE EOI Appendix 16A and 16B as necessary to bypass RCIC Low RPV Pressure and Test Mode Isolation Interlocks. 2. IF ..... Suppression Pool level CANNOT be maintained below 5.25 in., THEN ... EXECUTE EOI Appendix 16E concurrently with this procedure to bypass HPCI High Suppression Pool Level Suction Transfer Interlock. IF ..... RCIC Turbine is operating and NOT required for 3. RPV level control, THEN ... ALIGN RCIC in test mode as follows: a. OPEN 3-FCV-71-38, RCIC PUMP CST TEST VLV. b. VERIFY OPEN 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. **VERIFY CLOSED** 3-FCV-71-39, RCIC PUMP INJECTION VALVE.
  - b. **VERIFY RESET** and **OPEN** 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. **VERIFY** RCIC Turbine speed accelerates to above 2100 rpm.
- VERIFY 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 NOT present,

#### AND

- RCIC flow is below 60 gpm,
- 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.

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

- 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 ... ALIGN 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.

LAST PAGE

JPM NO. 81 REV. NO. 8 PAGE 1 OF 12

### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER:	81
TITLE:	RESPOND TO UNCOUPLED CONTROL ROD (MULTIPLE NOTCHES)
TASK NUMBER:	U-000-AB-02

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

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

JPM NO. 81 REV. NO. 8 PAGE 2 OF 12

### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

# 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

JPM NO. 81 REV. NO. 8 PAGE 3 OF 12

### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

1

OPERATOR:			
RO	SRO	DATE:	
JPM NUMBER:	81		
TASK NUMBER:	U-000-AB-02		
TASK TITLE:	RESPOND TO AN UNCOU	JPLED CONTROL R	OD
K/A NUMBER:	201003A2.02 K/	A RATING: RO <u>3</u>	.7 SRO: 3.8
*****	* * * * * * * * * * * * * * * * * * * *	*****	* * * * * * * * * * * * * * * * * * *
TASK STANDARD:	PERFORM OPERATIONS UNCOUPLED CONTROL R		
LOCATION OF PER	RFORMANCE: SIMULATOR	X PLANT	CONTROL ROOM
REFERENCES/PROC	CEDURES NEEDED: 2-AC	DI-85-2, REV 12	
VALIDATION TIME	CONTROL F	ROOM:11:00	LOCAL:
MAX. TIME ALLOW	VED: (Comple	ted for Time C	citical JPMs only)
PERFORMANCE TIN	1E:	CONTROL ROOM	LOCAL
COMMENTS:			
Additional comm	nent sheets attached	? YES	NO
RESULTS:	SATISFACTORY	_UNSATISFACTORY	
SIGNATURE:	XAMINER	DATE:	

### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

#### 

**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

START TIME

NOTE; SELECT A STARTUP IC WITHDRAWING RODS TO POSITION 48 AND INSERT THE UNCOUPLED MALFUNCTION FOR ROD 02-23 AND WITHDRAW IT TO POSITION 48 TO GENERATE THE DRIFT AND OVERTRAVEL ANNUNCIATORS.

Performance Step:

Critical Not Critical X

WHEN REQUESTED BY EXAMINER identify/obtain copy of required procedure.

Standard:

IDENTIFIED OR OBTAINED copy of 2-AOI-85-2.

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

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.0 OPERATOR ACTIONS
.1 Immediate Actions
*****************
Performance Step: Critical X Not Critical
4.1.1 STOP all control rod withdrawal.
tandard:
DID NOT ATTEMPT further rod withdrawal.
ATUNSATN/ACOMMENTS:
.2 Subsequent Actions
********************
erformance 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.
tandard:
<b>NOTIFIED</b> Reactor Engineer to evaluate the rod for its impact on core thermal limits and rod worth.
AT 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.



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- 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 **NOTCH INSERT** the control rod drive to position 46 to attempt to couple the control rod.

Standard:

NOTCHED control rod drive in to notch 46.

SAT\_\_\_UNSAT\_\_\_N/A\_\_\_\_COMMENTS:\_\_\_\_\_

Performance Step :

Critical\_\_\_\_ Not Critical X

4.2.3.2 **RESET** associated annunciators.

Standard:

**RESET** CONTROL ROD OVERTRAVEL and CONTROL ROD DRIFT annunciators.

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

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

* * * * * * * * * * * * * * * * * * * *	* * * * * * * * *
Performance Step : Critical X Not	Critical
4.2.3.3 <b>NOTCH WITHDRAW</b> the control position 48.	rod drive to
Standard:	
NOTCH WITHDREW the affected control rod to post	ition 48.
SAT UNSAT N/A COMMENTS:	
***************************************	* * * * * * * * *
Performance Step : Critical X Not	Critical
4.2.3.4 <b>PERFORM</b> a coupling check.	
Standard:	
<b>PERFORMED</b> coupling integrity check by giving an withdrawal signal. <b>VERIFIED</b> control rod still observing CONTROL ROD OVERTRAVEL and CONTROL RO and loss of control rod position indication.	uncoupled by
SAT UNSAT N/A COMMENTS:	





JPM NO. 81 REV. NO. 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 INSERTED the affected control rod to 00.

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

Performance Step :

Critical X Not Critical

4.2.3.5.1 **RESET** associated annunciators.

Standard:

**RESET** 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.



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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 **NOTCH WITHDRAW** the control rod drive to position 48.

Standard:

NOTCH WITHDREW the affected control rod to position 48.

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

Performance Step :

Critical X Not Critical

4.2.3.5.3 **PERFORM** 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.

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

NOTE: COUPLING INTEGRITY IS SATISFIED IF CRD NOTCH OVERRIDE SWITCH IS USED AND ROD IS WITHDRAWN TO POSITION 48.

STOP TIME

END OF TASK

JPM NO. 81 REV. NO. 8 PAGE 11 OF 12

### GENERIC WORK PRACTICES

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 \_\_\_\_COMMENTS:\_\_\_\_\_

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:\_\_\_\_\_





BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

#### 

**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 JOB PERFORMANCE MEASURE

#### 

**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.



TVA

**Browns Ferry Nuclear Plant** 

Unit 2 Abnormal Operating Instruction

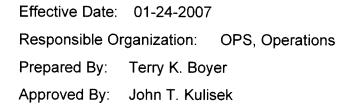
# 2-AOI-85-2

## **Uncoupled Control Rod**

**Revision 0012** 

**Quality Related** 

Level of Use: Continuous Use



### **Current Revision Description**

2-AOI-85-2

Rev. 0012

Page 2 of 8

Pages Affected: All

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.



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BFN	Uncoupled Control Rod	2-AOI-85-2	
Unit 2		Rev. 0012	
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### 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 Unit 2		Uncoupled Control Rod	2-AOI-85-2 Rev. 0012 Page 5 of 8	
4.0	OPERA	TOR A	CTIONS		
4.1	Immedi	ate Actic	ons		
	[1]	STOP all	control rod withdrawal.		
4.2	Subseq	uent Act	tions		
			Reactor Engineer to evaluate the susp od for its impact on core thermal limits	-	
			rod pattern as directed by Reactor Er ut performance of this procedure.	ngineer	
			l rod drive is at position 48, <b>THEN,</b> wit concurrence,	h Reactor	
	I	PERFOR	RM the following:		
	[3.1]	-	OTCH INSERT control rod drive to pose empt to couple the control rod.	ition 46 to	
	[3.2]	] RE	SET associated annunciators.		
	[3.3]	] <b>NC</b>	TCH WITHDRAW control rod drive to	position 48.	
	[3.4]	] PE	RFORM coupling check.		
	[3.5]	] IF	coupling integrity check fails, <b>THEN</b>		
		pos	<b>DNTINUOUSLY INSERT</b> control rod d sition 00 to attempt to latch control roc ve mechanism.		
	[	3.5.1]	<b>RESET</b> 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

Subse	equent Act	ions	(continued)	
[4]	IF the cor THEN	ntrol I	rod drive is at any position other than notch 48	
			Engineer concurrence, after thorough evaluation	
		M on	core conditions, e of the following sub-steps as directed by the eer.	
[4.			<b>PT</b> to latch control rod by fully inserting control bllows:	
	[4.1.1]	pos	<b>NTINUOUSLY INSERT</b> control rod drive to ition 00 to attempt to latch control rod with trol rod drive mechanism.	
	[4.1.2]	NO	TCH WITHDRAW control rod to position 48.	
	[4.1.3]	PEI	RFORM coupling check.	
	[4.1.4]	IF c	coupling integrity check fails, THEN	
		pos	<b>NTINUOUSLY INSERT</b> control rod drive to ition 00 to attempt to latch control rod with trol rod drive mechanism.	
		Α.	<b>RESET</b> associated annunciators.	
		B.	<b>NOTCH WITHDRAW</b> control rod to position 48.	
		C.	PERFORM coupling check.	
[4.	-		PT to latch control rod by inserting control rod th as follows:	
	[4.2.1]		TCH INSERT control rod drive one notch to mpt to couple control rod.	
	[4.2.2]		<b>TCH WITHDRAW</b> control rod drive to ition 48.	
	[4.2.3]	PEF	RFORM coupling check.	



4.2

BFN	Uncoupled Control Rod	2-AOI-85-2
Unit 2		Rev. 0012
		Page 7 of 8

#### 4.2 Subsequent Actions (continued)

[4.2.4] **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. NOTCH WITHDRAW control rod to
- position 48.
- C. **PERFORM** coupling check.

#### CAUTION

Technical Specification 3.1.3 applies to a control rod which CANNOT be coupled to its drive.

[5]		upling integrity check fails after above actions have been ed out, <b>THEN</b>	
[5	5.1]	<b>CONTINUOUSLY INSERT</b> control rod drive to position 00 AND <b>REMOVE</b> the associated hydraulic control unit from service until corrective action is performed. REFER TO 2-OI-85.	
[5	.2]	RESET associated annunciators.	



#### 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





JPM NO. 81 REV. NO. 8 PAGE 1 OF 12

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER:	81
TITLE:	RESPOND TO UNCOUPLED CONTROL ROD (MULTIPLE NOTCHES)
TASK NUMBER:	U-000-AB-02

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

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

JPM NO. 81 REV. NO. 8 PAGE 2 OF 12

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

# 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

JPM NO. 81 REV. NO. 8 PAGE 3 OF 12

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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	3.7 SRO: <u>3.8</u>
****	* * * * * * * * * * * * * * * * * * * *	*****	* * * * * * * * * * * * * * * * * * * *
TASK STANDARD:	PERFORM OPERATION UNCOUPLED CONTROL		
LOCATION OF PER	RFORMANCE: SIMULAT	OR X PLANT	CONTROL ROOM
REFERENCES/PROC	CEDURES NEEDED: 3	-AOI-85-2, REV 6	
VALIDATION TIME	E: CONTROI	ROOM: 11:00	LOCAL:
MAX. TIME ALLOW	VED: (Comp	leted for Time C	ritical JPMs only)
PERFORMANCE TIN	1E:	CONTROL ROOM	LOCAL
COMMENTS:			
Additional comm	ment sheets attach	ed? YES	NO
RESULTS:	SATISFACTORY	UNSATISFACTORY	۲
SIGNATURE:	XAMINER	DATE:	

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

#### 

**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.

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

START TIME

NOTE; SELECT A STARTUP IC WITHDRAWING RODS TO POSITION 48 AND INSERT THE UNCOUPLED MALFUNCTION FOR ROD 02-23 AND WITHDRAW IT TO POSITION 48 TO GENERATE THE DRIFT AND OVERTRAVEL ANNUNCIATORS.

Performance Step:

Critical \_\_\_ Not Critical X

WHEN REQUESTED BY EXAMINER identify/obtain copy of required procedure.

Standard:

IDENTIFIED OR OBTAINED copy of 3-AOI-85-2.

SAT\_\_\_\_UNSAT\_\_\_\_N/A COMMENTS:

JPM NO. 81 REV. NO. 8 PAGE 6 OF 12

4.0 OPERATOR ACTIONS
4.1 Immediate Actions
* * * * * * * * * * * * * * * * * * * *
<u>Performance Step:</u> Critical <u>X</u> 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
*********************
<u>Performance Step:</u> 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:
<b>NOTIFIED</b> 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.



JPM NO. 81 REV. NO. 8 PAGE 7 OF 12

- 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 **NOTCH INSERT** the control rod drive to position 46 to attempt to couple the control rod.

Standard:

NOTCHED control rod drive in to notch 46.

SAT\_\_\_UNSAT\_\_\_N/A\_\_\_ COMMENTS:\_\_\_\_

Performance Step :

Critical\_\_\_ Not Critical\_X\_\_\_

4.2.3.2 **RESET** associated annunciators.

Standard:

**RESET** CONTROL ROD OVERTRAVEL and CONTROL ROD DRIFT annunciators.

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



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

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



JPM NO. 81 REV. NO. 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 INSERTED the affected control rod to 00.

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

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

Performance Step :

Critical X Not Critical

4.2.3.5.1 **RESET** associated annunciators.

Standard:

**RESET** CONTROL ROD OVERTRAVEL and CONTROL ROD DRIFT annunciators on Panel 3-9-5.

SAT UNSAT N/A COMMENTS:

NOTE: HAVE CONSOLE OPERATOR DELETE ROD UNCOUPLED MALFUNCTION.





JPM NO. 81 REV. NO. 8 PAGE 10 OF 12

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

4.2.3.5.2 **NOTCH WITHDRAW** the control rod drive to position 48.

Standard:

NOTCH WITHDREW the affected control rod to position 48.

SAT UNSAT N/A COMMENTS:

Performance Step :

Critical X Not Critical

4.2.3.5.3 **PERFORM** 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.

SAT\_\_\_\_UNSAT 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

JPM NO. 81 REV. NO. 8 PAGE 11 OF 12

#### GENERIC WORK PRACTICES

#### 

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 \_\_\_\_\_COMMENTS:\_\_\_\_\_

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:





BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

#### 

**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.

BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

#### 

**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.



**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



## **Current Revision Description**

Pages Affected: All

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 Unit 3	Uncoupled Control Rod	3-AOI-85-2 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

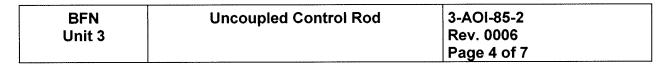
#### NOTE

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



#### 4.0 OPERATOR ACTIONS

4.2

STOP all control rod withdrawal. [1] **Subsequent Actions** [1] NOTIFY Reactor Engineer to evaluate the suspect uncoupled control rod for its impact on core thermal limits and rod worth. [2] ADJUST the rod pattern as directed by the Reactor Engineer throughout the performance of this procedure. IF the control rod drive is at position 48 AND with Reactor [3] Engineer concurrence, THEN **PERFORM** the following: NOTCH INSERT the control rod drive to position 46 to [3.1] attempt to couple the control rod. **RESET** associated annunciators. [3.2] [3.3] **NOTCH WITHDRAW** the control rod drive to position 48. **PERFORM** a coupling check. [3.4] [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. **PERFORM** a coupling check. [3.5.3]



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** 

**PERFORM** one of the following sub-steps as directed by the Reactor Engineer:

[4.1] **ATTEMPT** to latch control rod by fully inserting control rod as follows:

[4.1.1]	<b>CONTINUOUSLY INSERT</b> 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 a 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.

Α.	<b>RESET</b> associated annunciators.	
B.	<b>NOTCH WITHDRAW</b> 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	

#### 4.2 Subsequent Actions (continued)

- [4.2] **ATTEMPT** to latch control rod by inserting control rod one notch as follows:
  - [4.2.1] **NOTCH INSERT** the control rod drive one notch to attempt to couple the control rod.
  - [4.2.2] **NOTCH WITHDRAW** the control rod drive to position 48.
  - [4.2.3] **PERFORM** a coupling check.
  - [4.2.4] **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. **NOTCH WITHDRAW** control rod to position 48.
- C. **PERFORM** a coupling check.

#### CAUTION

Technical Specification 3.1.3 applies to a control rod which <u>CANNOT</u> be coupled to its drive.

- [5] **IF** coupling integrity check fails after above actions have been carried out, **THEN** 
  - [5.1] **CONTINUOUSLY INSERT** control rod drive to position 00 AND **REMOVE** the associated hydraulic control unit from service until corrective action is performed. **REFER TO** 3-OI-85.
  - [5.2] **RESET** associated annunciators.



#### 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 NO. 55 REV. NO. 10 PAGE 1 of 12

## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER: 55

TITLE: 2-EOI APPENDIX-13 - EMERGENCY VENTING PRIMARY CONTAINMENT

TASK NUMBER: U-000-EM-63

SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:		DATE:
	TRAINING	
PLANT CONCURREN		_ DATE:
	OPERATIONS	
* Examination IDMs	Require Operations Training Manager Appro	wal or Designed Approval and

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

JPM NO. 55 REV. NO. 10 PAGE 2 of 12

## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

# **REVISION LOG**

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           -         -         -         -           -         -         -         -           -         -         -         -           -         -         -         -           -         -         -         -           -         -         -         -           -         -         -         -           -         -         -         -         -           -         -         -         -         -           -         -         -         -         -           -         -         -         -         -           -         -	Revision	Effective	Pages	Description
609/08/023,4Delete SS#, delete safety statement701/05/06AllGeneral revision807/29/07AllUpdate906/20/08AllGeneral revision				
609/08/023,4Delete SS#, delete safety statement701/05/06AllGeneral revision807/29/07AllUpdate906/20/08AllGeneral revision			All	Procedure revision, added 3-way comm.
701/05/06AllGeneral revision807/29/07AllUpdate906/20/08AllGeneral revision		09/08/02	3,4	
9 06/20/08 All General revision		01/05/06	All	
9 06/20/08 All General revision		07/29/07	All	Update
10       03/27/09       All       General revision & re-format	9	06/20/08	All	
	10	03/27/09	All	General revision & re-format
Image: Section of the section of th				
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JPM NO. 55 REV. NO. 10 PAGE 3 of 12

## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

OPERATOR:	
RO	SRO DATE:
JPM NUMBER:	55
TASK NUMBER:	U-000-EM-63
TASK TITLE:	2-EOI APPENDIX-13 - EMERGENCY VENTING PRIMARY CONTAINMENT
K/A NUMBER:	295024EA1.14 K/A RATING: RO <u>3.4</u> SRO <u>3.5</u>
*****	***************************************
TASK STANDARD	PERFORM CONTROL ROOM OPERATIONS REQUIRED TO EMERGENCY VENTILATE PRIMARY CONTAINMENT
PERFORMANCE	LOCATION: SIMULATOR X PLANT CONTROL ROOM
REFERENCES/PR	OCEDURES NEEDED: 2-EOI Appendix-13, Rev 6
VALIDATION TIME	SIMULATOR: 5:00 LOCAL:
MAX. TIME ALLOV	ED: (FOR TIME CRITICAL JPMs ONLY)
PERFORMANCE 1	IME:
COMMENTS:	
ADDITIONAL COM	MENT SHEETS ATTACHED? YES NO
RESULTS:	SATISFACTORY UNSATISFACTORY
EXAMINER SIGNA	TURE:DATE:

JPM NO. 55 REV. NO. 10 PAGE 4 of 12

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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. 1 PAGE 5 of 1	0
START TIME				-
**********	*******	*****	******	******
PERFORMANCE STEP:	CRITICAL	<b>.</b>	NOT CRITICAL	<u> </u>
When requested by examiner ide	ntify/obtain copy of	f required pr	rocedure.	
STANDARD:				
Obtained copy of 2-EOI Appendix	<b>&lt;-13</b> .			
SAT UNSAT	_ N/A	COMME	NTS:	
		· · · · · · · · · · · · · · · · · · ·		
			чануница) — раникананана.	
PERFORMANCE STEP:			NOT CRITICAL	
		*********		
1. <b>NOTIFY</b> Shift Manager / S	ED of the following	:		
<ul> <li>Emergency Venting of Pr</li> <li>Off-Gas Release Rate Li</li> </ul>			ess.	
	This will be exceed	eu.		
CUE: [Shift Manager/SED ackn	owledges] Emerg	ency Prima	ry Containment	
venting is in progress and Off-G	as release rate in	iits will be e	exceeded.	
STANDARD:				
Notified Shift Manager/SED by vo	ice contact with ex	aminer.		
SAT UNSAT	N/A	COMMEN	NTS:	
	· · · · · · · · · · · · · · · · · · ·			

PEF	RFORM	IANCE STEP:	CRI	TICAL	NOT CRITICAL
2.	VEN	IT the Suppression	Chamber as foll	ows (Panel 9	-3):
	a.	IFEIT⊦	IER of the follow	wing exists:	
		Suppression Po		ANNOT be d	letermined to be below 2
		Suppression Ch	<b>OR</b> amber CANNO	T be vented,	
		THEN <b>CON</b>	TINUE in this p	rocedure at S	Step 3.
<u>STA</u>		<u>D:</u>			
		ppression Pool Leve VEL and/or ICS.	el below 20 ft us	sing 2-LI-64-1	59A, SUPPR POOL
WA	TER LE	VEL and/or ICS.		-	59A, SUPPR POOL
WA <sup>-</sup> SAT		VEL and/or ICS.	N/A	_ COM	IMENTS:
WA <sup>-</sup> SAT		VEL and/or ICS. UNSAT ANCE STEP:	N/A CRI7 witch 2-HS-64-2	_ COM	MENTS:
WA <sup>-</sup> SAT 		VEL and/or ICSUNSAT ANCE STEP: PLACE keylock s VENT OUTBD PE	N/A CRI7 witch 2-HS-64-2	_ COM	MENTS:
WA <sup>-</sup> SAT <u></u>	EFORM	VEL and/or ICSUNSAT ANCE STEP: PLACE keylock s VENT OUTBD PE	N/A CRIT witch 2-HS-64-2 ERMISSIVE, in I	_ COM	MENTS:



		JPM NO. 55 REV. NO. 10 PAGE 7 of 12
***********	******	******
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X
c. <b>CHECK</b> blue indicatir CHBR VENT OUTBD	ng light above 2-HS-64 ) PERMISSIVE, illumin	-222B, HARDENED SUPPR ated.
STANDARD:		
Verified BLUE indicating lamp above	ve 2-HS-64-222B Illum	inated.
SAT UNSAT	N/A CO	MMENTS:
PERFORMANCE STEP:		X NOT CRITICAL
d. <b>OPEN</b> 2-FCV-64-222 VLV.		CHBR VENT OUTBD ISOL
STANDARD:		
Placed 2-HS-64-222A in the OPEN position indicating lamp above asso		
SAT UNSAT	N/A CO	MMENTS:
SAT UNSAT	N/A CO	MMENTS:



			JPM NO. 55 REV. NO. 10 PAGE 8 of 12
******	*******	******	******
PERFORMANCE STEP:	CRITICAL _	<u>X</u>	NOT CRITICAL
e. <b>PLACE</b> keylock switch VENT INBD PERMISS		RDENI	ED SUPPR CHBR
STANDARD:			
Placed 2-HS-64-221B in the PERM	position.		
SAT UNSAT	N/A C	OMME	NTS:
PERFORMANCE STEP:			NOT CRITICAL X
TEN ON MANOL OTET .	CRITICAL _		
f. <b>CHECK</b> blue indicating CHBR VENT INBD PE	– g light above 2-HS-6	64-221E	
f. <b>CHECK</b> blue indicating	– g light above 2-HS-6	64-221E	
f. <b>CHECK</b> blue indicating CHBR VENT INBD PE	g light above 2-HS-6 RMISSIVE, illumina	54-221E ated.	3, HARDENED SUPPR
f. <b>CHECK</b> blue indicating CHBR VENT INBD PE <u>STANDARD:</u>	- g light above 2-HS-6 RMISSIVE, illumina e 2-HS-64-221B Illui	54-221B ated. minated	B, HARDENED SUPPR
f. <b>CHECK</b> blue indicating CHBR VENT INBD PE <u>STANDARD:</u> Verified BLUE indicating lamp above	- g light above 2-HS-6 RMISSIVE, illumina e 2-HS-64-221B Illui	54-221B ated. minated	B, HARDENED SUPPR





				JPM NO. 59 REV. NO. PAGE 9 of	10
******	*****	******	********	*****	*******
PERFORMA	NCE STEP:	CRITICA	<u>    X    </u>	NOT CRITICAL	
g.	<b>OPEN</b> 2-FCV-64 VLV.	-221, HARDENED S	UPPR CHI	BR VENT INBD IS	OL
STANDARD	<u>.</u>				
		PEN position (critical) associated hand swi			D valve
SAT	UNSAT	N/A	COMM	ENTS:	
PERFORMA		CRITICAL		NOT CRITICAL	
h.	CHECK Drywell	and Suppression Cha	mber Pres	sure lowering.	
STANDARD	<u>.</u>				
	vell and suppression trumentation and/o	on chamber pressure or ICS.	lowering b	y available contai	nment
SAT	_ UNSAT	N/A	COMME		
				, or Portfold States in the second	
*******		······			



			JPM NO. 55 REV. NO. PAGE 10 of	10
PERFORMANCE STEP:			NOT CRITICAL	
i. <b>MAINTAIN</b> Primary 222, HARDENED S SRO.				
STANDARD:				
None.				
SAT UNSAT	_ N/A	COMME	NTS:	

CUE: [When Drywell Pressure lowering] That completes this task.

SAT UNSAT	N/A CC	DMMENTS:
<u>STANDARD:</u> PERFORMER utilized 3-WAY C	OMMUNICATION in acc	ordance with plant sta
PERFORMER demonstrated the		
PERFORMANCE STEP:		NOT CRITICA
SAT UNSAT	N/A CO	OMMENTS:
PERFORMER verified applicabl accordance with plant standards		g SELF CHECKING i
STANDARD:		
PERFORMER demonstrated the	e use of SELF CHECKIN	G during this JPM
PERFORMANCE STEP:	CRITICAL	
*******	****	PAGE 11

(o ipe)

## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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.

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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.

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>	<u>REVISED</u> <u>PAGES</u>	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 Rev. 6 Page 1 of 6

 $(\checkmark)$ 

# 2-EOI APPENDIX-13

# **EMERGENCY VENTING PRIMARY CONTAINMENT**

LOCATION: Unit 2 Control Room

ATTACHMENTS: 1.Tools and Equipment 2.Vent System Overview 3.Hardened Vent Flow Path

- 1. **NOTIFY** Shift Manager / SED of the following:
  - Emergency Venting of Primary Containment is in progress.
  - Off-Gas Release Rate Limits will be exceeded.
- 2. **VENT** the Suppression Chamber as follows (Panel 9-3):
  - a. IF ..... <u>EITHER</u> of the following exists:
    - Suppression Pool water level <u>CANNOT</u> be determined to be below 20 ft,
    - **OR** Suppression Chamber <u>CANNOT</u> be vented,

THEN...... CONTINUE in this procedure at Step 3.

- b. **PLACE** keylock switch 2-HS-64-222B, HARDENED SUPPR CHBR VENT OUTBD PERMISSIVE, in PERM.
- c. **CHECK** blue indicating light above 2-HS-64-222B, HARDENED SUPPR CHBR VENT OUTBD PERMISSIVE, illuminated.
- d. **OPEN** 2-FCV-64-222, HARDENED SUPPR CHBR VENT OUTBD ISOL VLV.
- e. **PLACE** 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. **OPEN** 2-FCV-64-221, HARDENED SUPPR CHBR VENT INBD ISOL VLV.

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Rev. 6
Page 2 of 6

 		Fage 2 01 0	
2.	(con	tinued from previous page)	
	h.	CHECK Drywell and Suppression Chamber Pressure lowering.	
	i.	<b>MAINTAIN</b> 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, NVENT the Drywell as follows:	
	a.	<b>NOTIFY</b> Shift Manager / SED that Secondary Containment integrity failure is possible.	
	b.	<b>NOTIFY</b> 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.	<b>VERIFY CLOSED</b> 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.	<b>VERIFY OPEN</b> 2-FCV-64-30, DRYWELL VENT OUTBD ISOLATION VLV (Panel 9-3).	



3.	(con	tinued from previous page)	
******	******	<u>CAUTION</u>	*****
*****	****	<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).	
	k.	VERIFY OPEN 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	



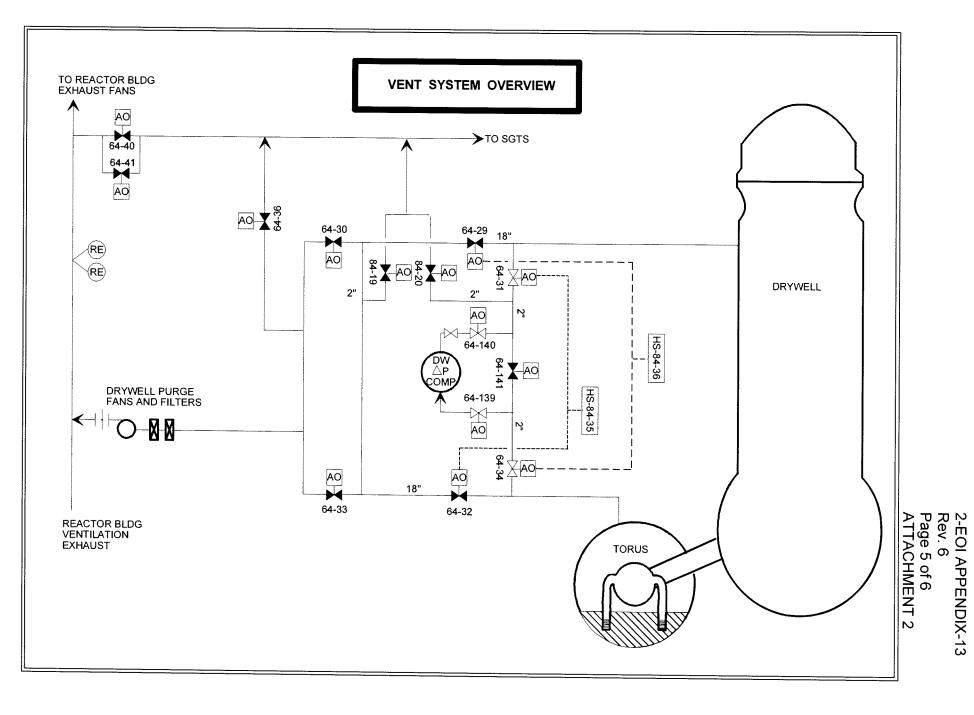
2-EOI APPENDIX-13 Rev. 6 Page 4 of 6 ATTACHMENT 1

TOOLS AND EQUIPMENT:	LOCATION:
1. One 12-in. banana jack jumper.	Unit 2 Auxiliary Instrument Room, EOI Equipment Storage Box.



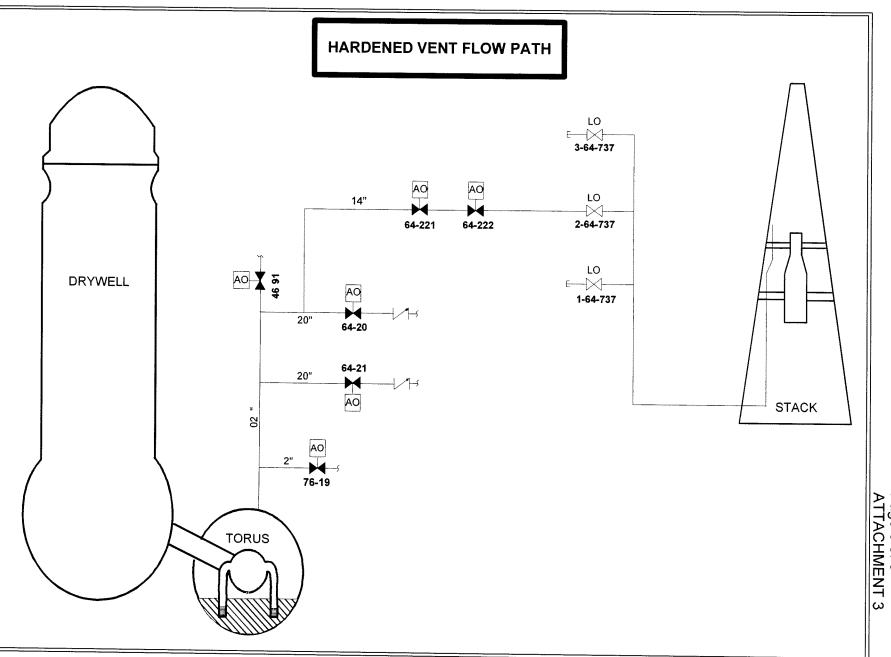


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LAST PAGE



2-EOI APPENDIX-13 Rev. 6 Page 6 of 6 ATTACHMENT 3

• •

JPM NO. 104F REV. NO. 4 PAGE 1 of 19

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER: 104F

TITLE: TIE D/G TO 4kV SHUTDOWN BOARD AT PANEL 9-23

TASK NUMBER: U-082-NO-07

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

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

JPM NO. 104F REV. NO. 4 PAGE 2 of 19

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

#### **REVISION LOG**

Revision	Effective	Pages	Description
Number	Date	Affected	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			

JPM NO. 104F REV. NO. 4 PAGE 3 of 19

BROW	/NS	FER	RY N	UCL	EAR	PLANT	•
JOB	PE	RFOF	AMS	NCE	MEA	SURE	

OPERATOR:				
RO	SRO	D	ATE:	
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 W AS DIRECTED BY 0-0I-83	S NECESSARY <sup>-</sup> ITH OFFSITE PO	TO PARALLI OWER AT PA	EL A
PERFORMANCE	LOCATION: SIMULATO	DR <u>X</u> PLANT		. ROOM
REFERENCES/PR	OCEDURES NEEDED:	0-0I-82, Rev 10	00	
VALIDATION TIME	SIMULATOF	R: <u>15:00</u>		
MAX. TIME ALLOW	VED: (FOR	TIME CRITICA	_ JPMs ONL	Y)
PERFORMANCE 1	ГІМЕ:			
COMMENTS:				
		· · · · · · · · · · · · · · · · · · ·		
ADDITIONAL COM	IMENT SHEETS ATTACHE	D? YI	ES	NO
RESULTS:	SATISFACTORY	_ UNSA	TISFACTOF	(Y
EXAMINER SIGNA	TURE:	D	ATE:	

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

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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 <u>+</u> 50 Kw.

START TI	ME	_	JPM NO. 104 REV. NO. 4 PAGE 5 of 19	
	**************************************	CRITICAL	NOT CRITICAL	
When requ	lested by examiner ide	ntify/obtain copy of requi		
<u>STANDAR</u>	<u>D:</u>			
Identified o	or Obtained copy of 0-C	DI-82.		
SAT	UNSAT	_ N/A CO	MMENTS:	
*****	*****	*****		
			NOT CRITICAL	
PERFORM	IANCE STEP:	CRITICAL		
	IANCE STEP: I with System Operat			
		ion at Panel 9-23		
8.1 Paralle	I with System Operat	ion at Panel 9-23		
8.1 Paralle	I with System Operat VERIFY the followin A. All Precautions a	ion at Panel 9-23	3.0 have been reviewed	d
8.1 Paralle	I with System Operat VERIFY the followin A. All Precautions an B. Diesel Generator	<b>ion at Panel 9-23</b> og initial conditions: nd Limitations in Section	3.0 have been reviewed accordance with Sectio	d n 5.0
8.1 Paralle	I with System Operat VERIFY the followin A. All Precautions an B. Diesel Generator C. 4-kV Shutdown B power source D. Diesel Generator	tion at Panel 9-23 ig initial conditions: nd Limitations in Section A(B,C,D) is operating in	3.0 have been reviewed accordance with Sectio supplied power from an o 3, and 3-1 at Diesel Gen	d n 5.0 offsite
8.1 Paralle [1]	I with System Operat VERIFY the followin A. All Precautions an B. Diesel Generator C. 4-kV Shutdown B power source D. Diesel Generator Protective Relay	tion at Panel 9-23 og initial conditions: nd Limitations in Section A(B,C,D) is operating in Board A(B,C,D) is being s	3.0 have been reviewed accordance with Sectio supplied power from an o 3, and 3-1 at Diesel Gen	d n 5.0 offsite
8.1 Paralle [1] <u>STANDARI</u> REVIEWEI	I with System Operat VERIFY the followin A. All Precautions an B. Diesel Generator C. 4-kV Shutdown B power source D. Diesel Generator Protective Relay D: O Precautions and Limi on START switch. VEF ed light illuminated on t	tion at Panel 9-23 og initial conditions: nd Limitations in Section A(B,C,D) is operating in Board A(B,C,D) is being s	3.0 have been reviewed accordance with Sectio supplied power from an o 3, and 3-1 at Diesel Gen of each other	d n 5.0 offsite erator light Board



JPM NO. 104F REV. NO. 4 PAGE 6 of 19

### CAUTION

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

PERFORMANCE STEP:

CRITICAL X NOT CRITICAL

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

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 SYNC switch in the ON position

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

	***************************************			
PERFURM	IANCE STEP:	CRITICAL	NO <sup>-</sup>	I CRITICAL
[3]	<b>CHECK</b> that 4-kV VOLTs and 4400 transients	/ Shutdown Board A( VOLTs and <b>NOT</b> und	B,C,D) voltage i dergoing abnorr	s between 395 nal voltage
<u>STANDARI</u>	<u>D:</u>			
Verified 4k	V Shutdown Bd A vo	oltage 3950-4400 vol	s and stable	
SAT	UNSAT	N/A	COMMENTS	•
SAT	UNSAT	N/A	COMMENTS	•
SAT	UNSAT	N/A	COMMENTS	•
SAT	UNSAT	N/A	COMMENTS	•
****		****	*****	*******
PERFORM	ANCE STEP:	CRITICAL	**************************************	T CRITICAL _
*****	ANCE STEP: CHECK SYSTEM	****	NO⁻ Y is between 59	T CRITICAL _
PERFORM [4]	ANCE STEP: CHECK SYSTEM and NOT undergo	CRITICAL 1 SYNC FREQUENC	NO⁻ Y is between 59	T CRITICAL _
PERFORM [4] STANDARI	ANCE STEP: CHECK SYSTEM and NOT undergo	CRITICAL SYNC FREQUENC bing abnormal freque	Y is between 59	T CRITICAL _
PERFORM [4] STANDARI	ANCE STEP: CHECK SYSTEM and NOT undergo	CRITICAL 1 SYNC FREQUENC	Y is between 59	T CRITICAL _
PERFORM [4] STANDARI	ANCE STEP: CHECK SYSTEM and NOT undergo	CRITICAL 1 SYNC FREQUENC bing abnormal freque	Y is between 59 ncy transients	T CRITICAL _
PERFORM [4] STANDARI	ANCE STEP: CHECK SYSTEM and NOT undergo D: stem Sync Frequence	CRITICAL 1 SYNC FREQUENC bing abnormal freque	Y is between 59 ncy transients	F CRITICAL _

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



**JPM NO. 104F** REV. NO. 4 **PAGE 8 of 19** 

PERFORMANCE STEP:

CRITICAL

\_\_\_\_\_ NOT CRITICAL X

- IF 4-kV Shutdown Board A(B,C,D) is experiencing abnormal [5] 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

STANDARD:

N/A – System is stable at this time

SAT

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

#### CAUTION

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



**JPM NO. 104F** REV. NO. 4 PAGE 9 of 19

PERFORMANCE STEP:

CRITICAL X\_ NOT CRITICAL \_\_\_\_\_

PULL and PLACE the associated Diesel Generator mode selector switch [6] 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

STANDARD:

Pulled Up on 0-HS-82-A/5A and Placed in Parallel With System

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. 10 <sup>2</sup> REV. NO. 4 PAGE 10 of 2	
******	*****	*****	****	********	*****
PERFORMAN	NCE STEP:	CRITI	CAL	NOT CRITICAL	<u> </u>
		esel Generator m ITH SYSTEM ligh		switch and OBSER	VE
STANDARD:					
Released the light illuminate		Selector switch a	nd Verified RE	D Parallel with Sys	stem
SAT	UNSAT	N/A	COMMI	ENTS:	
	······				
*****	*****	******	*****	******	******
PERFORMAN	NCE STEP:	CRITIC	CAL X	NOT CRITICAL	
[8]	ADJUST Diesel (	Generator frequen	icy using the a	associated Diesel	

[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	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:
-----	-------	-------	-----------



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

PERFORMANCE STEP:

- CRITICAL X NOT CRITICAL \_\_\_\_\_
- [9] USE the associated Diesel Generator voltage regulator control switch to match Diesel Generator and System voltages

Diesel	Instrument Name	Instrument	Panel
A	DG A VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	<u>0-HS-82-A/2A</u> <u>0-EI-82-AB</u> <u>0-EI-211-AB</u>	0-9-23-7
В	DG B VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	<u>0-HS-82-B/2A</u> <u>0-EI-82-AB</u> <u>0-EI-211-AB</u>	0-9-23-7
С	DG C VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	<u>0-HS-82-C/2A</u> <u>0-EI-82-CD</u> <u>0-EI-211-CD</u>	0-9-23-8
D	DG D VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	<u>0-HS-82-D/2A</u> <u>0-EI-82-CD</u> <u>0-EI-211-CD</u>	0-9-23-8

STANDARD:

Adjusted 0-HS-82-A/2A to match 0-EI-82-AB and 0-EI-211-AB readings

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





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

#### 

PERFORMANCE STEP:

CRITICAL X NOT CRITICAL

[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
A	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	 MMENTS:_	 
w		 		

**JPM NO. 104F** REV. NO. 4 PAGE 13 of 19

PERFORMANCE STEP:

CRITICAL \_\_\_\_\_ NOT CRITICAL X

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

Diesel	Instrument Name	Instrument No.	Panel
A	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



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PERFORMANCE STEP:

CRITICAL X NOT CRITICAL \_\_\_\_\_

[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 DG A VOLT REGULATOR CONT	<u>0-HS-82-A/3A</u> 0-HS-82-A/2A	0-9-23-7
В	DG B GOVERNOR CONTROL DG B VOLT REGULATOR CONT	<u>0-HS-82-B/3A</u> 0-HS-82-B/2A	0-9-23-7
С	DG C GOVERNOR CONTROL DG C VOLT REGULATOR CONT	<u>0-HS-82-C/3A</u> 0-HS-82-C/2A	0-9-23-8
D	DG D GOVERNOR CONTROL DG C VOLT REGULATOR CONT	<u>0-HS-82-D/3A</u> 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:		NOT CRITICAL
[13] <b>RECORD</b> time/date	loaded on Illustration 2	
CUE: Another Operator is perfo	orming Illustration 2	
STANDARD:		
Acknowledges another Operator is	s performing Illustration	2 and continues to [14]
SAT UNSAT		
	<u> </u>	
Simulator driver should Insert 0	Grid Instability Now	
Simulator driver should Insert G		
	******	
*****	CRITICAL	XNOT CRITICAL
PERFORMANCE STEP:	CRITICAL	XNOT CRITICAL
<u>PERFORMANCE STEP:</u>	CRITICAL	XNOT CRITICAL
<u>PERFORMANCE STEP:</u>	CRITICAL	XNOT CRITICAL
PERFORMANCE STEP: EXAMINERS NOTE: ALTERNAT [14] MONITOR the offsite STANDARD:	CRITICAL	XNOT CRITICAL E: ed with the Diesel Generator
PERFORMANCE STEP: EXAMINERS NOTE: ALTERNAT [14] MONITOR the offsite	CRITICAL	X NOT CRITICAL E: ed 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:

Operator may Unload D/G First. Then Trips DG output Breaker 1818 and, Pulls up and releases the DG control switch 0-HS-82-A/1A

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

			JPM NO. 104F REV. NO. 4 PAGE 17 of 19
*****	*****	****	*****
PERFORM	ANCE STEP: [15.3] <b>REFER T</b> Diesel Ge	<b>O</b> Section 7.1 and <b>C</b>	ONTINUE with Shutting down the
STANDARD	<u>):</u>		
Refers to se	ection 7.1 of 0-OI-8	2 to continue shutdo	wn of diesel generator
CAT		NI/A	COMMENTS:

CUE: Another Operator will continue with shutting down the Diesel, that completes this task

		JPM NO. 104 REV. NO. 4 PAGE 18 of 1
PERFORMANCE STEP:		NOT CRITICAL
PERFORMER demonstrated the	use of SELF CHECKIN	IG during this JPM
STANDARD:		
PERFORMER verified applicable accordance with plant standards.	• •	g SELF CHECKING in
SAT UNSAT	_ N/A C	OMMENTS:
***************************************		
PERFORMANCE STEP: PERFORMER demonstrated the	_	NOT CRITICAL
	use of 3-WAY COMMU	INICATION during this JF
PERFORMER demonstrated the STANDARD:	use of 3-WAY COMMU	JNICATION during this JF
PERFORMER demonstrated the <u>STANDARD:</u> PERFORMER utilized 3-WAY CC	use of 3-WAY COMMU	JNICATION during this JF
PERFORMER demonstrated the <u>STANDARD:</u> PERFORMER utilized 3-WAY CC	use of 3-WAY COMMU DMMUNICATION in acc _ N/A C 	JNICATION during this JF



#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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.

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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 <u>+</u> 50 Kw.



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**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
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#### **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 attatched 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



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#### 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

#### 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



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#### 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



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#### 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.



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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

- \* Reduced rating applies for engine cooling water outlet temperature exceeding 190°F in conjunction with combustion air (outside air) exceeding 90°F.
- \*\* Reduced rating applies when combustion air (outside air) exceeds 90°F, regardless of engine cooling water outlet temperature.
- 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.



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- 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.

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- 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.
  - 2. A Pre-Accident Signal (Reactor Vessel Low Low Low water level <u>OR</u> High Drywell pressure) on Unit 1, Unit 2 <u>or</u> 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
  - 5. Overspeed
  - 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.)



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- 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.
  - 1. 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. [II/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]



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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.



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- 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.

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#### 8.0 INFREQUENT OPERATIONS

#### 8.1 Parallel with System Operation at Panel 9-23

- [1] **VERIFY** 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



2 i E

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



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#### 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
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

[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.



1.5

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#### 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 А 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
A	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



1 - E

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[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	
A	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-El-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
A	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



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

Diesel	Instrument Name	Instrument No.	Panel
A	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	
A	DG A GOVERNOR CONTROL	0-HS-82-A/3A	0.0007	
A	DG A VOLT REGULATOR CONT	0-HS-82-A/2A	- 0-9-23-7	
В	DG B GOVERNOR CONTROL	0-HS-82 B/3A	0.0.00.7	
D	DG B VOLT REGULATOR CONT	0-HS-82-B/2A	- 0-9-23-7	
С	DG C GOVERNOR CONTROL	0-HS-82-C/3A	0.0.00.0	
0	DG C VOLT REGULATOR CONT	0-HS-82-C/2A	- 0-9-23-8	
D	DG D GOVERNOR CONTROL	0-HS-82-D/3A		
U	DG D VOLT REGULATOR CONT	0-HS-82-D/2A	- 0-9-23-8	

[13] **RECORD** time/date loaded on Illustration 2.

[14] **MONITOR** the offsite source that is paralleled with the Diesel Generator.

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

**PERFORM** the following:

+ F - E

[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
A	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.

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

UNLOAD the Diesel Generator as follows:

#### CAUTION

[II/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	
А	DG A VOLT REGULATOR CONT	0-HS-82-A/2A	
~	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	
В	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	
C	DG C KILOWATTS	0-JI-82-C/A	0-9-23-8
	DG C KILOVARS	0-VAR-82-C/A	
	DG D GOVERNOR CONTROL	0-HS-82-D/3A	
D	DG D VOLT REGULATOR CONT	0-HS-82-D/2A	
U	DG D KILOWATTS	0-JI-82-D/A	0-9-23-8
	DG D KILOVARS	0-VAR-82-D/A	

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

Diesel	Handswitch Name	Handswitch No.	Panel
A	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 А 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] **RELEASE** the Diesel Generator mode selector switch 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

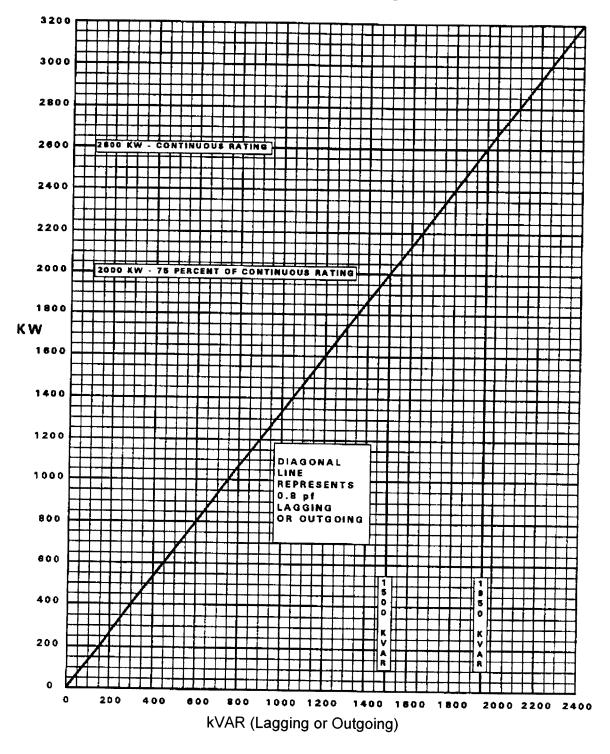
Continuous operation of Diesel Generators at loads below 550 kW should be avoided to prevent oil and soot accumulation in exhaust system, air box, cylinders, and injection nozzles.

- [17] **IF** operation of the Diesel Generator is no longer required, **THEN** 
  - **REFER TO** Section 7.0 and **SHUT DOWN** the Diesel Generator.



#### Illustration 1 (Page 1 of 1)

## DG kW vs. kVAR Loading





	BFN Unit 0	Standby Diesel Generator System			F	-Ol-82 lev. 0 <sup>.</sup> age 1	100	178				
				Illust (Page								
		D	iesel Ge	enerat	or Op	erating	Log					
0	Date							Diesel	Genera	itor		
L	og all manipulations of	Diesel Generat	or LOGIC	BREAK	ER in th	ne Narrativo	e Log.					
S	STARTS/LOAD RUNS						(	OUT OF	SERVIC	E TIME		
F	Reason for Start:			Time/Date Removed from Service: /				1				
(	Test, Auto Start)				Reason Taken Out of Service:							
3	Slow Starts/Load Runs	1							·			
3	Fast Starts/Load Runs	1		Time/Date Returned to Service: /								
т	"ime/Date Started:	1		Comments/Explanation of Failures:								
Т	ime/Date Loaded:	1		-								
т	ime/Date Unloaded:	/										
	ime/Date Stopped:	1										
E	Operations send Facsimile SR AND send to the Diesel Board depending on D/G co ated speed and once even	GeneratorSyst ontrol location.	em Engine Readings a	er. UO l are initia	Reading ted once	js are taken e everv 15 r	from I ninute:	Panel 9- s durina	23 or ap the first	oplicabl t hour o	e Shuto	lown
	TIME											
(!	Generator Frequency 59 - 61 HERTZ) <sup>1</sup>											
	Generator Voltage⁵ 3950 - 4400 VOLTs)											
(!	Generator Watts <sup>2,4</sup> 550 - 2850 kW)											+
G	Generator VARs <sup>2,4</sup> 400 - 2100 kVAR)						1		-			1
	enerator amps (less than 95 amps)						1		1	1		

1 Only indicated if one of the associated 4kV shutdown board feeder breaker synchroscope switches is in ON. The synchroscope switch should only be placed in ON long enough to obtain a reading, and then placed back in OFF.

2 The lower limit specified for Generator Watts and the limits specified for Generator VARs do not apply when the Diesel Generator is the only source of power to the shutdown board.

3 Number of each type of start/number of times load was applied either automatically or manually after each type of start.

4 The upper limits specified for generator Watts and VARs shall be 2805 kW/2100 kVAR for the first two hours and 2550KW/1913 kVar for the remaining 22 hours of the DG 24 hour run surveillance.

5 This voltage is based on the Diesel Generator being loaded. For a Diesel Generator which is running unloaded the voltage should be 4250 to 4400 volts.

	Name (Print)	Initials	Name (Print)	Initials
Performed by:				

Review by the US signifies copy of Illustration 2 has been FAX'd to ICE FAX @ 8164 and **AND** the original Illustration 2 has been attached to the SR if the D/G was run to support an SR. Otherwise, place the original in the STA box for delivery to the Diesel Generator System Engineer.



INITIALS

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Reviewed by:

BFN Unit	-	Standby Diesel Generator System				em	0-OI-82 Rev. 0100 Page 178 of 178			
				Illustrat (Page 2						
		Die	sel Ge	enerator	Operat	ing Lo	og			
Date	Diesel G	enerator	EL	APSED T	IME INDI	CATOF	R Initial		Fin	al
CHECK Lube Oil turbocharger oil po BEARING LUBE ( Log all manipu	ressure is betwe DIL PRESS IND	en 10-35 psig as R, 0-PI-082-1000	indicated	on DG-D TL	RBOCHAF	RGER CO	MP			
Readings are ta Operating Read once every 30 n specified range,	ken locally in I ings (885-915 hinutes thereat	DG Room. Idle rpm) are initiat fter. Enter the and action tak	Reading ed once o actual tim en in RE	is (440-460 every 15 m ne that each MARKS.	rpm) are nutes duri	recordeo na the fi	I within 10 n	peration	at rated	speed a
TIME		440-460 rpm	900 RF	PM						
RPM (885-915)		2 1 1 1 1		<u> </u>						
PRIMING FUEL PRE (20-56 psig)	SS DG A-D					-				
NORMAL FUEL PRE (20-56 psig)	ESS DG A-D									
MAIN BEARINGS LU (45-125 psig) (note 3										
(DG D ONLY) TURE COMP BEARING LU (45-125 psig) (note 3	BE OIL PRESS									
LUBE OIL FILTER IN (8-40 psig) (note 4)										
ENGINE CLG WTR ( (100-190°F)										
LO CLR CLG WTR ( (100-190°F)										
LO CLR LUBE OIL C (100-190°F)										
Engine Lube Oil Leve (note 1) Governor Fuel Rack										
(.62 - 1.96)						-			-	
Governor Oil Level /		The South								
Governor Oil Level-(I visible in the sightgla FUEL TANK LEVEL		MERO, TLA ED S					1	1		1
visible in the sightgla	GAUGE									
visible in the sightgla FUEL TANK LEVEL (260-500 gallons) EXPANSION TANK LEVEL (RUNNING L	GAUGE WATER OW-RUNNING									

\* 1 \$

2 Notify Unit Supervisor if 7 day tank fuel oil level iso  $\leq 83\%$ . Tech Spec LCO is required when fuel oil level is less than 81%.

3 Idle Speed value for Main Bearing Lube Oil Pressure is > 20 psig obtained at a minimum of 30 seconds following engine start.

Idle Speed value for Lube Oil Filter Inlet Pressure is > 3 psig obtained at a minimum of 3 minutes following engine start.

Remarks:

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

## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER: 390F

1.

TITLE: RESPOND TO OFF-GAS POST-TREATMENT RADIATION HI-HI-HI

TASK NUMBER: U-066-AB-02

SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:		DATE:
	TRAINING	
PLANT CONCURRE		DATE:
	OPERATIONS	
* Examination JPM Plant Concurrence	ls Require Operations Training Manager Appro	val or Designee Approval and

JPM NO. 390F REV. NO. 1 PAGE 2 of 14

## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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## **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
L			

JPM NO. 390F REV. NO. 1 PAGE 3 of 14

## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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OPERATOR:				
RO	SRO		DATE:	
JPM NUMBER:	390F			
TASK NUMBER:	U-066-AB-02			
TASK TITLE:	RESPOND TO OFF- HI-HI-HI	GAS POST-TR	REATMENT RADI	ATION
K/A NUMBER:	271000A2.04	(/A RATING:	RO <u>3.7</u>	SRO <u>4.1</u>
	: RESPOND TO OFF-( HI-HI-HI PER 3-ARP-	GAS POST-TRI	EATMENT RADIA	
PERFORMANCE I	LOCATION:		SIMULA	
REFERENCES/PR	OCEDURES NEEDED		-4C/35, Rev 29, -2 Rev 10	
VALIDATION TIME	SIMULA	ATOR: 15:00	DLOCAL:	
MAX. TIME ALLOW	/ED:(	FOR TIME CR	ITICAL JPMs ON	LY)
PERFORMANCE T	IME:			
COMMENTS:				
ADDITIONAL COM	MENT SHEETS ATTA	CHED?	YES	NO
RESULTS:	SATISFACTORY _		UNSATISFACTO	RY
EXAMINER SIGNA	TURE:		DATE:	. <u></u>

JPM NO. 390F REV. NO. 1 PAGE 4 of 14

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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."

				JPM NO. 390 REV. NO. 1 PAGE 5 of 14	
START TI	ME				
	<u>MANCE STEP:</u>			NOT CRITICAL	
1. When re	equested by examin	er identify/obtain	copy of rec	quired procedure.	
<u>STANDAR</u>	<u>:D:</u>				
Obtained o	copy of 3-ARP-9-4C	window 35 and/o	or 3-AOI-66	9-2.	
SAT	UNSAT	N/A	_ COI	MMENTS:	
		<b></b>			
Examiner performar (Page 7)	Note: If candidate nce steps 2 & 3 and	goes directly to continues at p	3-AOI-66- erformance	-2, Skip the following e step 4. [4.1 of 3-AOI-	-66-2]

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

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PERFORMANCE STEP:

CRITICAL \_\_\_\_\_ NOT CRITICAL \_\_ X

- 2. 3-ARP-9-4C window 35
  - A. **VERIFY** alarm condition on the following
    - OFFGAS POST-TREATMENT RADIATION recorder, 3-RR-90-265 on Panel 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.

## STANDARD:

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 alarm condition on 3-RR-90-265 and 3-RM-90-265 & 266.

SAT	UNSA	T N/A	COMMENTS:	
-----	------	-------	-----------	--

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:
Refers to 3-AOI-66-2.
SAT UNSAT N/A COMMENTS:
PERFORMANCE STEP:       CRITICAL X NOT CRITICAL
4. 4.1 Immediate Actions
[1] IF scram has NOT occurred, THEN
PERFORM the following:
[1.1] <b>IF</b> core flow is above 60%, <b>THEN</b>
<b>REDUCE</b> core flow to 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 UNSAT N/A COMMENTS:

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******	*****	*****	****	*****	JPM NO. 390F REV. NO. 1 PAGE 8 of 14
PERF	ORMAN	ICE STEP:	CRITICAL	X_	NOT CRITICAL
5.	[1.2]	MANUALLY S	CRAM the Reactor. RE	EFER T	<b>O</b> 3-AOI-100-1.
STAN	IDARD:				
	ally Scra IOT CRIT		tor and referred to 3-AC	) -100-1	. (Referring to 3-AOI-10
SAT		UNSAT	N/A	СОММ	ENTS:
			crammed the reactor n the actions of scran		en the scram report,] dure, continue in your
	nt proce				ano, commo m you
					*****
PERF	ORMAN	<u>CE STEP:</u>	CRITICAL		NOT CRITICAL X
6.	4.2 S	Subsequent Act	iona		
		Subsequent Act	ions		
	[1]	IF OFFGAS S			-FCV-066-0028 has bee nditions, <b>THEN</b>
		IF OFFGAS S mechanically r	SYSTEM ISOLATION V restrained open due to p 3-FCV-066-0028 mechand ndwheel fully in the cou	plant co anical re	nditions, <b>THEN</b> estraint by rotating the
CUE:	[1]	IF OFFGAS S mechanically r DISENGAGE restraining har the stack (othe	SYSTEM ISOLATION V restrained open due to p 3-FCV-066-0028 mechand ndwheel fully in the cou	plant co anical re ntercloc	nditions, <b>THEN</b> estraint by rotating the kwise direction, locally a
	[1]	IF OFFGAS S mechanically r DISENGAGE restraining har the stack (othe	SYSTEM ISOLATION V/ restrained open due to p 3-FCV-066-0028 mech ndwheel fully in the cour erwise)	plant co anical re ntercloc	nditions, <b>THEN</b> estraint by rotating the kwise direction, locally a
STAN	[1] If asked DARD:	IF OFFGAS S mechanically r DISENGAGE restraining har the stack (othe	SYSTEM ISOLATION V/ restrained open due to p 3-FCV-066-0028 mechandwheel fully in the course erwise)	plant co anical re ntercloc	nditions, <b>THEN</b> estraint by rotating the kwise direction, locally a d
<u>STAN</u> Dispat	[1] <b>If asked</b> DARD: tches AU	IF OFFGAS S mechanically r DISENGAGE restraining har the stack (othe 1, 3-FCV-66-28 is	SYSTEM ISOLATION V/ restrained open due to p 3-FCV-066-0028 mech ndwheel fully in the course erwise) <b>s Not mechanically re</b>	plant co anical re ntercloc strained	nditions, <b>THEN</b> estraint by rotating the kwise direction, locally a <b>d</b> tinues to the next step.
<u>STAN</u> Dispat	[1] <b>If asked</b> DARD: tches AU	IF OFFGAS S mechanically r DISENGAGE restraining har the stack (othe 1, 3-FCV-66-28 is	SYSTEM ISOLATION V/ restrained open due to p 3-FCV-066-0028 mech ndwheel fully in the course erwise) <b>s Not mechanically re</b>	plant co anical re ntercloc strained	nditions, <b>THEN</b> estraint by rotating the kwise direction, locally a d

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		ANCE STEP:			NOT CRITICAL	
CV		S NOTE: ALTER	NATE PATH START	5 HERE:		Le 12
7.	[2]		ED OFFGAS SYSTE n Panel 3-9-53 or loca		N VALVE,	
<u>STA</u>		<u>):</u>				
3-9-	4C W35	5 "Automatic Act	ve been previously tions." OPDP-1 allov ed. See page 5 perfo	vs actions to	be taken that s	
TRE		NT HI-HI-HI radiat	/-66-28 failed to auto ion. Performer places amp illuminated abov	3-HS-66-28	in close on Pane	
TRE ( <b>Cri</b>	EATMEN <b>tical</b> ) ar	NT HI-HI-HI radiat nd verifies green I	ion. Performer places	3-HS-66-28 e HS ( <b>Not Cr</b>	in close on Pane	l 3-9
TRE ( <b>Cri</b>	EATMEN <b>tical</b> ) ar	NT HI-HI-HI radiat nd verifies green I	ion. Performer places amp illuminated abov	3-HS-66-28 e HS ( <b>Not Cr</b>	in close on Pane <b>itical</b> ).	l 3-9
TRE (Cri SAT	EATMEN tical) ar	NT HI-HI-HI radiat nd verifies green I UNSAT	ion. Performer places amp illuminated abov N/A	3-HS-66-28 e HS ( <b>Not Cr</b> COMMEI	in close on Pane <b>'itical</b> ). NTS:	·I 3-9
TRE ( <b>Cri</b> SAT 	EATMEN tical) ar	NT HI-HI-HI radiat nd verifies green l UNSAT 	ion. Performer places amp illuminated abov N/A	3-HS-66-28 e HS ( <b>Not Cr</b> COMMEI	in close on Pane itical). NTS:	·I 3-9
TRE ( <b>Cri</b> SAT  <u>PEF</u> 8.	EATMEN tical) ar	ANCE STEP: MONITOR area	ion. Performer places amp illuminated abov N/A ********************************	3-HS-66-28 e HS ( <b>Not Cr</b> COMMEI	in close on Pane itical). NTS:	·I 3-9
TRE ( <b>Cri</b> SAT  <u>PEF</u> 8. <u>STA</u>	EATMEN tical) ar - - - RFORM/ [3] .NDARE	ANCE STEP: MONITOR area	ion. Performer places amp illuminated abov N/A CRITICA	3-HS-66-28 e HS ( <b>Not Cr</b> COMMEI	in close on Pane itical). NTS:	·I 3-9

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					JPM NO. 39 REV. NO. PAGE 10 of	1
*****	******	*****	****	****	PAGE 10 01	
PERI	FORMA	NCE STEP:	CRIT		_ NOT CRITICAL	X
8.	[4]	REFER TO EPIP	P-1 for emergenc	y classificatio	on level and response	e.
CUE	: The S	Shift Manager is i	mplementing El	PIP-1 Classi	fication.	
STAN	NDARD	<u>:</u>				
Conti	inues to	the next step.				
SAT		_ UNSAT	N/A	СОМ	MENTS:	
	······	waxaa gaaaaa ahaa ahaa ahaa ahaa ahaa aha				

JPM NO. 390F REV. NO. 1 PAGE 11 of 14

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PERFORMANCE STEP: CRITICAL NOT CRITICAL

- 9. [5] **MONITOR** 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, 0-RR-90-147, on Panel 1-9-2.

CUE: [When Candidate calls Unit 1 Operator for a reading on 0-RR-90-147, Report] STACK GAS RADIATION, 0-RR-90-147 IS READING...... 6 x 10<sup>6</sup> cps.

#### STANDARD:

Monitors 3-RR-90-135, 157, 265, on Unit 3 Panel 3-9-2 and called Unit 1 Operator for a reading on 0-RR-90-147, Unit 1 Panel 1-9-2.

SAT	UNSAT	N/A	COMMENTS:

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

PERFORMANCE STEP:

CRITICAL X NOT CRITICAL

10. [6] **IF** after five minutes from scram the Offgas Post Treatment activity is **NOT** less than  $6 \times 10^5$  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

## CUE: The Unit has been scrammed for 5 minutes.

#### STANDARD:

Recognized that the OFF-GAS POST TREATMENT activity is >  $6 \times 10^5$  cps and **CLOSES** ALL Main Steam Isolation Valves (Critical) and Main Steam Line Drain Valves, 3-FCV-1-55 and 56. (Not Critical)

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

CUE: That completes this task.

		END OF TASK		
SAT	UNSAT	N/A Co	OMMENTS:	
<u>STANDARD:</u> PERFORMER	t utilized 3-WAY C	OMMUNICATION in acc	cordance with plant stanc	larc
12. PERFOR JPM	RMER demonstrat	ed the use of 3-WAY CO	OMMUNICATION during	this
PERFORMAN			NOT CRITICAL	
SAT	UNSAT	N/A C	OMMENTS:	
PERFORMER accordance w	R verified applicabl ith plant standards	e components by utilizin s.	IG SELF CHECKING in	
<u>STANDARD:</u>				
11. PERFOR	MER demonstrate	ed the use of SELF CHE	CKING during this JPM	
PERFORMAN	NCE STEP:	CRITICAL _	NOT CRITICAL	
*****	******	******	PAGE 13 of	



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#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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 Rev. 002 Page 45	29
	OG POST RAD MON HI HI HI/I 3-RA-90- SOLID MAGEN (Page 1	IITOR NOP 265C TA 35	<u>Sensor/Trip Point</u> : 3-RM-90-265A 3-RM-90-266A	6.2 x 10⁵ CPS 6.2 x 10⁵ CPS	
	Sensor Location:	3-RE-090-( 3-RE-090-(		Panel 3-25-94 Off Elevation 538.5	-Gas Building,
	Cause: B. Fuel da		rap failure (RWCU or C amage.	ondensate demins).	
			SYSTEM ISOLATION V	ALVE 3-FCV-66-28 closes	after a 5 second time
•	Operator Action:	<ul> <li>OFf 3-R</li> <li>OG mor</li> <li>OG</li> </ul>	R-90-265 on Panel 3-9- POST-TREATMENT C nitor, 3-RM-90-266A on	ENT RADIATION recorder, -2 HAN A RAD MON RTMR r Panel 3-9-10 HAN B RAD MON RTMR r	
		B. REFER	R <b>TO</b> 3-AOI-66-2.		
	References:	3-45E620-4 FSAR Sect 3-SIMI-90B	ions 1.6.4.4.6, 7.12.2.2,	0-47E610-90-2 , 7.12.2.3, 7.12.3.3, 9.5.4, a	GE 3-729E814-6 and 13.6.2





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

## **Current Revision Description**

Type of onlinge. Deolon on Anoe	Type of Change:	DESIGN CHANGE
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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.



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BFN	Offgas Post Treatment	3-AOI-66-2	
Unit 3	Radiation Hi Hi Hi	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  $10^5$  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 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.

	BFN Unit 3		Offgas Post Treatment Radiation Hi Hi Hi	3-AOI-66-2 Rev. 0010 Page 6 of 9	
4.0	OPE	RATO	DR ACTIONS		
4.1	lmm	ediat	e Actions		
	[1]	IF s	scram has NOT occurred, THEN		
		PEI	RFORM the following:		
	[1	1.1]	IF core flow is above 60%, THEN		
			REDUCE core flow to between 50-609	%.	
	[1	1.2]	MANUALLY SCRAM the Reactor. RI 3-AOI-100-1.	EFER TO	
4.2	Subs	seque	ent Actions		
	[1]	has	DFFGAS SYSTEM ISOLATION VALVE, been mechanically restrained open due ditions, <b>THEN</b>		
		rota	<b>ENGAGE</b> 3-FCV-066-0028 mechanical in ting the restraining handwheel fully in the ection, locally at the stack (otherwise).		
	[2]		RIFY CLOSED OFFGAS SYSTEM ISOL/ CV-66-28 on Panel 3-9-53 or locally.	ATION VALVE,	
	[3]	MO	NITOR area radiation levels at Panel 3-9	-11.	
	[4]		FER TO EPIP-1 for emergency classification ponse.	tion level and	
	[5]	MO	NITOR the following parameters:		
		A.	MAIN STEAM LINE RADIATION, 3-RR- Panel 3-9-2	-90-135,	
		Β.	OFFGAS PRETREATMENT RADIATIO Panel 3-9-2	N, 3-RR-90-157,	
		C.	OFFGAS POST-TREATMENT RADIAT 3-RR-90-265, Panel 3-9-2	ION,	
		D.	STACK GAS RADIATION/CONT RM R/ 0-RR-90-147, on Panel 1-9-2.	ADIATION,	

BFN	Offgas Post Treatment	3-AOI-66-2
Unit 3	Radiation Hi Hi Hi	Rev. 0010
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# 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]	<b>PLACE</b> 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]	<b>REQUEST</b> Chemistry sample reactor water for radioactivity.	



#### 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	Offgas Post Treatment	3-AOI-66-2
Unit 3	Radiation Hi Hi Hi	Rev. 0010
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# 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



	TVA	TITLE Conduct of Operations	OPDP-1 Rev. 0012 Page 1 of 65
	NPG Standard Department Procedure		Quality Related   ☑ Yes   □ No
			Effective Date 02-02-2009
9			
-	Responsible Peer Tea	am/Working Group: Operations	
	Approved by:	O. J. Miller Corporate Functional Manager	2-2-09 Date

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# 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.



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## 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:
  - 1. 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 than10 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.

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# 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.



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# BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER: 346 TITLE: PLACING STANDBY STEAM JET AIR EJECTOR IN OPERATION TASK NUMBER: U-066-NO-07

Completed copy of Appendix A required to be given to Candidate (Last page of JPM)

SUBMITTED BY:		DATE:
VALIDATED BY:		DATE:
APPROVED BY:	TRAINING	DATE:
	TRAINING	
PLANT CONCURRENC	E:	DATE:
	OPERATIONS	

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

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# BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

# **REVISION LOG**

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

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# BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

OPERATOR:		
RO	SRO DATE:	, 
JPM NUMBER:	346	
TASK NUMBER:	U-066-NO-07	
TASK TITLE:	PLACING STANDBY STEAM JET AIR EJECTOR	R IN OPERATION
K/A NUMBER:	239001A2.08 K/A RATING: RO <u>3.6</u>	SRO <u>3.6</u>
	PERFORM CONTROL ROOM MANIPULATIONS PLACE THE STANDBY STEAM JET AIR EJECT OPERATION DURING POWER OPERATION	REQUIRED TO
PERFORMANCE	LOCATION: SIMULATOR X PLANT CON	TROL ROOM
REFERENCES/PR	ROCEDURES NEEDED: 3-OI-66, Rev 57	
VALIDATION TIME	E: SIMULATOR: <u>10:00</u> LOO	CAL:
MAX. TIME ALLOW	NED: (FOR TIME CRITICAL JPMs	ONLY)
PERFORMANCE T	ГІМЕ:	
COMMENTS:		
ADDITIONAL COM	IMENT SHEETS ATTACHED? YES	NO
RESULTS:	SATISFACTORY UNSATISFAC	CTORY
EXAMINER SIGNA	TURE:DATE:	

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# BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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: Yo

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.

START TIME		JPM NO. 3 REV. NO. PAGE 5 of
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL
When requested by examiner	identify/obtain copy of required	d procedure.
STANDARD:		
Obtained copy of 3-OI-66.		
SAT UNSAT	N/A COMN	/IENTS:
	NOTES	
1) Panel 25-105 located in Uni	NOTES it 3 Turbine Bldg. El 586' T12-C	).
2) The HWC System is shutdo receipt of the automatic trip		g of SJAEs to prev
2) The HWC System is shutdo receipt of the automatic trip DISCHARGE VALVES 3-Fe	it 3 Turbine Bldg. El 586' T12-C own prior to intentional swappin o of the HWC System that occu CV-66-14 and 18 are closed.	g of SJAEs to prev rs when both SJAE
2) The HWC System is shutdo receipt of the automatic trip DISCHARGE VALVES 3-F	it 3 Turbine Bldg. El 586' T12-C own prior to intentional swappin o of the HWC System that occu CV-66-14 and 18 are closed.	g of SJAEs to prev rs when both SJAE
2) The HWC System is shutdo receipt of the automatic trip DISCHARGE VALVES 3-Fe	it 3 Turbine Bldg. El 586' T12-C own prior to intentional swappin o of the HWC System that occu CV-66-14 and 18 are closed. CRITICAL	g of SJAEs to prev rs when both SJAE
<ul> <li>2) The HWC System is shutdo receipt of the automatic trip DISCHARGE VALVES 3-Ferror PERFORMANCE STEP:</li> <li>8.4 Placing Standby SJAE</li> </ul>	it 3 Turbine Bldg. El 586' T12-C own prior to intentional swappin o of the HWC System that occu CV-66-14 and 18 are closed. CRITICAL	g of SJAEs to prev rs when both SJAE
<ul> <li>2) The HWC System is shutdo receipt of the automatic trip DISCHARGE VALVES 3-Ferror PERFORMANCE STEP:</li> <li>8.4 Placing Standby SJAE</li> </ul>	it 3 Turbine Bldg. El 586' T12-C own prior to intentional swappin o of the HWC System that occu <u>CV-66-14 and 18 are closed.</u> CRITICAL	g of SJAEs to prev rs when both SJAE
<ul> <li>2) The HWC System is shutdo receipt of the automatic trip DISCHARGE VALVES 3-F</li> <li>PERFORMANCE STEP:</li> <li>8.4 Placing Standby SJAE</li> <li>[1] REVIEW all Preceipt</li> </ul>	it 3 Turbine Bldg. El 586' T12-C own prior to intentional swappin o of the HWC System that occu <u>CV-66-14 and 18 are closed.</u> CRITICAL	g of SJAEs to prev rs when both SJAE
<ul> <li>2) The HWC System is shutdo receipt of the automatic trip DISCHARGE VALVES 3-F0</li> <li>PERFORMANCE STEP:</li> <li>8.4 Placing Standby SJAE <ul> <li>[1] REVIEW all Precess</li> </ul> </li> <li>STANDARD:</li> <li>Reviews section 3.0.</li> </ul>	it 3 Turbine Bldg. El 586' T12-C own prior to intentional swappin o of the HWC System that occu <u>CV-66-14 and 18 are closed.</u> CRITICAL	g of SJAEs to prev rs when both SJAE



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			PAGE 6 of 22					
**********	******	******	******					
PERFORM	ANCE STEP:	CRITICAL	NOT CRITICAL X					
[2]	IF determined necessary by Unit Supervisor, THEN (Otherwise N/A)							
	<b>NOTIFY</b> Radiation Protection that an RPHP exists for the impending action to place the standby SJAE (3A or 3B) in service. <b>RECORD</b> time Radiation Protection notified in the NOMS Narrative Log. [BFN PER 126211]							
			Ires recorded on Appendix A ctions [Tech Spec 5.7, SOER 01-1,					
CUE: Give	copy of completed App	endix A to Candida	te. (Last page of JPM)					
STANDARE	<u>):</u>							
Candidate a	acknowledges that a RPHF	P (Appendix A) has I	peen completed.					
SAT	UNSAT N	Ά CΟ	MMENTS:					

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PERFORM			******			NOT CRITICAL	
[3]	VEF	<b>RIFY</b> the follov	ving initia	I conditions	have be	een met:	
	A.			n service, <b>T</b> System. (F		therwise NA) ΓΟ 3-ΟΙ-4)	
	В.	SJAEs are	in operat	tion. (REFE	R TO S	ection 5.9).	
STANDAR	<u>D:</u>						
	a in tha	initial conditiv	200				
N/A - aiver	т пт пте						
· ·		JNSAT			СОМ	MENTS:	
SAT	(	JNSAT	N/A	******	******	****	****
SAT		JNSAT	N/A	CRITICAL		NOT CRITICAL	*****
SAT		JNSAT	N/A	CRITICAL		NOT CRITICAL	*****
SAT		JNSAT STEP: RIFY OPEN the	N/A	CRITICAL	 Panel 3	NOT CRITICAL	******
SAT	ANCE	JNSAT STEP: RIFY OPEN the SJAE 3B(3,	N/A	CRITICAL g valves at	Panel 3 LVE, usi	-9-6:	******
SAT PERFORM [4]	( I <u>ANCE</u> VER A. B.	JNSAT STEP: RIFY OPEN the SJAE 3B(3,	N/A	CRITICAL g valves at	Panel 3 LVE, usi	-9-6: ng 3-HS-2-31A(36A)	******
PERFORM [4] STANDARI At Panel 3-	( IANCE VER A. B. <u>D:</u> 9-6, Ve	JNSAT STEP: SJAE 3B(3, SJAE 3B(3,	N/A e followin A) CNDS A) CNDS	CRITICAL Ig valves at INLET VA	Panel 3 LVE, usi /ALVE, t	-9-6: ng 3-HS-2-31A(36A)	******



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PERFORMANCE STEP:

CRITICAL \_\_\_\_\_ NOT CRITICAL \_\_X

[5] **VERIFY** CONDENSATE FROM SJAE B(A) pressure, 3-PI-2-34(40), is greater than 60 psig at Panel 25-105,

# CUE: [When contacted] 3-PI-2-34, Condensate from SJAE B, indicates 90 psig.

# STANDARD:

Called Outside US to determine reading from 3-PI-2-34, CONDENSATE FROM SJAE B, Panel 25-105.

SAT	UNSAT	N/A	COMMENTS:	
-----	-------	-----	-----------	--

PERFORM	ERFORMANCE STEP:		CRITICAL	NOT CRITICAL _				
[6]	VEF setp	RIFY manual/hand points at Panel 25-	loader output pressur 105, are adjusted as fo	e and pressure controlle pllows:	r			
	A.			TAGE I & II, 3-PC-1-152 cated inside controller	(1			
	В.		lanual/Hand loader for STEAM TO SJAE B(A) STAGE I & II, -PC-1-152(150) set for approximately 14 psig.					
	C.			TAGE III, 3-PC-1-167(16 cated inside controller	6) (6)			
	D.	<ul> <li>D. Manual/hand loader for STEAM TO SJAE B(A) STAGE III,</li> <li>3-PC-1-167(166), set for approximately 12 psig.</li> </ul>						
is set for 2	225 psi	g. (inside control	t for steam to SJAE E ller housing). tage I and II is set at	3 stages I and II, 3-PC-1 14 psig.	1-1			
is set for 2 Manual ha Setpoint fo	225 psi and loa or stea	g. (inside control der for SJAE B si m to SJAE B, sta	ller housing). tage I and II is set at					
is set for 2 Manual ha Setpoint fo controller	225 psi and loa or stea housir	g. (inside control der for SJAE B si m to SJAE B, sta ng).	ller housing). tage I and II is set at ge III, 3-PC-1-167 is s	14 psig.				

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	* * * * * * * * * * * * * * * * * * * *

PERFORMANCE STEP:

CRITICAL \_\_\_\_\_ NOT CRITICAL \_\_\_\_

- [7] **VERIFY** both SJAE dilution steam pressure modifiers (located at the rear of panel 25-105) are adjusted to approximately mid-position.
  - A. MS SJAE B(A) PRESS MODIFIER, 3-XM-1-152(150).
  - B. MS SJAE B(A) PRESS MODIFIER, 3-XM-1-167(166).

# CUE: [When called] Both SJAE dilution steam pressure modifiers are adjusted to mid-position.

# **STANDARD:**

Directed US to perform/verify both SJAE dilution steam pressure modifiers are in mid-position.

********	******	******	*****	******	*******	**********	******	******
PERFORMANCE STEP:				CRITICAL		NOT CRI	TICAL	<u> </u>
[8]	VER		both SJAE	Inlet Valves	at Panel	3-9-8, using	g the foll	owing
	Α.	SJAE 34	A INLET VAI	LVE, 3-HS-6	6-11.			
	В.	SJAE 3E	B INLET VAI	_VE, 3-HS-6	6-15.			
STANDAR	<u>D:</u>							
Verified 3-I	HS-66-′	11 and 3-H	S-66-15 in tl	he OPEN po	sition.			
SAT	U	NSAT	N/A		СОММ	ENTS:		

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				***************************************
PERFORMANC	E STEP:	CRITICAL	<u> </u>	NOT CRITICAL
[9] <b>PL</b> CL	ACE the STEAM <sup>-</sup> OSE at Panel 3-9-	TO SJAE 3A(3B)   7.	handswitch	n, 3-HS-1-155A(156A), ii
STANDARD:				
Placed 3-HS-1-1	55A in the CLOSE	position.		
SAT	UNSAT	N/A	COMME	NTS:
PERFORMANCI				
	<b>ACE the</b> SJÀE 3A IS-1-150(152), in (			R handswitch,
STANDARD:				
	50 in the CLOSE r	osition		
Placed 2-HS-1-1		0511011.		
Placed 2-HS-1-1			COMME	NTS:



					JPM NC REV. N PAGE 1	O. 0
	**************************************					
[11]	At Panel 3-9-8, 3-HS-66-14(18)		SJAE 3A(3	B) OG O	UTLET VALVE	E using
STANDARD	<u>):</u>					
Placed 3-HS	5-66-14 IN CLOS	E position.				
SAT	UNSAT	N/A		COMM	ENTS:	
			·····			
	ANCE STEP:				NOT CRITIC	
PERFORMA		N/AUTO the	CRITICAL SJAE 3B(3	<u> </u>	NOT CRITIC	CAL
<u>PERFORMA</u> [12]	ANCE STEP: <b>PLACE</b> in OPE 3-HS-66-18(14)	N/AUTO the	CRITICAL SJAE 3B(3	<u> </u>	NOT CRITIC	CAL
PERFORMA [12] STANDARD	ANCE STEP: <b>PLACE</b> in OPE 3-HS-66-18(14)	N/AUTO the at panel 3-9	CRITICAL SJAE 3B(3 -8.	<u> </u>	NOT CRITIC	CAL
PERFORMA [12] STANDARD Placed 3-HS	ANCE STEP: <b>PLACE</b> in OPE 3-HS-66-18(14) <u>9:</u>	N/AUTO the at panel 3-9 EN/AUTO po	CRITICAL SJAE 3B(3 -8. osition.	X A) OG O	NOT CRITIC	CAL



	••• ••••••••••			
SAT	_ UNSAT	N/A	COMM	ENTS:
Placed 3-HS	-1-152 in the OPE	EN position.		
STANDARD	-			
[14]	PLACE the STE 3-HS-1-152(150)			ONTROLLER handswit
	ANCE STEP:			NOT CRITICAL
SAT	UNSAT	N/A		IENTS:
Placed 3-HS	S-1-156A in OPEN	l position.		
<u>STANDARD</u>	<u>):</u>			
[13]	PLACE the STE OPEN at panel 3	AM TO SJAE 38 3-9-7.	(3A) handswit	ch, 3-HS-1-156A(155A)
PERFORM	ANCE STEP:	CRI	FICAL X	NOT CRITICAL
************	*****	*****	****	****
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PERFORMANCE STEP:

CRITICAL X NOT CRITICAL \_\_\_\_

- [15] **ADJUST** manual/hand loaders at Panel 25-105, until dilution steam pressure is indicating approximately 190 to 220 psig on the following 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: [When called] 3-PI-1- 152 & 3-PI-1-167 are adjusted to 200 psig.

# STANDARD:

Directed US to adjust 3-PI-1- 152 & 3-PI-1-167 to 190 – 220 psig.

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

Examiner Note: [If desired to save time, when contacted for step [15] - report]

Steps [15] through [20] are completed locally.

[Then you can skip down to step [21] on page 19]

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# NOTE

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.

PERFORMANCE STEP:

CRITICAL X NOT CRITICAL

- [16] **ADJUST** the SJAE dilution steam pressure modifiers (located at the rear of panel 25-105) as necessary to obtain stable steam pressure indication on the following instruments.
  - A. SJAE B(A) PRESS MODIFIER, 3-XM-1-152(150)
  - B. SJAE B(A) PRESS MODIFIER, 3-XM-1-167(166)

CUE: [When called] 3-XM-1-152 & 3-XM-1-167 adjusted to obtain a stable pressure indication.

STANDARD:

Directed US to adjust modifiers 3-XM-1-152 & 3-XM-1-167 to obtain a stable pressure indication.

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

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### 

PERFORMANCE STEP:

CRITICAL X NOT CRITICAL

- [17] **TRANSFER** SJAE STAGE I and II pressure control from the manual/hand loader to the pressure controller at Panel 25-105, by performing the following:
  - [17.1] ADJUST 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] SLOWLY RAISE manual/hand loader for STEAM TO SJAE B(A) STAGE I & II, 3-PC-001-0152(0150) setting to approximately 14 psig.
  - [17.3] **VERIFY** stable SJAE dilution steam pressure is maintained on STEAM TO SJAE B(A) STAGE I & II, 3-PI-001-0152(0150).

CUE: [When called] 3-PC-1-152 adjusted for 200 psig and the manual/hand loader for 3-PC-1-152 raised to 14 psig & 3-PI-1-152 is stable.

# STANDARD:

Directed US to adjust 3-PC-1-152 to ~ 200 psig, 3-PC-1-152 manual/hand loader to ~ 14 psig, and Verify 3-PI-1-152 is stable.

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

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#### 

PERFORMANCE STEP:

CRITICAL X NOT CRITICAL

- [18] **TRANSFER** SJAE STAGE III pressure control from the manual/hand loader to the pressure controller at panel 25-105, by performing the following:
  - [18.1] ADJUST setpoint for STEAM TO SJAE B(A) STAGE III, 3-PC-001-0167(0166) set for approximately 200 psig (dial located inside controller housing).
  - [18.2] **SLOWLY RAISE** manual/hand loader for STEAM TO SJAE B(A) STAGE III, 3-PC-001-0167(0166) setting to approximately 12 PSIG.
  - [18.3] **VERIFY** stable SJAE dilution steam pressure is maintained on STEAM TO SJAE B(A) STAGE III, 3-PI-001-0167(0166).

CUE: [When called] 3-PC-1-167 adjusted for 200 psig and the manual/hand loader for 3-PC-1-167 raised to 12 psig & 3-PI-1-167 is stable.

# STANDARD:

Directed US to adjust 3-PC-1-167 to ~ 200 psig, 3-PC-1-167 manual/hand loader to ~ 12 psig, and Verify 3-PI-1-167 is stable.

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

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PAGE 18 of 22

***************************************	***

PERFORMANCE STEP:

CRITICAL X NOT CRITICAL

- [19] **VERIFY** both SJAE dilution steam pressure modifiers for the SJAE removed from service are adjusted to approximately mid-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)

# CUE: [When called] 3-XM-1-150 & 3-XM-001-0166 are adjusted to mid-position.

# STANDARD:

Directed US to Verify both SJAE dilution steam pressure modifiers for the SJAE removed from service are adjusted to approximately mid-position

SAT UNSAT	N/A	COMMENTS:
*****	*****	*****
PERFORMANCE STEP:	CRITICAL	XNOT CRITICAL
[20] VERIFY SJAE TRAI	N PERMISSIVE 3	-HS-001-0375 in the position for the

SJAE selected for Standby operation SJAE A(SJAE B).

CUE: [When called] SJAE TRAIN PERMISSIVE, 3-HS-001-0375, is selected for SJAE A.

# STANDARD:

Directed US to Verify SJAE TRAIN PERMISSIVE, 3-HS-001-0375, is in the position for the Standby SJAE (3A).

SAT	 UNSAT	N/A	COMMENTS:	

			JPM NO. 346 REV. NO. 0 PAGE 19 of 22
	**************************************	CRITICAI	NOT CRITICAL X
	MONITOR hotwell	pressure as indicated on H 3-XR-2-2 at Panel 3-9-6.	
STANDARE	<u>):</u>		
Monitored h	otwell pressure.		
SAT	UNSAT	N/A COM	MENTS:
*****	*****	******	*****
PERFORM/	ANCE STEP:	CRITICAL	NOT CRITICALX
[22]	PERFORM the follo	owing at Panel 3-9-53:	
	[22.1] VERIFY Off TO Section	Gas Hydrogen Analyzer in 8.25.	manual operation. <b>REFER</b>
		Off Gas Hydrogen concentra N ANALYZER 3-H2R-66-96 re stable.	
	n addressed] Anot service and monito	ther Operator will place th	e Off Gas Hydrogen

CUE: That completes this task.

		JPM NO. 346 REV. NO. 0 PAGE 20 of 22
PERFORMANCE STEP:		NOT CRITICAL
PERFORMER demonstrated th	ne use of SELF CHECKIN	G during this JPM
STANDARD:		
PERFORMER verified applicab accordance with plant standard		SELF CHECKING in
SAT UNSAT	N/A CC	DMMENTS:
PERFORMANCE STEP:		NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated th	CRITICAL	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated th STANDARD:	CRITICAL	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated th	CRITICAL	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated th STANDARD: PERFORMER utilized 3-WAY C	CRITICAL	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated th STANDARD: PERFORMER utilized 3-WAY C	CRITICAL	NOT CRITICAL

# BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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

**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.

# Appendix A (Page 2 of 2)

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Name Of Radiation Protection Person Notified: Joe Neutron
Date: <u>Today</u> Time: <u>Now</u>
Step# <u>8.4[2]</u> Procedure: <u>3-OI-66</u> (if not this procedure) Rev: <u>Current</u>
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: Today Time: Now
Comments: For swapping SJAE from 3A to 3B
Nome Of Rediction Protection Person Natified
Name Of Radiation Protection Person Notified:Joe Neutron
Name Of Radiation Protection Person Notified:       Joe Neutron         Date:       Today       Time:       Now
Date: <u>Today</u> Time: <u>Now</u>
Date: <u>Today</u> Time: <u>Now</u> Step# <u>8.14[1]</u> Procedure: <u>3-OI-66</u> (if not this procedure) Rev: <u>Current</u>
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)
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)       (N)
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

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



# BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**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.

Appendix A (Page 2 of 2)
Name Of Radiation Protection Person Notified: Joe Neutron
Date: <u>Today</u> Time: <u>Now</u>
Step# <u>8.4[2]</u> Procedure: <u>3-OI-66</u> (if not this procedure) Rev: <u>Current</u>
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: Today Time: Now
Comments: For swapping SJAE from 3A to 3B
Name Of Radiation Protection Person Notified:
Name Of Radiation Protection Person Notified:      Joe Neutron         Date:       Today
Date: <u>Today</u> Time: <u>Now</u>
Date: <u>Today</u> Time: <u>Now</u> Step# <u>8.14[1]</u> Procedure: <u>3-OI-66</u> (if not this procedure) Rev: <u>Current</u>
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
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)
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       Release       Release
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)
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       Release       Release

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Browns Ferry Nuclear Plant

Unit 3

**Operating Instruction** 

3-01-66

**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



#### **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. page106, 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



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• • • • • • -		

Attachment 5: Off-Gas System Monthly Seal Air Flow Checklist.

#### 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







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#### 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

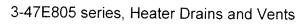
3-GOI-100-12A, Unit Shutdown from Power Operation to Cold Shutdown and Reductions in Power During Power Operations

3-ARP-9-7, Alarm Response Procedure

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



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



#### 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



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#### 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

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#### 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:
  - 1. 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.



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- H. Off-Gas System valves are potentially spark-producing when operated; therefore, when hydrogen concentration is suspected of being greater than 4%, <u>NO</u> 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.
- I. 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<sub>2</sub>O.
- 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
  - 2. 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), <u>or</u>
  - 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.

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- 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:
  - 1. 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.
  - 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]

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- 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

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- 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.



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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.



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- 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.

#### 3.1 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.

#### 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>:
  - 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.



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#### 8.4 Placing Standby SJAE in Operation

### NOTES

- 1) Panel 25-105 located in Unit 3 Turbine Bldg. El 586' T12-C.
- The HWC system is shut down prior to intentional swapping of SJAEs to prevent receipt of the automatic trip of the HWC system that will occur when both SJAE DISCHARGE VALVES 3-FCV-66-14 and 18 are closed.
  - [1] **REVIEW** all Precautions and Limitations in Section 3.0.
  - [2] **IF** determined necessary by Unit Supervisor, **THEN** (Otherwise N/A)

**NOTIFY** Radiation Protection that an RPHP exist 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]

(R) \_\_

Initials

[2.1] **VERIFY** appropriate data and signatures recorded on Appendix A in accordance with Appendix A Instructions [Tech Spec 5.7, SOER 01-1, BFN PER 126211]

			(R)	
				Initials
[3]	VE	<b>RIFY</b> 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-OI-4.		
	В.	SJAEs are in operation. <b>REFER TO</b> Section 5.9.		
[4]	VE	<b>RIFY OPEN</b> the following valves at Panel 3-9-6, :		
	Α.	SJAE 3B(3A) CNDS INLET VALVE, using 3-HS-2-31A(36A)		
	Β.	SJAE 3B(3A) CNDS OUTLET VALVE, using 3-HS-2-35A(41A)		
[5]		<b>RIFY</b> CONDENSATE FROM SJAE B(A) pressure, I-2-34(40), is greater than 60 psig at Panel 25-105, .		

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8.4	Plac	ing S	tandby SJAE in Operation (continued)		
	[6]	<b>VE</b> cor	<b>RIFY</b> manual/hand loader output pressure a stroller setpoints at panel 25-105, are adjust	and pressure ed as follows:	
		A.	Setpoint for STEAM TO SJAE B(A) STAG 3-PC-001-0152(0150) set for approximate located inside controller housing).	iE I & II, Iy 225 psig (dial	
		B.	Manual/Hand loader for STEAM TO SJAE STAGE I & II, 3-PC-001-0152(0150) set fo 14 psig.	B(A) or approximately	
		C.	Setpoint for STEAM TO SJAE B(A) STAG 3-PC-001-0167(0166) set for approximate located inside controller housing).	E III, ly 225 psig (dial	
		D.	Manual/hand loader for STEAM TO SJAE 3-PC-001-0167(0166), set for approximate	B(A) STAGE III, ely 12 psig.	
	[7]	at th	<b>RIFY</b> both SJAE dilution steam pressure mo ne rear of panel 25-105).are adjusted to app -position	odifiers (located proximately	
		Α.	MS SJAE B(A) PRESS MODIFIER, 3-XM-	001-0152(0150)	
		Β.	MS SJAE B(A) PRESS MODIFIER, 3-XM-	001-0167(0166)	
	[8]	VEF the f	RIFY OPEN both SJAE Inlet Valves at panel following:	3-9-8, using	
		Α.	SJAE 3A INLET VALVE, 3-HS-66-11		
		B.	SJAE 3B INLET VALVE, 3-HS-66-15		
	[9]	<b>PLA</b> 3-HS	<b>CE</b> the STEAM TO SJAE 3A(3B) handswite S-1-155A(156A), in CLOSE at panel 3-9-7	ch,	
	[10]	<b>PLA</b> 3-HS	<b>CE</b> the SJAE 3A(3B) PRESS CONTROLLE S-1-150(152), in CLOSE at panel 3-9-7	R handswitch,	
	[11]	At Pa using	anel 3-9-8, <b>PLACE</b> the SJAE 3A(3B) OG OI 3 3-HS-66-14(18) in CLOSE.	UTLET VALVE	
	[12]	<b>PLA</b> VAL	<b>CE</b> in OPEN/AUTO the SJAE 3B(3A) OG O /E using, 3-HS-66-18(14) at panel 3-9-8.	UTLET	
	[13]	PLA 3-HS	<b>CE</b> the STEAM TO SJAE 3B(3A) handswitc -1-156A(155A), in OPEN at panel 3-9-7	h,	

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

[14] **PLACE** the STEAM TO SJAE 3B(3A)PRESS CONTROLLER handswitch, 3-HS-1-152(150), in OPEN at Panel 3-9-7.

#### NOTE

It may be necessary to return 3-HS-1-152(150) to CLOSE position, then back to OPEN in order to open the SJAE steam supply valves. This will reset the logic sequence.

[15]	ADJUST manual/hand loaders at Panel 25-105, until dilution
	steam pressure is indicating approximately 190 to 220 psig on
	the following 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)



#### NOTE

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.

- [16] **ADJUST** the SJAE dilution steam pressure modifiers (located at the rear of panel 25-105):as necessary to obtain stable steam pressure indication on the following instruments.
  - A. SJAE B(A) PRESS MODIFIER, 3-XM-1-152(150)
  - B. SJAE B(A) PRESS MODIFIER, 3-XM-1-167(166)



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8.4	Placi	ng Si	tandby SJAE in Operation (continued)		
	[17]	mar	ANSFER SJAE STAGE I and II pressure con nual/hand loader to the pressure controller a performing the following:	ntrol from the It Panel 25-105,	
	[17	7.1]	<b>ADJUST</b> setpoint for STEAM TO SJAE B STAGE I & II, 3-PC-001-0152(0150) set f approximately 200 psig (dial located insid housing).	or	
	[17	7.2]	<b>SLOWLY RAISE</b> manual/hand loader for SJAE B(A) STAGE I & II, 3-PC-001-0152( to approximately 14 psig.	STEAM TO (0150) setting	
	[17	7.3]	<b>VERIFY</b> stable SJAE dilution steam press maintained on STEAM TO SJAE B(A) ST, 3-PI-001-0152(0150).	sure is AGE I & II,	
	[18]	man	<b>NSFER</b> SJAE STAGE III pressure control fi ual/hand loader to the pressure controller at erforming the following:	rom the t panel 25-105,	
	[18	5.1]	<b>ADJUST</b> setpoint for STEAM TO SJAE B( 3-PC-001-0167(0166) set for approximate (dial located inside controller housing).	(A) STAGE III, ly 200 psig	
	[18	.2]	<b>SLOWLY RAISE</b> manual/hand loader for S SJAE B(A) STAGE III, 3-PC-001-0167(016 approximately 12 PSIG.	STEAM TO 66) setting to	
	[18.	.3]	<b>VERIFY</b> stable SJAE dilution steam pressumaintained on STEAM TO SJAE B(A) STA 3-PI-001-0167(0166).	ure is \GE III,	
		SJAE	<b>FY</b> both SJAE dilution steam pressure mode removed from service are adjusted to appr position.(modifiers are located at the rear of	oximately	
	,	A. I	MS SJAE A(B) PRESS MODIFIER, 3-XM-00	01-0150(0152)	
	E	B. M	MS SJAE A(B) PRESS MODIFIER, 3-XM-00	)1-0166(0167)	

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8.4	Placi	ng S	tandby SJAE in Operation (continued)		
	[20]	pos	<b>RIFY</b> SJAE TRAIN PERMISSIVE 3-HS-001- ition for the SJAE selected for Standby ope SJAE B).		
	[21]		<b>NITOR</b> hotwell pressure as indicated on HC D PRESS recorder, 3-XR-2-2 at Panel 3-9-6		
	[22]	PE	<b>RFORM</b> the following at Panel 3-9-53:		
	[2:	2.1]	<b>VERIFY</b> Off Gas Hydrogen Analyzer in m operation. <b>REFER TO</b> Section 8.25.	anual	
	[2:	2.2]	<b>MONITOR</b> Off Gas Hydrogen concentrati OFF GAS HYDROGEN ANALYZER 3-H2 Panel 3-9-53 until conditions are stable	on using the 2R-66-96 at	
	[23]	WH	<b>EN</b> stable SJAE operation has been confirm	ned, THEN	
		dire	HWC System may be placed back in servic ction of the Unit Supervisor. REFER TO 3-0 tem (N/A if HWC System is unavailable).	ce at the DI-4, HWC	

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#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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 CONCURRENCE:	OPERATIONS	DATE:

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

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#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

#### **REVISION LOG**

Revision	Effective	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

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BROWNS	ERRY N	UCLEAR PLAN	T
JOB PER	FORMA	NCE MEASURE	

OPERATOR:			
RO	SRO	DATE:	
JPM NUMBER:	113		
TASK NUMBER:	U-085-NO-04		
TASK TITLE:	SHIFT CRD STABILIZING VALVES		
K/A NUMBER:	201001A3.01 K/A RATING:	RO <u>3.0</u>	SRO <u>3.0</u>
******************	***************************************	*****	*****
TASK STANDARD	SIMULATE PERFORMING OPERAT	TIONS REQUIRED G VALVES TO 'B'	TO SHIFT SET.
PERFORMANCE I	OCATION: SIMULATOR PLA	NT X CONTROL	ROOM
REFERENCES/PR	OCEDURES NEEDED: 2-OI-85, F	Rev 116	
VALIDATION TIME	CONTROL ROOM: <u>9:00</u>	LOCAL: _	6:00
MAX. TIME ALLOW	/ED: (FOR TIME CRI	TICAL JPMs ONL	Y)
PERFORMANCE T	IME:		
COMMENTS:		and a start start of the start st	
ADDITIONAL COM	MENT SHEETS ATTACHED?	YESN	۰۰ – ۲
RESULTS:	SATISFACTORY U	JNSATISFACTOR	Y
EXAMINER SIGNA	TURE:	DATE:	

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#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**IN-PLANT:** I will explain the initial conditions and state the task to be performed. <u>ALL</u> <u>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 values to the 'B' set in accordance with 2-OI-85, Section 6.4.

# CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!

STA	RT TIME		REV. NO. 8 PAGE 5 of 1	2
	FORMANCE STEP:			
Whe	n requested by examiner, i	identify/obtain copy of requ	uired procedure.	
Exar simu	miner Note: Applicant ha ulator, therefore, just han	as demonstrated obtainin d him/her the procedure.	g procedures on the	
	NDARD:			
Ident	tified or obtained copy of 2-0	OI-85.		
SAT	UNSAT	N/A CO	MMENTS	
SAT	UNSAT	N/A CO	MMENTS:	
SAT	UNSAT	N/A CO	MMENTS:	
	UNSAT			
*****		****		*****
*****	****	CRITICAL	****	*****
****** PERI	FORMANCE STEP: Shifting CRD Stabilizin	CRITICAL g Valve Sets Rod Drive Hydraulic Systen	NOT CRITICAL	*****
<u>PER</u> 6.4	FORMANCE STEP: Shifting CRD Stabilizin [1] VERIFY Control F	CRITICAL g Valve Sets Rod Drive Hydraulic Systen	NOT CRITICAL	*****
<u>PERI</u> 6.4	FORMANCE STEP: Shifting CRD Stabilizin [1] VERIFY Control F REFER TO Sectio	CRITICAL g Valve Sets Rod Drive Hydraulic System on 5.1.	NOT CRITICAL	*****
<u>PER</u> 6.4 <u>STAN</u>	FORMANCE STEP: Shifting CRD Stabilizin [1] VERIFY Control F REFER TO Section	CRITICAL g Valve Sets Rod Drive Hydraulic Systen on 5.1.	NOT CRITICAL	******* X

			JPM NO. 113 REV. NO. 8 PAGE 6 of 12
	ANCE STEP:		$\frac{1}{2}  \text{NOT CRITICAL}  \underline{X}$
[2]	<b>REVIEW</b> all Precaut	ions and Limitations in S	Section 3.1.
<u>STANDARI</u>	<u>D:</u>		
Reviewed S	Section 3.1.		
SAT	UNSAT	N/A COI	MMENTS:
	<u>*************************************</u>		××××××××××××××××××××××××××××××××××××××
[3]	<b>PERFORM</b> the follow service:	wing for Stabilizing Valve	e set being brought into
	[3.1] <b>OPEN</b> STAB SHUTOFF, 2-	VLV FCV-85-20 A & B(F -SHV-085-0580(0578).	CV-85-21 A & B), INLET
	[3.2] <b>OPEN</b> STAB SHUTOFF, 2-	VLV FCV-85-20 A & B(F SHV-085-0581(0579).	CV-85-21 A & B), OUTLET
CUE: [As e The valve i	each valve is correctl s Open.	y Simulated] The hand	wheel is turning, (PAUSE)
STANDARE	<u>D:</u>		
Simulated o handwheels	pening 2-SHV-085-057 in the Counterclockwis	8 and 2-SHV-085-0579 b e direction.	y turning the valve
SAT	UNSAT	N/A COM	MMENTS:

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

#### 

PERFORMANCE STEP:

CRITICAL \_\_\_\_ NOT CRITICAL \_\_X\_

[4] PLACE CRD STABILIZER VLV INSERVICE SELECT, 2-XS-85-20, in A(B) to select the Stabilizing valve set being brought into service on Panel 2-9-5.

# CUE: [When requested] 2-XS-85-20 has been placed in the 'B' position.

#### STANDARD:

Simulated requesting Unit 2 operator to place 2-XS-85-20 in the 'B' position on Panel 2-9-5.

SAT UNSAT N/A COMMENTS:	<b></b>
-------------------------	---------

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PERFORMANCE STEP:

CRITICAL \_\_\_\_\_ NOT CRITICAL X

- [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).
  - [5.2] **CLOSE** STAB VLV FCV-85-20 A & B(FCV-85-21 A & B), OUTLET SHUTOFF, 2-SHV-085-0581(0579).

CUE: [As each valve is correctly Simulated] The handwheel is turning, (PAUSE) The valve is Closed.

#### STANDARD:

Simulated closing 2-SHV-085-0580 and 2-SHV-085-0581 by turning the valve handwheels in the Clockwise direction.

SAT UNSAT	N/A	COMMENTS:
*****	*****	*****
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL X
[6] <b>VERIFY</b> CRD STABI approximately 6 gpm		FI-85-22, on 2-LPNL-925-0018B is
CUE: When located on local par	nel, 2-FI-85-22 ind	icates 6 gpm.
STANDARD:		
Verified stabilizing flow of approxin	nately six gpm on 2	2-FI-85-22.
SAT UNSAT	N/A	COMMENTS:

				JPM NO. 113 REV. NO. 8 PAGE 9 of 12
PERFORMA				NOT CRITICAL
[7]	VERIFY CRD DRI gpm on Panel 2-9-		OW, 2-FI-8	5-15A, is approximately 0
CUE: 2-FI-8	5-15A indicates 0	gpm.		
STANDARD:				
Simulated ca approximatel	lling Unit 2 control y '0' gpm.	room to verify tha	t CRD drive	water header flow is
SAT	UNSAT	N/A	COMM	IENTS:
		*****		
PERFORMA				NOT CRITICAL X
[8]	IF CRD Stabilizing	Flow adjustment	is necessar	y, <b>THEN</b>
	<b>REQUEST</b> Techni stabilizer needle va	cal Support to per alve settings.	form 0-TI-20	0 in order to adjust
CUE: Flow a	adjustment is not	necessary. That	completes	this task.
STANDARD:				
<u>STANDARD:</u> N/A SAT	UNSAT	N/A	СОММ	ENTS:

		PAGE 10 of 12
PERFORMANCE STEP:		NOT CRITICAL
PERFORMER complied with all sa	fety rules and regulation	ns
STANDARD:		
PERFORMER complied with all saf sideshields, and hearing protection	ety rules and regulations was worn AS REQUIRE	s (hardhat, safety glasses, D.)
ELECTRICAL SAFETY was also ac such as rings, metal wristwatches, l employees within <u>reaching distance</u> or greater.	pracelets, and metal nec	klaces shall not be worn by
SAT UNSAT	N/A COI	MMENTS:
*****	*****	*****
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL
PERFORMER demonstrated prope	r radiological practices A	S REQUIRED
<u>STANDARD:</u>		
PERFORMER applied proper radiol performance.	ogical practices, AS RE	QUIRED, during JPM
		MMENTS:



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		JPM NO. 113 REV. NO. 8 PAGE 11 of 12
PERFORMANCE STEP:		NOT CRITICAL
PERFORMER demonstrated th	ne use of SELF CHECKING	during this JPM
STANDARD:		
PERFORMER verified applicab accordance with plant standard	ble components by utilizing ls.	SELF CHECKING in
SAT UNSAT	N/A CO	MMENTS:
******		*****
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL
PERFORMER demonstrated th		
PERFORMER demonstrated th <u>STANDARD:</u>	ne use of 3-WAY COMMUN	IICATION during this JPM
PERFORMANCE STEP: PERFORMER demonstrated th <u>STANDARD:</u> PERFORMER utilized 3-WAY ( SAT UNSAT	ne use of 3-WAY COMMUN	IICATION during this JPM
PERFORMER demonstrated th <u>STANDARD:</u> PERFORMER utilized 3-WAY (	ne use of 3-WAY COMMUN	IICATION during this JPM
PERFORMER demonstrated th <u>STANDARD:</u> PERFORMER utilized 3-WAY (	ne use of 3-WAY COMMUN	IICATION during this JPM
PERFORMER demonstrated th <u>STANDARD:</u> PERFORMER utilized 3-WAY (	ne use of 3-WAY COMMUN	IICATION during this JPM



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#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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

**IN-PLANT:** I will explain the initial conditions and state the task to be performed. <u>ALL</u> <u>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!

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**IN-PLANT:** I will explain the initial conditions and state the task to be performed. <u>ALL</u> <u>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!**



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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



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#### **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, 0	9000936

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

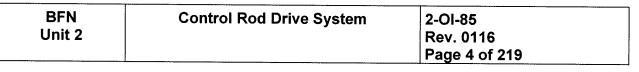




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- Attachment 1: CRD Hydraulic System Valve Lineup Checklist
- Attachment 2: CRD Hydraulic System Panel Lineup Checklist
- Attachment 2A: RMCS Panel Lineup Checklist
- Attachment 2B: ROD WORTH MINIMIZER Panel Lineup Checklist
- Attachment 3: CRD Hydraulic 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

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#### 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.







#### 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.

## 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



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#### 2.6 Miscellaneous Documents

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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)

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#### 2.6 Miscellaneous Documents (continued)

4 4

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.

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#### 3.0 PRECAUTIONS AND LIMITATIONS

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## 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]

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- 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  $\Delta P$  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]



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- R. When opening or closing HCU isolation valves, the following guidelines are required to be adhered to:
  - 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.
  - 1. 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.

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- 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.



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- 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.

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## 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]

**y** 1

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:
  - 1. 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:
  - 1. 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.

- 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:
  - 1. 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).
  - 1. 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.

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:
  - 1. 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]

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- 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.

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# 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  $\geq$  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).

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# 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:

- 1. Mode switch in refuel interlocks.
- 2. IRM functional tests
- 3. Scram discharge volume water level interlocks
- 4. RPS test switches
- 5. CRD accumulator pressure.

#### 3.5 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:

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#### 3.5 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 <u>unless</u>:
  - 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.



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6.4	Shift	ting C	RD Stabilizing Valve Sets		
	[1]		<b>RIFY</b> Control Rod Drive Hydraulic Systen FER TO Section 5.1.	n in operation.	
	[2]	RE	VIEW all Precautions and Limitations in §	Section 3.1.	
	[3]		<b>RFORM</b> the following for Stabilizing Valve ught into service:	e set being	
	[3	3.1]	<b>OPEN</b> STAB VLV FCV-85-20 A & B(F INLET SHUTOFF, 2-SHV-085-0580(0		
	[3	8.2]	<b>OPEN</b> STAB VLV FCV-85-20 A & B(F OUTLET SHUTOFF, 2-SHV-085-0581		
	2-XS-85		ACE CRD STABILIZER VLV INSERVICE S-85-20, in A(B) to select the Stabilizing ught into service on Panel 2-9-5.		
	<ul> <li>[5] PERFORM the following for stabilizing valve set being removed from service:</li> <li>[5.1] CLOSE STAB VLV FCV-85-20 A &amp; B(FCV-85-21 A &amp; B), INLET SHUTOFF, 2-SHV-085-0580(0578).</li> <li>[5.2] CLOSE STAB VLV FCV-85-20 A &amp; B(FCV-85-21 A &amp; B), OUTLET SHUTOFF, 2-SHV-085-0581(0579).</li> <li>[6] VERIFY CRD STABILIZING FLOW, 2-FI-85-22, on 2-LPNL-925-0018B is approximately 6 gpm.</li> <li>[7] VERIFY CRD DRIVE WTR HDR FLOW, 2-FI-85-15A, is approximately 0 gpm on Panel 2-9-5.</li> </ul>		set being		
			RIFY CRD STABILIZING FLOW, 2-FI-85- PNL-925-0018B is approximately 6 gpm.	-22, on	
			I-85-15A, is		
	[8]	IF C	RD Stabilizing Flow adjustment is neces	sary, <b>THEN</b>	
			QUEST Technical Support to perform 0-T st stabilizer needle valve settings.	1-20 in order to	

i e e e e

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## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER: 308F

TITLE: PLACE ± 24V NEUTRON BATTERY CHARGER IN SERVICE TO APPLICABLE BATTERY BOARD

TASK NUMBER: S-57D-NO-08

Provide a copy of 0-OI-57D, Section 5.13 (include 0-OI-57D, Section 3.0)

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

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

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## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

## **REVISION LOG**

Revision Number	Effective Date	Pages Affected	Description Of Revision
0	03/20/09	All	Initial issue
·			
	-		

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## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

OPERATOR:				
RO	SRO		DATE:	
JPM NUMBER:	308F			
TASK NUMBER:	S-57D-NO-08			
TASK TITLE:	PLACE <u>+</u> 24V NE APPLICABLE BA	EUTRON BATTER	Y 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 PLAC BATTERY CHAR	CING B2-3 <u>+</u> 24V N GER IN SERVICE	NEUTRON MONI TO BATTERY B	TORING OARD 3.
PERFORMANCE	LOCATION: SI	MULATOR PL		OL ROOM
REFERENCES/PR	OCEDURES NEEI	DED: 0-0I-57[	D, Rev 121	
VALIDATION TIME	CONTROL	. ROOM :	LOCAL	:
MAX. TIME ALLOV	VED:		RITICAL JPMs ON	NLY)
PERFORMANCE T	ÎME:			
COMMENTS:				
			······································	
ADDITIONAL COM	MENT SHEETS A	TTACHED?	YES	_NO
RESULTS:	SATISFACTORY		UNSATISFACTO	)RY
EXAMINER SIGNA	TURE:		DATE	

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## BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**IN-PLANT:** I will explain the initial conditions and state the task to be performed. <u>ALL</u> <u>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.  $\pm$  24V Neutron Monitoring Battery B is in service in accordance with Section 5.10 of 0-OI-57D.  $\pm$  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 <u>+</u> 24V Neutron Monitoring Battery B.

# CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!

			JPM NO. 308 REV. NO. 0 PAGE 5 of 1	
START TIM	1E	_		-
		*********	******	***
PERFORM	ANCE STEP:	CRITICAL _	NOT CRITICAL	<u> </u>
When reque	ested by examiner, ide	entify/obtain copy of re	quired procedure.	
Examiner I simulator,	Note: Applicant has therefore, just hand	demonstrated obtain him/her the procedu	ning procedures on the re.	
STANDAR	<u>):</u>			
Identified or	obtained copy of 0-OI	-57D		
SAT	UNSAT	_ N/A C	COMMENTS:	
			····	····
*******	*****	******	******	
	ANCE STEP:		NOT CRITICAL	
<u></u>				
5.13	Placing Unit 3 ± 24\ in Service to Battery	/ Neutron Monitoring B		
	in Service to Battery [1] VERIFY the ±	/ Neutron Monitoring B	attery A(B) Chargers	
5.13	in Service to Battery [1] VERIFY the service in acc	/ Neutron Monitoring B / Board 3 ± 24V Neutron Monitor	attery A(B) Chargers	
5.13 <u>STANDARD</u>	in Service to Battery [1] VERIFY the service in acc	/ Neutron Monitoring B / Board 3 ± 24V Neutron Monitor cordance with Section	attery A(B) Chargers	
5.13 <u>STANDARD</u> N/A – given	in Service to Battery [1] VERIFY the <u>service</u> in acc	/ Neutron Monitoring B / Board 3 ± 24V Neutron Monitor cordance with Section s	attery A(B) Chargers	

			JPM NO. 308 REV. NO. 0 PAGE 6 of 15	
****************	*****	******	******	******
PERFORMANCE STEP:	CRITICAL		NOT CRITICAL	Х
[2] REVIEW Preca	autions and Limita	ations.		
REFER TO Se	ction 3.0.			
STANDARD:				
Reviewed Section 3.0				
SAT UNSAT	N/A	COMME	ENTS:	

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#### **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.

PERFORMANCE STEP:

CRITICAL X\_\_\_NOT CRITICAL

- CLOSE ± 24V DC CHARGERS (applicable charger, see [3] Table 3 above) TIE TO BAT BD 3, BKR 1201 Ch. A (1221 Ch. B), by placing breaker in the ON position.

# CUE: [When correctly simulated] Breaker 1221 is closed.

STANDARD:

In Battery Board Room 3, Simulated placing bkr 1221 in the ON position.

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

# INSTRUCTOR'S NOTE: DO NOT ALLOW THE EXAMINEE TO OPEN THE FRONT COVER OF THE + 24V NEUTRON MONITORING BATTERY CHARGER. (Next Page)

JPM NO. 308F REV. NO. 0 PAGE 8 of 15

HAND THE CANDIDATE	E ATTACHMENT 1.
******	***************************************
PERFORMANCE STEP:	CRITICAL NOT CRITICAL
Charger	e front cover of the ± 24V Neutron Monitoring Battery to be placed in service and VERIFY CLOSED the DC rcuit breaker by placing it in the ON Position.
CUE: [When correctly simu preaker is in the <u>ON</u> positio	Ilated] The B2-3 + 24V Battery Charger DC output
TANDARD:	
Ionitoring Battery Charger ar	ted would open the front cover of B2-3 <u>+</u> 24V Neutron nd Verify Closed the DC output breaker.
Ionitoring Battery Charger ar	nd Verify Closed the DC output breaker.
Anitoring Battery Charger an	nd Verify Closed the DC output breaker.
ERFORMANCE STEP: [5] CLOSE the test of the second s	Image: Model of the DC output breaker.           Image: N/A         COMMENTS:
AT UNSAT ERFORMANCE STEP: [5] CLOSE th Battery C	Merify Closed the DC output breaker.  N/A COMMENTS: CRITICAL _X NOT CRITICAL CRITICAL _X NOT CRITICAL Not criticate the breaker in ON.  Interact Clack of the breaker in ON.  Interact the breaker i
AT UNSAT ERFORMANCE STEP: [5] CLOSE th Battery C UE: [When correctly simu C Circuit Breaker is in the	Merify Closed the DC output breaker.  N/A COMMENTS: CRITICAL _X NOT CRITICAL CRITICAL _X NOT CRITICAL Not criticate the breaker in ON.  Interact Clack of the breaker in ON.  Interact the breaker i
AT UNSAT ERFORMANCE STEP: [5] CLOSE th Battery C UE: [When correctly simul C Circuit Breaker is in the TANDARD:	Merify Closed the DC output breaker.  N/A COMMENTS: CRITICAL _X NOT CRITICAL CRITICAL _X NOT CRITICAL Not criticate the breaker in ON.  Interact Clack of the breaker in ON.  Interact the breaker i

PERFOR	MANCE			CRITICAL _		NOT CRITIC
	[6]	DEP bein	PRESS OV	ERVOLTAGE RESE I service.	ET pusł	n-button on cha
CUE: [WI	nen corr	ectly s	imulated]	, pushbutton has b	een de	pressed
<u>STANDAI</u>	<u>RD:</u>					
Simulated Battery Cl	l depress	sing ov	ervoltage r	eset pushbutton on	B2-3 <u>+</u>	24V Neutron M
•	Ũ	NSAT		N/A C		
0/11	0	NOAT			ONINE	INTS:
<del></del>						
******	*******	******	****	****		
PERFORI			*****	CRITICAL _		
		<u>STEP:</u> CHE	CK the follo		norma	NOT CRITICA
	MANCE	<u>STEP:</u> CHE	CK the follo cable ± 24	CRITICAL _	norma g Batte	NOT CRITICA
	MANCE	<u>STEP:</u> CHE appli	CK the folk cable ± 24 DC Volta	CRITICAL owing indications of V Neutron Monitoring	norma g Batte √olts	NOT CRITICA
PERFOR	<u>MANCE :</u> [7]	<u>STEP:</u> CHE appli A. B.	CK the folk cable ± 24 DC Volta DC Volta	CRITICAL owing indications of V Neutron Monitoring age greater than 24 V age less than 29 Volt	norma g Batte Volts	NOT CRITICA l operation on th ery Charger:
PERFOR	MANCE : [7] hen corr	<u>STEP:</u> CHE appli A. B.	CK the folk cable ± 24 DC Volta DC Volta	CRITICAL owing indications of V Neutron Monitoring age greater than 24 V	norma g Batte Volts	NOT CRITICA l operation on th ery Charger:
<u>PERFOR</u>	MANCE : [7] hen corr	STEP: CHE appli A. B.	CK the folk cable ± 24 DC Volta DC Volta ndicated] [	CRITICAL owing indications of V Neutron Monitoring age greater than 24 V age less than 29 Volt DC voltage is readi	norma g Batte Volts	NOT CRITICA l operation on th ery Charger:
<u>PERFORI</u> CUE: [WI STANDAF -ocates ar	MANCE : [7] hen corr <u>RD:</u> nd reads	STEP: CHE appli A. B. <b>ectly i</b>	CK the folk cable ± 24 DC Volta DC Volta <b>ndicated]</b> I	CRITICAL owing indications of V Neutron Monitoring age greater than 24 V age less than 29 Volt DC voltage is readi the B2-3 charger.	norma g Batte Volts s	NOT CRITICA l operation on th ery Charger:

			JPM NO. 308F REV. NO. 0 PAGE 10 of 15
***************************************	******	*********	********
PERFORMANCE STEP:	CRITICAL		NOT CRITICAL X
[8] VERIFY the N	ORMAL/EQUALIZ	ZE switch	is in NORMAL.
CUE: [When correctly indicated	] The Normal/Eq	ualize swi	tch is in Normal.
STANDARD:			
Locates and verifies the Normal/Ed	qualize switch is ir	n Normal.	
SAT UNSAT	N/A	COMME	ENTS:
		······································	
****			
PERFORMANCE STEP:			NOT CRITICAL X
[9] VERIFY the E	QUALIZE HOURS	6 timer is s	et to zero
CUE: [When correctly indicated]	The timer indica	ates zero.	
STANDARD:			
Locates and verifies the Equalize H	lours Timer is read	dina zero.	
SAT UNSAT		-	NTO
	N/A	COMME	NTS:

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## EXAMINER NOTE: ALTERNATE PATH STARTS HERE: candidate should perform the actions in the "CAUTION"

#### 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.

***************************************
---

PERFORMANCE STEP:

CRITICAL X NOT CRITICAL

- CHECK the following indications of normal operation on the [10] applicable ± 24V Neutron Monitoring Battery Charger:
  - ٠ 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

CUE: [As each is indicated] DC Voltage now reading 20 volts, DC Amperes is reading 80 amps.

#### STANDARD:

Locates and reads the voltmeter and amp meter on the B2-3 charger. When given the CUE, performs actions in "Caution" above.

OPENS the AC Circuit Breaker and Tie to Bat Bd 3 bkr 1221 and Notifies the Unit Supervisor immediately. (Opening the breakers is Critical, not notifying the US)

SAT		UNSAT		N/A	COMMENTS:
-----	--	-------	--	-----	-----------

CUE: [When the AC Circuit breaker and Tie to BB 3 bkr 1221 are OPEN] This ends this JPM.

		JPM NO. 308F REV. NO. 0 PAGE 12 of 15
**************************************		NOT CRITICAL
PERFORMER complied with all s	afety rules and regulation	S
STANDARD:		
PERFORMER complied with all sa sideshields, and hearing protection	afety rules and regulations n was worn AS REQUIREE	(hardhat, safety glasses, ).)
ELECTRICAL SAFETY was also a such as rings, metal wristwatches, employees within <u>reaching distanc</u> or greater.	bracelets, and metal neck	laces shall not be worn by
SAT UNSAT	_ N/A COM	IMENTS:
*****		
PERFORMANCE STEP:		NOT CRITICALX
PERFORMER demonstrated prope	er radiological practices AS	S REQUIRED
STANDARD:		
PERFORMER applied proper radic performance.	ological practices, AS REQ	UIRED, during JPM
SAT UNSAT	N/A COM	MENTS:



		JPM NO. 308F REV. NO. 0 PAGE 13 of 15
PERFORMANCE STEP:		NOT CRITICAL
PERFORMER demonstrated		
STANDARD:		
PERFORMER verified applica accordance with plant standar	able components by utilizi rds.	ng SELF CHECKING in
SAT UNSAT	N/A (	COMMENTS:
******	****	***
PERFORMANCE STEP:	CRITICAL _	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated t STANDARD:	CRITICAL _	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated t STANDARD: PERFORMER utilized 3-WAY	CRITICAL _	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated t STANDARD:	CRITICAL _	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated t STANDARD: PERFORMER utilized 3-WAY	CRITICAL _	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated t STANDARD: PERFORMER utilized 3-WAY	CRITICAL _	NOT CRITICAL

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**IN-PLANT:** I will explain the initial conditions and state the task to be performed. <u>ALL</u> <u>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. <u>+</u> 24V Neutron Monitoring Battery B is in service in accordance with Section 5.10 of 0-OI-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  $3 \pm 24V$  Neutron Monitoring Battery Charger B2-3 to service to  $\pm 24V$  Neutron Monitoring Battery B.

# CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!

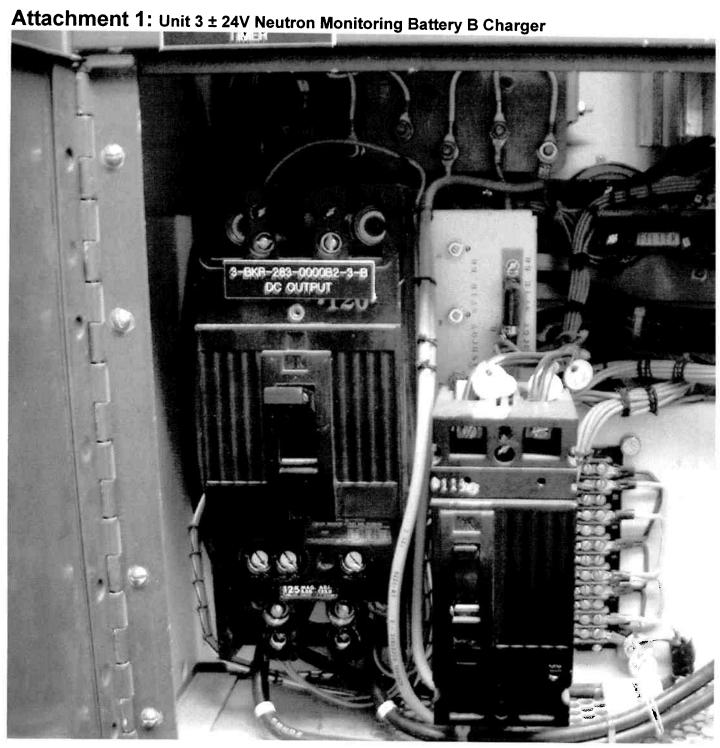
#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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**INITIAL CONDITIONS:** You are an Operator. Unit 3 is at 100% power.  $\pm$  24V Neutron Monitoring Battery B is in service in accordance with Section 5.10 of 0-OI-57D.  $\pm$  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!





Browns Ferry Nuclear Plant

Unit 0 Operating Instruction

0-0I-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



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## **Current Revision Description**

Type of Change: Enhancement

S. . . . .

Tracking Number: 158

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

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Unit	0

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#### 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

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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



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#### 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







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#### 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-C196CI1017, 125V DC Single Line Diagram



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#### 2.5 Vendor Manuals

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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



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#### 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:
    - a. 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



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- 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.
  - b. 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]
  - 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 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.



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- 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]

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- 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.

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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. [II/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. [II-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]



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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



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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

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#### 5.13 Placing Unit 3 ± 24V Neutron Monitoring Battery A(B) Chargers in Service to Battery Board 3

- [1] **VERIFY** the  $\pm$  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.

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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]	Ta	<b>.OSE</b> ± 24V DC CHARGERS (applicable charger, see ble 3 above) TIE TO BAT BD 3, BKR 1201 Ch. A (1221 B), by placing breaker in the ON position.	
[4]	Ch	<b>PEN</b> the front cover of the ± 24V Neutron Monitoring Battery arger to be placed in service and <b>VERIFY CLOSED</b> the DC to the the the transform the transform of the transform.	
[5]	<b>CL</b> Bat	<b>OSE</b> the AC CIRCUIT BREAKER on Neutron Monitoring ttery Charger by placing the breaker in ON.	
[6]	<b>DE</b> bei	<b>PRESS</b> OVERVOLTAGE RESET push-button on chargers ng placed in service.	
[7]	<b>СН</b> арр	<b>ECK</b> the following indications of normal operation on the blicable $\pm$ 24V Neutron Monitoring Battery Charger:	
	Α.	DC Voltage greater than 24 Volts	
	В.	DC Voltage less than 29 Volts	П



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#### 5.13 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:

٠	DC Voltage greater than 24 Volts	
٠	DC Voltage less than 29 Volts	
٠	DC Amperes less than 50 amps	
٠	Chargers are supplying power to the bus, indicated by DC amps greater than zero	



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#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

JPM NUMBER: 323

TITLE: 3-EOI APPENDIX-16A - BYPASS RCIC LOW PRESSURE ISOLATION

TASK NUMBER: U-000-EM-66

Provide a copy of 3-EOI Appendix-16A

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

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

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#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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

OPERATOR:				
RO	SRO		DATE:	
JPM NUMBER:	323			
TASK NUMBER:	U-000-EM-66			
TASK TITLE:	3-EOI APPENDIX ISOLATION	( 16A - BYPASS F	RCIC LOW PRESS	URE
K/A NUMBER:	217000A2.03	K/A RATING:	RO <u>3.4</u>	SRO <u>3.3</u>
*****	******	*****	******	*****
TASK STANDARD			SARY TO BYPASS N AS DIRECTED E	
PERFORMANCE	LOCATION: SI	MULATOR PL		
REFERENCES/PR	OCEDURES NEE	DED: 3-EOI A	ppendix-16A, Rev ´	I
VALIDATION TIME	CONTROL	ROOM:	LOCAL: <u>15:</u>	00
MAX. TIME ALLOV	VED:		RITICAL JPMs ONL	_Y)
PERFORMANCE 1	IME:			
COMMENTS:				
ADDITIONAL COM	MENT SHEETS A	TTACHED?	YES	NO
RESULTS:	SATISFACTORY		UNSATISFACTO	RY
EXAMINER SIGNA	TURE:		DATE:	

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#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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**IN-PLANT:** I will explain the initial conditions and state the task to be performed. <u>ALL</u> <u>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!**

START TIME		PAGE 5 of 11
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL
When requested by examiner, id	entify/obtain copy of requ	uired procedure.
Examiner Note: Applicant has simulator, therefore, just hand applicant locates the EOI Equi (Third floor in Reactor bldg)	him/her the procedure pment Storage Box (on	, however, Verify that wall behind pnl 25-31)
<u>STANDARD:</u>		
Identified or obtained copy of 3-E	OI Appendix-16A.	
SAT UNSAT	_ N/A CC	MMENTS:
PERFORMANCE STEP:		NOT CRITICAL
1. <b>NOTIFY</b> Unit Operator and		
CUE: [As Unit 3 Operator] Ack	nowledge 3-EOI Appen	dix-16A in progress.
STANDARD:		
Simulated contacting Unit 3 Oper in progress.	ator and informed him/h	er that 3-EOI Appendix-16
		MMENTS:

PERFORMANCE STEP:	CRITICAL	NOT CRITICAL
2. <b>REFER TO</b> Attachment 1	and OBTAIN neces	sary tools and equipment.
CUE: [When simulated] You h	ave pliers, tape an	d screwdriver.
STANDARD:		
Identified EOI storage box at Par holding screwdriver.	nel 3-25-31 and Sim	ulated obtaining pliers, tape
SAT UNSAT	N/A	COMMENTS:
****		
		NOT CRITICAL
PERFORMANCE STEP: 3. LOCATE terminal strip DE	CRITICAL	NOT CRITICAL
PERFORMANCE STEP:	CRITICAL	NOT CRITICAL
PERFORMANCE STEP: 3. LOCATE terminal strip DE	CRITICAL D inside Panel 3-25-	NOT CRITICAL

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			JPM NO. 323 REV. NO. 3 PAGE 7 of 11	
**************************************			NOT CRITICAL X	
	red wire attached to			
STANDARD:				
Located red wire	attached to termina	al DD-48.		
SAT (	UNSAT I	N/A	COMMENTS:	
••••••••••••••••••••••••••••••••••••••				
****************	**********************	*******	*****	rskak
PERFORMANCE			<u>XNOT CRITICAL</u>	
PERFORMANCE	<u>ESTEP:</u> terminal screw at te	CRITICAL		
5. <b>REMOVE</b> needle-nos	<u>ESTEP:</u> terminal screw at te se pliers.	CRITICAL erminal DD-48 <u>W</u>	X NOT CRITICAL	
5. <b>REMOVE</b> needle-nos	<u>ESTEP:</u> terminal screw at te se pliers.	CRITICAL erminal DD-48 <u>W</u>	<u>X</u> NOT CRITICAL	
PERFORMANCE         5. <b>REMOVE</b> needle-nos         CUE:       [When constrained]         STANDARD:	<u>ESTEP:</u> terminal screw at te se pliers.	CRITICAL erminal DD-48 <u>W</u>	<u>X</u> NOT CRITICAL <u>HILE</u> holding the red wire with	
PERFORMANCE         5. <b>REMOVE</b> needle-nos <b>CUE:</b> [When construction         STANDARD:         Simulated removing	<u>E STEP:</u> terminal screw at te se pliers. <b>rrectly simulated]</b> ing terminal screw v	CRITICAL erminal DD-48 <u>W</u> The terminal sc while holding wire	<u>X</u> NOT CRITICAL <u>HILE</u> holding the red wire with	d.
PERFORMANCE         5. <b>REMOVE</b> needle-nos <b>CUE:</b> [When construction]         STANDARD:         Simulated removing	<u>E STEP:</u> terminal screw at te se pliers. <b>rrectly simulated]</b> ing terminal screw v	CRITICAL erminal DD-48 <u>W</u> The terminal sc while holding wire	XNOT CRITICAL HILE holding the red wire with rew at DD-48 has been remove	d.

PERFORMANCE		CRITIC/		NOT CRITICA	
B. <b>REMOVE</b>	and TAPE lug	ged end of red wire	e lifted from	terminal DD-48.	
CUE: [When co DD-48 has been	prrectly simula removed and	ited] The lugged e I taped.	nd of the re	ed wire from ter	rminal
STANDARD:					
	ing and taping	lugged end of red	wire.		
		N/A		ENTS:	
		IV/A	COMM		· · ·
an a		1212 · · · · · · · · · · · · · · · · · ·			
		*****			
				NOT CRITICA	
PERFORMANCE	<u>E STEP:</u> Jnit Operator th		AL	NOT CRITICA	L _)
PERFORMANCE 7. NOTIFY L bypassed.	<u>E STEP:</u> Jnit Operator th	CRITICA at RCIC Low RPV	AL	NOT CRITICA	L <u>)</u> is
PERFORMANCE NOTIFY L bypassed.	<u>E STEP:</u> Jnit Operator th 	CRITICA	AL	NOT CRITICA	L <u>)</u> is
PERFORMANCE 7. NOTIFY L bypassed.	<u>E STEP:</u> Jnit Operator th 	CRITICA at RCIC Low RPV	AL	NOT CRITICA	L <u>)</u> is
PERFORMANCE NOTIFY U bypassed.	<u>E STEP:</u> Jnit Operator th mulated] Opera	CRITICA nat RCIC Low RPV	AL Pressure Is es RCIC Iow	NOT CRITICA	L <u>)</u> is isolat
PERFORMANCE NOTIFY U bypassed.	<u>E STEP:</u> Jnit Operator th mulated] Opera	CRITICA at RCIC Low RPV	AL Pressure Is es RCIC Iow	NOT CRITICA	L <u>)</u> is isolat
PERFORMANCE NOTIFY U bypassed.	<u>E STEP:</u> Unit Operator th 	CRITICA nat RCIC Low RPV	AL Pressure Is s RCIC low	NOT CRITICA	L is isolat

			JPM NO. REV. NO. PAGE 9 o	3
PERFORMANCE STEP:				
PERFORMER complied with all s	afety rules and r	regulations		
STANDARD:				
PERFORMER complied with all sa sideshields, and hearing protection	-	÷ ,		sses,
ELECTRICAL SAFETY was also a such as rings, metal wristwatches, employees within <u>reaching distanc</u> or greater.	bracelets, and m	netal neckla	ces shall not be w	/orn by
SAT UNSAT	_ N/A	COMM	1ENTS:	
PERFORMANCE STEP:				
PERFORMER demonstrated prop	er radiological pr	actices AS	REQUIRED	
STANDARD:				
PERFORMER applied proper radio performance.	ological practices	s, AS REQU	IIRED, during JPN	Λ
SAT UNSAT	_ N/A	COMM	IENTS:	

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		JPM NO. 3 REV. NO. PAGE 10 d
PERFORMANCE STEP:		
PERFORMER demonstrated the	e use of SELF CHECKINC	G during this JPM
STANDARD:		
PERFORMER verified applicabl accordance with plant standards		SELF CHECKING in
SAT UNSAT	N/A CO	MMENTS:
PERFORMANCE STEP:		
	CRITICAL	NOT CRITICA
PERFORMANCE STEP:	CRITICAL	NOT CRITICA
PERFORMANCE STEP: PERFORMER demonstrated the	CRITICAL	NOT CRITICA
PERFORMANCE STEP: PERFORMER demonstrated the STANDARD:	CRITICAL	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated the STANDARD: PERFORMER utilized 3-WAY C	CRITICAL	NOT CRITICAL
PERFORMANCE STEP: PERFORMER demonstrated the STANDARD: PERFORMER utilized 3-WAY C	CRITICAL	NOT CRITICAI IICATION during this ordance with plant sta
PERFORMANCE STEP: PERFORMER demonstrated the STANDARD: PERFORMER utilized 3-WAY C	CRITICAL	NOT CRITICAI IICATION during this ordance with plant sta

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

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**IN-PLANT:** I will explain the initial conditions and state the task to be performed. <u>ALL</u> <u>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!**

#### BROWNS FERRY NUCLEAR PLANT JOB PERFORMANCE MEASURE

**IN-PLANT:** I will explain the initial conditions and state the task to be performed. <u>ALL</u> <u>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.

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# 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



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#### HISTORY OF REVISION/REVIEW 3-EOI APPENDIX-16A

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REV. <u>NO.</u>	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.

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# 3-EOI APPENDIX-16A

#### BYPASSING RCIC LOW RPV PRESSURE ISOLATION INTERLOCKS

LOCATION: Unit 3 Reactor Building

ATTACHMENTS: 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.
- 4. LOCATE red wire attached to terminal DD-48.
- 5. **REMOVE** terminal screw at terminal DD-48 <u>WHILE</u> holding the red wire with needle-nose pliers.
- 6. **REMOVE** and **TAPE** 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:
<ol> <li>Needle-nose pliers.</li> <li>Electrical tape.</li> </ol>	Unit 3 RB NE, El 621 ft, at Panel 3-25-31, EOI Equipment Storage Box.
3. Screwdriver.	



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