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: ______________________ DATE:__________
TRAINING

PLANT CONCURRENCE: ______________________ DATE:__________
OPERATIONS

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

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ______________________________

RO _____ SRO _____ DATE: ____________

JPM NUMBER: 347

TASK NUMBER: U-000-EM-39

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

K/A NUMBER: 203000A4.07 K/A RATING: RO 4.5 SRO 4.5

****

TASK STANDARD: PERFORM CORRECT EQUIPMENT MANIPULATIONS REQUIRED TO INJECT MAKEUP INTO THE RPV AS DIRECTED BY 3-EOI APPENDIX-7D

PERFORMANCE LOCATION: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 3-EOI APPENDIX 7D, REV 2

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 _____ UNSATISFACTORY _____

EXAMINER SIGNATURE: ____________________ 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 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."

START TIME ______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

STANDARD:

Identified or obtained copy of 3-EOI Appendix-7D.

SAT _____ UNSAT _____ N/A _____ COMMENTS: ______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

1. **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

STANDARD:

Verifies 3-FCV-74-61, 3-FCV-74-60, 3-FCV-74-57, 3-FCV-74-58, 3-FCV-74-59, and 3-FCV-23-46 are closed by observing illuminated Green only light above each handswitch.

SAT _____ UNSAT _____ N/A _____ COMMENTS: ______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

b. **VERIFY** RHR Pumps 3A and 3C are NOT running

STANDARD:

Verifies 3A and 3B RHR pumps are Not running by observing illuminated Green only light above each handswitch.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

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)

Simulator driver: When dispatched, simulator driver calls back after 1 minute and reports breaker closed for 3-FCV-74-100

STANDARD:

Dispatches AUO to close breaker for 3-FCV-74-100 at 3B 480v RMOV bd, compartment 19A.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

2. **START** RHRSW Pumps B1 and B2

STANDARD:

Starts RHRSW pumps B1 and B2 using handswitches 0-HS-23-15A/3 and 0-HS-23-19A/3 respectively (Critical) and verifies Red only light above each handswitch (Not Critical)

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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)

Simulator driver: When contacted as Unit 1 Operator, report 1-FCV-23-46 Closed

STANDARD:

Contacts Unit 1 Operator to verify 1-FCV-23-46 closed

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL ______ NOT CRITICAL __X__

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

Simulator driver: When contacted as Unit 2 Operator, report 2-FCV-23-46 Closed

STANDARD:

Contacts Unit 2 Operator to verify 2-FCV-23-46 closed

SAT ______ UNSAT ______ N/A ______ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL ______

b. **OPEN** 2-FCV-23-57, STANDBY COOLANT VLV FROM RHRSW

Simulator driver: When contacted as Unit 2 Operator, report 2-FCV-23-57 Open

STANDARD:

Contacts Unit 2 Operator to Open 2-FCV-23-57

SAT ______ UNSAT ______ N/A ______ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

5. **INJECT** 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

STANDARD:

Closes 3-FCV-74-52 (Critical) and verifies Green only light illuminated above handswitch (Not Critical)

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

b. **OPEN** 3-FCV-74-100, RHR SYS I U-2 DISCH XTIE

STANDARD:

Opens 3-FCV-74-100 (Critical) and verifies Red only light illuminated above handswitch (Not Critical)

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

c. **OPEN** 3-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE

STANDARD:

Opens 3-FCV-74-53 (Critical) and verifies Red only light illuminated above handswitch (Not Critical)

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

d. **THROTTLE** 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE, to control injection

STANDARD:

Throttles Open 3-FCV-74-52 (Critical) and verifies Red only light illuminated above handswitch (if opened fully) (Not Critical) or Red and Green lights illuminated (if throttled) (Not Critical) and verifies flow to the Reactor vessel using 3-FI-74-50 and verifies level recovering using 3-LI-3-58A or B on panel 9-5 or from ICS computer Emergency Range level (Critical)

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

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 __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:________________

____

____

END OF TASK

STOP TIME: ______________

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.”

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.”

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

EOI PROGRAM MANUAL SECTION IX

3-EOI APPENDIX-7D

ALTERNATE RPV INJECTION SYSTEM LINEUP STANDBY COOLANT

REVISION 2

PREPARED BY: M. Morrow PHONE: 3708

RESPONSIBLE ORGANIZATION: Operations

APPROVED BY: A. S. Bhatnagar

EFFECTIVE DATE: 10/26/00

LEVEL OF USE: REFERENCE USE

VALIDATION DATE: 02/14/92

QUALITY-RELATED

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

REV. NO.	DATE:	REVISED PAGES	REASON FOR CURRENT REVISION
0	7/28/95	ALL	New procedure. Necessary to support implementation of BFNP Unit 3 EOIs.
1	10/5/95	1	Added Step 1.c. to close breaker for 3-FCV-74-100.
		2	Added Step 5.a. to close LPCI outboard inject valve so that it can be throttled open.
2	10/26/00	All	Converted to MS-Word.

3-EOI APPENDIX-7D

ALTERNATE RPV INJECTION SYSTEM LINEUP
STANDBY COOLANT

LOCATION: Unit 3 Control Room

ATTACHMENTS: None

(√)

1. **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. ____

5. **INJECT** 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. **THROTTLE** 3-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE, to control injection. ____

LAST PAGE

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: ______________________________ DATE:__________
TRAINING

PLANT CONCURRENCE: ______________________________ DATE:__________
OPERATIONS

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ____________________

RO _____ SRO _____ DATE: ____________

JPM NUMBER: 399

TASK NUMBER: U-085-SU-02

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

K/A NUMBER: 201006 A2.05 K/A RATING: RO 3.1 SRO 3.5

****

TASK STANDARD: Perform 3-SR-3.3.2.1.2 RWM Functional Test for Startup

PERFORMANCE LOCATION: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 3-SR-3.3.2.1.2, Rev 3, 3-OI-85, Rev 64

VALIDATION TIME: SIMULATOR: 15:00 LOCAL: ____________

MAX. TIME ALLOWED: ____________ (FOR TIME CRITICAL JPMs ONLY)

PERFORMANCE TIME: ____________

COMMENTS: Copy of 3-SR-3.3.2.1.2 required complete up to step 7.0[4] (current REV) – give to Applicant after SR found in Book. 3-SR-3.1.3.5(A) Control Rod Movement Data Sheet needs to be open to Group 1.

ADDITIONAL COMMENT SHEETS ATTACHED? YES _____ NO X

RESULTS: SATISFACTORY _____ UNSATISFACTORY _____

EXAMINER SIGNATURE: ____________________ 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 a Unit Operator on Unit 3. Unit 3 is making preparations for startup using the A2 Startup Sequence. The RWM in operation per 3-OI-85, Control Rod Drive System. Reactor Engineering has performed 3-SR-3.3.2.1.7, RWM Program Verification.
3-SR-3.3.2.1.2, “RWM Functional Test for Startup,” has been completed up thru step 7.0[3].

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

START TIME ______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

STANDARD:

Locates SR in book in the Simulator (then Examiner hands copy to Candidate)

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

7.0 PROCEDURE STEPS

[4] **RECORD** the start date **AND** time, reason for test, plant conditions **AND ANY** pre-test remarks on Attachment 1, Surveillance Procedure Review Form in Section 8.0.

STANDARD:

Records start date and time, reason for test (startup) on Attachment 1.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

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

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[5] **PLACE** the Control Rod Drive (CRD) POWER switch (3-HS-85-46) momentarily to OFF **AND** next **SWITCH** to ON.

STANDARD:

Places 3-HS-85-46 to OFF and back to ON.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[6] **VERIFY ALL** control rods are deselected on the rod select matrix.

STANDARD:

Verifies no rod selected.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7] **PERFORM** the RWM Functional Test as follows:

[7.1] **VERIFY OR PLACE** the RWM in operation per 3-OI-85.

STANDARD:

N/A – Given in initial conditions.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7.2] [NER/C] **REQUEST** Reactor Engineering to **PERFORM** 3-SR-3.3.2.1.7 **OR VERIFY** performance of 3-SR-3.3.2.1.7. [INPO SOER 84-002]

STANDARD:

N/A – Given in initial conditions.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

CUE: Examiner, as Reactor Engineer, initial step [7.2].

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7.3] **REFER** to the Control Rod Movement Data Sheet from 3-SR-3.1.3.5(A) to identify a rod from RWM Group 02.

STANDARD:

Uses Control Room copy of 3-SR-3.1.3.5(A) to identify a Group 2 rod in the A2 Startup Sequence.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7.4] **RECORD** below the rod chosen:

Rod Number: ____ - ____

STANDARD:

Records identified rod (can be ANY control rod from RWM Group 2 (A2 Startup Sequence) – (02-31, 26-07, 58-23, 42-55, 10-39, 42-07, 58-39, 26-55, 10-23, 50-15, 50-47, 18-47, 18-15, 50-31, 34-47, 18-31, 34-15, 42-39, 26-39, 26-23, 42-23, or 34-31)

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[7.5] **SELECT** the rod recorded in Step 7.0[7.4].

STANDARD:

Selects rod from A2 Startup Sequence Group 2.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7.6] **VERIFY** the SELECT ERROR status block on the RWM display is in alarm (red background).

STANDARD:

Verifies Select Error in alarm.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[7.7] **NOTCH** the selected rod to position 02.

STANDARD:

Notch withdraws selected rod to position 02.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7.8] **VERIFY** that the rod moved to position 02 is identified as a withdraw error on the RWM display.

STANDARD:

Verifies rod at position 02 has a withdraw error on the display.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[7.9] **PLACE** the CRD Control switch (3-HS-85-48) to ROD OUT NOTCH **AND VERIFY** the following:

[7.9.1] The selected control rod does **NOT** withdraw.

STANDARD:

Places control switch 3-HS-85-48 to rod out notch and verifies the selected rod does NOT withdraw.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7.9.2] The WITHDRAW BLOCK status block on the RWM display is in alarm (red background).

STANDARD:

Verifies the Withdraw Block status block on the RWM display is in alarm.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7.9.3] RWM ROD BLOCK (3-XA-55-5B, Window 35) is in ALARM.

STANDARD:

Verifies RWM Rod Block alarm 3-XA-55-5B, window 35 is in alarm.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[7.10] **INSERT** the selected rod from position 02 to 00.

STANDARD:

Inserts selected rod from position 02 to 00.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7.11] **VERIFY** the WITHDRAW BLOCK status block on the RWM display is **NOT** in alarm.

STANDARD:

Verifies the Withdraw Block status block on the RWM display is NOT in alarm.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7.12] **VERIFY** RWM ROD BLOCK (3-XA-55-5B, Window 35) will RESET.

STANDARD:

Verifies RWM Rod Block alarm 3-XA-55-5B, window 35 alarm will reset.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[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.

STANDARD:

Uses Control Room copy of 3-SR-3.1.3.5(A) to identify a Group 1 rod in the A2 Startup Sequence.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7.14] **RECORD** below the rod chosen:

Rod Number: ____ - ____

STANDARD:

Records identified rod (can be ANY control rod from RWM Group 1 (A2 Startup Sequence) – (58-31, 34-07, 02-23, 18-55, 50-39, 19-07, 02-39, 34-55, 50-23, 10-15, 10-47, 42-47, 42-15, 10-31, 26-47, 42-31, 26-15, 18-39, 34-39, 34-23, 18-23, or 26-31)

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[7.15] **SELECT** the rod recorded in Step 7.0[7.14].

STANDARD:

Selects rod from A2 Startup Sequence Group 1.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7.16] **VERIFY** that rod Group 01 is indicated as the latched group on the RWM Panel.

STANDARD:

Verifies Select Error in alarm.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

CUE: The remaining portions will be completed by another Operator.

****

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:________________

____

____

END OF TASK

STOP TIME: ________________

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 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

****

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.

TVA

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

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.

Table of Contents

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 ≤ 10% Rated Thermal Power (RTP) in MODE 2.

1.4 Applicability

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

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

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.

Date Today

4.0 PREREQUISITES

[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. UO

[3] The reactor is in Mode 2. UO

5.0 SPECIAL TOOLS AND EQUIPMENT RECOMMENDED

None

6.0 ACCEPTANCE CRITERIA

A. Responses which fail to satisfy the following Acceptance Criteria (AC) constitute unsatisfactory Surveillance Procedure results **AND** require immediate notification of the Unit Supervisor (US) at the time of the failure:

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.

Date Today

7.0 PROCEDURE STEPS

[1] **VERIFY** that the following initial conditions are satisfied:

[1.1] **ALL** precautions **AND** limitations in Section 3.0 have been reviewed. UO

[1.2] **ALL** prerequisites in Section 4.0 are satisfied. UO

[2] **OBTAIN** permission from Unit Supervisor (US) to perform this 3-SR-3.3.2.1.2 test procedure:

Unit Supervisor	Today	now
US Signature	Date	Time

UO

[3] [NRC/C] **NOTIFY** Unit Operator (UO) before commencing this 3-SR-3.3.2.1.2 test procedure. [RPT 82-16, LER 259/8232]. UO

[4] **RECORD** the start date **AND** time, reason for test, plant conditions **AND ANY** pre-test remarks on Attachment 1, Surveillance Procedure Review Form in Section 8.0. ______

NOTE

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

[5] **PLACE** the Control Rod Drive (CRD) POWER switch (3-HS-85-46) momentarily to OFF **AND** next **SWITCH** to ON. ______

[6] **VERIFY ALL** control rods are deselected on the rod select matrix. ______

Date ________

7.0 PROCEDURE STEPS (continued)

[7] **PERFORM** the RWM Functional Test as follows:

[7.1] **VERIFY OR PLACE** the RWM in operation per 3-OI-85.

[7.2] [NER/C] **REQUEST** Reactor Engineering to **PERFORM** 3-SR-3.3.2.1.7 **OR VERIFY** performance of 3-SR-3.3.2.1.7. [INPO SOER 84-002] ________ RE

[7.3] **REFER** to the Control Rod Movement Data Sheet from 3-SR-3.1.3.5(A) to identify a rod from RWM Group 02. ________

[7.4] **RECORD** below the rod chosen:

Rod Number: ____ - ____ ________

[7.5] **SELECT** the rod recorded in Step 7.0[7.4]. ________

[7.6] **VERIFY** the SELECT ERROR status block on the RWM display is in alarm (red background). ________

[7.7] **NOTCH** the selected rod to position 02. ________

[7.8] **VERIFY** that the rod moved to position 02 is identified as a withdraw error on the RWM display. ________

[7.9] **PLACE** the CRD Control switch (3-HS-85-48) to ROD OUT NOTCH **AND VERIFY** the following:

[7.9.1] The selected control rod does **NOT** withdraw. _____(AC)

[7.9.2] The WITHDRAW BLOCK status block on the RWM display is in alarm (red background). _____(AC)

[7.9.3] RWM ROD BLOCK (3-XA-55-5B, Window 35) is in ALARM. ________

[7.10] **INSERT** the selected rod from position 02 to 00. ________

[7.11] **VERIFY** the WITHDRAW BLOCK status block on the RWM display is **NOT** in alarm. ________

[7.12] **VERIFY** RWM ROD BLOCK (3-XA-55-5B, Window 35) will RESET. ________

Date ________

7.0 PROCEDURE STEPS (continued)

[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.

Attachment 1
(Page 1 of 1)

Surveillance Procedure Review Form

REASON FOR TEST:
- ☑ Scheduled Surveillance
- ☐ System Inoperable (Explain in Remarks)
- ☐ Maintenance (WO No. ________________)
- ☐ Other (Explain in Remarks)

DATE/TIME STARTED Today / now
DATE/TIME COMPLETED ________
PLANT CONDITIONS ________

PRE-TEST REMARKS: ________________________________

PERFORMED BY:

Initials	Name (Print)		Name (Signature)
UO	Unit Operator	(Test Dir/Lead Perf)	Un Oper
		(Test Dir/Lead Perf)	

Delays or Problems (If yes, explain in POST-TEST REMARKS)? ☐ Yes ☐ No
Acceptance Criteria Satisfied? ☐ Yes ☐ No
If the above answer is no, the Unit Supervisor shall determine if an LCO exists. LCO ☐ Yes ☐ No

UNIT SUPERVISOR ____________________ Date ________

IQR (OPS) ____________________ Date ________

SCHEDULING COORDINATOR ____________________ Date ________

POST-TEST REMARKS: ________________________________

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: ______________________ DATE:__________
TRAINING

PLANT CONCURRENCE: ______________________ DATE:__________
OPERATIONS

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

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

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 4.1 SRO 4.1

****

TASK STANDARD: 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 LOCATION: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 2-EOI Appendix-11B, Rev 5

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 _____ UNSATISFACTORY _____

EXAMINER SIGNATURE: ______________________ 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. 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.

START TIME ______________

Simulator Driver: This JPM requires 71-9 tripped and failure of RCIC controller after time delay (trigger off of 71-8 valve).

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

STANDARD:

Obtained copy of 2-EOI Appendix-11B.

SAT _____ UNSAT _____ N/A _____ COMMENTS:______________

____

____

CAUTION

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

****

PERFORMANCE STEP: CRITICAL ____ NOT CRITICAL X

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 NOT to execute EOI Appendix 16A or 16B.

SAT ____ UNSAT ____ N/A ____ COMMENTS:____________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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.

STANDARD:

Determined Suppression Pool level <5.25 inches and EOI Appendix-16E not required.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

3. IF ..... RCIC Turbine is operating and NOT 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.

STANDARD:

N/A – RCIC is Not operating.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

4. IF ..... RCIC is in standby readiness,
THEN ... **START** RCIC as follows:

a. **VERIFY CLOSED** 2-FCV-71-39, RCIC PUMP INJECTION VALVE.

STANDARD:

Verified only GREEN valve position indicating lamp illuminated above 2-HS-71-39A.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

b. **VERIFY RESET** and **OPEN** 2-FCV-71-9, RCIC TURB TRIP/THROT VALVE RESET.

STANDARD:

Recognizes FCV-71-9 is tripped. Resets and Opens FCV-71-9 (Critical) and Verifies illuminated RED position indicating lamp above 2-ZI-71-9.(Not Critical)

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

c. **VERIFY OPEN** the following valves:

- 2-FCV-71-38, RCIC PUMP CST TEST VLV

STANDARD:

Held 2-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: CRITICAL __X__ NOT CRITICAL _____

- 2-FCV-71-25, RCIC LUBE OIL COOLING WTR VLV

STANDARD:

Placed 2-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 ______ NOT CRITICAL __X__

- 2-FCV-71-34, RCIC PUMP MIN FLOW VALVE

STANDARD:

Placed 2-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: CRITICAL __X__ NOT CRITICAL ______

- 2-FCV-73-36, HPCI/RCIC CST TEST VLV.

STANDARD:

Placed 2-HS-73-36A 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 _____ NOT CRITICAL __X__

d. **PLACE** 2-HS-71-31A, RCIC VACUUM PUMP, handswitch in START.

STANDARD:

Placed 2-HS-71-31A in the START position.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

e. **OPEN** 2-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV, to start RCIC Turbine.

STANDARD:

Placed 2-HS-71-8A in the OPEN position (Critical) and verified illuminated RED valve position indicating lamp above hand switch (Not Critical).

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

f. **VERIFY** RCIC Turbine speed accelerates to above 2100 rpm.

STANDARD:

Verified speed greater than 2100 rpm indicated on 2-SI-71-42A.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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.

STANDARD:

When 2-FIC-71-36A indicated flow > 120 gpm, verified only GREEN valve position indicating lamp illuminated above 2-HS-71-34A.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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.

STANDARD:

Verified RCIC flow > 60 gpm as indicated on 2-FIC-71-36A and/or RCIC initiation lamp located above XS-71-52 Not illuminated.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

6. **THROTTLE** 2-FCV-71-38, RCIC PUMP CST TEST VLV, to control RCIC pump discharge pressure at or below 1100 psig.

STANDARD:

Throttled 2-FCV-71-38 to maintain pressure on 2-PI-71-35A at or below 1100 psig. (ONLY CRITICAL if pressure exceeds 1100 psig – any pressure < 1100 psig is acceptable.)

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

EXAMINERS NOTE: ALTERNATE PATH STARTS HERE:

7. **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 Manual 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:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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.

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.

****

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:_______________

____

____

END OF TASK

STOP TIME: _______________

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

2-EOI APPENDIX-11B

ALTERNATE RPV PRESSURE CONTROL SYSTEMS RCIC TEST MODE

LOCATION: Unit 2 Control Room

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.

****

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. ____

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. ____

3. IF ..... RCIC Turbine is operating and NOT 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. ____

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

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

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

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

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 4.1 SRO 4.1

****

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 _____ UNSATISFACTORY _____

EXAMINER SIGNATURE: ____________________ 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. 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.

START TIME ______________

Simulator Driver: This JPM requires 71-9 tripped and failure of RCIC controller after time delay (trigger off of 71-8 valve).

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

STANDARD:

Obtained copy of 3-EOI Appendix-11B.

SAT _____ UNSAT _____ N/A _____ COMMENTS:______________

____

____

CAUTION

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

****

PERFORMANCE STEP: CRITICAL ____ NOT CRITICAL __X__

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 or steam cooling are not required.

STANDARD:

Determined NOT to execute EOI Appendix16A or 16B.

SAT ____ UNSAT ____ N/A ____ COMMENTS:____________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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.

STANDARD:

Determined Suppression Pool level < +5.25 inches and EOI Appendix-16E not required.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

3. IF ..... RCIC Turbine is operating and NOT required for 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.

STANDARD:

N/A – RCIC is Not operating.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

4. IF ..... RCIC is in standby readiness,
THEN ... **START** RCIC as follows:

a. **VERIFY CLOSED** 3-FCV-71-39, RCIC PUMP INJECTION VALVE.

STANDARD:

Verified only GREEN valve position indicating lamp illuminated above 3-HS-71-39A.

SAT ______ UNSAT ______ N/A ______ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

b. **VERIFY RESET** and **OPEN** 3-FCV-71-9, RCIC TURB TRIP/THROT VALVE RESET.

STANDARD:

Recognizes FCV-71-9 is tripped. Resets and Opens FCV-71-9 (Critical) and Verifies illuminated RED position indicating lamp above 3-ZI-71-9.(Not Critical)

SAT ______ UNSAT ______ N/A ______ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ 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:________________

____

____

****

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 _____ NOT CRITICAL __X__

- 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 _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ 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 valve position indicating lamp illuminated above associated control switch (Not Critical).

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL ______ NOT CRITICAL __X__

d. **PLACE** 3-HS-71-31A, RCIC VACUUM PUMP, handswitch in START.

STANDARD:

Placed 3-HS-71-31A in the START position.

SAT ______ UNSAT ______ N/A ______ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL ______

e. **OPEN** 3-FCV-71-8, RCIC TURBINE STEAM SUPPLY VLV, to start RCIC Turbine.

STANDARD:

Placed 3-HS-71-8A in the OPEN position (Critical) and verified illuminated RED valve position indicating lamp above hand switch (Not Critical).

SAT ______ UNSAT ______ N/A ______ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

f. **VERIFY** RCIC Turbine speed accelerates to above 2100 rpm.

STANDARD:

Verified speed greater than 2100 rpm indicated on 3-SI-71-42A.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

5. **VERIFY** proper RCIC minimum flow valve operation as follows:

a. IF...... RCIC flow is above 120 gpm,
THEN.... **VERIFY CLOSED** 3-FCV-71-34, RCIC PUMP MIN FLOW VALVE.

STANDARD:

When 3-FIC-71-36A indicated flow > 120 gpm, verified only GREEN valve position indicating lamp illuminated above 3-HS-71-34A.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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.

STANDARD:

Verified RCIC flow > 60 gpm as indicated on 3-FIC-71-36A and/or RCIC initiation lamp located above XS-71-52 Not illuminated.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

6. **THROTTLE** 3-FCV-71-38, RCIC PUMP CST TEST VLV, to control RCIC pump discharge pressure at or below 1100 psig.

STANDARD:

Throttled 3-FCV-71-38 to maintain pressure on 3-PI-71-35A at or below 1100 psig. (ONLY CRITICAL if pressure exceeds 1100 psig – any pressure < 1100 psig is acceptable.)

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

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 Manual 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:____________

****

PERFORMANCE STEP: CRITICAL ______ NOT CRITICAL __X__

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.

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.

****

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:________________

____

____

END OF TASK

STOP TIME: ________________

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.

****

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

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

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

EOI PROGRAM MANUAL SECTION IX

3-EOI APPENDIX-11B

ALTERNATE RPV PRESSURE CONTROL SYSTEMS RCIC TEST MODE

REVISION 3

PREPARED BY: D. Powell PHONE: 2528

RESPONSIBLE ORGANIZATION: Operations

APPROVED BY: Tony Elms

EFFECTIVE DATE: 08/22/2007

LEVEL OF USE: REFERENCE USE

EOI VALIDATION DATE: 02/14/1992

QUALITY-RELATED

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

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

3-EOI APPENDIX-11B

ALTERNATE RPV PRESSURE CONTROL SYSTEMS RCIC TEST MODE

LOCATION: Unit 3 Control Room

ATTACHMENTS: None (√)

****

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.

****

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. ____

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. ____

3. IF ..... RCIC Turbine is operating and NOT required for 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.

5. **VERIFY** proper RCIC minimum flow valve operation as follows:

a. IF ..... RCIC flow is above 120 gpm,
THEN ... **VERIFY CLOSED**D 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. ____

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

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: ______________________ DATE: __________
TRAINING

PLANT CONCURRENCE: ______________________ DATE: __________
OPERATIONS

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

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

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 UNCOUPLED CONTROL ROD

K/A NUMBER: 201003A2.02 K/A RATING: RO 3.7 SRO: 3.8

****

TASK STANDARD: PERFORM OPERATIONS NECESSARY TO RESPOND TO AN UNCOUPLED CONTROL ROD AS DIRECTED BY 2-AOI-85-2

LOCATION OF PERFORMANCE: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 2-AOI-85-2, REV 12

VALIDATION TIME: CONTROL ROOM: 11:00 LOCAL: ________

MAX. TIME ALLOWED: ________ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: ________ CONTROL ROOM ______ LOCAL ______

COMMENTS: ____

Additional comment sheets attached? YES _____ NO _____

RESULTS: **SATISFACTORY** _______ **UNSATISFACTORY** _______

SIGNATURE: ________________________ **DATE:** ________________
EXAMINER

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.

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:___________________________

4.0 OPERATOR ACTIONS

4.1 Immediate Actions

****

Performance Step: Critical X Not Critical ____

4.1.1 STOP all control rod withdrawal.

Standard:

DID NOT ATTEMPT further rod withdrawal.

SAT_____ UNSAT______ N/A ______ COMMENTS:______________________

4.2 Subsequent Actions

****

Performance Step: Critical___ Not Critical X

4.2.1 NOTIFY Reactor Engineer to evaluate the uncoupled control rod for its impact on core thermal limits and rod worth.

Standard:

NOTIFIED Reactor Engineer to evaluate the rod for its impact on core thermal limits and rod worth.

SAT_____ UNSAT______ N/A ______ COMMENTS:______________________

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

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

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

PERFORM the following:

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

****

Performance Step : Critical X Not Critical ___

4.2.3.1 **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: ______________________

____

____

****

Performance Step : Critical X Not Critical___

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

Standard:

NOTCH WITHDREW the affected control rod to position 48.

SAT_____ UNSAT_______ N/A _______ COMMENTS:_______________

****

Performance Step : Critical X Not Critical___

4.2.3.4 **PERFORM** a coupling check.

Standard:

PERFORMED coupling integrity check by giving another notch withdrawal signal. **VERIFIED** control rod still uncoupled by observing CONTROL ROD OVERTRAVEL and CONTROL ROD DRIFT alarms and loss of control rod position indication.

SAT_____ UNSAT_______ N/A _______ COMMENTS:_______________

****

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.

****

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.

END OF TASK

STOP TIME__________

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

Effective Date: 01-24-2007

Responsible Organization: OPS, Operations

Prepared By: Terry K. Boyer

Approved By: John T. Kulisek

Current Revision Description

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.

Table of Contents

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

4.0 OPERATOR ACTIONS

4.1 Immediate Actions

[1] **STOP** all control rod withdrawal. ☐

4.2 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** rod pattern as directed by Reactor Engineer throughout performance of this procedure. ☐

[3] **IF** control rod drive is at position 48, **THEN,** with Reactor Engineer concurrence,

PERFORM the following: ☐

[3.1] **NOTCH INSERT** control rod drive to position 46 to attempt to couple the control rod. ☐

[3.2] **RESET** associated annunciators. ☐

[3.3] **NOTCH WITHDRAW** control rod drive to position 48. ☐

[3.4] **PERFORM** coupling check. ☐

[3.5] **IF** coupling integrity check fails, **THEN**

CONTINUOUSLY INSERT control rod drive to position 00 to attempt to latch control rod with control rod drive mechanism. ☐

[3.5.1] **RESET** associated annunciators. ☐

[3.5.2] **NOTCH WITHDRAW** control rod to position 48. ☐

[3.5.3] **PERFORM** coupling check. ☐

4.2 Subsequent Actions **(continued)**

[4] **IF** the control rod drive is at any position other than notch 48 **THEN** with Reactor Engineer concurrence, after thorough evaluation of the reactor core conditions, **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] **CONTINUOUSLY INSERT** control rod drive to position 00 to attempt to latch control rod with control rod drive mechanism. ☐

[4.1.2] **NOTCH WITHDRAW** control rod to position 48. ☐

[4.1.3] **PERFORM** coupling check. ☐

[4.1.4] **IF** coupling integrity check fails, **THEN**

CONTINUOUSLY INSERT control rod drive to position 00 to attempt to latch control rod with control rod drive mechanism. ☐

A. **RESET** associated annunciators. ☐

B. **NOTCH WITHDRAW** control rod to position 48. ☐

C. **PERFORM** coupling check. ☐

[4.2] **ATTEMPT** to latch control rod by inserting control rod one notch as follows: ☐

[4.2.1] **NOTCH INSERT** control rod drive one notch to attempt to couple control rod. ☐

[4.2.2] **NOTCH WITHDRAW** control rod drive to position 48. ☐

[4.2.3] **PERFORM** coupling check. ☐

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] **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 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

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: ______________________ DATE: __________
TRAINING

PLANT CONCURRENCE: ______________________ DATE: __________
OPERATIONS

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

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

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 UNCOUPLED CONTROL ROD

K/A NUMBER: 201003A2.02 K/A RATING: RO 3.7 SRO: 3.8

****

TASK STANDARD: PERFORM OPERATIONS NECESSARY TO RESPOND TO AN UNCOUPLED CONTROL ROD AS DIRECTED BY 3-AOI-85-2

LOCATION OF PERFORMANCE: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 3-AOI-85-2, REV 6

VALIDATION TIME: CONTROL ROOM: 11:00 LOCAL: __________

MAX. TIME ALLOWED: ________ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: __________ CONTROL ROOM ______ LOCAL _______

COMMENTS: ____

____

____

Additional comment sheets attached? YES ______ NO ______

RESULTS: **SATISFACTORY** ________ **UNSATISFACTORY** ________

SIGNATURE: ______________________________ **DATE:** ______________________
EXAMINER

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.

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:___________________________

____

____

4.0 OPERATOR ACTIONS

4.1 Immediate Actions

****

Performance Step: Critical X Not Critical ____

4.1.1 STOP all control rod withdrawal.

Standard:

DID NOT ATTEMPT further rod withdrawal.

SAT_____ UNSAT______ N/A ______ COMMENTS:______________________________

4.2 Subsequent Actions

****

Performance Step: Critical ___ Not Critical X

4.2.1 NOTIFY Reactor Engineer to evaluate the uncoupled control rod for its impact on core thermal limits and rod worth.

Standard:

NOTIFIED Reactor Engineer to evaluate the rod for its impact on core thermal limits and rod worth.

SAT_____ UNSAT______ N/A ______ COMMENTS:______________________________

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

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

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

PERFORM the following:

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

****

Performance Step : Critical X Not Critical___

4.2.3.1 **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:____________________________

____

____

****

Performance Step : Critical X Not Critical___

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

Standard:

NOTCH WITHDREW the affected control rod to position 48.

SAT_____ UNSAT______ N/A ______ COMMENTS:____________________________

____

____

****

Performance Step : Critical X Not Critical___

4.2.3.4 **PERFORM** a coupling check.

Standard:

PERFORMED coupling integrity check by giving another notch withdrawal signal. **VERIFIED** control rod still uncoupled by observing CONTROL ROD OVERTRAVEL and CONTROL ROD DRIFT alarms and loss of control rod position indication.

SAT_____ UNSAT______ N/A ______ COMMENTS:____________________________

____

____

****

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.

****

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____________

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)

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

4.1 Immediate Actions

[1] **STOP** all control rod withdrawal. ☐

4.2 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. ☐

[3] **IF** the control rod drive is at position 48 **AND** with Reactor Engineer concurrence, **THEN**

PERFORM the following:

[3.1] **NOTCH INSERT** the control rod drive to position 46 to attempt to couple the control rod. ☐

[3.2] **RESET** associated annunciators. ☐

[3.3] **NOTCH WITHDRAW** the control rod drive to position 48. ☐

[3.4] **PERFORM** a coupling check. ☐

[3.5] **IF** coupling integrity check fails, **THEN**

CONTINUOUSLY INSERT control rod drive to position 00 to attempt to latch control rod with control rod drive mechanism.

[3.5.1] **RESET** associated annunciators. ☐

[3.5.2] **NOTCH WITHDRAW** control rod to position 48. ☐

[3.5.3] **PERFORM** a coupling check. ☐

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] **CONTINUOUSLY INSERT** control rod drive to position 00 to attempt to latch control rod with control rod drive mechanism. ☐

[4.1.2] **NOTCH WITHDRAW** control rod to position 48. ☐

[4.1.3] **PERFORM** 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.

A. **RESET** associated annunciators. ☐

B. **NOTCH WITHDRAW** control rod to position 48. ☐

C. **PERFORM** a coupling check. ☐

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 CANNOT 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

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 CONCURRENCE: ______________________ DATE: __________
OPERATIONS

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description 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

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 3.4 SRO 3.5

****

TASK STANDARD: PERFORM CONTROL ROOM OPERATIONS REQUIRED TO EMERGENCY VENTILATE PRIMARY CONTAINMENT

PERFORMANCE LOCATION: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 2-EOI Appendix-13, Rev 6

VALIDATION TIME: SIMULATOR: 5:00 LOCAL: __________

MAX. TIME ALLOWED: __________ (FOR TIME CRITICAL JPMs ONLY)

PERFORMANCE TIME: __________

COMMENTS: ____________________
____
____

ADDITIONAL COMMENT SHEETS ATTACHED? YES _____ NO _____

RESULTS: SATISFACTORY _____ UNSATISFACTORY _____

EXAMINER SIGNATURE: ____________________ 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. 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.

START TIME ______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

STANDARD:

Obtained copy of 2-EOI Appendix-13.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

1. **NOTIFY** Shift Manager / SED of the following:

   - Emergency Venting of Primary Containment is in progress.
   - Off-Gas Release Rate Limits will be exceeded.

CUE: [Shift Manager/SED acknowledges] Emergency Primary Containment venting is in progress and Off-Gas release rate limits will be exceeded.

STANDARD:

Notified Shift Manager/SED by voice contact with examiner.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

2. **VENT** the Suppression Chamber as follows (Panel 9-3):

a. IF ....EITHER of the following exists:

• Suppression Pool water level CANNOT be determined to be below 20 ft,

OR

• Suppression Chamber CANNOT be vented,

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

STANDARD:

Verified Suppression Pool Level below 20 ft using 2-LI-64-159A, SUPPR POOL WATER LEVEL and/or ICS.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

b. **PLACE** keylock switch 2-HS-64-222B, HARDENED SUPPR CHBR VENT OUTBD PERMISSIVE, in PERM.

STANDARD:

Placed 2-HS-64-222B in the PERM position.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

c. **CHECK** blue indicating light above 2-HS-64-222B, HARDENED SUPPR CHBR VENT OUTBD PERMISSIVE, illuminated.

STANDARD:

Verified BLUE indicating lamp above 2-HS-64-222B Illuminated.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

d. **OPEN** 2-FCV-64-222, HARDENED SUPPR CHBR VENT OUTBD ISOL VLV.

STANDARD:

Placed 2-HS-64-222A in the OPEN position (critical) and Verified illuminated RED valve position indicating lamp above associated hand switch (not critical).

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

e. **PLACE** keylock switch 2-HS-64-221B, HARDENED SUPPR CHBR VENT INBD PERMISSIVE, in PERM.

STANDARD:

Placed 2-HS-64-221B in the PERM position.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

f. **CHECK** blue indicating light above 2-HS-64-221B, HARDENED SUPPR CHBR VENT INBD PERMISSIVE, illuminated.

STANDARD:

Verified BLUE indicating lamp above 2-HS-64-221B Illuminated.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

g. **OPEN** 2-FCV-64-221, HARDENED SUPPR CHBR VENT INBD ISOL VLV.

STANDARD:

placed 2-HS-64-221A in the OPEN position (critical) and Verified illuminated RED valve position indicating lamp above associated hand switch (not critical).

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

h. **CHECK** Drywell and Suppression Chamber Pressure lowering.

STANDARD:

Verified drywell and suppression chamber pressure lowering by available containment pressure instrumentation and/or ICS.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

i. **MAINTAIN** Primary Containment Pressure below 55 psig using 2-FCV-64-222, HARDENED SUPR CHBR VENT OUTBD ISOL VLV, as directed by SRO.

STANDARD:

None.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

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

****

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:_______________

____

____

END OF TASK

STOP TIME: _______________

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

2-EOI APPENDIX-13

EMERGENCY VENTING PRIMARY CONTAINMENT

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 .... EITHER of the following exists:

      - Suppression Pool water level CANNOT be determined to be below 20 ft,

        OR

      - Suppression Chamber CANNOT 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. ____

2. (continued from previous page)

   h. **CHECK** Drywell and Suppression Chamber Pressure lowering. ____

   i. **MAINTAIN** Primary Containment Pressure below 55 psig using 2-FCV-64-222, HARDENED SUPR CHBR VENT OUTBD ISOL VLV, as directed by SRO. ____

3. IF............Suppression Chamber vent path is NOT available,
THEN.......**VENT** the Drywell as follows:

   a. **NOTIFY** Shift Manager / SED that Secondary Containment integrity failure is possible. ____

   b. **NOTIFY** Radiation Protection that Reactor Building is being evacuated due to imminent failure of Primary Containment vent ducts. ____

   c. **EVACUATE** ALL Reactor Buildings using P.A. System. ____

   d. **START** ALL available SGTS trains. ____

   e. **VERIFY CLOSED** 2-FCV-64-36, DW/SUPPR CHBR VENT TO SGT (Panel 9-3). ____

   f. **VERIFY OPEN** the following dampers (Panel 9-25):

      - 2-FCO-64-40, REACTOR ZONE EXH TO SGTS ____
      - 2-FCO-64-41, REACTOR ZONE EXH TO SGTS. ____

   g. **VERIFY CLOSED** 2-FCV-64-29, DRYWELL VENT INBD ISOL VALVE (Panel 9-3 or Panel 9-54). ____

   h. **DISPATCH** personnel to Unit 2 Auxiliary Instrument Room to perform the following:

      1) **REFER TO** Attachment 1 and **OBTAIN** one 12-in. banana jack jumper from EOI Equipment Storage Box. ____
      2) **LOCATE** terminal strip DD in Panel 9-43, Front. ____
      3) **JUMPER** DD-76 to DD-77 (Panel 9-43). ____
      4) **NOTIFY** Unit Operator that jumper for 2-FCV-64-30, DRYWELL VENT OUTBD ISOLATION VLV, is in place. ____

   i. **VERIFY OPEN** 2-FCV-64-30, DRYWELL VENT OUTBD ISOLATION VLV (Panel 9-3). ____

3. (continued from previous page)

****

CAUTION

- The following step will fail ductwork inside Secondary Containment and may fail Secondary Containment Integrity.
- Off-Gas Release Rate Limits will be exceeded.

****

j. **PLACE** keylock switch 2-HS-84-36, SUPPR CHBR/DW VENT ISOL BYP SELECT, to DRYWELL (Panel 9-54). ____

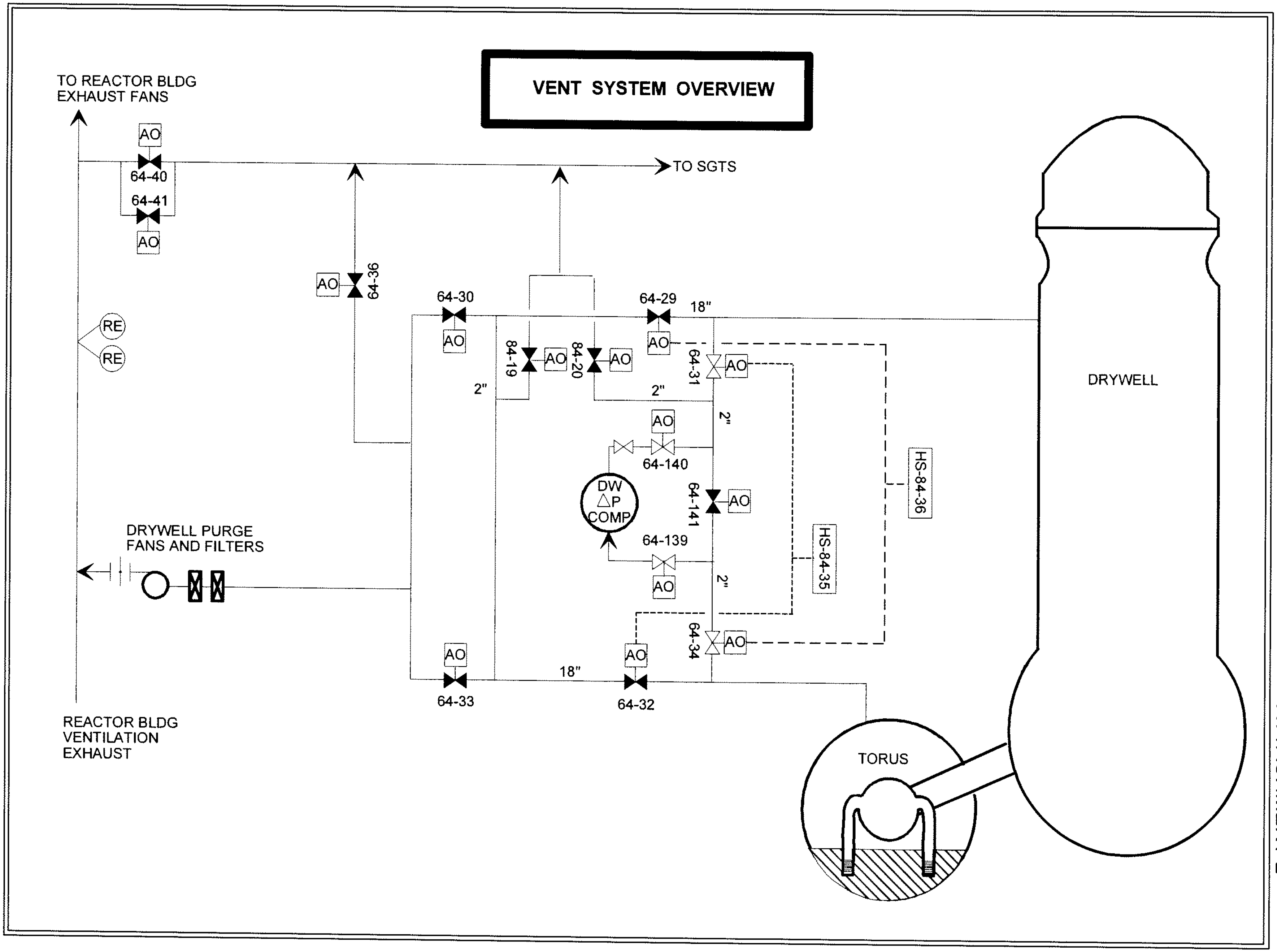
k. **VERIFY OPEN** 2-FCV-64-29, DRYWELL VENT INBD ISOL VALVE (Panel 9-54). ____

l. **CHECK** Drywell and Suppression Chamber pressure lowering. ____

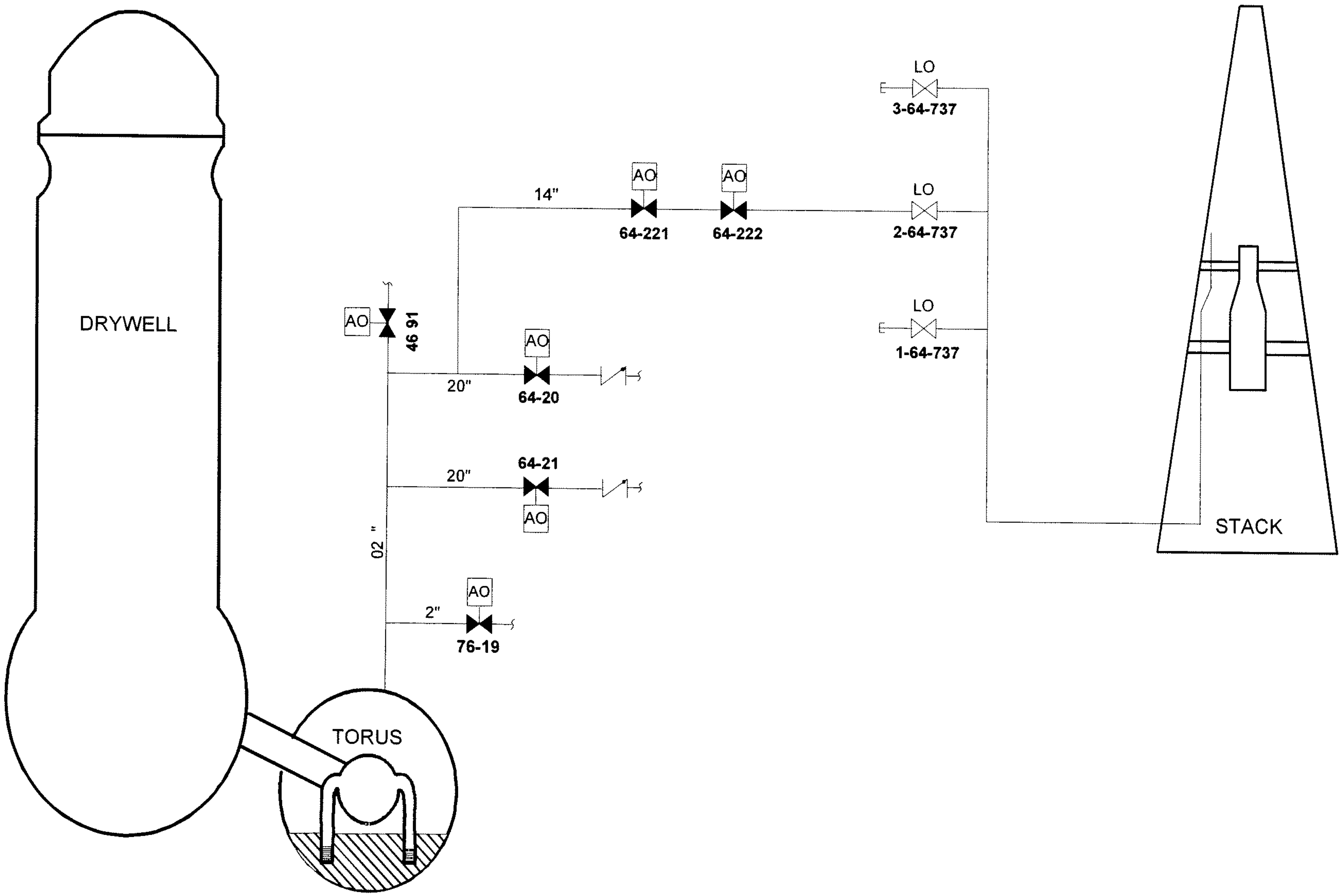
m. **MAINTAIN** Primary Containment pressure below 55 psig using 2-FCV-64-29, DRYWELL VENT INBD ISOL VALVE, as directed by SRO. ____

END OF TEXT

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


VENT SYSTEM OVERVIEW
TO REACTOR BLDG
EXHAUST FANS
TO SGTS
AO
64-40
64-41
AO
AO
64-36
RE
RE
64-30
64-29
18"
AO
AO
84-19
AO
84-20
AO
64-31
AO
2"
2"
2"
AO
64-140
DW
△P
COMP
64-141
AO
64-139
AO
2"
HS-84-36
HS-84-35
DRYWELL PURGE
FANS AND FILTERS
64-34
AO
AO
AO
18"
64-33
64-32
DRYWELL
TORUS
REACTOR BLDG
VENTILATION
EXHAUST

HARDENED VENT FLOW PATH



LAST PAGE

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: ______________________ DATE:__________
TRAINING

PLANT CONCURRENCE: ______________________ DATE:__________
OPERATIONS

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ______________________________

RO ______ SRO ______ DATE: ______________

JPM NUMBER: 104F

TASK NUMBER: U-082-NO-07

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

K/A NUMBER: 264001A4.04 K/A RATING: RO 3.7 SRO 3.7

****

TASK STANDARD: PERFORM OPERATIONS NECESSARY TO PARALLEL A DIESEL GENERATOR WITH OFFSITE POWER AT PANEL 9-23 AS DIRECTED BY 0-OI-82, WITH DEGRADED GRID

PERFORMANCE LOCATION: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 0-OI-82, Rev 100

VALIDATION TIME: SIMULATOR: 15:00

MAX. TIME ALLOWED: ___________ (FOR TIME CRITICAL JPMs ONLY)

PERFORMANCE TIME: ___________

COMMENTS: ______________________________

____

____

ADDITIONAL COMMENT SHEETS ATTACHED? YES ______ NO ______

RESULTS: SATISFACTORY ______ UNSATISFACTORY ______

EXAMINER SIGNATURE: ___________________________ 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 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.

START TIME ______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

STANDARD:

Identified or Obtained copy of 0-OI-82.

SAT _____ UNSAT _____ N/A _____ COMMENTS:______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

STANDARD:

REVIEWED Precautions and Limitations. **VERIFIED** DG A operating by alarm/red light illuminated on START switch. **VERIFIED** normal supply breaker to 4kV Shutdown Board closed by red light illuminated on breaker control switch. Phase voltages were given in initial conditions.

SAT _____ UNSAT _____ N/A _____ COMMENTS:______________

____

____

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
A	**DG A BKR 1818 SYNC**	**0-25-211-A/22A**	**0-9-23-7**
B	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
C	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

STANDARD:

Placed 0-25-211-A/22A SYNC switch in the ON position

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[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

STANDARD:

Verified 4kV Shutdown Bd A voltage 3950-4400 volts and stable

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[4] **CHECK** SYSTEM SYNC FREQUENCY is between 59 Hertz and 61 Hertz and **NOT** undergoing abnormal frequency transients

STANDARD:

Verified System Sync Frequency 59-61 Hz and stable

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

CAUTION

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

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

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

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

[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

****

PERFORMANCE STEP: CRITICAL X NOT CRITICAL ____

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

Diesel	Handswitch Name	Handswitch No.	Panel
A	**DG A MODE SELECT**	**0-HS-82-A/5A**	**0-9-23-7**
B	DG B MODE SELECT	0-HS-82-B/5A	0-9-23-7
C	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

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7] **RELEASE** the Diesel Generator mode selector switch **and OBSERVE** PARALLELED WITH SYSTEM light illuminated

STANDARD:

Released the Operation Mode Selector switch and Verified RED Parallel with System light illuminated

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[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
A	**DG A GOVERNOR CONTROL**	**0-HS-82-A/3A**	**0-9-23-7**
B	DG B GOVERNOR CONTROL	0-HS-82-B/3A	0-9-23-7
C	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:________________

****

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**	**0-HS-82-A/2A** **0-EI-82-AB** **0-EI-211-AB**	**0-9-23-7**
B	DG B VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	0-HS-82-B/2A 0-EI-82-AB 0-EI-211-AB	0-9-23-7
C	DG C VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	0-HS-82-C/2A 0-EI-82-CD 0-EI-211-CD	0-9-23-8
D	DG D VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	0-HS-82-D/2A 0-EI-82-CD 0-EI-211-CD	0-9-23-8

STANDARD:

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

SAT ____ UNSAT ____ N/A ____ COMMENTS:____________

****

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**
B	DG B BKR 1822	0-HS-211-B/4A	0-9-23-7
C	DG C BKR 1812	0-HS-211-C/4A	0-9-23-8
D	DG D BKR 1816	0-HS-211-D/20A	0-9-23-8

STANDARD:

When synchroscope needle approximately 2 minutes to left of 12 0'clock position, Placed 0-HS-211-A/22A in the Close position

SAT ______ UNSAT ______ N/A ______ COMMENTS:__________________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[11] **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**
B	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
C	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

STANDARD:

Placed 0-25-211-A/22A 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

****

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
A	**DG A GOVERNOR CONTROL** **DG A VOLT REGULATOR CONT**	**0-HS-82-A/3A** **0-HS-82-A/2A**	**0-9-23-7**
B	DG B GOVERNOR CONTROL DG B VOLT REGULATOR CONT	0-HS-82-B/3A 0-HS-82-B/2A	0-9-23-7
C	DG C GOVERNOR CONTROL DG C VOLT REGULATOR CONT	0-HS-82-C/3A 0-HS-82-C/2A	0-9-23-8
D	DG D GOVERNOR CONTROL DG C VOLT REGULATOR CONT	0-HS-82-D/3A 0-HS-82-D/2A	0-9-23-8

STANDARD:

Adjusted 0-HS-82-A/3A to obtain 2600 $\pm$50 Kw. Determined KVAR loading to be 1950 $\pm$ 50 from Illustration 1. Adjusted 0-HS-82-A/2A to obtain 1950 $\pm$50 KVAR

SAT ____ UNSAT ____ N/A ____ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

CUE: Another Operator is performing Illustration 2

STANDARD:

Acknowledges another Operator is performing Illustration 2 and continues to [14]

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

Simulator driver should Insert Grid Instability Now

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

EXAMINERS NOTE: ALTERNATE PATH STARTS HERE:

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

STANDARD:

Monitors offsite source and notices a voltage transient in progress

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

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
A	**DG A CONTROL**	**0-HS-82-A/1A**	**0-9-23-7**
B	DG B CONTROL	0-HS-82-B/1A	0-9-23-7
C	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:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[15.3] **REFER TO** Section 7.1 and **CONTINUE** with Shutting down the Diesel Generator

STANDARD:

Refers to section 7.1 of 0-OI-82 to continue shutdown of diesel generator

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

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

****

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:_______________

____

____

END OF TASK

STOP TIME: _______________

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 $\pm$ 50 Kw.

TVA

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

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

Table of Contents

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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

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

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.

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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.

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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.

3.0 PRECAUTIONS AND LIMITATIONS (continued)

M. Personnel working in the D/G rooms should remain aware that the possibility exists of CO_2 discharge into the room. Upon CO_2 initiation, an alarm will sound. Personnel then have 20 seconds to evacuate the area before CO_2 is dispensed. For detection purposes, a wintergreen odor is injected into CO_2 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 or 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 OR High Drywell pressure) on Unit 1, Unit 2 or Unit 3 will start all eight Diesel Generators.

S. Under normal conditions, any 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
6. Common Accident Signal (Low Low Low Reactor water level OR Low Reactor pressure in conjunction with High Drywell pressure on Unit 1, 2 or Unit 3.)

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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]

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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.

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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.

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

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
B	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
C	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

[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. ☐

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

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
A	DG A BKR 1818 SYNC	0-25-211-A/22A	0-9-23-7
B	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
C	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

[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. ☐

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

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
A	DG A MODE SELECT	0-HS-82-A/5A	0-9-23-7
B	DG B MODE SELECT	0-HS-82-B/5A	0-9-23-7
C	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
B	DG B GOVERNOR CONTROL	0-HS-82-B/3A	0-9-23-7
C	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

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

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

Diesel	Instrument Name	Inst No.	Panel
A	DG A VOLT REGULATOR CONT	0-HS-82-A/2A	0-9-23-7
	GEN SYNC REF VOLTAGE	0-EI-82-AB	
	SYSTEM SYNC REF VOLTAGE	0-EI-211-AB	
B	DG B VOLT REGULATOR CONT	0-HS-82-B/2A	0-9-23-7
	GEN SYNC REF VOLTAGE	0-EI-82-AB	
	SYSTEM SYNC REF VOLTAGE	0-EI-211-AB	
C	DG C VOLT REGULATOR CONT	0-HS-82-C/2A	0-9-23-8
	GEN SYNC REF VOLTAGE	0-EI-82-CD	
	SYSTEM SYNC REF VOLTAGE	0-EI-211-CD	
D	DG D VOLT REGULATOR CONT	0-HS-82-D/2A	0-9-23-8
	GEN SYNC REF VOLTAGE	0-EI-82-CD	
	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
B	DG B BKR 1822	0-HS-211-B/4A	0-9-23-7
C	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

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

[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
B	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
C	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

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	0-9-23-7
	DG A VOLT REGULATOR CONT	0-HS-82-A/2A	
B	DG B GOVERNOR CONTROL	0-HS-82 B/3A	0-9-23-7
	DG B VOLT REGULATOR CONT	0-HS-82-B/2A	
C	DG C GOVERNOR CONTROL	0-HS-82-C/3A	0-9-23-8
	DG C VOLT REGULATOR CONT	0-HS-82-C/2A	
D	DG D GOVERNOR CONTROL	0-HS-82-D/3A	0-9-23-8
	DG D VOLT REGULATOR CONT	0-HS-82-D/2A	

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

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

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

[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
A	DG A CONTROL	0-HS-82-A/1A	0-9-23-7
B	DG B CONTROL	0-HS-82-B/1A	0-9-23-7
C	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. ☐

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

[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
A	DG A GOVERNOR CONTROL	0-HS-82-A/3A	0-9-23-7
	DG A VOLT REGULATOR CONT	0-HS-82-A/2A	
	DG A KILOWATTS	0-JI-82-A/A	
	DG A KILOVARS	0-VAR-82-A/A	
B	DG B GOVERNOR CONTROL	0-HS-82 B/3A	0-9-23-7
	DG B VOLT REGULATOR CONT	0-HS-82-B/2A	
	DG B KILOWATTS	0-JI-82-B/A	
	DG B KILOVARS	0-VAR-82-B/A	
C	DG C GOVERNOR CONTROL	0-HS-82-C/3A	0-9-23-8
	DG C VOLT REGULATOR CONT	0-HS-82-C/2A	
	DG C KILOWATTS	0-JI-82-C/A	
	DG C KILOVARS	0-VAR-82-C/A	
D	DG D GOVERNOR CONTROL	0-HS-82-D/3A	0-9-23-8
	DG D VOLT REGULATOR CONT	0-HS-82-D/2A	
	DG D KILOWATTS	0-JI-82-D/A	
	DG D KILOVARS	0-VAR-82-D/A	

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

[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
B	DG B BKR 1822	0-HS-211-B/4A	0-9-23-7
C	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
A	DG A MODE SELECT	0-HS-82-A/5A	0-9-23-7
B	DG B MODE SELECT	0-HS-82-B/5A	0-9-23-7
C	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

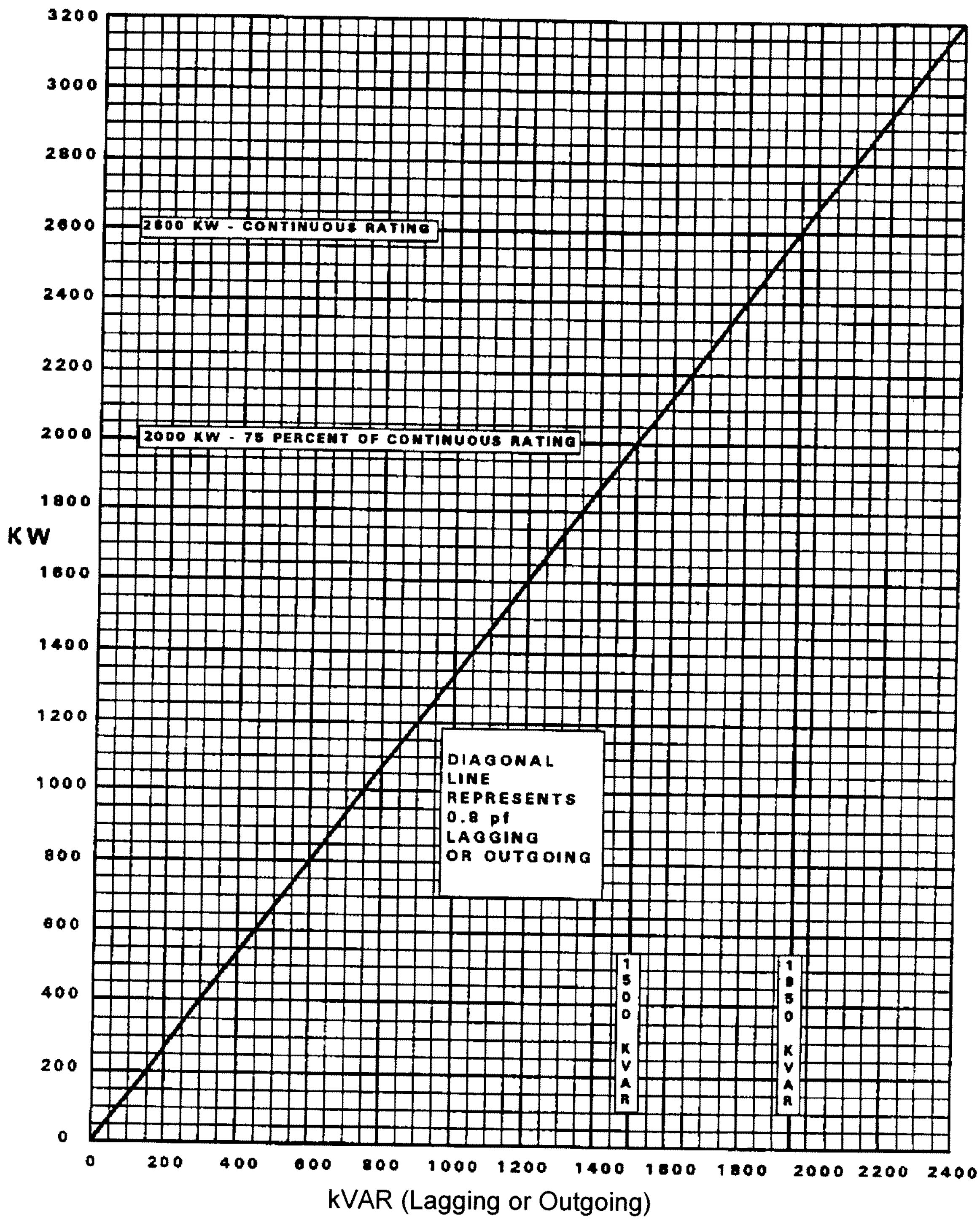

Illustration 2
(Page 1 of 2)
Diesel Generator Operating Log

Date ______________ Diesel Generator ______________

Log all manipulations of Diesel Generator LOGIC BREAKER in the Narrative Log.

STARTS/LOAD RUNS

Reason for Start: ______________
(Test, Auto Start)
[3]Slow Starts/Load Runs ______ / ______
[3]Fast Starts/Load Runs ______ / ______
Time/Date Started: ______ / ______
Time/Date Loaded: ______ / ______
Time/Date Unloaded: ______ / ______
Time/Date Stopped: ______ / ______

OUT OF SERVICE TIME

Time/Date Removed from Service: ______ / ______
Reason Taken Out of Service: ______________
____
Time/Date Returned to Service: ______ / ______
Comments/Explanation of Failures: ______________
____
____
____

Operations send Facsimile of Illustration 2 to ICE **FAX @ 8164** of ______________ **and** attach the original to SR **AND** send to the Diesel GeneratorSystem Engineer. UO Readings are taken from Panel 9-23 or applicable Shutdown Board depending on D/G control location. Readings are initiated once every 15 minutes during the first hour of operation at rated speed and once every 30 minutes thereafter. Enter the actual time that each set of readings is initiated.

TIME													
Generator Frequency (59 - 61 HERTZ)[1]													
Generator Voltage[5] (3950 - 4400 VOLTs)													
Generator Watts [2,4] (550 - 2850 kW)													
Generator VARs[2,4] (400 - 2100 kVAR)													
Generator amps (less than 495 amps)													
INITIALS													

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.

Reviewed by: ______________ ______________
Unit Supervisor Signature Date

Illustration 2
(Page 2 of 2)
Diesel Generator Operating Log

Date ________ Diesel Generator ____ ELAPSED TIME INDICATOR Initial ________ Final ________

CHECK Lube Oil Circulating Pump is running following DG Shutdown, and for DG-D **VERIFY** the turbocharger oil pressure is between 10-35 psig as indicated on DG-D TURBOCHARGER COMP BEARING LUBE OIL PRESS INDR, 0-PI-082-1000D. ☐

Log all manipulations of Diesel Generator LOGIC BREAKER in the Narrative Log.

Readings are taken locally in DG Room. Idle Readings (440-460 rpm) are recorded within 10 minutes of Diesel Start. Operating Readings (885-915 rpm) are initiated once every 15 minutes during the first hour of operation at rated speed and once every 30 minutes thereafter. Enter the actual time that each set of readings is initiated. If any reading is out of its specified range, record reason and action taken in REMARKS.

	440-460 rpm	900 RPM										
TIME												
RPM (885-915)												
PRIMING FUEL PRESS DG A-D (20-56 psig)												
NORMAL FUEL PRESS DG A-D (20-56 psig)												
MAIN BEARINGS LUBE OIL PRESS (45-125 psig) (note 3)												
(**DG D ONLY**) TURBOCHARGER COMP BEARING LUBE OIL PRESS (45-125 psig) (note 3)												
LUBE OIL FILTER INLET PRESS (8-40 psig) (note 4)												
ENGINE CLG WTR OUTLET TEMP (100-190°F)												
LO CLR CLG WTR OUTLET TEMP (100-190°F)												
LO CLR LUBE OIL OUTLET TEMP (100-190°F)												
Engine Lube Oil Level (-4-0 inches) (note 1)												
Governor Fuel Rack Position (.62 - 1.96)												
Governor Oil Level-(Min/Max level visible in the sightglass)												
FUEL TANK LEVEL GAUGE (260-500 gallons)												
EXPANSION TANK WATER LEVEL (RUNNING LOW-RUNNING FULL)												
7 Day Tank Level (83% - 92%) (note 2)												
INITIALS												

1. Initiate corrective maintenance to restore lube oil level if it lowers to ≤ -2" at idle speed. Initiate corrective maintenance to restore lube oil level if it lowers to ≤ -3" while the Diesel Engine is running.
2. Notify Unit Supervisor if 7 day tank fuel oil level iso ≤ 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.
4. Idle Speed value for Lube Oil Filter Inlet Pressure is > 3 psig obtained at a minimum of 3 minutes following engine start.

Remarks: ____

	Name (Print)	Initials
Performed by:	________________	________
Reviewed by:	________________	________
	Unit Supervisor Signature	Date

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER:	390F
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 CONCURRENCE: ______________________ DATE:__________
OPERATIONS

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ____________________

RO ______ SRO ______ DATE: ____________

JPM NUMBER: 390F

TASK NUMBER: U-066-AB-02

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

K/A NUMBER: 271000A2.04 K/A RATING: RO 3.7 SRO 4.1

****

TASK STANDARD: RESPOND TO OFF-GAS POST-TREATMENT RADIATION HI-HI-HI PER 3-ARP-9-4C/35 and 3-AOI-66-2

PERFORMANCE LOCATION: SIMULATOR X

REFERENCES/PROCEDURES NEEDED: 3-ARP-9-4C/35, Rev 29,
3-AOI-66-2 Rev 10

VALIDATION TIME: SIMULATOR: 15:00 LOCAL: ____________

MAX. TIME ALLOWED: ____________ (FOR TIME CRITICAL JPMs ONLY)

PERFORMANCE TIME: ____________

COMMENTS: ____________________

ADDITIONAL COMMENT SHEETS ATTACHED? YES ______ NO ______

RESULTS: SATISFACTORY ______ UNSATISFACTORY ______

EXAMINER SIGNATURE: ____________________ 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 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."

START TIME ______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

STANDARD:

Obtained copy of 3-ARP-9-4C window 35 and/or 3-AOI-66-2.

SAT _____ UNSAT _____ N/A _____ COMMENTS:______________

Examiner Note: If candidate goes directly to 3-AOI-66-2, Skip the following performance steps 2 & 3 and continues at performance step 4. [4.1 of 3-AOI-66-2] (Page 7)

****

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 _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

****

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] **IF** core flow is above 60%, **THEN**

REDUCE core flow to between 50-60%.

STANDARD:

Reduced core flow to between 50-60% with recirc system. Initiates **EITHER** a Core Flow Runback [3-HS-68-44] **OR** reduces with Recirc Master Control [3-HS-68-35] on panel 3-9-5.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL ______

5. [1.2] **MANUALLY SCRAM** the Reactor. **REFER TO** 3-AOI-100-1.

STANDARD:

Manually Scrammed the Reactor and referred to 3-AOI-100-1. (Referring to 3-AOI-100-1 is NOT CRITICAL.)

SAT ______ UNSAT ______ N/A ______ COMMENTS:________________

____

____

CUE: [After Performer has scrammed the reactor and given the scram report,] Another operator will perform the actions of scram procedure, continue in your current procedure.

****

PERFORMANCE STEP: CRITICAL ______ NOT CRITICAL __X__

6. **4.2 Subsequent Actions**

[1] **IF** OFFGAS SYSTEM ISOLATION VALVE, 3-FCV-066-0028 has been mechanically restrained open due to plant conditions, **THEN**

DISENGAGE 3-FCV-066-0028 mechanical restraint by rotating the restraining handwheel fully in the counterclockwise direction, locally at the stack (otherwise)

CUE: If asked, 3-FCV-66-28 is Not mechanically restrained

STANDARD:

Dispatches AUO locally to verify valve Not restrained and continues to the next step.

SAT ______ UNSAT ______ N/A ______ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

EXAMINERS NOTE: ALTERNATE PATH STARTS HERE:

7. [2] **VERIFY CLOSED** OFFGAS SYSTEM ISOLATION VALVE, 3-FCV-66-28 on Panel 3-9-53 or locally.

STANDARD:

NOTE: 3-FCV-66-28 may have been previously CLOSED as addressed by ARP 3-9-4C W35 "Automatic Actions." OPDP-1 allows actions to be taken that should have automatically happened. See page 5 performance step 2.

Performer Verified that 3-FCV-66-28 failed to automatically close on OFF-GAS POST-TREATMENT HI-HI-HI radiation. Performer places 3-HS-66-28 in close on Panel 3-9-53 (**Critical**) and verifies green lamp illuminated above HS (**Not Critical**).

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

8. [3] **MONITOR** area radiation levels at Panel 3-9-11.

STANDARD:

Monitors radiation levels at Panel 3-9-11.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

8. [4] **REFER TO** EPIP-1 for emergency classification level and response.

CUE: The Shift Manager is implementing EPIP-1 Classification.

STANDARD:

Continues to the next step.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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 10^6 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:_______________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

10. [6] **IF** after five minutes from scram the Offgas Post Treatment activity is **NOT** less than 6 x 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 x 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.

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

11. 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__

12. PERFORMER demonstrated the use of 3-WAY COMMUNICATION during this JPM

STANDARD:

PERFORMER utilized 3-WAY COMMUNICATION in accordance with plant standards.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

END OF TASK

STOP TIME: _______________

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."

OG POST TRTMT RAD MONITOR HI HI HI/INOP 3-RA-90-265C SOLID MAGENTA 35

(Page 1 of 1)

Sensor/Trip Point:

3-RM-90-265A 6.2×10^5 CPS
3-RM-90-266A 6.2×10^5 CPS

Sensor Location: 3-RE-090-0265, 3-RE-090-0266 — Panel 3-25-94 Off-Gas Building, Elevation 538.5

Probable Cause:
A. Resin trap failure (RWCU or Condensate demins).
B. Fuel damage.

Automatic Action: OFFGAS SYSTEM ISOLATION VALVE 3-FCV-66-28 closes after a 5 second time delay

Operator Action:
A. **VERIFY** alarm condition on the following:
- OFFGAS POST-TREATMENT RADIATION recorder, 3-RR-90-265 on Panel 3-9-2 ☐
- OG POST-TREATMENT CHAN A RAD MON RTMR radiation monitor, 3-RM-90-266A on Panel 3-9-10 ☐
- OG POST-TREATMENT CHAN B RAD MON RTMR radiation monitor, 3-RM-90-265A on Panel 3-9-10 ☐

B. **REFER TO** 3-AOI-66-2. ☐

References: 3-45E620-4 3-45E614-2 0-47E610-90-2 GE 3-729E814-6
FSAR Sections 1.6.4.4.6, 7.12.2.2, 7.12.2.3, 7.12.3.3, 9.5.4, and 13.6.2
3-SIMI-90B

Browns Ferry Nuclear Plant

Unit 3

Abnormal Operating Instruction

3-AOI-66-2

Offgas Post Treatment Radiation Hi Hi Hi

Revision 0010

Quality Related

Level of Use: Continuous Use

Effective Date: 04-15-2008

Responsible Organization: OPS, Operations

Prepared By: Michael K Teggins

Approved By: James A McCrary

Current Revision Description

Type of Change:	DESIGN CHANGE	**Tracking Number:**	**011**
DCN	63290A, 51109		
PCRs	05001777, 07001721		

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

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

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

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

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

Table of Contents

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 6×10^5 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.

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.

4.0 OPERATOR ACTIONS

4.1 Immediate Actions

[1] **IF** scram has **NOT** occurred, **THEN**

PERFORM the following:

[1.1] **IF** core flow is above 60%, **THEN**

REDUCE core flow to between 50-60%. ☐

[1.2] **MANUALLY SCRAM** the Reactor. **REFER TO** 3-AOI-100-1. ☐

4.2 Subsequent Actions

[1] **IF** OFFGAS SYSTEM ISOLATION VALVE, 3-FCV-066-0028 has been mechanically restrained open due to plant conditions, **THEN**

DISENGAGE 3-FCV-066-0028 mechanical restraint by rotating the restraining handwheel fully in the counterclockwise direction, locally at the stack (otherwise). ☐

[2] **VERIFY CLOSED** OFFGAS SYSTEM ISOLATION VALVE, 3-FCV-66-28 on Panel 3-9-53 or locally. ☐

[3] **MONITOR** area radiation levels at Panel 3-9-11. ☐

[4] **REFER TO** EPIP-1 for emergency classification level and response. ☐

[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/CONT RM RADIATION, 0-RR-90-147, on Panel 1-9-2. ☐

4.2 Subsequent Actions (continued)

[6] **IF** after five minutes from scram the Offgas Post Treatment activity is **NOT** less than 6 x 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. ☐

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

[7] **PLACE** STACK DILUTION FAN SEL control switch, 3-XS-66-29, Panel 3-9-8, in OFF. ☐

[8] **START** standby STACK DILUTION FAN 3B(3A) using control switch, 3-HS-66-31A(29A), Panel 3-9-8. ☐

[9] **REQUEST** Unit 1 and Unit 2 operators to start standby Stack Dilution Air Fans. ☐

[10] **REQUEST** Chemistry perform 0-SI-4.8.B.2-8, Airborne Effluent Analysis - Stack Noble Gas, to determine activity. ☐

[11] **REQUEST** Chemistry sample reactor water for radioactivity. ☐

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

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 **NPG Standard Department Procedure**	**TITLE** **Conduct of Operations**	**OPDP-1** **Rev. 0012** **Page 1 of 65** Quality Related ☑ Yes ☐ No Effective Date 02-02-2009

Responsible Peer Team/Working Group: Operations

Approved by: O. J. Miller — 2-2-09

Corporate Functional Manager — Date

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.

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.

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.

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: ______________________________ DATE:__________
TRAINING

PLANT CONCURRENCE: ______________________________ DATE:__________
OPERATIONS

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

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

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 IN OPERATION

K/A NUMBER: 239001A2.08 K/A RATING: RO 3.6 SRO 3.6

****

TASK STANDARD: PERFORM CONTROL ROOM MANIPULATIONS REQUIRED TO PLACE THE STANDBY STEAM JET AIR EJECTOR IN OPERATION DURING POWER OPERATION

PERFORMANCE LOCATION: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 3-OI-66, Rev 57

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 ______ UNSATISFACTORY ______

EXAMINER SIGNATURE: ______________________ 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 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 ______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

STANDARD:

Obtained copy of 3-OI-66.

SAT _____ UNSAT _____ N/A _____ COMMENTS:______________

____

____

NOTES
1) Panel 25-105 located in Unit 3 Turbine Bldg. El 586' T12-C.
2) The HWC System is shutdown prior to intentional swapping of SJAEs to prevent receipt of the automatic trip of the HWC System that occurs when both SJAE DISCHARGE VALVES 3-FCV-66-14 and 18 are closed.

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

8.4 **Placing Standby SJAE in Operation**

[1] **REVIEW** all Precautions and Limitations in Section 3.0.

STANDARD:

Reviews section 3.0.

SAT _____ UNSAT _____ N/A _____ COMMENTS:______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[2] **IF** determined necessary by Unit Supervisor, **THEN** (Otherwise N/A)

NOTIFY Radiation Protection that an RPHP exists for the impending action to place the standby SJAE (3A or 3B) in service. **RECORD** time Radiation Protection notified in the NOMS Narrative Log. [BFN PER 126211]

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

CUE: Give copy of completed Appendix A to Candidate. (Last page of JPM)

STANDARD:

Candidate acknowledges that a RPHP (Appendix A) has been completed.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[3] **VERIFY** the following initial conditions have been met:

A. **IF** HWC System is in service, **THEN** (Otherwise NA) **SHUT DOWN** HWC System. (REFER TO 3-OI-4)

B. SJAEs are in operation. (REFER TO Section 5.9).

STANDARD:

N/A – given in the initial conditions.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[4] **VERIFY OPEN** the following valves at Panel 3-9-6:

A. SJAE 3B(3A) CNDS INLET VALVE, using 3-HS-2-31A(36A).

B. SJAE 3B(3A) CNDS OUTLET VALVE, using 3-HS-2-35A(41A).

STANDARD:

At Panel 3-9-6, Verified illuminated RED valve position indicating lamps above 3-HS-2-31A and 3-HS-2-35A.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

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:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[6] **VERIFY** manual/hand loader output pressure and pressure controller setpoints at Panel 25-105, are adjusted as follows:

A. Setpoint for STEAM TO SJAE B(A) STAGE I & II, 3-PC-1-152(150) set for approximately 225 psig (dial located inside controller housing).

B. Manual/Hand loader for STEAM TO SJAE B(A) STAGE I & II, 3-PC-1-152(150) set for approximately 14 psig.

C. Setpoint for STEAM TO SJAE B(A) STAGE III, 3-PC-1-167(166) set for approximately 225 psig (dial located inside controller housing).

D. Manual/hand loader for STEAM TO SJAE B(A) STAGE III, 3-PC-1-167(166), set for approximately 12 psig.

CUE: [When called] The Setpoint for steam to SJAE B stages I and II, 3-PC-1-152 is set for 225 psig. (inside controller housing).

Manual hand loader for SJAE B stage I and II is set at 14 psig.

Setpoint for steam to SJAE B, stage III, 3-PC-1-167 is set for 225 psig. (inside controller housing).

Manual hand loader for steam to SJAE B, stage III, 3-PC-1-167 is set for 12 psig.

STANDARD:

Directed US to perform/verify steps 8.4[6]A through 8.4[6]D.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****
PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[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.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****
PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[8] **VERIFY OPEN** both SJAE Inlet Valves at Panel 3-9-8, using the following:

A. SJAE 3A INLET VALVE, 3-HS-66-11.

B. SJAE 3B INLET VALVE, 3-HS-66-15.

STANDARD:

Verified 3-HS-66-11 and 3-HS-66-15 in the OPEN position.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL ____

[9] **PLACE** the STEAM TO SJAE 3A(3B) handswitch, 3-HS-1-155A(156A), in CLOSE at Panel 3-9-7.

STANDARD:

Placed 3-HS-1-155A in the CLOSE position.

SAT ____ UNSAT ____ N/A ____ COMMENTS:____________

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL ____

[10] **PLACE the** SJAE 3A(3B) PRESS CONTROLLER handswitch, 3-HS-1-150(152), in CLOSE at Panel 3-9-7,

STANDARD:

Placed 2-HS-1-150 in the CLOSE position.

SAT ____ UNSAT ____ N/A ____ COMMENTS:____________

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[11] At Panel 3-9-8, **PLACE** the SJAE 3A(3B) OG OUTLET VALVE using 3-HS-66-14(18) in CLOSE.

STANDARD:

Placed 3-HS-66-14 IN CLOSE position.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[12] **PLACE** in OPEN/AUTO the SJAE 3B(3A) OG OUTLET VALVE using, 3-HS-66-18(14) at panel 3-9-8.

STANDARD:

Placed 3-HS-66-18 in the OPEN/AUTO position.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

****

PERFORMANCE STEP: CRITICAL X NOT CRITICAL ____

[13] **PLACE** the STEAM TO SJAE 3B(3A) handswitch, 3-HS-1-156A(155A), in OPEN at panel 3-9-7.

STANDARD:

Placed 3-HS-1-156A in OPEN position.

SAT ____ UNSAT ____ N/A ____ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL X NOT CRITICAL ____

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

STANDARD:

Placed 3-HS-1-152 in the OPEN position.

SAT ____ UNSAT ____ N/A ____ COMMENTS:________________

NOTE

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

****

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]

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:_______________

____

____

****

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:_______________

____

____

****

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:________________

____

____

****

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 __X__ NOT CRITICAL _____

[20] **VERIFY** SJAE TRAIN 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:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[21] **MONITOR** hotwell pressure as indicated on HOTWELL TEMP AND PRESS recorder, 3-XR-2-2 at Panel 3-9-6.

STANDARD:

Monitored hotwell pressure.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[22] **PERFORM** the following at Panel 3-9-53:

[22.1] **VERIFY** Off Gas Hydrogen Analyzer in manual operation. **REFER TO** Section 8.25.

[22.2] **MONITOR** Off Gas Hydrogen concentration using the OFF GAS HYDROGEN ANALYZER 3-H2R-66-96 at Panel 3-9-53 until conditions are stable.

CUE: [When addressed] Another Operator will place the Off Gas Hydrogen Analyzer in service and monitor H2 levels.

CUE: That completes this task.

****

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:________________

____

____

END OF TASK

STOP TIME: ________________

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: Today Time: Now

Step# 8.4[2] Procedure: 3-OI-66 (if not this procedure) Rev: Current

RPHP Required by OI? X (Y) ____(N) RPHP Required For GOI? ____(Y) X (N)

RCI-17 Controls Necessary? X (Y) ____(N)

Radiation Protection Supervisor Signature for Release

Joe Neutron Date: Today Time: Now

Comments: For swapping SJAE from 3A to 3B

Name Of Radiation Protection Person Notified: Joe Neutron

Date: Today Time: Now

Step# 8.14[1] Procedure: 3-OI-66 (if not this procedure) Rev: Current

RPHP Required by OI? X (Y) ____(N) RPHP Required For GOI? ____(Y) X (N)

RCI-17 Controls Necessary? X (Y) ____(N)

Radiation Protection Supervisor Signature for Release

Joe Neutron Date: Today Time: Now

Comments: Contingency in case 3B SJAE fails to swap back to 3A

FORWARD copies of completed Appendix pages to Radiation Protection Supervisor.

BROWNS FERRY NUCLEAR PLANT
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.

Name Of Radiation Protection Person Notified: ______Joe Neutron________________

Date: ____Today________ Time:______Now________

Step#__8.4[2]__ Procedure: ___3-OI-66____ (if not this procedure) Rev:_Current_

RPHP Required by OI? __X_(Y) ____(N) RPHP Required For GOI? ____(Y) __X_(N)

RCI-17 Controls Necessary? __X_(Y) ____(N)

Radiation Protection Supervisor Signature for Release

_______Joe Neutron____________ Date: ____Today______ Time:_____Now______

Comments: For swapping SJAE from 3A to 3B

Name Of Radiation Protection Person Notified: ______Joe Neutron________________

Date: ____Today________ Time:______Now________

Step#__8.14[1]__ Procedure: ___3-OI-66____ (if not this procedure) Rev:_Current_

RPHP Required by OI? __X_(Y) ____(N) RPHP Required For GOI? ____(Y) __X_(N)

RCI-17 Controls Necessary? __X_(Y) ____(N)

Radiation Protection Supervisor Signature for Release

_______Joe Neutron____________ Date: ____Today______ Time:_____Now______

Comments: Contingency in case 3B SJAE fails to swap back to 3A

FORWARD copies of completed Appendix pages to Radiation Protection Supervisor.

TVA

Browns Ferry Nuclear Plant

Unit 3

Operating Instruction

3-OI-66

Off-Gas System

Revision 0057

Quality Related

Level of Use: Continuous Use

Effective Date: 03-10-2009

Responsible Organization: OPS, Operations

Prepared By: William Wambsgan @ 6360

Approved By: John T. Kulisek

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 stand-alone 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

Table of Contents

Table of Contents (continued)

Table of Contents (continued)

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_2 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

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

3-47E805 series, Heater Drains and Vents

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

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

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.

3.0 PRECAUTIONS AND LIMITATIONS (continued)

H. Off-Gas System valves are potentially spark-producing when operated; therefore, when hydrogen concentration is suspected of being greater than 4%, NO action is allowed to be taken that will change off-gas valve positions until after the unit is shut down except for the SJAE's, which may be started following an isolation, and alternated if required with greater than 4% hydrogen. SJAE's have non-sparking valve seats, and hydrogen flammability lower limit is NOT a concern in a saturated steam environment.

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_2O.

M. The mechanical vacuum pumps will auto trip under any of the following conditions:

1. Hotwell pressure is equal to or below -26" HG, or

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), or

3. Main Steam Line radiation is greater than or equal to 3 times normal background at full load (vacuum pumps suction valves also close), or

4. Seal water pump trips, or

5. Undervoltage.

N. During SJAE operation, steam supply pressure is to be maintained between 190 and 225 psig. Insufficient steam pressure will result in improper dilution of hydrogen. Excessive steam pressure causes water droplet carryover which reduces recombiner efficiency.

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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.

2. Off-Gas System Isolation Valve, 3-FCV-066-0028, is an air-to-open against spring pressure, diaphragm operated valve. The valve is designed to faill closed on loss of Control Air Supply, or with loss of power to the solenoid operated valves that supply air to the valve.

3. A handwheel is attached to the valve that can be engaged to mechanically restrain the valve open against spring pressure. Rotating the handwheel clockwise restrains the valve in the open position, overriding all automatic closures. Rotating the handwheel to the fully counter-clockwise position allows the valve to operate normally and to close with spring pressure. The handwheel will only be used to open the valve in the event of a failure during Unit power operation. Manually opening the valve is only allowed in the event of a Control Air, power, solenoid, or diaphragm failure.

R. Dehumidifier drain 66-19, and Holdup volume drain 66-23 will auto close on high pressure in the Holdup Volume (10 psig).

S. After auto isolation, 3-HS-90-155 is to be placed to RESET and then AUTO to place system back in service when initiating conditions clear.

T. During operations with valid CONDENSER A, B, OR C VACUUM LOW 3-PA-47-125 alarm, and condensate temperature of 136 F or greater at the inlet of the SJAE (ICS point 2-28), reduced SJAE First Stage performance (stalling) could occur. This condition will cause reduced Off Gas flow and a loss of vacuum/turbine trip.
[BFPER 02-016091-000]

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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.

2. 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

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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.

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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.

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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 not identified as RPHP steps are considered courtesy notification steps. Most require an entry be made into the NOMS narrative log. These courtesy notification steps DO NOT require a hold in the procedure OR 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.

8.4 Placing Standby SJAE in Operation

NOTES
1) Panel 25-105 located in Unit 3 Turbine Bldg. El 586' T12-C.
2) 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] **VERIFY** the following initial conditions have been met:

A. **IF** HWC System is in service, **THEN** (Otherwise N/A)

SHUT DOWN HWC System. **REFER TO 3-OI-4**. ☐

B. SJAEs are in operation. **REFER TO** Section 5.9. ☐

[4] **VERIFY OPEN** the following valves at Panel 3-9-6, :

A. SJAE 3B(3A) CNDS INLET VALVE, using 3-HS-2-31A(36A) ☐

B. SJAE 3B(3A) CNDS OUTLET VALVE, using 3-HS-2-35A(41A) ☐

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

8.4 Placing Standby SJAE in Operation (continued)

[6] **VERIFY** manual/hand loader output pressure and pressure controller setpoints at panel 25-105, are adjusted as follows:

A. Setpoint for STEAM TO SJAE B(A) STAGE I & II, 3-PC-001-0152(0150) set for approximately 225 psig (dial located inside controller housing). ☐

B. Manual/Hand loader for STEAM TO SJAE B(A) STAGE I & II, 3-PC-001-0152(0150) set for approximately 14 psig. ☐

C. Setpoint for STEAM TO SJAE B(A) STAGE III, 3-PC-001-0167(0166) set for approximately 225 psig (dial located inside controller housing). ☐

D. Manual/hand loader for STEAM TO SJAE B(A) STAGE III, 3-PC-001-0167(0166), set for approximately 12 psig. ☐

[7] **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-001-0152(0150) ☐

B. MS SJAE B(A) PRESS MODIFIER, 3-XM-001-0167(0166) ☐

[8] **VERIFY OPEN** both SJAE Inlet Valves at panel 3-9-8, using the following:

A. SJAE 3A INLET VALVE, 3-HS-66-11 ☐

B. SJAE 3B INLET VALVE, 3-HS-66-15 ☐

[9] **PLACE** the STEAM TO SJAE 3A(3B) handswitch, 3-HS-1-155A(156A), in CLOSE at panel 3-9-7. . ☐

[10] **PLACE** the SJAE 3A(3B) PRESS CONTROLLER handswitch, 3-HS-1-150(152), in CLOSE at panel 3-9-7. . ☐

[11] At Panel 3-9-8, **PLACE** the SJAE 3A(3B) OG OUTLET VALVE using 3-HS-66-14(18) in CLOSE. ☐

[12] **PLACE** in OPEN/AUTO the SJAE 3B(3A) OG OUTLET VALVE using, 3-HS-66-18(14) at panel 3-9-8. ☐

[13] **PLACE** the STEAM TO SJAE 3B(3A) handswitch, 3-HS-1-156A(155A), in OPEN at panel 3-9-7. . ☐

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) ☐

8.4 Placing Standby SJAE in Operation (continued)

[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). ☐

[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). ☐

[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) ☐

8.4 Placing Standby SJAE in Operation (continued)

[20] **VERIFY** SJAE TRAIN PERMISSIVE 3-HS-001-0375 in the position for the SJAE selected for Standby operation SJAE A(SJAE B). ☐

[21] **MONITOR** hotwell pressure as indicated on HOTWELL TEMP AND PRESS recorder, 3-XR-2-2 at Panel 3-9-6. . ☐

[22] **PERFORM** the following at Panel 3-9-53:

[22.1] **VERIFY** Off Gas Hydrogen Analyzer in manual operation. **REFER TO** Section 8.25. ☐

[22.2] **MONITOR** Off Gas Hydrogen concentration using the OFF GAS HYDROGEN ANALYZER 3-H2R-66-96 at Panel 3-9-53 until conditions are stable ☐

[23] **WHEN** stable SJAE operation has been confirmed, **THEN**

The HWC System may be placed back in service at the direction of the Unit Supervisor. REFER TO 3-OI-4, HWC System (N/A if HWC System is unavailable). ☐

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: ______________________ DATE:__________
TRAINING

PLANT CONCURRENCE: ______________________ DATE:__________
OPERATIONS

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description 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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE 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 3.0 SRO 3.0

****

TASK STANDARD: SIMULATE PERFORMING OPERATIONS REQUIRED TO SHIFT FROM 'A' SET OF CRD STABILIZING VALVES TO 'B' SET.

PERFORMANCE LOCATION: SIMULATOR ___ PLANT X CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 2-OI-85, Rev 116

VALIDATION TIME: CONTROL ROOM: 9:00 LOCAL: 6:00

MAX. TIME ALLOWED: __________ (FOR TIME CRITICAL JPMs ONLY)

PERFORMANCE TIME: __________

COMMENTS: ____________________

ADDITIONAL COMMENT SHEETS ATTACHED? YES _____ NO _____

RESULTS: SATISFACTORY _____ UNSATISFACTORY _____

EXAMINER SIGNATURE: ____________________ DATE: ____________

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-PLANT: I will explain the initial conditions and state the task to be performed. ALL STEPS WILL BE SIMULATED. Do NOT 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!

START TIME ______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

Examiner Note: Applicant has demonstrated obtaining procedures on the simulator, therefore, just hand him/her the procedure.

STANDARD:

Identified or obtained copy of 2-OI-85.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

6.4 Shifting CRD Stabilizing Valve Sets

[1] **VERIFY** Control Rod Drive Hydraulic System in operation.
REFER TO Section 5.1.

STANDARD:

N/A – Given in initial conditions.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[2] **REVIEW** all Precautions and Limitations in Section 3.1.

STANDARD:

Reviewed Section 3.1.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[3] **PERFORM** the following for Stabilizing Valve set being brought into service:

[3.1] **OPEN** STAB VLV FCV-85-20 A & B(FCV-85-21 A & B), INLET SHUTOFF, 2-SHV-085-0580(0578).

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

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

STANDARD:

Simulated opening 2-SHV-085-0578 and 2-SHV-085-0579 by turning the valve handwheels in the Counterclockwise direction.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

****

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:________________

____

____

****

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] **VERIFY** CRD STABILIZING FLOW, 2-FI-85-22, on 2-LPNL-925-0018B is approximately 6 gpm.

CUE: When located on local panel, 2-FI-85-22 indicates 6 gpm.

STANDARD:

Verified stabilizing flow of approximately six gpm on 2-FI-85-22.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[7] **VERIFY** CRD DRIVE WTR HDR FLOW, 2-FI-85-15A, is approximately 0 gpm on Panel 2-9-5.

CUE: 2-FI-85-15A indicates 0 gpm.

STANDARD:

Simulated calling Unit 2 control room to verify that CRD drive water header flow is approximately '0' gpm.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[8] **IF** CRD Stabilizing Flow adjustment is necessary, **THEN**

REQUEST Technical Support to perform 0-TI-20 in order to adjust stabilizer needle valve settings.

CUE: Flow adjustment is not necessary. That completes this task.

STANDARD:

N/A

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

PERFORMER complied with all safety rules and regulations

STANDARD:

PERFORMER complied with all safety rules and regulations (hardhat, safety glasses, sideshields, and hearing protection was worn AS REQUIRED.)

ELECTRICAL SAFETY was also adhered to AS REQUIRED: Exposed conductive articles such as rings, metal wristwatches, bracelets, and metal necklaces shall not be worn by employees within reaching distance of exposed energized electrical conductors of 50 volts or greater.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

PERFORMER demonstrated proper radiological practices AS REQUIRED

STANDARD:

PERFORMER applied proper radiological practices, AS REQUIRED, during JPM performance.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

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:________________

END OF TASK

STOP TIME: ________________

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-PLANT: I will explain the initial conditions and state the task to be performed. ALL STEPS WILL BE SIMULATED. Do NOT 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. ALL STEPS WILL BE SIMULATED. Do NOT 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

Unit 2

Operating Instruction

2-OI-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

Current Revision Description

Pages Affected:	34, 50, 58-60, 67, 69, 159, 173, 174, 185, 204; Attachment Pages 18	
Type of Change:	Enhancement	Tracking Number 149
PERs		
PCRs	08003363, 09000021, 09000556, 09000674, 09000936	

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

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

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

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

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

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

THIS REVISION AFFECTS SYSTEM STATUS on ATTACHMENT 1

Table of Contents

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Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

ATTACHMENTS

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

2.6 Miscellaneous Documents

INPO SOER 80-006, Partial Failure of Control Rods to Insert.

INPO SOER 84-002, Control Rod Mispositioning.

INPO SER 90-009, Failure of Two Control Rods to Insert During Scram Time Testing.

GE SIL 66, Interior Surfaces of CRD HCU Accumulators.

GE SIL 139, Control Rod Drive Collet Retainer Tube Cracking.

GE SIL 294, HCU Accumulator Piston Seal Maintenance.

GE SIL 536, HCU Liquid Level Switch Malfunction.

GE SIL 538, CRD Cooling Water Orifices.

GE SIL 419, CRD HCU Isolation Valves.

GE SIL 427, CRD Lay UP Procedures for an Extended Outage.

NRC IR 84-02, Define Use of the ROD OUT NOTCH Override (RONOR) Switch.

Technical Specifications Assessment Report (TSAR) Item D-16. A stuck rod should be hydraulically isolated versus electrical.

TSAR Item D-17. Require inoperable rods to be fully inserted if **NOT** stuck prior to disarming.

TSAR Item D-22. Anytime a control rod is fully withdrawn, a coupling check shall be performed.

TSAR Item D-25. Control rod scram time testing should be required prior to declaring a rod operable after maintenance which could affect its scram time.

BFPER961434, Control Rod misposition event.

BFPER960792, Control Rod misposition event.

BFPER950743, Control Rod coupling event.

BFPER960610, SDV vents and drains misposition event.

Memo from Louis C. Eichenberger to Steve Lawson concerning operation with elevated CRD flow. RIMS R69 980415 805

NEDC-32751P, Power Uprate Safety Analysis for the Browns Ferry Nuclear Plant (RIMS R08-980316-888)

2.6 Miscellaneous Documents (continued)

TVA-BFN-TS-384, Technical Specification(TS) Change TS-384 - Request For License Amendment For Power Uprate Operation (RIMS R08-980316-888)

GE-NE-B13-01866-39, Summary of System Evaluations and Proposed Changes to Design Criteria Documents (RIMS W79-980827-003)

ND-Q0068-980014, Anticipated Transient Without Scram (ATWS) (RIMS R14-980423-104)

TVAN Calculation, 2/3-F-78A & 78B (RIMS R14-981104-113)

TVAN Calculation, ED-N0001-980035 (RIMS R14-981202-106)

GE SC07-08, Inadvertent CRD Rod Withdrawal

INPO SEN 264, Unplanned BWR Control Rod Withdrawals While Shut Down

OE27698, Unplanned Loss of Shutdown Cooling While Placing CRD System in Service at the Monticello Nuclear generating System.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Control Rod Drive Hydraulic (CRDH) System

A. A Control Rod Drive pump should remain in operation at all times to preclude the possibility of air entering the system.

B. Shutdown of the CRDH System when reactor moderator is at rated temperature and pressure, the reactor is critical, or when a Recirculation or Reactor Water Cleanup pump is operating, may result in equipment damage.

C. A Control Rod Drive Hydraulic pump trips as a result of any of the following:

1. Pump low suction pressure (18" Hg. absolute after 6 sec. T.D.).
2. Pump motor overload (electrical fault protection).
3. Bus undervoltage.

D. Water draining from the Control Rod Drive Hydraulic System is potentially contaminated and should be handled accordingly.

E. The Control Rod Drive System flow and differential pressures should be maintained in accordance with this instruction. Excessive throttling of system flow produces a low flow, high D/P situation resulting in damage to the flow control valve.

F. [NER/C] When the reactor is shutdown, the Control Rod Drive Hydraulic System should remain in service and, whenever possible, the CRD mechanisms cycled at least one notch weekly. This provides a continuous flow of water to the control rod drive mechanisms to prevent crud buildup and minimize corrosion. For outages with a duration greater than 28 days and CRD System unavailable, alternate methods should be evaluated to assist in minimizing corrosion and crud buildup. [GE SIL 427]

G. CRD EXH/RTN LINE ISOLATION VALVE, 2-FCV-85-50, should remain closed except under conditions requiring CRD makeup, as specified in 2-EOI-1 Flowchart, RPV Control, or if it is used to vent CRD System during system startup, or to vent control rod drives.

H. Reactor Water Cleanup System or other Water Reject Path may be required when Control Rod Drive Hydraulic System is in service.

I. [NER/C] CRDs that do NOT insert with normal system drive pressures may be inoperable (Tech Spec 3.1.3). However, if rod motion is observed, but the CRD fails to notch, drive water pressure may be raised to compensate for excessive under-piston leakage. [GE SIL 139 and 538]

3.1 Control Rod Drive Hydraulic (CRDH) System (continued)

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_2 pressure compensation.
5. Allen wrench for adjusting control rod drive speed.
6. "SNOOP" for leak checking.

K. When CRD System or HCU is to be removed from service, Shift Manager/Unit Supervisor should be notified to check the impact on Technical Specifications requirements and other systems, such as Reactor Water Cleanup or Reactor Recirculating Pump seals.

L. [NER/C] Activities that can directly affect core reactivity are of a critical nature. Strict procedural compliance and conservative actions are required to be followed. [INPO SOER-84-002]

M. Tech Specs should be reviewed for actions required when a control rod becomes inoperable.

N. [NER/C] **DO NOT** "cool" a hot CRD by giving it repeated drive signals. After checking for possible discharge scram valve leakage, a CRD with a high temperature alarm should be left "hot". Schedule such a CRD for maintenance during the next refueling outage. [GE SIL 139]

O. HCU valving sequences should not deviate from those listed in this instruction, otherwise serious damage to the CRD could result.

P. [TSAR/C] A stuck control rod should be hydraulically isolated. Stuck rods could be severely damaged from ΔP forces on a scram signal if NOT hydraulically isolated. [Item D16]

Q. [NER/C] [TSAR/C] Inoperable control rods should always be inserted (if NOT stuck) prior to disarming. Rods inoperable due to excessive scram times need NOT be disarmed, but should be included in the control rod exercise test (2-SR-3.1.3.2 / 2-SR-3.1.3.3). [Item D17] [INPO SER 90-009]

3.1 Control Rod Drive Hydraulic (CRDH) System (continued)

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

1. HCU valves should only be opened or closed hand tight unless there is a need to apply additional torque to ensure leak tightness. The torque values provided in Illustration 2 are required to be used when torquing is required. Ordinarily, hand tightness is all that is necessary to provide an adequate isolation boundary. Repeated torquing to maximum values can cause breaking of the "ears" on the wedges in the Hancock gate valves used on the HCUs. This results in the wedge becoming stuck in the seat.

2. [NER/C] If a maximum torque value from Illustration 2 is exceeded, a WO is required to be initiated and the System Engineer is to be notified. [GE SIL 419]

S. [TSAR/C] Prior to declaring a rod operable, after maintenance that could affect its scram time, Control Rod Scram Time Testing is required. [Item D25]

T. The ATWS/ARI/RPT is activated by either two low levels (≤ -45 in) or two high pressures (1148 psig) or manual initiation pushbutton.

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.

3.1 Control Rod Drive Hydraulic (CRDH) System (continued)

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.

3.1 Control Rod Drive Hydraulic (CRDH) System (continued)

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.

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 - Core Off Loaded, 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]

3.3 Rod Worth Minimizer (RWM) (continued)

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.

3.3 Rod Worth Minimizer (RWM) (continued)

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.

3.3 Rod Worth Minimizer (RWM) (continued)

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]

3.3 Rod Worth Minimizer (RWM) (continued)

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. 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.

3.4 Requirements for Moving Control Rods in Modes 3, 4 or 5 (continued)

3. 2-SR-3.10.4(B), Verification of Surveillance Requirements for Single Control Rod Withdrawal - Cold Shutdown (Multiple Rod Maintenance or Testing)

   This procedure verifies that the requirements of LCO 3.10.4 (single control rod withdrawal while in cold shutdown) are met when it is desired to withdraw several control rods, one at a time, in short succession. This procedure is intended to be used during control rod testing, such as that required by 0-TI-20 following a refueling outage. 2-SR-3.10.4(A) should be used when only one control rod is to be withdrawn for an extended period for maintenance or testing. 2-SR-3.10.4(A) must be used if a control rod is withdrawn and the associated control rod drive is to be removed.

   This surveillance also verifies each withdrawn Control Rod Scram accumulator pressure is ≥ 940 psig. This will satisfy Technical Specification SR 3.9.5.2. per LCO 3.10.4.c.1.

4. 2-SR-3.10.5, Verification of Surveillance Requirements for Single Control Rod Drive (CRD) Removal - Refueling

   This procedure verifies that the requirements of LCO 3.10.5 are met to allow the removal of a single control rod drive (CRD) associated with a control rod withdrawn from a core cell containing one or more fuel assemblies.

5. 2-SR-3.10.6, Verification of Surveillance Requirements for Multiple Control Rod Withdrawal - Refueling

   This procedure verifies that the requirements of LCO 3.10.6 are met to allow the withdrawal of multiple control rods, and/or the removal of associated control rod drives (CRDs).

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:

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 not identified as RPHP steps are considered courtesy notification steps. Most require an entry be made into the NOMS narrative log. These courtesy notification steps DO NOT require a hold in the procedure OR 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 CANNOT be omitted unless:

1. the action associated with the step is not performed, OR

2. the Radiation Protection notification requirements are currently satisfied for the action, OR

3. the step allows the notification to be N/A'd as determined by the Unit Supervisor.

E. Removal of any Radiation Protection Notification 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 actions that require Radiation Protection notification, requires that Radiation Protection be notified.

6.4 Shifting CRD Stabilizing Valve Sets

[1] **VERIFY** Control Rod Drive Hydraulic System in operation. **REFER TO** Section 5.1. ☐

[2] **REVIEW** all Precautions and Limitations in Section 3.1. ☐

[3] **PERFORM** the following for Stabilizing Valve set being brought into service:

[3.1] **OPEN** STAB VLV FCV-85-20 A & B(FCV-85-21 A & B), INLET SHUTOFF, 2-SHV-085-0580(0578). ☐

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

[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. ☐

[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). ☐

[6] **VERIFY** CRD STABILIZING FLOW, 2-FI-85-22, on 2-LPNL-925-0018B is approximately 6 gpm. ☐

[7] **VERIFY** CRD DRIVE WTR HDR FLOW, 2-FI-85-15A, is approximately 0 gpm on Panel 2-9-5. ☐

[8] **IF** CRD Stabilizing Flow adjustment is necessary, **THEN**

REQUEST Technical Support to perform 0-TI-20 in order to adjust stabilizer needle valve settings. ☐

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: ______________________ DATE: __________
TRAINING

PLANT CONCURRENCE: ______________________ DATE: __________
OPERATIONS

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

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR:______________________________

RO _____ SRO _____ DATE:______________

JPM NUMBER: 308F

TASK NUMBER: S-57D-NO-08

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

K/A NUMBER: 263000K1.02 K/A RATING: RO 3.2 SRO 3.3

****

TASK STANDARD: SIMULATE PLACING B2-3 ± 24V NEUTRON MONITORING BATTERY CHARGER IN SERVICE TO BATTERY BOARD 3.

PERFORMANCE LOCATION: SIMULATOR ___ PLANT X CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 0-OI-57D, Rev 121

VALIDATION TIME: CONTROL ROOM :__________ LOCAL: 15:00

MAX. TIME ALLOWED: __________ (FOR TIME CRITICAL JPMs ONLY)

PERFORMANCE TIME: __________

COMMENTS: ______________________________
____
____

ADDITIONAL COMMENT SHEETS ATTACHED? YES _____ NO _____

RESULTS: SATISFACTORY _____ UNSATISFACTORY _____

EXAMINER SIGNATURE: ______________________ DATE:______________

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

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

****

INITIAL CONDITIONS: You are an Operator. Unit 3 is at 100% power. ± 24V Neutron Monitoring Battery B is in service in accordance with Section 5.10 of 0-OI-57D. ± 24V Neutron Monitoring Battery Charger B2-3 was temporarily taken out of service for maintenance and is now ready for return to service.

INITIATING CUES: The Shift Manager directs you to return Unit 3 ± 24V Neutron Monitoring Battery Charger B2-3 to service to ± 24V Neutron Monitoring Battery B.

CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!

START TIME ______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

Examiner Note: Applicant has demonstrated obtaining procedures on the simulator, therefore, just hand him/her the procedure.

STANDARD:

Identified or obtained copy of 0-OI-57D.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

[1] VERIFY the ± 24V Neutron Monitoring Battery A(B) is in service in accordance with Section 5.10.

STANDARD:

N/A – given in the initial conditions

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[2] REVIEW Precautions and Limitations.

REFER TO Section 3.0.

STANDARD:

Reviewed Section 3.0

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

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 ± 24V Neutron Monitoring Battery Charger A(B) located in Battery Board Room 3.

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[3] CLOSE ± 24V DC CHARGERS (applicable charger, see 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)

INSTRUCTOR'S NOTE: DO NOT ALLOW THE EXAMINEE TO OPEN THE FRONT COVER OF THE ± 24V NEUTRON MONITORING BATTERY CHARGER.

HAND THE CANDIDATE ATTACHMENT 1.

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[4] OPEN the front cover of the ± 24V Neutron Monitoring Battery Charger to be placed in service and VERIFY CLOSED the DC output circuit breaker by placing it in the ON Position.

CUE: [When correctly simulated] The B2-3 ± 24V Battery Charger DC output breaker is in the ON position

STANDARD:

In Battery Board Room 3, Stated would open the front cover of B2-3 ± 24V Neutron Monitoring Battery Charger and Verify Closed the DC output breaker.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

[5] CLOSE the AC CIRCUIT BREAKER on Neutron Monitoring Battery Charger by placing the breaker in ON.

CUE: [When correctly simulated] ± 24v Neutron Monitoring Battery Charger B2-3 AC Circuit Breaker is in the ON position.

STANDARD:

Simulated placing B2-3 ± 24V Neutron Monitoring Battery Charger AC circuit breaker in the ON position.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[6] DEPRESS OVERVOLTAGE RESET push-button on chargers being placed in service.

CUE: [When correctly simulated], pushbutton has been depressed

STANDARD:

Simulated depressing overvoltage reset pushbutton on B2-3 $\underline{+}$ 24V Neutron Monitoring Battery Charger.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

A. DC Voltage greater than 24 Volts

B. DC Voltage less than 29 Volts

CUE: [When correctly indicated] DC voltage is reading 25 volts.

STANDARD:

Locates and reads the voltmeter on the B2-3 charger.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[8] VERIFY the NORMAL/EQUALIZE switch is in NORMAL.

CUE: [When correctly indicated] The Normal/Equalize switch is in Normal.

STANDARD:

Locates and verifies the Normal/Equalize switch is in Normal.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

[9] VERIFY the EQUALIZE HOURS timer is set to zero.

CUE: [When correctly indicated] The timer indicates zero.

STANDARD:

Locates and verifies the Equalize Hours Timer is reading zero.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

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

CAUTION

If a charger malfunction occurs the AC Circuit Breaker and ± 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 _____

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

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

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.

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

PERFORMER complied with all safety rules and regulations

STANDARD:

PERFORMER complied with all safety rules and regulations (hardhat, safety glasses, sideshields, and hearing protection was worn AS REQUIRED.)

ELECTRICAL SAFETY was also adhered to AS REQUIRED: Exposed conductive articles such as rings, metal wristwatches, bracelets, and metal necklaces shall not be worn by employees within reaching distance of exposed energized electrical conductors of 50 volts or greater.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

PERFORMER demonstrated proper radiological practices AS REQUIRED

STANDARD:

PERFORMER applied proper radiological practices, AS REQUIRED, during JPM performance.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

____

____

****

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:________________

____

____

END OF TASK

STOP TIME: ________________

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

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

****

INITIAL CONDITIONS: You are an Operator. Unit 3 is at 100% power. ± 24V Neutron Monitoring Battery B is in service in accordance with Section 5.10 of 0-OI-57D. ± 24V Neutron Monitoring Battery Charger B2-3 was temporarily taken out of service for maintenance and is now ready for return to service.

INITIATING CUES: The Shift Manager directs you to return Unit 3 ± 24V Neutron Monitoring Battery Charger B2-3 to service to ± 24V Neutron Monitoring Battery B.

CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

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

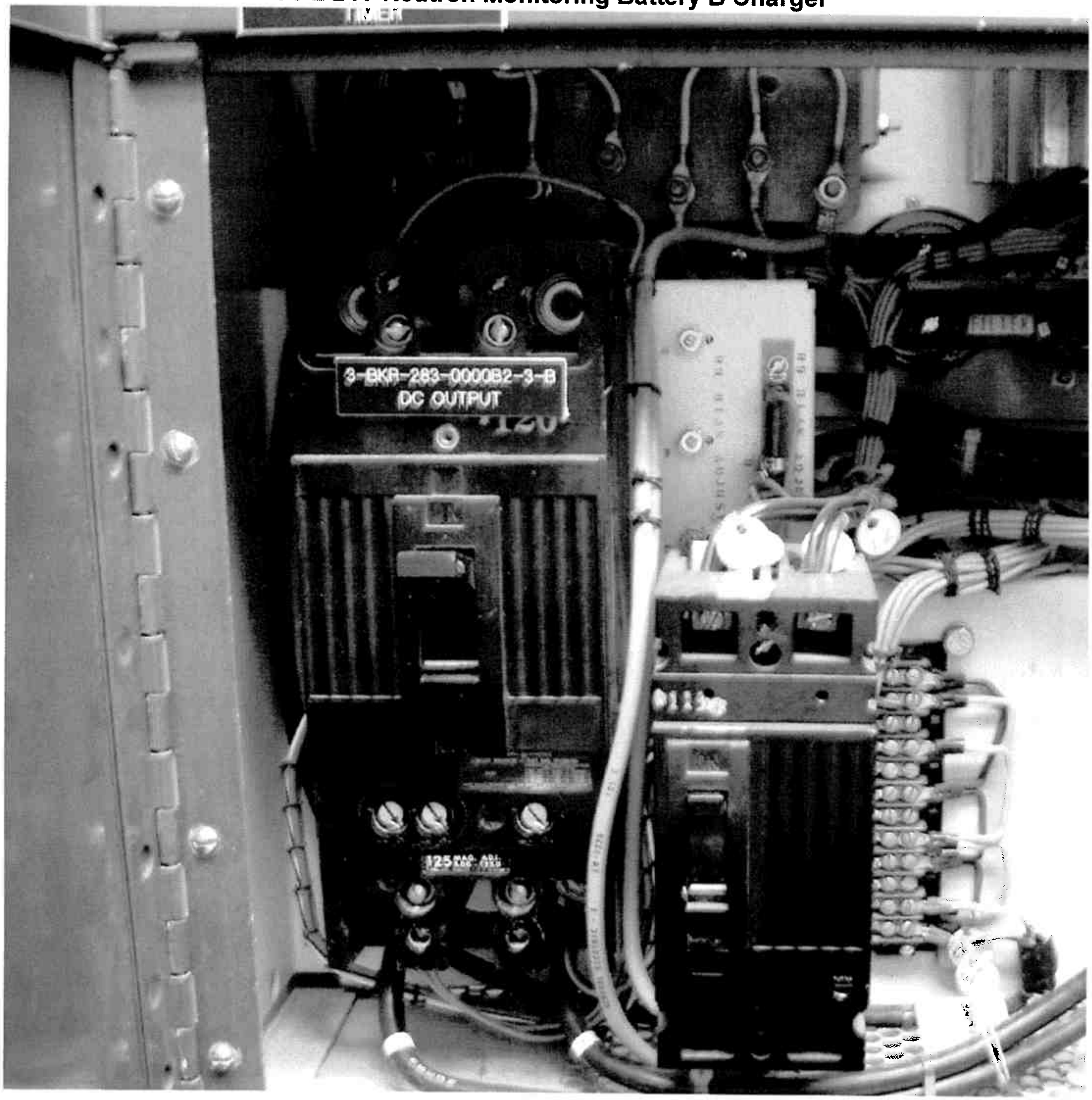
****

INITIAL CONDITIONS: You are an Operator. Unit 3 is at 100% power. ± 24V Neutron Monitoring Battery B is in service in accordance with Section 5.10 of 0-OI-57D. ± 24V Neutron Monitoring Battery Charger B2-3 was temporarily taken out of service for maintenance and is now ready for return to service.

INITIATING CUES: The Shift Manager directs you to return Unit 3 ± 24V Neutron Monitoring Battery Charger B2-3 to service to ± 24V Neutron Monitoring Battery B.

CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!

Attachment 1: **Unit 3 ± 24V Neutron Monitoring Battery B Charger**



TVA

Browns Ferry Nuclear Plant

Unit 0

Operating Instruction

0-OI-57D

DC Electrical System

Revision 0121

Quality Related

Level of Use: Continuous Use

Effective Date: 11-06-2008

Responsible Organization: OPS, Operations

Prepared By: William Wambsgan @ 6360

Approved By: James A. McCrary

Current Revision Description

Type of Change: Enhancement 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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Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

ATTACHMENTS

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

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

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

2.5 Vendor Manuals

C&D Installation, Operating, and Maintenance Instructions for Stationary Batteries, Contract No. 822407, BFN-VTM-C173-0010

LORAIN Products Corp., Model F100E25 Flotrol Rectifier, Contract No. 69-64520, BFN-VTM-L270-0010

General Electric, GEK 779 and GEK 779A Volume XI, Electrical Power Systems, Contract No. 90744, BFN-CVM-2105 and BFN-CVM-2244

GEK-31040, Regulated, Filtered 3 Phase Battery Charger 48 Volt, 100 Amp, Contract No. 90744, BFN-VTM-G080-1085

GEK-1249A, SCR Battery Chargers, Contract No. 90744, BFN-VTM-G080-6720

GEK-31041, Regulated, Filtered 3 Phase Battery Charger 250 volt, 300 amp, BFN-VTM-G080-7390

C&D Charger Power Systems 250V DC Shutdown Boards Battery Chargers, BFN-VTM-C173-0150

Southern Testing Services I/O/M Manual for 250 VDC Distribution Panel, Contract E19013, BFN-CVM-2659

General Electric Type AK POWER Circuit Breakers, BFN-VTM-G080-1020

Operation and Maintenance Manual for Power Conversion Product Three Phase SCRR Battery Charger, BFN-VD-5021

2.6 Miscellaneous Documents

INPO SOER 81-015, Partial Loss of DC Power

LER 88021/25

II-B-91-056

CAQR BFP 880827

NRC IE Inspection Follow-up Item 86-40

DCN Q33440A Revise Battery Charger Vendor Manual

DCN T39994A, Revise Unit Battery and 250VDC RMOV Board Load Limits associated with FCV-73-44

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).

    b. 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

3.0 PRECAUTIONS AND LIMITATIONS (continued)

2. 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.

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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]

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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.

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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]

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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

3.0 PRECAUTIONS AND LIMITATIONS (continued)

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

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

[1] **VERIFY** the ± 24V Neutron Monitoring Battery A(B) is in service in accordance with Section 5.10. ☐

[2] **REVIEW** Precautions and Limitations. **REFER TO** Section 3.0. ☐

TABLE 3

CHANNEL A CHARGERS	POWER SUPPLY
A1-3 & A2-3	Batt Board 3, Breaker 1201
CHANNEL B CHARGERS	**POWER SUPPLY**
B1-3 & B2-3	Batt Board 3, Breaker 1221

NOTE
Steps 5.13[4] through 5.13[10] are performed from the ± 24V Neutron Monitoring Battery Charger A(B) located in Battery Board Room 3.

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

[4] **OPEN** the front cover of the ± 24V Neutron Monitoring Battery Charger to be placed in service and **VERIFY CLOSED** the DC output circuit breaker by placing it in the ON Position. ☐

[5] **CLOSE** the AC CIRCUIT BREAKER on Neutron Monitoring Battery Charger by placing the breaker in ON. ☐

[6] **DEPRESS** OVERVOLTAGE RESET push-button on chargers being placed in service. ☐

[7] **CHECK** the following indications of normal operation on the applicable ± 24V Neutron Monitoring Battery Charger:

A. DC Voltage greater than 24 Volts ☐

B. DC Voltage less than 29 Volts ☐

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 ± 24V DC Chgs. (applicable charger, see Table 1) Tie to Bat Bd 1(2,3), BKR 1201 Ch. A (1221 Ch. B) should be placed to the OFF position and the Unit Supervisor informed immediately.

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

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

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

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description 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
3	06/01/08	All	General revision & re-format

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 16A - BYPASS RCIC LOW PRESSURE ISOLATION

K/A NUMBER: 217000A2.03 K/A RATING: RO 3.4 SRO 3.3

****

TASK STANDARD: PERFORM OPERATIONS NECESSARY TO BYPASS RCIC LOW REACTOR PRESSURE ISOLATION AS DIRECTED BY 3-EOI APPENDIX-16A

PERFORMANCE LOCATION: SIMULATOR ___ PLANT X CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 3-EOI Appendix-16A, Rev 1

VALIDATION TIME: CONTROL ROOM: _____ LOCAL: 15:00

MAX. TIME ALLOWED: __________ (FOR TIME CRITICAL JPMs ONLY)

PERFORMANCE TIME: __________

COMMENTS: ______________________________

ADDITIONAL COMMENT SHEETS ATTACHED? YES _____ NO _____

RESULTS: SATISFACTORY _____ UNSATISFACTORY _____

EXAMINER SIGNATURE: ______________________ DATE: ______________

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-PLANT: I will explain the initial conditions and state the task to be performed. ALL STEPS WILL BE SIMULATED. Do NOT 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 ______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

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

Examiner Note: Applicant has demonstrated obtaining procedures on the simulator, therefore, just hand him/her the procedure, however, Verify that applicant locates the EOI Equipment Storage Box (on wall behind pnl 25-31) (Third floor in Reactor bldg)

STANDARD:

Identified or obtained copy of 3-EOI Appendix-16A.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

1. **NOTIFY** Unit Operator and **CONTINUE** in this procedure.

CUE: [As Unit 3 Operator] Acknowledge 3-EOI Appendix-16A in progress.

STANDARD:

Simulated contacting Unit 3 Operator and informed him/her that 3-EOI Appendix-16A is in progress.

SAT _____ UNSAT _____ N/A _____ COMMENTS:_______________

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

2. **REFER TO** Attachment 1 and **OBTAIN** necessary tools and equipment.

CUE: [When simulated] You have pliers, tape and screwdriver.

STANDARD:

Identified EOI storage box at Panel 3-25-31 and Simulated obtaining pliers, tape and holding screwdriver.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

3. **LOCATE** terminal strip DD inside Panel 3-25-31, Rear.

STANDARD:

Located terminal strip DD in Panel 3-25-31.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL ____ NOT CRITICAL __X__

4. **LOCATE** red wire attached to terminal DD-48.

STANDARD:

Located red wire attached to terminal DD-48.

SAT ____ UNSAT ____ N/A ____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL ____

5. **REMOVE** terminal screw at terminal DD-48 WHILE holding the red wire with needle-nose pliers.

CUE: [When correctly simulated] The terminal screw at DD-48 has been removed.

STANDARD:

Simulated removing terminal screw while holding wire with pliers.

SAT ____ UNSAT ____ N/A ____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL __X__ NOT CRITICAL _____

6. **REMOVE** and **TAPE** lugged end of red wire lifted from terminal DD-48.

CUE: [When correctly simulated] The lugged end of the red wire from terminal DD-48 has been removed and taped.

STANDARD:

Simulated removing and taping lugged end of red wire.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

7. **NOTIFY** Unit Operator that RCIC Low RPV Pressure Isolation Interlock is bypassed.

CUE: [When simulated] Operator acknowledges RCIC low RPV pressure isolation interlock is bypassed

STANDARD:

Simulated notifying Unit 3 Operator that RCIC Low Pressure Isolation Interlock is bypassed.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

CUE: That completes this task.

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

PERFORMER complied with all safety rules and regulations

STANDARD:

PERFORMER complied with all safety rules and regulations (hardhat, safety glasses, sideshields, and hearing protection was worn AS REQUIRED.)

ELECTRICAL SAFETY was also adhered to AS REQUIRED: Exposed conductive articles such as rings, metal wristwatches, bracelets, and metal necklaces shall not be worn by employees within reaching distance of exposed energized electrical conductors of 50 volts or greater.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****

PERFORMANCE STEP: CRITICAL _____ NOT CRITICAL __X__

PERFORMER demonstrated proper radiological practices AS REQUIRED

STANDARD:

PERFORMER applied proper radiological practices, AS REQUIRED, during JPM performance.

SAT _____ UNSAT _____ N/A _____ COMMENTS:________________

____

____

****
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:_______________

____

____

END OF TASK

STOP TIME: _______________

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-PLANT: I will explain the initial conditions and state the task to be performed. ALL STEPS WILL BE SIMULATED. Do NOT 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. ALL STEPS WILL BE SIMULATED. Do NOT 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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INITIAL CONDITIONS: You are an operator. The Unit 3 reactor has scrammed due to a leak in primary containment and reactor level is -30". RCIC is isolated from the RPV due to low RPV pressure but is needed for RPV makeup. 3-EOI Appendix-5C, INJECTION SYSTEM LINEUP - RCIC, is in progress.

INITIATING CUES: The Unit 3 Operator directs you to bypass RCIC Low Reactor Pressure Isolation Interlocks as directed by 3-EOI Appendix-16A.

CAUTION: DO NOT OPERATE ANY PLANT EQUIPMENT!

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

EOI PROGRAM MANUAL SECTION IX

3-EOI APPENDIX-16A

BYPASSING RCIC LOW RPV PRESSURE ISOLATION INTERLOCKS

REVISION 1

PREPARED BY: M. Morrow PHONE: 3708

RESPONSIBLE ORGANIZATION: Operations

APPROVED BY: A. S. Bhatnagar

EFFECTIVE DATE: 10/26/00

LEVEL OF USE: REFERENCE USE

VALIDATION DATE: 01/08/92

QUALITY-RELATED

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

REV. NO.	DATE:	REVISED PAGES	REASON FOR CURRENT REVISION
0	7/28/95	ALL	New procedure. Necessary to support implementation of BFNP Unit 3 EOIs.
1	10/26/00	All	Converted to MS-Word.

3-EOI APPENDIX-16A

BYPASSING RCIC LOW RPV PRESSURE ISOLATION INTERLOCKS

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:
1. Needle-nose pliers. 2. Electrical tape. 3. Screwdriver.	Unit 3 RB NE, El 621 ft, at Panel 3-25-31, EOI Equipment Storage Box.