Facility:	HB ROBINSON	Task No.:	01000110605
Task Title:	Withdrawing Control Rod Shutdown Bank B	JPM No.:	2011-2 NRC JPM A
K/A Reference:	003 AK3.04 3.8/4.1		

Examinee: NRC Examiner: N/A

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: Preparations for a reactor startup are in progress.

GP-003 has been completed up to Step 8.2.22.d.

Reactor Engineering has provided Mode 2 determination point of 28 steps on Control Bank C.

You are the Reactor Operator.

Task Standard: Drive Control Rods into the core to ensure reactor is shutdown.

Required Materials: GP-003, Normal Plant Startup from Hot Shutdown to Critical, Revision 94

AOP-001, Malfunction of Reactor Control System, Revision 26

General References: GP-003

AOP-001

Handouts:	GP-003 completed up to Step 8.2.22.d
Initiating Cue:	The CRS has directed you to continue rod withdrawal in support of performing a reactor startup, starting at Step # 8.2.22.d.
Time Critical Task:	NO
Validation Time:	7 minutes

SIMULATOR SETUP

1. Reset to IC-806
2. Open SCN: 008_JPM_NRC_A
3. Place simulator in run when directed by the examiner.

(Denote Critical Steps with an asterisk*)

START TIME: _______

* **Performance Step: 1** Select SBB on the Rod Bank Selector switch (Step 8.2.22.d)

Standard: Candidate places the rod bank selector switch in the SBB (Shutdown Bank B) position.

Examiner's Note:

Comment:

NOTE

During rod withdrawal, the Operator At The Controls (OAC) is manipulating the Rod Withdrawal and monitoring applicable parameters. Simultaneously, a licensed RO other that the assigned OAC will assist in performing the Attachment 10.3, Control Rod Withdrawal Checklist.

CAUTION

When above 220 steps withdrawn, Shutdown Banks should be withdrawn in 1 or 2 step increments to prevent overstepping of the control rods.

* **Performance Step: 2** Withdraw Shutdown Bank "B" to 225 steps while performing the checks of Attachment 10.3, Control Rod Withdrawal Checklist. (Step 8.2.22.e)

Standard: Candidate places the IN-HOLD-OUT lever in the OUT position and withdraws Shutdown Bank B rods.

Examiner's Note: When the rods reach 70 steps withdrawn, 4 of the rods will drop into the core. The candidate will be expected to perform the immediate actions of AOP-001 and then enter the procedure.

Examiner's Cue:

Comment:

<u>NOTE</u>

Steps 1 through 3 are immediate action steps.

Performance Step: 3 Check unexpected rod motion – IN PROGRESS (Step 1)

Standard: Candidate determines that no unexpected rod motion is in progress, proceeds to the RNO step and proceeds to Step 7.

Examiner's Note:

Comment:

Performance Step: 4 Make a PA announcement for procedure entry (Step 7)

Standard: Candidate uses an available PA handset and makes a PA announcement for entry into AOP-001.

Examiner's Note:

Comment:

Performance Step: 5 Determine if multiple rods have dropped as follows: (Step 8)

a. Analyze indications for multiple rod drop
- Prompt drop – PRESENT
- More than 1 rod bottom light – ILLUMINATED
- More than 1 IRPI – INDICATES ON BOTTOM

b. Check multiple dropped rods - PRESENT

Standard: Candidate determines that there are multiple dropped rods by the IRPI indication for the affected rods at zero and rod bottom bistables illuminated.

Examiner's Note:

Comment:

Performance Step: 6 Check reactor status – MODE 1 OR 2 (Step 9)

Standard: Candidate determines the reactor is in Mode 3, proceeds to the RNO step and proceeds to Section A, Dropped Rod.

Examiner's Note:

Comment:

Performance Step: 7 Check plant status – Mode 1 (Step 1, Section A)

Standard: Candidate determines the reactor is in Mode 3, proceeds to the RNO step and proceeds to caution prior to Step 35.

Examiner's Note:

Comment:

CAUTION

Attempts to recover a dropped rod from a Mode 2 initial condition could result in an inadvertent return to criticality.

Performance Step: 8

Check plant status – MODE 2 (Step 35, Section A)

Standard:

Candidate determines that the plant is in Mode 3 and proceeds to the RNO step which directs transition to Step 37.

Examiner's Note:

Comment:

***Performance Step: 9**

Perform the following: (Step 37, Section A)

a. Fully insert all Control Bank rods
b. Fully insert Shutdown Bank B rods
c. Fully insert Shutdown Bank A rods

Standard:

Candidate determines that the control bank rods are fully inserted by observing the IRPI and step counters for the control bank rods.

Candidate starts inserting Shutdown Bank B rods by placing the IN-HOLD-OUT lever in the IN position and observes the IRPI downward movement along with the applicable step counters indicating inward rod motion.

Examiner's Note:

Once the rod insertion of Shutdown Bank B has commenced, the JPM can be terminated.

Comment:

<u>END OF TASK</u>

Terminating Cue: **When control rod insertion is commenced, the evaluation of this JPM is complete.**

STOP TIME: ____________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM A

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________________ Date: __________________

INITIAL CONDITIONS:	Preparations for a reactor startup are in progress. GP-003 has been completed up to Step 8.2.22.d. Reactor Engineering has provided Mode 2 determination point of 28 steps on Control Bank C. You are the Reactor Operator.
INITIATING CUE:	The CRS has directed you to continue rod withdrawal in support of performing a reactor startup, starting at Step # 8.2.22.d.

INITIAL CONDITIONS: Preparations for a reactor startup are in progress.

GP-003 has been completed up to Step 8.2.22.d.

Reactor Engineering has provided Mode 2 determination point of 28 steps on Control Bank C.

You are the Reactor Operator.

INITIATING CUE: The CRS has directed you to continue rod withdrawal in support of performing a reactor startup, starting at Step # 8.2.22.d.

Progress Energy

C
Continuous Use

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 3

PART 3

GP-003

NORMAL PLANT STARTUP FROM HOT SHUTDOWN TO CRITICAL

REVISION 94

CAUTION
Reactor Startup is a Major Reactivity Manipulation (R1) as defined by OPS-NGGC-1306, Reactivity Management Program

SUMMARY OF CHANGES
PRR 465999
GP-003 Revision 94

Step / Section	REVISION COMMENTS
5.4.7	Added “or EOP-E-0” after PATH-1 in second bullet. (PRR 465999)

TABLE OF CONTENTS

1.0 **PURPOSE**

To provide the initial conditions, precautions, and instructions for a safe, normal Plant startup from MODE 3 to MODE 2.

R1 REACTIVITY EVOLUTION

2.0 **REFERENCES**

2.1. NRC, INPO and Industry Documents

1. SOER 88-02, Premature Criticality Events During Reactor Startup
2. SOER 90-3, Nuclear Instrument Miscalibration (Recommendation 2)
3. SOER 03-2 Recommendation 4.b, Managing Core Design Changes
4. Westinghouse Recommendation, Standard Information Package on Chemistry, Criteria & Specification SIP 5-1, Table 1.5 Note B
5. SOER 07-1, Reactivity Management, Recommendation #1, Standards and Expectations
6. SOER 07-1, Reactivity Management, Recommendation #2, Crew Supervision
7. SOER 07-1, Reactivity Management, Recommendation #3, Reactor Engineering
8. SOER 98-1, Safety System Status Control (Recommendation 2A) (CR 98-01853)
9. SOER 96-1, Control Room Supervision, Operational Decision Making, and Teamwork. (Recommendations 1 & 2)
10. SOER 96-02, Design and Operating Considerations for Reactor Cores (Recommendation 1)
11. EPRI PWR Primary Water Chemistry Guidelines, Volume 1, Revision 5

2.2. NGG Procedures and Documents

1. OPS-NGGC-1000, Fleet Conduct of Operations
2. OPS-NGGC-1305, Operability Determinations
3. OPS-NGGC-1306, Reactivity Management Program
4. CAP-NGGC-0200, Condition Identification and Screening Process
5. NFP-NGGC-0029, Reactivity Manipulation Plan Development
6. EGR-NGGC-1020, Conduct of Reactor Engineering and Nuclear Fuels Management

2.3. RNP Procedures and Documents

1. Improved Technical Specifications (ITS)
2. Station Curve Book
3. Emergency Operating Procedure Network
4. AOP-001, Malfunction of Reactor Control System
5. GP-002, Cold Shutdown to Hot Subcritical at No Load T-AVG
6. GP-004, Post Trip Stabilization
7. GP-006-1, Normal Plant Shutdown From Power Operation to Hot Shutdown
8. GP-006-2, Rapid Plant Shutdown
9. OP-002, Nuclear Instrumentation System
10. OP-301, Chemical and Volume Control System
11. OP-405, Main and Extraction Steam System
12. OP-406, Steam Generator Blowdown/Wet Layup System
13. OP-603, Electrical Distribution
14. OP-923, Containment Integrity
15. OST-001, Nuclear Instrumentation Source Range, Intermediate Range, Power Range

2.3 (Continued)

16. OST-008, Nuclear Instrumentation Startup Rate Channel
17. OST-011, Rod Cluster Control Exercise & Rod Position Indication Monthly Interval
18. OST-020, Shiftly Surveillances
19. OST-021, Daily Surveillances
20. OST-022, Weekly Surveillances
21. OST-023, Monthly Surveillances
22. OST-051, Reactor Coolant System Leakage Evaluation
23. OST-052, RCS Leakage Test and Examination Prior to Startup Following Opening of the Primary System
24. OST-160, Pressure Isolation Check Valve Back Leakage
25. OST-901, HVH Condensate Measuring System
26. OST-920, Operations Cold Shutdown Test Procedure
27. MST-010, Source Range Trip Logic Train "A" and "B"
28. MST-011, Reactor Protection Logic Train “A” and “B” at “0” Power
29. MST-551, Turbine Trip Logic Channel Testing
30. MST-932, Low Autostop Oil Pressure and Turbine Stop Valve Closure Testing
31. EST-032, Visual Inspection of Hydraulic Mechanical Shock Suppressors
32. EST-033, Functional Testing of Hydraulic and Mechanical Shock Suppressors
33. EST-050, Refueling Startup Procedure
34. CP-001, Chemistry Monitoring Program
35. OMM-001-12, Minimum Equipment List and Shift Relief
36. OMM-001-6, Operations Assessments
37. FMP-001, Core Operating Limits Report (COLR)

2.3 (Continued)

38. FMP-012, Manual Determination of Shutdown margin Boron Concentration
39. EMP-1715(P), POWERTRAX User's Guide
40. PLP-006, Containment Vessel Inspection/Closeout
41. PLP-037, Conduct of Infrequently Performed Tests or Evolutions and Pre-Job Briefs
42. PLP-100, Technical Requirements Manual (TRM)
43. Project 97-00161, IN 96-69 Operator Actions Affecting Reactivity
44. EC 47208, NR-45 Recorder Replacement
45. LER-2004-002-00, Entry into Mode 3 With the SDAFW Pump inoperable
46. FMP-025, POWERTRAX, OSG, ECC, SDB & PDD Modules
47. APP-005, NIS & Reactor Control
48. APP-036, Auxiliary Annunciator
49. APP-004, First Out Reactor Trips
50. OMM-022, Emergency Operating Procedures User`s Guide
51. OMM-024, Rod Position Channel Check
52. EC 72149, RNP Cycle 27 Reload Design and Safety Analyses

2.4. Nuclear Condition Reports (NCRs) and Adverse Condition Reports (ACRs)

1. ACR 94-01276, Steam Line Drains Found Out of Position
2. ACR 94-01746, PWST Curve Inadequacy
3. ACR 94-01088, Spray Additive Tank Curve Inadequacy
4. CR 96-02954, SOER 96-01 RESPONSE.
5. NCR 233326, Enhance NARPI Adjustment Guidance in AOP-1 and GPs
6. NCR 308587, GP-003 Requirement for OST-001 Performance
7. NCR 358896, PIC-497 Setpoint Not Updated in OAO Logs
8. IMPR 364913, NCON Assignment Tracking
9. NCR 433838, GP-003 Actions Directed by Note

3.0 RESPONSIBILITIES

1. Operations is responsible for the performance, review, and approval of this procedure.

2. Reactor Engineering is responsible for providing support in the Control Room during the startup process as defined in OPS-NGGC-1306, Reactivity Management Program and EGR-NGGC-1020, Conduct of Reactor Engineering and Nuclear Fuels Management.

4.0 PREREQUISITES

		INIT
1.	**IF** a heatup from MODE 4 to MODE 3 has been performed, **THEN VERIFY** GP-002, Cold Shutdown to Hot Subcritical at No Load T-AVG, is complete.	N/A
2.	**IF** this startup is preceded by a Reactor Shutdown, **THEN VERIFY** GP-006-1, Normal Plant Shutdown from Power Operation to Hot Shutdown, or GP-006-2, Rapid Plant Shutdown, is complete.	N/A
3.	**IF** this startup follows a Reactor trip, **THEN VERIFY** GP-004, Post Trip Stabilization, is complete.	[illegible]
4.	**VERIFY** that an approved Reactivity Manipulation Plan for this startup is available as required by OPS-NGGC-1306, Reactivity Management Program.	[illegible]
5.	**VERIFY** the Control Room access doors are posted to limit access IAW OPS-NGGC-1000, Fleet Conduct of Operations, and OPS-NGGC-1306, Reactivity Management Program.	[illegible]

5.0 PRECAUTIONS AND LIMITATIONS

5.1. Control Rod Banks:

1. Control rod banks shall always be withdrawn and inserted in the prescribed sequence: (ITS LCO 3.1.6)

   - Withdrawal sequence is Control Bank "A", Control Bank "B", Control Bank "C", and Control Bank "D".

   - Insertion sequence is Control Bank "D", Control Bank "C", Control Bank "B", and Control Bank "A".

2. When automatic bank sequencing is used (Rod Bank Selector switch in "A" or "M"), verify correct bank sequencing by monitoring both the group step counters **AND** the rod position indicators.

3. Overlap of consecutive control banks shall not exceed 97 steps. For example, when Bank "C" is 128 steps withdrawn, withdrawal of Bank "D" will begin, with Banks "C" and "D" moving together until "C" is fully withdrawn, and "D" is 97 steps withdrawn. (ITS LCO 3.1.6)

4. When withdrawing control rods in MODES 1 and 2, efforts should be made to maintain RPI within the ITS alignment limits. Rod motion should be stopped **AND** adjustments made, as allowed, to maintain indication within the limits. (ITS LCO 3.1.7/LCO 3.1.4)

5.2. Shutdown Bank Rods:

1. ITS LCO 3.1.5 requires that the Shutdown Bank Rods be within insertion limitations specified in the COLR during MODE 1 and MODE 2 with any Control Bank not fully inserted. The COLR requires that the Shutdown Bank Rods be withdrawn to at least 225 steps.

> **NOTES:** The COLR identifies the required Shutdown Margin (SDM) based on plant conditions, which include:
> 1) Whether the rod control system is capable of rod withdrawal
> 2) The number of RCPs in operation
> 3) The RCS temperature to be maintained.
>
> The required Boron Concentration can be determined using Powertrax or the Station Curve Book using the SDM identified in the COLR.

2. The following constraints are placed on Shutdown Bank and Control Bank Rod positioning when in MODES 3, 4 and 5:

   a. All Control Rods including Shutdown Banks “A” and “B” are fully inserted. The Reactor Trip Breakers may be left closed as long as the Shutdown Margin (SDM) requirements of the Core Operating Limits Report (COLR, FMP-001) are fully met.

   b. Primary plant heat-up and cooldown with the Reactor Trip Breakers shut (RCCA Control Rod Drive Mechanisms energized) requires that all Shutdown and Control Rods are stepped out to the 5 step point. This is to help prevent thermal binding of the RCCA rodlets in the individual dashpots.

3. The RCS shall be borated as conditions require **AND** the concentration confirmed by sampling.

5.3. Precautions during Approach to Criticality:

1. Startup Rate shall **NOT** be permitted to exceed 1.0 decade/minute as read on the STARTUP RATE METER.

2. An Inverse Count Rate Ratio Plot (1/M) with a minimum of four data points (including baseline data point which is taken after Shutdown Banks "A" and "B" are fully withdrawn) shall accompany the Reactor startup.

3. After the third doubling, if the predicted critical rod position from the 1/M plot falls outside the +/-500 pcm position, the Reactor Operator should notify the SM and Reactor Engineer for further guidance.
(Project 97-00161)

5.4. General

1. OPS-NGGC-1306, Reactivity Management Program, defines a reactor startup as a **Major Reactivity Manipulation (R1).** The Reactivity management requirements of OPS-NGGC-1306 should be reviewed prior to commencing the plant start-up **AND** periodically during the evolution to ensure proper compliance.

2. Reactor Startup shall be secured if all RPIs are **NOT** operable. Reactor startup will **NOT** be commenced without an approved alternate means of verifying Control Rod position.

3. Criticality shall be anticipated at any time when the Shutdown Banks or Control Banks are being withdrawn, **OR** when boron dilution operations are in progress.

4. If the count rate on either Source Range channel goes up by a factor of two or more during any step involving a boron concentration change, the operation shall be stopped immediately **AND** suspended until a satisfactory evaluation of the situation has been made.

5. When the Reactor is subcritical, positive reactivity shall **NOT** be added by more than one method at a time. (Exception: Due to the slow insertion rate contributed by the decay of Xenon, positive reactivity addition by the Operator may be performed during periods of Xenon decay.) (SOER 07-1, Recommendation #1)

6. The Reactor will **NOT** be made critical until the Hydrogen concentration in the RCS is between 25 and 50 cc/kg of water. (EPRI PWR Primary Water Chemistry Guidelines, Volume 1, Revision 5)

5.4 (Continued)

7. The following requirements apply to the Source Range Nuclear Instruments when in MODE 2 below P-6: (ITS Table 3.3.1-1 item 4)

   - **IF** one Source Range channel becomes inoperable, **THEN** immediately suspend operations involving positive reactivity additions. Also reference ITS 3.3.1, Required Action I.1 and the ITS basis for clarification concerning allowances for limited RCS boron and RCS temperature changes.

   - **IF** two Source Range channels become inoperable, **THEN** immediately trip the Reactor **AND GO TO** PATH-1 or EOP-E-0 **IF** any of the following conditions are met: (Reference to ITS 3.3.1, Table 3.3.1-1 Item 4 and APP-005)

     - The plant is in MODE 2 with Reactor Power less than the P-6 set point

     - The plant is in MODE 3 with the Rod Control System capable of rod withdrawal

     - The plant is in MODE 3 with one or more rods **NOT** fully inserted

8. Whenever possible, the Steam Dump Valves should be used for RCS temperature control.

9. Feedwater additions during Hot Shutdown should be initiated as slowly as possible **AND** should **NOT** exceed 400 gpm **OR** 0.2 X 10^6 lbm/hr to minimize the thermal stress cycles on the feedwater nozzle.

10. During Secondary Plant warm up, steam should be drawn off slowly and feedwater additions should be regulated to maintain the desired temperature range of the RCS.

5.4 (Continued)

11. ITS Table 1.1-1 defines MODE 2 as K_{EFF} greater than or equal to 0.99 and Rated Thermal Power (RTP) less than or equal to 5% (excluding decay heat). Since K_{EFF} indication is not available, the following is used to define when MODE 2 is entered in this procedure:

    – When a second bank of rods (control or shutdown) is withdrawn more than 20 steps **OR** when the RCS boron concentration is less than the lowest boron concentration required for Shutdown Margin by POWERTRAX or by Curve 1.11 (Curve Book) for the current core burnup and RCS temperature, the Reactor shall be considered to be in MODE 2.

    – The above description of MODE 2 may be modified by an approved reactivity balance for the current or proposed plant conditions which shows the K_{EFF} for the plant condition in question such that the new MODE 2 declaration point is determined.

12. If criticality occurs with the Control Rods BELOW the Minimum Control Rod Insertion Limit, the Reactor should be shut down in a controlled manner and the Reactor Engineer notified of the reactivity anomaly. (ITS LCO 3.1.6)

13. The minimum RCS temperature for criticality is 530°F (ITS LCO 3.4.2)

14. The POWERTRAX Estimated Critical Condition (ECC) is the official estimate. The GP-003 ECP hand calculation is a back-up. Deviations of 250 pcm or more between the two should be investigated. If the deviation exceeds 500 pcm, do not attempt to take the reactor critical until the deviation is resolved. (SOER 07-1, Recommendation 3; FMP-025)

15. Auxiliary Boilers "A" and "B" are rated at 300 Horse Power (HP), approximately 10,350 lbs/Hr steam production each. Auxiliary Boiler "C" is rated at 600 HP, approximately 23,000 lbs/Hr steam production. It is normal to run two Auxiliary Boilers. Depending on the wear condition of the Main Turbine Gland Seals and the Auxiliary Steam (AS) System loads, it may be necessary to run all three Auxiliary Boilers to maintain stable Gland Seal pressure. Loss of Gland Seal pressure could lead to a loss of Main Condenser Vacuum. Loss of Main Condenser Vacuum would result in a loss of temperature control when using the Steam Dumps. This will complicate the reactor start-up and cause unnecessary distractions while approaching criticality.

5.4 (Continued)

16. OPS-NGGC-1306, Reactivity Management Program, defines a Reactivity Management Event (RME) as follows:

    "Any unexpected occurrence which results in a significant change in core reactivity, loss of reactivity control, operation in an unanalyzed condition, or a reduction of margin to the licensing basis."

    Any indications of an RME necessitate the submittal of an NCR IAW CAP-NGGC-0200, Condition Identification and Screening Process. Depending on the type and severity of the RME, plant shutdown may be required. Reactor restart after an RME will be conducted only after approval of the Plant Nuclear Safety Committee (PNSC).

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

N/A

INIT

8.0 INSTRUCTIONS

8.1. Initial Conditions

NOTE:	This section has been screened IAW PLP-037 criteria and determined N/A to PLP-037.

1. **VERIFY** this revision is the latest revision available. [signature] Today
Date

NOTE:	Performance of the steps in this section is not sequence dependent and can be performed in any order. Documentation of the procedure completion dates and MODES is solely to assist with the decision making questions in the subsequent steps.

2. **RECORD** the last date performed for the following procedures: [signature]

OST-001 Today
OST-008 Today
OST-021 Today for MODE 1
OST-022 Today for MODE 1
OST-023 Today for MODE 1
OST-051 Today
OST-052 Today
OST-160 Today
OST-920 Today
MST-010 Today
MST-011 Today
MST-551 Today
MST-932 Today
PLP-006, Attachment 6.3 Today

INIT

3. **IF** the test frequency will be due during the startup, **THEN PERFORM** OST-051. (ITS SR 3.4.13.1) N/A

4. **IF** OST-001 has not been completed in the previous 92 days, **THEN PERFORM** the OST-001. N/A

5. **IF** OST-008 has not been completed in the previous 7 days, **THEN PERFORM** the OST-008. N/A

6. **IF** OST-011 has not been completed within the previous 31 days, **THEN PERFORM** the OST-011. N/A

7. **IF** the primary system was opened, **THEN VERIFY** OST-052 has been performed. N/A

NOTE:	OST-160 is required prior to entry into MODE 2 whenever the unit has been in MODE 5 for seven days or more **AND** leakage testing has not been performed within the previous nine months **OR** within 24 hours following a PIV actuation due to automatic or manual action **OR** within 24 hours following flow through any RCS PIV. (ITS SR 3.4.14.1).

8. **IF** required, **THEN VERIFY** OST-160 has been performed. N/A

9. **IF** this Reactor Startup is immediately following a Refueling Outage, **THEN VERIFY** completion of the required Refueling Test procedures in OST-920. N/A

10. **IF** the plant has been in Cold Shutdown, **THEN VERIFY** completion of the required Cold Shutdown Test procedures in OST-920. N/A

11. **VERIFY** one of the following (N/A the two items **NOT** used):

    – MST-011 has been performed within the previous 31 days.

    – MST-010 was completed within 4 hours of entering MODE 3 from MODE 2. N/A

    – MST-010 was completed prior to closing the reactor trip breakers if not performed within 4 hours of entering MODE 3 from MODE 2. N/A

INIT

12. **VERIFY** that either MST-551 **OR** MST-932 has been performed within the previous 31 days.

13. **REVIEW** all open degraded but operable SSCs (NCONS) as follows:

> **CAUTION**
>
> Ensure all degraded or non-conforming conditions as identified in open NCON assignments have either been corrected or that startup without correction, along with any applicable compensatory actions, has been justified and the justification has been concurred with by the Plant Nuclear Safety Committee (PNSC). The justification must provide an explanation as to why the corrections could not be made during the current outage and provide an alternate, acceptable, completion date based on the safety significance. (Reference OPS-NGGC-1305 and IMPR 364913)

a. **VERIFY** that all degraded SSCs scheduled for correction/restoration have been restored.

b. **IF** degraded SSC could not be restored during this outage, **THEN RECORD** the following information:

AR Number	Impacted SSC along with any required compensatory actions. (COMP ACTION may be marked as "N/A" if none is listed or required.)	Expected date for SSC restoration.	PNSC Meeting Number & date of concurrence.
N/A	SSC: N/A Comp Action: N/A	N/A	N/A
N/A	SSC: N/A Comp Action: N/A	N/A	N/A
N/A	SSC: N/A Comp Action: N/A	N/A	N/A
N/A	SSC: N/A Comp Action: N/A	N/A	N/A
N/A	SSC: N/A Comp Action: N/A	N/A	N/A

8.1.13 (Continued) INIT

c. **VERIFY** each Compensatory Action recorded in Step 8.1.13.b is also recorded in the Robinson Nuclear Plant Operations Compensatory Action Data Base. N/A

14. **REVIEW** the following documents **AND VERIFY** all Post-Maintenance Testing is completed **OR** scheduled for completion and conditions do **NOT** exist that would jeopardize the operability of ITS or TRM required equipment: [LER 2004-002-00]

– Temporary Equipment Modification Log

– Equipment Inoperable Record

– Caution Tag Log

NOTE:	The Reactor will not be made critical until the Hydrogen concentration in the RCS is between 25 and 50 cc/kg of water. (EPRI PWR Primary Water Chemistry Guidelines, Volume 1, Revision 5)

15. **REQUEST** E&C to sample the RCS to verify RCS Hydrogen Concentration is between 25 and 50 cc/kg of water.

– H_2 Concentration 38 cc/kg

– J.M. Hill
E&C Contact (Print name)

NOTE:	The S/G Blowdown Auto Closure Defeat key switches are to be operated in pairs **AND** are located in back of RTGB.

16. **PLACE** the S/G Blowdown Auto Closure Defeat key switches to the NORMAL position to restore the Steam Generator Blowdown valve auto closure signal from the Main Feedwater Pump breakers.

- FW PPS OFF Train "A" Normal
- FW PPS OFF Train "B" Normal

INIT

17. **VERIFY** that the RTGB AFW auto initiation status lights, TRAIN "A" DEFEATED and TRAIN "B" DEFEATED, are EXTINGUISHED.

- TRAIN "A" DEFEATED Extinguished
- TRAIN "B" DEFEATED Extinguished

18. **VERIFY** that the Nuclear Instrumentation Checklist attachment of OP-002 has been completed.

19. **VERIFY** the Containment Evacuation Horn is operable as demonstrated by the last satisfactory performance of either OST-001 or PLP-006, Attachment 6.3.

CAUTION
During MODE 3 and MODE 2, an Audible and Visual Flux Count Rate shall be maintained. Audible Count Rate is **ONLY** required when Source Range Instruments are operating (i.e., in MODE 2 when Source Range Instruments are no longer in service, Audible Count Rate is **NOT** available).

20. **VERIFY** the CHANNEL SELECTOR switch on the Audio Count Rate Channel drawer is selected to SR 31 **OR** SR 32.

21. **VERIFY** the SR count rate is audible on the Audio Count Rate Channel speaker **AND** visible on at least one Source Range channel CPS NEUTRON LEVEL meter.

22. **VERIFY** the following NIS **AND** Rod Control System recorders are in service **AND** operating properly:

- NR-45, POWER RANGE RECORDER (CPS, AMPS, %FP)
- NR-53, EXCORE NIS RECORDER
- NR-46, POWER RANGE, NI-41, NI-43, 0-200%
- NR-47, POWER RANGE, NI-42, NI-44, 0-200%

INIT

23. **IF** the Steam Line PORV setpoint controllers are **NOT** set for power operation, **THEN PERFORM** the following: N/A

CAUTION

The S/G PORV proportional-reset local controller will cause the PORV to lift if the output signal is 3-15 psig. The output signal will quickly lift the PORV if setpoint is equal to or less than steam line pressure, **AND** therefore requires expeditious actions to raise the setpoint once an output signal is noticed to prevent PORVs from lifting.

NOTE: Steps 2 through 8 should be performed in order for each PORV setpoint **AND** repeated until the S/G PORVs are properly set.

The BOP Operator and Auxiliary Operator should review this task prior to setting the S/G PORV setpoints.

S/G PORV controller setpoint is indicated on the lower orange indicator on the 0-1500 psig scale.

1	Station an Operator at the Secondary Control Panel in communication with the Control Room.			INIT
		PIC-477 INIT	PIC-487 NIT	PIC-497 INIT
2	Verify T_{avg} is at 547°F +/- 0.5°F (546.5°F to 547.5°F)	N/A	N/A	N/A
3	Slowly adjust the SG PORV potentiometer on the RTGB until the local CONTROLLER AIR PRESS starts to go up as reported by the Operator at the controller.	N/A	N/A	N/A
4	**WHEN** the local Operator sees a rising CONTROLLER AIR PRESS, **THEN** report the indicated controller setpoint to the Control Room.	N/A	N/A	N/A
5	**WHEN** the local Operator reports the indicated controller setpoint, **THEN** record the controller setpoint reported in the previous step.			
	PIC-477 indicated: N/A psig	N/A		
	PIC-487 indicated: N/A psig		N/A	
	PIC-497 indicated: N/A psig			N/A
6	Lower the PORV potentiometer setting until CONTROLLER AIR PRESS is at minimum as reported by the local Operator.	N/A	N/A	N/A

	8.1.23 (Continued)	PIC-477 INIT	PIC-487 NIT	PIC-497 INIT
7	Determine the required PORV setpoint by adding 30 psig to the pressure recorded in Step 8.1.23.5.			
	PIC-477: N/A psig + 30 = N/A psig (Indicated / Setpoint)	N/A		
	PIC-487: N/A psig + 30 = N/A psig (Indicated / Setpoint)		N/A	
	PIC-497: N/A psig + 30 = N/A psig (Indicated / Setpoint)			N/A
8	Slowly adjust the SG PORV potentiometer to the controller setpoint calculated in the previous step as reported by the local Operator.	N/A	N/A	N/A
9	Log the SG PORV potentiometer settings in the columns to the right.	RV-1 N/A	RV-2 N/A	RV-3 N/A
10	Record the SG PORV potentiometer setting on the Status Board **AND** notify the Outside AO to update the Outside AO Logs to reflect the new PORV pressure setpoints.	N/A	N/A	N/A
11	Send a copy of this page to the simulator support group.			N/A

INIT

24. **VERIFY** the Outside Auxiliary Operator (OAO) logs and Status Board are updated for the new Main Steam PORV setpoints recorded in Step 7 of the Data Table in the previous step. (NCR 358896)

OAO

25. **IF** this startup is after a Reactor Trip **OR** Safeguards Actuation, **THEN VERIFY** the Post Trip/Safeguards Review Report portion of OMM-001-6 has been completed as indicated by the appropriate startup approval signature.

INIT

~~NOTE:~~	RCS Temperature Control with the Main Steam Isolation Valves (MSIV's) shut is accomplished IAW OP-405, Main Steam System, and OP-923, Containment Integrity. These procedures require a dedicated operator for operation and isolation of the flow path. RCS Temperature Control via Steam Dump Operation is set in either GP-002 or GP-004.

26. **VERIFY** RCS temperature is being maintained between 545°F and 549°F using one of the following (N/A the method not used): (ACR 94-01276)
    - Controlling RCS Temperature section of OP-405. N/A
    - Steam Dump operation in STEAM PRESS mode. JR

27. **IF** this startup is required due to a Reactor Trip, **THEN VERIFY** Blowdown to the Flash Tank with Heat Recovery Bypassed Section of OP-406 is completed. JR

~~NOTE:~~	Step 8.1.28 may be marked as Not Applicable (N/A) if this is a post-trip Reactor restart where decay heat is providing enough steam for Gland Seal System operation.

28. To minimize distractions during the Reactor startup, **VERIFY** the Auxiliary Boilers are maintaining the Main Turbine Gland Seal pressure with minimal Aux. Boiler Trouble alarms on APP-036, Auxiliary Annunciator Panel. JR

29. To minimize distractions during Reactor startup, **VERIFY** test(s) which require coordination with the Control Room, have been authorized by the Manager - Operations, **AND** are documented below: (CR 96-02954, SOER 96-1, Recommendations 1 & 2, SOER 96-02, Recommendation 1, SOER 98-1, Recommendation 2A, OPS-NGGC-1306) JR

None	N/A	N/A
N/A	N/A	N/A

INIT

NOTE:	A core alteration is the movement of any fuel, sources, or reactivity control components, within the reactor vessel with the vessel head removed and fuel in the vessel.

30. **VERIFY** the following:

    a. **IF** this startup is following a core alteration, **THEN NOTIFY** the Reactor Engineer to perform the prerequisites of EST-050.

    N/A
    Reactor Engineer Contact (Print name) — N/A

    b. **VERIFY** OMM-001-12 MODE 2 Checklist is completed.

NOTE:	MODE 1 required SRs shall be performed in the procedures listed below if the plans are to immediately continue to MODE 1 following startup. Refer to the information in Step 8.1.2 when determining the need to perform OST-021, OST-022 and OST-023.

    c. MODE 2 required SRs (and MODE 1 if required) identified in the following, are completed:

    – OST-020, Shiftly
    – OST-021, Daily

    d. **IF** the most recent performance of OST-022 and OST-023 did not include the MODE 1 SRs, **THEN PERFORM** the MODE 1 and MODE 2 inspections and tests:

    – OST-022, Weekly
    – OST-023, Monthly

    e. A Reactor Engineer is in the Control Room to support the startup (SOER 96-02).

INIT

NOTE: If this Reactor Start-up is immediately following a GP-002 RCS Heat-up, the Shutdown Banks and Control Banks may have been withdrawn to 005 steps each to prevent thermal binding .

31. **PERFORM** the following to **VERIFY** both Shutdown Banks **AND** all of the Control Banks are all at zero steps: [CAPR 173910-07]

a. **RECORD** the AS FOUND Group Counter readings for each of the Shutdown Banks **AND** the Control Banks:

BANK	GROUP 1	GROUP 2
Shutdown Bank "A"	000	000
Shutdown Bank "B"	000	000
Control Bank "A"	000	000
Control Bank "B"	000	000
Control Bank "C"	000	000
Control Bank "D"	000	000

b. **IF** ANY Group Counter is displaying any reading other than 000 **OR IF** there is any reason to believe that any RCCA is not fully inserted, **THEN PERFORM** the following:

NOTE: Unless the reason for initiating a Reactor Trip is due to an abnormal or emergency condition, entry into the Emergency Operating Procedure (EOP) Network is NOT required when tripping the Reactor as a part this procedure. (OMM-022)

(1) **DEPRESS EITHER** MANUAL REACTOR TRIP BUTTON.

(2) **VERIFY** the Reactor Trip Breakers **AND** Reactor Trip By-pass Breakers are OPEN.

(3) **VERIFY** APP-004-F5, MANUAL TRIP, is received.

(4) **DEPRESS** the FIRST OUT RESET pushbutton to acknowledge and clear APP-004-F5.

8.1.31 (Continued) INIT

NOTE:	The Reactor Trip Breakers are open, thus, the Stationary Gripper Coils are deenergized. This will change the magnetic coupling characteristics of the Individual Rod Position Indication Detectors. Some of the Rod Position Indications may have a slightly negative value (between zero and -5 inches) when checked on ERFIS. Performance of the actions in Step 8.1.31.c is NOT used to establish compliance with ITS LCO 3.1.4 and 3.1.7. These checks are performed in Step 8.2.9.g. These checks are used to verify the Rod Position Indication System is working correctly PRIOR to commencing the actions in Section 8.2. This ensures compliance with the meaning and intent of Precaution & Limitation (P&L) 5.4.2. OMM-024, Rod Position Channel Check, may be used as a reference and guide for acceptance criteria while performing Step 8.1.31.c.

c. **CHECK** that the Individual Rod Position Indication to Group Counter deviation criteria listed in OMM-024 is satisfied prior to withdrawing rods from the fully inserted condition. Ta

INIT

NOTE:	All steps shall either be initialed when performed or if the procedure intent is met by existing Plant conditions, the step shall be marked N/A and initialed by the Shift Manager (SM). If the safe, efficient operation of the Plant so dictates, the steps may be performed simultaneously or out of sequence. Steps associated with Control Rod manipulation and the approach to Criticality should be performed in the order written.

8.2. Instructions for Taking the Reactor Critical

NOTE:	**IF** this startup is immediately following a Refueling **OR** other core alteration, **THEN** this section involves PLP-037 Case I activities. **IF** this startup is **NOT** immediately following a Refueling **OR** other core alteration, **THEN** this section involves PLP-037 Case II activities.

1. **IF** this startup has been determined to involve PLP-037 Case I **OR** Case II activities, **THEN** verify a pre-job briefing has been completed.

   ____
   Management Designated Monitor signature

INIT

CAUTION

Access inside Containment during the Reactor Startup is restricted due to changing Radiological conditions. **IF** access is necessary during Startup, the activity should be coordinated with Radiation Protection.

2. **IF** access was made inside Containment (CV) during this shutdown, **THEN** perform the following:

   a. **INSPECT AND CLOSEOUT** the CV IAW PLP-006.

   b. **WHEN** the CV has been inspected and closed out IAW PLP-006 **AND** all discrepancies are resolved, **THEN LOCK CLOSED** the CV Personnel Hatch doors.

3. **VERIFY** with RC that access inside Containment during Reactor Startup is restricted due to changing Radiological conditions.

4. **IF** this is the initial startup following a core alteration, **THEN PERFORM** the following:

   a. **MARK** the rest of Sections 8.2 **AND** 8.3 "N/A". N/A

   b. **PERFORM** the Reactor startup IAW EST-050. N/A

5. **WHEN** the RCS is at the Estimated Critical Boron Concentration, **THEN REQUEST** that the Reactor Engineer verify that the Moderator Temperature Coefficient (MTC) is less than or equal to +5 pcm/°F (FMP-001).

   – SCOTT JACKSON
   Reactor Engineer Contact (Print name)

INIT

BEGIN CRITICAL STEPS

6. **OBTAIN** permission to take the Reactor critical from the Manager - Operations, **OR** the Plant General Manager, **OR** the individual who is designated Acting Plant General Manager.

   Permission granted by: PLANT MANAGER Time/Date: NOW / TODAY
   (Print name)

NOTE:	A dedicated Operator at the Controls and at least one other Licensed Operator shall be in the COs Watchstation during the Reactor Startup. Until the completion of this GP, distractions in the Control Room should be minimized to allow full operator attention to the startup. (SOER 07-1, Recommendation #2) Shift Turnover shall **NOT** be done unless the Reactor is stable **AND** Shutdown Bank rod withdrawal has **NOT** commenced, **OR** the Reactor is stable at 10^{-8} amps. (SOER 07-1, Recommendation #2)

7. **ANNOUNCE** the following two times on the Plant Public Address System:

   "ATTENTION, REACTOR STARTUP HAS COMMENCED; ALL WELDING ACTIVITIES ARE SUSPENDED UNTIL FURTHER NOTICE".

INIT

8. **REVIEW AND APPLY** the following items throughout the remainder of this procedure.

NOTE:	The Rod Group Alignment checks and the Rod Position Indication checks of ITS 3.1.4 and 3.1.7 are applicable in MODE 2 and MODE 1. All RPIs should be verified as in alignment prior to entering MODE 2.

- Criticality shall be anticipated at any time when the Control Rods are being withdrawn, or when boron dilution operations are in progress.
- The MAXIMUM Startup Rate allowable is 1.0 dpm.
- Once rod motion is commenced, the Operator may stop rod motion as necessary to control the reactivity addition.
- All checks of rod bottom lights, overlap, rod alignment, and stable counts shall be performed during the rod pulls, **AND** may be signed off when the Reactor is stable while plotting 1/M data.
- If a discrepancy is identified in rod position indication by rod bottom lights or rod position indication, rod speed, rod direction, or Nuclear Instrument response, the rod withdrawal shall be secured until the discrepancy is resolved.
- **WHEN** above 220 steps withdrawn, **THEN** Shutdown Banks should be withdrawn in 1 or 2 step increments to prevent overstepping of the control rods.
- The Reactor shall be declared CRITICAL when the following conditions exist:
  - NO ROD MOTION

    AND
  - STABLE POSITIVE STARTUP RATE

    AND
  - STEADILY RISING COUNTS OR AMPS

INIT

9. **WITHDRAW** Shutdown Bank "A" by performing the following:

a. **CHECK** ALL Shutdown Bank and Control Bank Group Counters are reading 000.

b. **IF** any Group Counters are **NOT** reading 000, **THEN PERFORM** Step 8.1.31 prior to proceeding. N/A

c. **VERIFY** the Reactor Trip Breakers CLOSED.

NOTE:	APP-005-E2, ROD CONT SYSTEM URGENT FAILURE, and APP-005-E3, ROD CONT SYSTEM NON-URGENT FAILURE, may reflash when the ROD CONTROL STARTUP pushbutton is depressed. This is due to the various control, alarm and logic relays cycling and resetting.

d. **DEPRESS** the ROD CONTROL STARTUP pushbutton.

e. **VERIFY** APP-005-E2 **AND** APP-005-E3 are extinguished.

f. **VERIFY** the Group Step Counters indicate ZERO.

g. **VERIFY** Individual Rod Position Indicators are within 7.5 inches of the Bank average rod height.

NOTE:	Performance of Step.8.2.9.h will ensure that the ERFIS Rod Misalignment Monitoring programs are properly enabled to perform the required automatic Rod Misalignment Checks of ITS LCO 3.1.4 and 3.1.7. Performance of these actions will not impact the various Pulse Counters in the Rod Control System.

h. Using the ERFIS Turn-on Code (TOC) "RODUP," **VERIFY** ERFIS is showing all Control Rod Groups at 0 (zero) steps.

i. **SELECT** SBA on the Rod Bank Selector switch.

8.2.9 (Continued)

INIT

NOTE:	During Rod Withdrawal, the Operator at the Controls (OAC) is manipulating the Rod Withdrawal and monitoring applicable parameters. Simultaneously, a licensed RO other than the assigned OAC will assist in performing the Attachment 10.3, Control Rod Withdrawal Checklist.

CAUTION

When above 220 steps withdrawn, Shutdown Banks should be withdrawn in 1 or 2 step increments to prevent overstepping of the control rods.

j. **WITHDRAW** Shutdown Bank "A" to 225 steps **AND** **PERFORM** the checks of Attachment 10.3, Control Rod Withdrawal Checklist.

k. **VERIFY** the Source Range count rate stabilizes **AND** does **NOT** rise in an unexpected manner.

NOTE:	POWERTRAX is the official ECC/ECP calculation. The intent of the following step is to validate the POWERTRAX Estimated Critical Position (ECP) calculation using Attachment 10.1. The manual method (Attachment 10.1) can utilize any or all of the following: the plant curve book, POWERTRAX Pre-calculated Data, or updated data provided that data has been reviewed and approved. The intent of a second Estimated Critical Position (ECP) using a different method than the first is to ensure a common mistake is not made on both of the ECPs. Reactor Engineering will provide multiple POWERTRAX ECC/ECP calculations. A manual ECP validation does not need to be performed for each and every POWERTRAX calculation. The manual ECP must be within the limits of Reference 2.3.46, FMP-025, POWERTRAX OSG, ECC and PDD Modules, when compared to the POWERTRAX calculation that is used as the official ECC/ECP. FMP-025 defines this limit as 250 pcm.

10. **PERFORM** at least two ECPs as follows: (Project 97-00161)

a. An ECP calculated by Reactor Engineer using POWERTRAX or a similar method.

b. An ECP calculated by Operations using Attachment 10.1, Estimated Critical Condition Form. (SOER 07-1, Recommendation 3)

INIT

11. **ATTACH** all ECPs to this procedure for routing to the vault as permanent plant records.

~~**NOTE:**~~	RCS Boron concentration should be verified by two consecutive samples at 15 minute intervals **AND** are to be within 10 PPM of Estimated Critical Boron Concentration previously recorded. Pressurizer (PZR) boron concentration should be within 20 PPM of RCS Boron concentration. (Reference 2.4.9, NCR 433838)

12. **PERFORM** a comparison of the Estimated Critical Boron Concentration and the actual RCS and Pressurizer (PZR) Boron concentrations as follows:

    a. **RECORD** the Estimated Critical Boron Concentration provided by either Reactor Engineering **OR** the calculated ECP. 457 ppm

    b. **RECORD** RCS Boron concentration from two consecutive samples taken at 15 minute intervals.

    - 1st Sample: Time: then at 457 ppm
    - 2nd Sample: Time: Now at 457 ppm

    c. **RECORD** Pressurizer (PZR) Boron concentration from two consecutive samples taken at 15 minute intervals.

    - 1st Sample: Time: then at 457 ppm
    - 2nd Sample: Time: Now at 457 ppm

    d. **CHECK** Pressurizer (PZR) Boron concentration within 20 ppm of RCS Boron concentration.

    e. **CHECK** RCS Boron concentration within 10 ppm of Estimated Critical Boron Concentration.

INIT

13. **IF** the current RCS Boron Concentration is **NOT** at the Estimated Critical Boron Concentration, **THEN** perform the following:

a. **ADJUST** RCS Boron Concentration per the Operation of RCS Makeup System for Automatic Makeup, Dilution, Boration and Alternate Dilute Section of OP-301. N/A

b. **WHEN** the boron concentration adjustment is completed, **THEN PERFORM** the following:

(1) **REQUEST** an RCS **AND** PZR sample to determine the adjusted boron concentration **AND COMPARE** to the Estimated Critical Boron Concentration results previously recorded.

– RCS Boron N/A ppm

– PZR Boron N/A ppm

– N/A
E&C Contact (Print name) N/A

(2) **WHEN** 15 minutes have passed since the previous sample, **THEN REQUEST** a second RCS **AND** PZR sample to determine the adjusted boron concentration **AND COMPARE** to the Estimated Critical Boron Concentration results previously recorded.

– RCS Boron N/A ppm

– PZR Boron N/A ppm

– N/A
E&C Contact (Print name) N/A

8.2.13 (Continued) INIT

c. **WHEN** the RCS **AND** PZR boron concentration sample results have been verified, **THEN NOTIFY** the Reactor Engineer of the results. (Project 97-00161)

- RCS Boron N/A ppm
- PZR Boron N/A ppm
- N/A
  Reactor Engineer Contact (Print name) N/A

d. **IF** the Reactor Engineer determines that the RCS boron concentration is **NOT** acceptable, **THEN ADJUST** RCS Boron Concentration per the Operation of RCS Makeup System for Automatic Makeup, Dilution, Boration and Alternate Dilute Section of OP-301 as necessary to achieve the required ECP boron concentration determined by Reactor Engineer.

Required RCS Boron N/A ppm N/A

(1) **WHEN** the boron concentration adjustment is completed, **THEN PERFORM** the following:

(a) **REQUEST** an RCS **AND** PZR sample to determine the adjusted boron concentration **AND COMPARE** to the Estimated Critical Boron Concentration results previously recorded.

- RCS Boron N/A ppm
- PZR Boron N/A ppm
- N/A
  E&C Contact (Print name) N/A

8.2.13.d(1) (Continued) INIT

(b) **WHEN** 15 minutes have passed since the previous sample, **THEN** request a second RCS **AND** PZR sample to determine the adjusted boron concentration **AND** **COMPARE** to the Estimated Critical Boron Concentration results previously recorded.

- RCS Boron N/A ppm
- PZR Boron N/A ppm
- N/A
  E&C Contact (Print name) N/A

(2) **WHEN** the RCS **AND** PZR boron concentration sample results have been verified, **THEN NOTIFY** the Reactor Engineer of the results. (Project 97-00161)

- RCS Boron N/A ppm
- PZR. Boron N/A ppm
- N/A
  Reactor Engineer Contact (Print name) N/A

14. **VERIFY** Reactor Engineer has determined the RCS boron concentration is acceptable.

- Scott Jackson
  Reactor Engineer Contact (Print name)

15. **RECORD** the highest reading Source Range Channel, **AND** the highest reading Intermediate Range Channel.

Highest Source Range N-32 120 cps

Highest Intermediate Range N-36 1x10-11 amps

16. **VERIFY** the Audio Count Rate Channel Selector switch is selected to the highest reading SR Channel. N-32

INIT

17. **VERIFY** the highest reading Intermediate Range Channel is selected on the Comparator and Rate Drawer. N-36

CAUTION
The Reactor shall **NOT** be taken Critical below Minimum Control Rod Insertion Limit.

18. **RECORD** the Tech Spec Minimum Control Rod Insertion Limit for zero power from the COLR (FMP-001) **OR** from the Plant Curve Book, Curve 1.9A **OR** 1.9B, Rod Insertion Limit, on Attachment 10.2, Inverse Count Rate Ratio (1/M) Data and Plot Form.

19. **REQUEST** the MODE 2 Control Bank Position corresponding to 2000 PCM below the Target Critical position from Reactor Engineering **AND** record on Attachment 10.3, Control Rod Withdrawal Checklist (NCR 233326).

SCOTT JACKSON

Reactor Engineer Contact (Print name)

NOTE:	
	ALL Nuclear Instruments shall be monitored and cross-checked against each other during the Startup. Both Source Range indications, both Intermediate Range indications, all Power Range indications, **AND** related current and rate indications should be included in the cross-checking. Audio Count Rate should also be used in the approach to Criticality. These indications should be used to verify Criticality indications as compared to ECP requirements. All anomalies should be immediately investigated. (SOER 88-02) Complete Verbatim Procedure Compliance shall be observed **AND** conservative actions always taken for all Control Rod movement during Startup. (SOER 88-02)

20. **RECORD** ECP data required in Attachment 10.3, Control Rod Withdrawal Checklist.

INIT

21. **PERFORM** the following:

a. **BLOCK** the HI FLUX AT SHUTDOWN ALARM on N-31 **AND** N-32. NI-31 ____ NI-32 ____

b. **VERIFY** APP-005-B1, HI FLUX AT SHUTDOWN ALARM BLOCK, is ILLUMINATED. ____

c. **CHECK** that the POWER ABOVE P-6 permissive light is EXTINGUISHED. (ITS SR 3.3.1.8) ____

d. **CHECK** that the POWER ABOVE P-10 permissive light is EXTINGUISHED. (ITS SR 3.3.1.8) ____

NOTE:	SR 3.1.6.1 requires verification that the estimated critical control bank position is within the limits specified in the COLR within 4 hours prior to achieving criticality. To support this SR, criticality must be achieved within 4 hours of a POWERTRAX critical condition prediction **AND** the minimum rod position predicted for criticality shall be greater than the minimum control bank position for criticality specified in the COLR. The following step ensures that sufficient time remains to achieve criticality on the current ECP. The Rod Alignment Checks of ITS 3.1.4 and 3.1.7 are applicable once the Reactor has entered MODE 2. The actions of Step 8.2.22.2 are continuous actions **AND** are applicable through all subsequent steps of the Reactor startup. The Rod Insertion Limits are found in FMP-001, Core Operating Limits Report (COLR), and Plant Curves 1.9A and 1.9B.

22. **WITHDRAW** Shutdown Bank "B" as follows:

a. Using either Plant Curve 1.9A or 1.9B, **PERFORM** the following:

(1) **RECORD** the current core EFPD. 448 EFPD ____

(2) **DETERMINE** the Rod Insertion Limits for the current core EFPD and zero percent power. ____

8.2.22.a (Continued)

INIT

(3) **RECORD** which Plant Curve was used.

CURVE 1.9A / CURVE 1.9B
(Circle curve used)

(4) **RECORD** the Rod Insertion Limits for the following:

Control Bank "C" 87 Steps

Control Bank "D" 0 Steps

b. **PERFORM** the following check every 2 hours until critical to satisfy requirements of ITS SR 3.1.6.1:

Estimated time of ECC/ECP	Minimum Rod Position (500 PCM below the ECC) Bank / Steps	Within COLR limits? (Circle one)
then	D/44	YES / NO
		YES / NO
		YES / NO
		YES / NO
		YES / NO

c. **IF** the control bank positions shown on the POWERTRAX printout for the estimated time of the ECC/ECP are **NOT** within the control bank insertion limits specified in the COLR, **THEN PERFORM** the following:

(1) **INSERT** all control banks to 0 steps. N/A

(2) **MARK** the remaining steps in Section 8.2 as N/A **AND PERFORM** the required actions of Section 8.3 for a missed or aborted startup. N/A

d. **SELECT** SBB on the Rod Bank Selector switch. ____

8.2.22 (Continued)

INIT

NOTE:	During Rod Withdrawal, the Operator at the Controls (OAC) is manipulating the Rod Withdrawal and monitoring applicable parameters. Simultaneously, a licensed RO other than the assigned OAC will assist in performing the Attachment 10.3, Control Rod Withdrawal Checklist.

CAUTION

When above 220 steps withdrawn, Shutdown Banks should be withdrawn in 1 or 2 step increments to prevent overstepping of the control rods.

e. **WITHDRAW** Shutdown Bank "B" to 225 steps while performing the checks of Attachment 10.3, Control Rod Withdrawal Checklist. ____

f. **IF** an alternate MODE 2 Declaration Point has **NOT** been established **AND** Shutdown Bank "B" is greater than 20 steps, **THEN PERFORM** the following (NCR 233326):

- **MAKE** a plant announcement that MODE 2 has been entered. ____
- **CHANGE** the ERFIS Mode indication to display MODE 2 by using the PMODE function. ____

g. **IF** an alternate MODE 2 declaration point has been established, **THEN PERFORM** the following: (NCR 233326)

(1) **WHEN** the Control Banks reach the position calculated for MODE 2 recorded in Attachment 10.3, Control Rod Withdrawal Checklist, **THEN PERFORM** the following:

- **MAKE** a plant announcement that MODE 2 has been entered. ____
- **CHANGE** the ERFIS Mode indication to display MODE 2 by using the PMODE function. ____

8.2.22 (Continued) INIT

h. **VERIFY** the Source Range count rate stabilizes **AND** does **NOT** rise in an unexpected manner. ____

NOTE: A minimum of four inverse count rate ratio (1/M) data points are required on the approach to criticality. The data points should be taken each time the count rate approaches a value that is approximately twice the previous stable data point. This is referred to as "doubling". The first data point, Reference Count Rate (CR_0), is obtained after Shutdown Bank “A” and Shutdown Bank "B" have been fully withdrawn.

The Audio Count Rate VOLUME AND AUDIO MULTIPLIER should be adjusted as the count rate rises to maintain a distinguishable audible count rate.

23. **WHEN** Shutdown Bank “A” and Shutdown Bank “B” are fully withdrawn **AND** the count rate is stable, **THEN RECORD** the time **AND** Reference Count Rate (CR_0) on Attachment 10.2, Inverse Count Rate Ratio (1/M) Data and Plot Form. ____

INIT

NOTE:	The following FOUR steps are continuous actions steps which remain in effect until the actions have been performed or plant conditions render the steps not applicable.

CAUTION

A minimum of one decade overlap between Source Range and Intermediate Range Channels is required prior to blocking the Source Range Reactor Trip signals.

24. **WHEN** Reactor power is indicating in the Intermediate Range, **THEN PERFORM** the following:

    a. **SELECT** the highest reading Intermediate Range Channel on the Comparator and Rate Drawer. N-______ ____

    b. **VERIFY** one decade overlap between the Source Range and Intermediate Range indication. ____

NOTE:	One Intermediate Range greater than 10^{-10} amps is required to satisfy the P-6 Permissive.

25. **WHEN** one Intermediate Range detector indicates greater than 10^{-10} amps, **THEN VERIFY** the POWER ABOVE P-6 permissive light ILLUMINATES. (ITS SR 3.3.1.8) ____

26. **WHEN** both Intermediate Range channels indicate greater than 10^{-10} amps, **THEN BLOCK** the Source Range Reactor Trip by depressing the SOURCE RANGE LOGIC TRIP DEFEAT TRAIN "A" **AND** the SOURCE RANGE LOGIC TRIP DEFEAT TRAIN "B" pushbuttons on the RTGB ____

27. **VERIFY** the following:

    a. All Source Range indication goes to zero. ____

    b. The SR DET LOSS OF DC Annunciator (APP-005-A1) ILLUMINATED. ____

INIT

NOTE:	The approach to criticality should take approximately four doublings of the indicated Reference Count Rate (CR_0) under ideal conditions. The target count rate is intended to serve as a known stable reactivity state suitable for data taking and criticality predictions. It is **NOT** necessary to attempt to stabilize at exactly double the previous count rate, therefore the use of a "target count rate" (as applied to each doubling of the count rate) is intended to allow the Operator to stabilize the core as close as is practical to the "doubling" count rate without excessive rod motion. APP-005-F2, ROD BOTTOM ROD DROP, will extinguish when Control Bank "A" is above 20 steps.

28. **WITHDRAW** control rods to achieve the target count rate determined in Attachment 10.2, Inverse Count Rate Ratio (1/M) Data and Plot Form, as follows:

    a. **SELECT** "M" on the Rod Bank Selector switch. ____

NOTE:	During Rod Withdrawal, the Operator at the Controls (OAC) is manipulating the Rod Withdrawal and monitoring applicable parameters. Simultaneously, a licensed RO other than the assigned OAC will assist in performing the Attachment 10.3, Control Rod Withdrawal Checklist.

    b. **WITHDRAW** Control Rods until count rate is approximately equal to the target count rate while performing the checks and verifications of Attachment 10.3, Control Rod Withdrawal Checklist. ____

    c. **VERIFY** the count rate stabilizes **AND** does **NOT** rise in an unexpected manner. ____

    d. **IF** criticality is indicated, **THEN GO TO** Section 8.3. ____

INIT

NOTE:	Each successive reactivity addition will require less rod motion and a longer time for the count rate to stabilize. The NR-45 trace should be closely monitored and cross-checked against available instrumentation to determine when count rate has stabilized following each successive rod pull to double counts.

29. **WHEN** rod motion has been stopped **AND** count rate is stable, **THEN RECORD** the required information on Attachment 10.2, Inverse Count Rate Ratio (1/M) Data and Plot Form. ____

30. **WITHDRAW** control rods to achieve the new target count rate determined in Attachment 10.2, Inverse Count Rate Ratio (1/M) Data and Plot Form, as follows:

NOTE:	During Rod Withdrawal, the Operator at the Controls (OAC) is manipulating the Rod Withdrawal and monitoring applicable parameters. Simultaneously, a licensed RO other than the assigned OAC will assist in performing the Attachment 10.3, Control Rod Withdrawal Checklist.

a. **WITHDRAW** Control Rods until count rate is approximately equal to the target count rate while performing the checks and verifications of Attachment 10.3, Control Rod Withdrawal Checklist. ____

b. **VERIFY** the count rate stabilizes **AND** does **NOT** rise in an unexpected manner. ____

c. **IF** criticality is indicated, **THEN GO TO** Section 8.3. ____

31. **WHEN** rod motion has been stopped **AND** count rate is stable, **THEN RECORD** the required information on Attachment 10.2, Inverse Count Rate Ratio (1/M) Data and Plot Form. ____

INIT

32. **WITHDRAW** control rods to achieve the new target count rate determined in Attachment 10.2, Inverse Count Rate Ratio (1/M) Data and Plot Form, as follows:

NOTES:	During Rod Withdrawal, the Operator At The Controls (OAC) is manipulating the Rod Withdrawal and monitoring applicable parameters. Simultaneously, a licensed RO other than the assigned OAC will assist in performing the Attachment 10.3, Control Rod Withdrawal Checklist.

a. **WITHDRAW** Control Rods until count rate is approximately equal to the target count rate while performing the checks and verifications of Attachment 10.3, Control Rod Withdrawal Checklist. ____

b. **VERIFY** the count rate stabilizes **AND** does **NOT** rise in an unexpected manner. ____

c. **IF** criticality is indicated, **THEN GO TO** Section 8.3. ____

33. **WHEN** rod motion has been stopped **AND** count rate is stable, **THEN RECORD** the required information on Attachment 10.2, Inverse Count Rate Ratio (1/M) Data and Plot Form. ____

34. After the third doubling, **IF** the predicted critical rod position from the 1/M plot falls outside the +/-500 pcm position,(minimum and maximum rod position) **THEN NOTIFY** the SM **AND** Reactor Engineer for further guidance (Project 97-00161). ____

35. **IF** the predicted Critical Rod Position is within the Minimum and Maximum Rod Position recorded on Attachment 10.3, Control Rod Withdrawal Checklist, **THEN N/A** Steps 8.2.36 through 8.2.37 at the discretion of the SM **AND GO TO** Step 8.2.38. ____

INIT

36. **WITHDRAW** control rods to achieve the new target count rate determined in Attachment 10.2, Inverse Count Rate Ratio (1/M) Data and Plot Form, as follows:

NOTE:	During Rod Withdrawal, the Operator At The Controls (OAC) is manipulating the Rod Withdrawal and monitoring applicable parameters. Simultaneously, a licensed RO other than the assigned OAC will assist in performing the Attachment 10.3, Control Rod Withdrawal Checklist.

a. **WITHDRAW** Control Rods until count rate is approximately equal to the target count rate while performing the checks and verifications of Attachment 10.3, Control Rod Withdrawal Checklist. ____

b. **VERIFY** the count rate stabilizes **AND** does **NOT** rise in an unexpected manner. ____

c. **IF** criticality is indicated, **THEN GO TO** Section 8.3. ____

37. **WHEN** rod motion has been stopped **AND** count rate is stable, **THEN RECORD** the required information on Attachment 10.2, Inverse Count Rate Ratio (1/M) Data and Plot Form. ____

38. **PERFORM** the following:

a. **WITHDRAW** Control Rods as necessary to achieve criticality **OR** to the Maximum Rod Position recorded on Attachment 10.3, Control Rod Withdrawal Checklist. ____

b. **WHEN** the following occur, **THEN DECLARE** the Reactor critical **AND RECORD** the time.

– The count rate is STEADILY RISING.

– The STARTUP RATE is STABLE and POSITIVE.

– There is NO ROD MOTION in progress. Time ________ ____

CAUTION
Radiological conditions inside Containment change during Reactor power alterations. Personnel requiring Containment entry after criticality shall coordinate with RC prior to entry.

39. **VERIFY** with SM/CRS restricted access inside Containment due to Reactor Startup is no longer required **AND INFORM** RC the unit is critical. ____

ESTIMATED CRITICAL CONDITION FORM

Criticality # 1 Control Operator R.G. Moore

Date Today SM [signature]

1 .0 PREVIOUS CRITICAL CONDITION for ~48 (hrs.) on 2 days Ago (Date)

NOTE:	Critical data from initial Startup Physics Testing should be used when calculating the ECP if this startup is to be performed during the first 5 EFPD of the fuel cycle. Siemens methodology accounts for the reactivity contribution associated with the difference in temperature on the integral boron worth by including the reactivity contribution into the Power Defect Curve and POWERTRAX. Therefore, integral boron worth is calculated based upon no load temperature of 547°F and Hot Zero Power (HZP) condition. The POWERTRAX ECC/ECP is the official estimate. (Reference to Precaution & Limitation 5.4.14and FMP-025)

CAUTION

Previous Critical Data should be from Equilibrium Conditions (i.e., Steady State Power for a minimum of 72 hrs). The use of Critical Data from non-equilibrium conditions must be adjusted or it can provide inaccurate ECP results.

INIT

1.1. **IF** ECP is following a mid-cycle shutdown (greater than 30 days), **THEN CONSIDER** Plutonium build in effects **AND OBTAIN** Reactor Engineering input for the ECP. N/A

N/A
Reactor Engineering Contact (Print name)

1.2. Rod Position on Controlling Bank D was 218 Steps [initials]
(Critical Data Stamp)

1.3. Power Level (Critical Data Stamp) 100 % [initials]

ESTIMATED CRITICAL CONDITION FORM

		INIT
1.4. Boron Concentration:		
1.4.1. **RECORD** Boron Concentration (Critical Data Stamp)	95 ppm	JR
1.4.2. **RECORD** number of days between date of last Critical Data Stamp and start of shutdown:	0 days	JR

> **NOTE:** If the time between last Critical Data Stamp and shutdown is less than or equal to one day, then calculating an adjusted current boron concentration is **NOT** necessary.

1.4.3. **IF** shutdown less than or equal to one day after last Critical Data Stamp, **THEN GO TO** Step 1.4.6 **AND RECORD** Critical Data Stamp Boron Concentration as the Current Critical Boron Concentration.		N/A
1.4.4. **RECORD** the observed change in RCS boron concentration per day for the last week prior to the last Critical Data Stamp (positive if rising, negative if lowering).	( ) N/A ppm/day	N/A
1.4.5. **CALCULATE** Boron Concentration Change since last Critical Data Stamp (Multiply days in Step 1.4.2 by change ppm/day in Step 1.4.4).	( ) N/A ppm	N/A
1.4.6. **RECORD** CALCULATED Critical Boron Concentration (Step 1.4.1 plus Step 1.4.5, if applicable)	95 ppm	JR
1.5. Integral Boron Worth (Curve 1.13 or POWERTRAX using CALCULATED Critical Boron Concentration) (Use curves or data based upon 547°F, HZP)	879 pcm	JR

ESTIMATED CRITICAL CONDITION FORM

			INIT
1.6.	Xenon Worth (Curve 2.1 or POWERTRAX)[1]	2827 pcm	JW
1.7.	Power Defect Worth (Curve 1.3 or POWERTRAX)	2695.7 pcm	JW
1.8.	Samarium Worth (Curve 2.4A, 2.4B, 2.5 or POWERTRAX)[2]	970 pcm	JW
1.9.	Inserted Rod Worth at Power (Curve 1.6, 1.8 or POWERTRAX)[3]	12 pcm	JW

[1] **IF** previous critical data is **NOT** from equilibrium conditions, **THEN** contact the Reactor Engineer for Xenon Worth.

[2] At the Beginning of Life (BOL) prior to reaching the equilibrium Samarium Value use Curve 2.5 or POWERTRAX data. After equilibrium Samarium concentration is reached, use Curve 2.4A (BOL) or Curve 2.4B (EOL), interpolating as necessary, or use POWERTRAX data.

[3] **IF** previous rod position was greater than 128 steps on Bank "D", **THEN** use the Full Power Rod Worth Curve 1.6. For rod positions less than 128 steps on Bank "D", Curve 1.8 should be used.

2.0 PROJECTED CRITICAL CONDITIONS for Now (hrs.) on Today (Date) JW

2.1	Boron Concentration (Actual)	457 ppm	JW
2.2	Average Temperature (Actual) (Achieve Criticality 547°F)	547 °F	JW
2.3	Hours Since Shutdown 48 Hrs		JW
2.4	Integral Boron Worth (Curve 1.13 or POWERTRAX) (Use curves or data based upon 547°F, HZP)	4220.2 pcm	JW
2.5	Xenon Worth (Curve 2.3 or POWERTRAX)	719.2 pcm	JW

> **NOTE:** Depending on the time in core life (burn-up) and the time since shutdown, it may be necessary to interpolate between both Curve 2.4A and 2.4B.

2.6 **IF** Samarium Worth is at equilibrium, **THEN DETERMINE** Samarium worth using one of the following.

– Curve 2.4A (BOL) interpolating as necessary.	N/A pcm	N/A
– Curve 2.4B (EOL) interpolating as necessary.	1225.4 pcm	JW
– POWERTRAX data.	N/A pcm	N/A

ESTIMATED CRITICAL CONDITION FORM

INIT

2.7 **IF** the startup is due to a trip before equilibrium Samarium is reached, **THEN ADD** the change as determined from Curve 2.4A to the previous Samarium worth of Step 1.8. N/A

Step 1.8 N/A pcm + Change (Curve 2.4A) N/A pcm = N/A pcm

3.0 REACTIVITY CHANGES FROM PREVIOUS CRITICAL TO PROJECTED CRITICAL

Complete the following table as follows:

3.1 **ENTER** the required information. (Each value entered into the PREVIOUS and PROJECTED fields should be entered as POSITIVE NUMBERS.

3.2 **PERFORM** the designated calculations to determine the change in each parameter and the total change in reactivity.

	Previous	Action	Projected	Result
1. Integral Boron Worth	879	Subtract	4220.2	= -3341.2 pcm
2. Xenon Worth	2827	Subtract	719.2	= 2107.8 pcm
3. Samarium Worth	970	Subtract	1225.4	= -255.4 pcm
4. Power Defect	2695.7	Subtract	0	= 2695.7 pcm
5. Change in Reactivity				1206.9 pcm

4.0 REACTIVITY BALANCE

4.1 New Controlling Rod Worth = 12 (Inserted Rod Worth (Step 1.9)) + 1206.9 (Change in Reactivity (Step 3.2.5))
= 1218.9 PCM

4.2 **RECORD** the New Controlling Rod Worth calculated on the ECP provided by the Reactor Engineer. 1225 PCM

4.3 **IF** the results of the two ECPs are not within 250 pcm of each other, **THEN CONTACT** the Reactor Engineer for further actions. N/A

4.4 New critical rod position associated with the integral worth in Step 4.1 as determined from Curve 1.8
68 Steps on Bank D

ESTIMATED CRITICAL CONDITION FORM

INIT

5.0 ESTIMATED CRITICAL CONDITION

5.1 Shutdown "A" 225 Steps*
Shutdown "B" 225 Steps*
Control "A" 225 Steps*
Control "B" 225 Steps*
Control "C" 196 Steps
Control "D" 68 Steps
Boron 457 ppm
T-AVG 547 °F
* These banks shall be at 225 steps except for physics tests.

5.2 Is the position above the minimum insertion limits? (ITS SR 3.1.6.1) C BANK @ 87 YES / NO (circle one)

5.3 Is the position less than or equal to 225 steps on Bank "D"? YES / NO (circle one)

6.0 **CALCULATE** the tolerance band of plus **OR** minus 500 pcm from the ECP.

6.1.1 Maximum rod position (Manual ECP - 500 pcm): 138 Steps on Bank D

6.1.2 Minimum rod position (Manual ECP + 500 pcm): 44 Steps on Bank D

~~NOTE:~~	The Minimum and Maximum rod positions to reflect +500 and -500 pcm, respectively are indicated on the POWERTRAX Estimated Critical Condition Module results data sheet as Low and High Rod Position. The values are referenced against CBD at zero steps. Negative values represent CBD at zero and CBC at 128 steps minus the negative value indicated (i.e. POWERTRAX rod position is -10 steps relates to CBD at zero steps and CBC at 118 steps).

6.1.3 **RECORD** the maximum and minimum rod positions from the POWERTRAX ECC/ECP.

Maximum rod position 140 Steps on Bank D

Minimum rod position 45 Steps on Bank D

ESTIMATED CRITICAL CONDITION FORM

7.0 **ESTABLISH** the time window for acceptable ECP results. INIT

7.1 **REVIEW** the POWERTRAX ECP Estimated Critical Condition Module results data sheet to establish a time window of acceptable ECP results, ensuring that the estimated time for achieving criticality reflects the Minimum Rod Position is above Rod Insertion Limit. JM

7.2 **INDICATE** the start and end step#, date, and time to establish a window below:

~~NOTE:~~	To allow the use of these ECPs, criticality must be achieved within the time window recorded below. This will ensure compliance with ITS SR 3.1.6.1. The START STEP and END STEP are from the POWERTRAX ECC/ECP printouts.

Start Step# 97 CBD Date Today, Time Now Jh

End Step# 96 CBD Date Today, Time Then Jh

7.3 **ATTACH** the POWERTRAX ECP Estimated Critical Condition Module results data sheet to this procedure.

Performed by: Jo Mon

Approved by: ______________________
CRS or SM Signature

INVERSE COUNT RATE RATIO (1/M) DATA AND PLOT FORM

1. **LOG** 1/M data as it is acquired following rod withdrawal in Table 1 of this attachment.

2. **PLOT** the reference count rate (CR_o) versus Control Rod Bank and Step position on the 1/M Plot Form.

3. **WHEN** CR_1 data is available, **THEN DIVIDE** CR_o by CR_1 (CR_0/CR_1=1/M).

4. **PLOT** the results versus Control Rod Bank and Step position on Attachment 10.2, Inverse Count Rate Ratio (1/M) Data and Plot Form, for Source Ranges **AND** Intermediate Ranges.

NOTE:	Extrapolations should extend through the X-AXIS at rod positions greater than the ECP and approach the ECP as the second and third points are plotted and extrapolated.

   - **CONNECT** the new point with the previous point **AND** extend the line (extrapolate) through the X-AXIS (predicted Critical Rod Position).
   - **LOG** the predicted Critical Rod Position on Table 1 as the LOWEST PROJECTED CRITICAL POSITION.

5. **VERIFY** that the Lowest Critical Rod Position is above the Minimum Insertion Limit.

6. **CALCULATE** the target count rate for the next doubling by multiplying the current count rate by two and log the result on Table 1 of this attachment.

7. **REPEAT** Steps 3 through 6 of this attachment for each ECP extrapolation using CR_2 through CR_4 acquired in Section 8.2 in place of CR_1 as shown on Table 1 of this attachment.

INVERSE COUNT RATE RATIO (1/M) DATA AND PLOT FORM

NOTE: After the third doubling, if the predicted critical rod position from the 1/M plot falls outside the +/-500 pcm position, the Reactor Operator should notify the SM and Reactor Engineer for further guidance. (Project 97-00161)

Minimum Insertion Limits: _______ Steps on Bank C / _______ Steps on Bank D

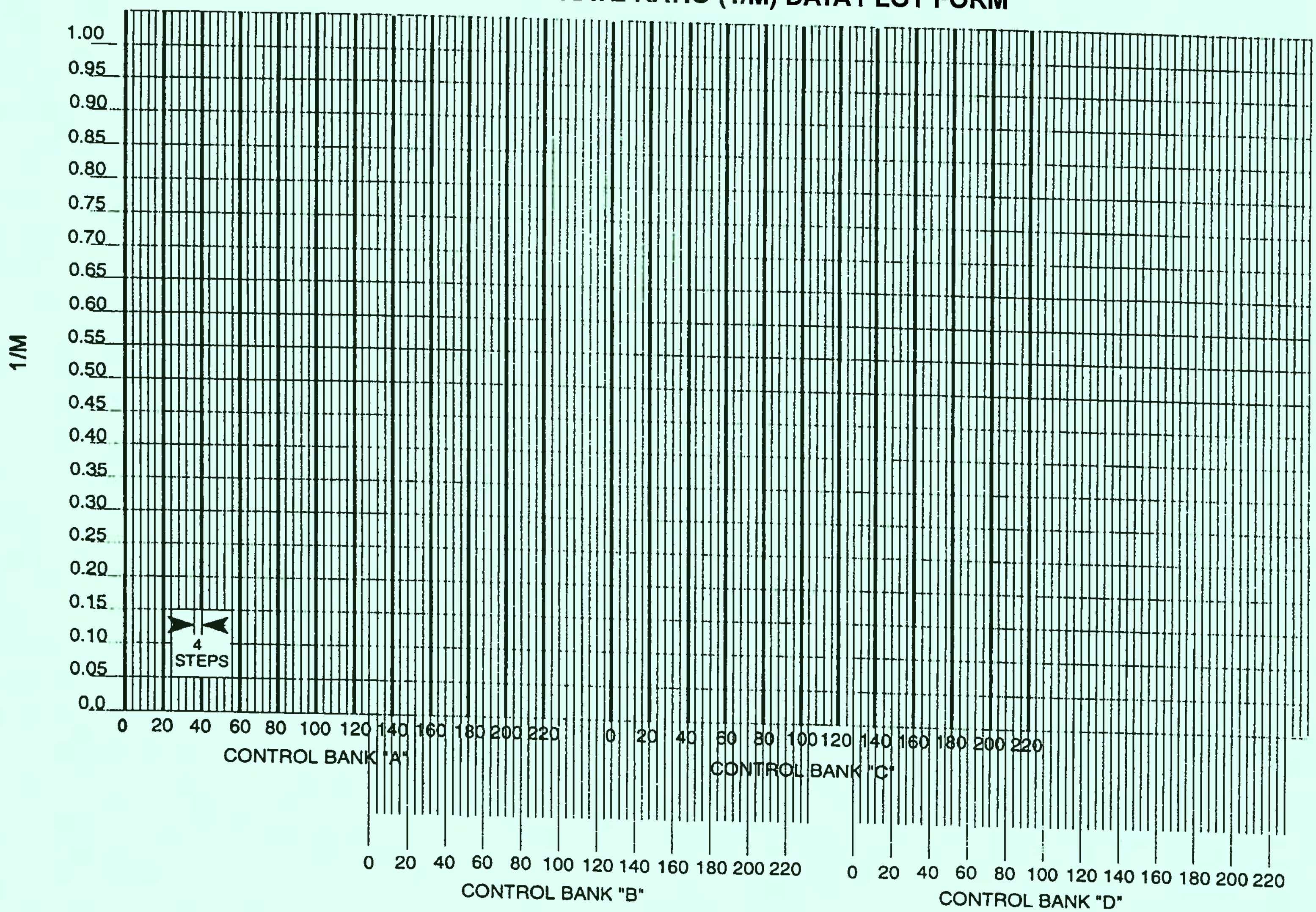
TABLE 1

STEP #	TIME	ROD POS.	NI-____ COUNTS	1/M	NI-____ AMPS	1/M	LOWEST PROJECTED CRITICAL POSITION	LOWEST PROJECTED CRIT. POS. ABOVE MIN INSERTION LIMIT (INIT)	TARGET COUNT RATE
8.2.23			CR_0=	CR_0/CR_0= 1.0	CR_0=	CR_0/CR_0= 1.0			2*CR_0=
8.2.29			CR_1=	CR_0/CR_1=	CR_1=	CR_0/CR_1=			2*CR_1=
8.2.31			CR_2=	CR_0/CR_2=	CR_2=	CR_0/CR_2=			2*CR_2=
8.2.33			CR_3=	CR_0/CR_3=	CR_3=	CR_0/CR_3=			2*CR_3=
8.2.37			CR_4=	CR_0/CR_4=	CR_4=	CR_0/CR_4=			

DATE: _______ STARTUP #: _______ 1/M PLOTTER: ___________________________

ATTACHMENT 10.2
Page 3 of 3

INVERSE COUNT RATE RATIO (1/M) DATA PLOT FORM



CONTROL ROD WITHDRAWAL CHECKLIST

1. Record the MODE 2 Control Bank Position corresponding to 2000 PCM below the Target Critical position (NCR 233326).

   28 Steps on Bank C

2. Record the following ECP data from Attachment 10.1, Estimated Critical Condition Form, **OR** from the POWERTRAX computer generated ECP (N/A blanks not used):

Estimated Time of Criticality	Minimum Rod Position (500 PCM below the ECC); Bank and steps	Expected Critical Rod Position; Bank and steps	Maximum Rod Position; (500 PCM above the ECC) Bank and steps
48 hrs	D-44	D-68	D-138

REQUIREMENT	SB "A" INIT	SB "B" INIT	CB "A" INIT	CB "B" INIT	CB "C" INIT	CB "D" INIT
Rod Speed = 66-70 steps/min	[illegible]					
Rod Speed = 43-47 steps/min						
Rod Bottom Lights extinguished between 9 and 33 steps	[illegible]					(1)
<200 steps, each rod within 7.5 inches of Bank Avg by RPI (2)	[illegible]					(1)
≥200 steps, each rod within 15 inches of Bank by Step Counter (2)	[illegible]				(1)	(1)
Bank Overlap: **WHEN** CB "A" at 129 steps, **THEN** CB "B" started						
Bank Overlap: **WHEN** CB "B" at 129 steps, **THEN** CB "C" started						
Bank Overlap: **WHEN** CB "C" at 129 steps, **THEN** CB "D" started.					(1)	

(1) May be marked "N/A" if not checked.

(2) Reference to ITS LCO 3.1.4 and 3.1.7, applicable in MODEs 1 & 2.

Performed by: [illegible] R.O. Moore

Initials Name (Print)

Approved by: ______________________

CRS or SM Signature

CONTINUOUS USE

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL
VOLUME 3
PART 5
ABNORMAL OPERATING PROCEDURE

AOP-001

MALFUNCTION OF REACTOR CONTROL SYSTEM

REVISION 26

AOP-001, Revision 26
Summary Of Changes
(PRR 429230)

ENTRY CONDITIONS

	Replaced the word unwarranted with unexpected to the types of rod motion.(PRR 418409)

Main Procedure

Various Steps	Added titles of the sections to facilitate finding the correct entry point in these procedures. (Editorial)
Various Steps	Changed Path-1 to Path-1 or EOP-E-0 in preperation for EOP upgrade. (PRR 464456)

Section A

Step 11.c	Added AFD - Within Operating Band check and RNO with the appropriate RNO actions. (PRR 429230)
Step 12.c	Changed increase to raise for human error prevention. (Editorial)
Step 31.b.2	Changed to allow the P to A converter to be raised or lowered, previously it was only allowed to be lowered. (PRR 429230)
N36	This note was added to inform Operators that AOP-007 is not required to be entered as the Operator is taking control of the Turbine. (PRR 429230)
Step 40	Added ITS 3.1.1 to the Technical Specifications that should be reviewed by the Operators. (PRR 429230)

AOP-001, Revision 26
Summary Of Changes
(PRR 429230)

Section B

Step 13.a & 21 a	Changed step so that now when the Operator is checking SDM being adequate, they are directed to FMP-012 for direction. (PRR 436602)
Step 13.b, 21.b & 22 RNO	As the procedure GP-006 has been changed, made changes to this procedure to reflect that the information is now located in GP-006-1 or 2. (PRR 462956)
N59	Added this note to inform the Operators that AOP-007 should NOT be used in response to the following steps. (PRR 429230)

Section D

Step 1 RNO	Added another item to check to determine why power is not available to IRPI. (PRR 430089)

Attachment 1

Step 6	Added the option to press the HOLD button as well as the Go button. (PRR 398019)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

1. PURPOSE

This procedure provides the instructions necessary for the Operator to recover a dropped rod, realign a misaligned rod, stop abnormal continuous rod motion and operate with an IRPI failure.

This procedure is applicable in Modes 1, 2, and 3 with the exception of IRPI which is MODE 2 and MODE 1.

2. ENTRY CONDITIONS

Any indication of a dropped rod, misaligned rod, unexpected rod motion, inability to move rod(s) or suspected IRPI malfunction.

It is not intended to enter AOP-001 while in MODE 3 during a startup when the MODE 1 and MODE 2 ITS 3.1.7 alignment limits of 7.5 inches of the average of the individual IRPIs in the associated bank when < 200 steps or IRPI within 15 inches of the associated bank demand position when > 200 steps are exceeded due to normal indicator drift during a startup while in MODE 3.

- END -

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

Steps 1 through 3 are Immediate Action Steps.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
1.	Check Unexpected Rod Motion - IN PROGRESS	Go To Step 7.
2.	Check Reactor Power - GREATER THAN 15%	Trip the Reactor AND Go To Path-1 or EOP-E-0, Reactor Trip or Safety Injection.
3.	Check Turbine Load - • CONTROL RODS STEPPING IN AND • UNEXPECTED LOAD REDUCTION IN PROGRESS OR • UNEXPECTED LOAD REDUCTION HAS OCCURRED	Attempt To Stop Rod Motion As Follows: a. IF ROD BANK SELECTOR Switch position in A (AUTO), THEN Place the ROD BANK SELECTOR Switch in M (Manual) b. IF ROD BANK SELECTOR Switch in M (Manual) OR Individual Bank Select, THEN Place the ROD BANK SELECTOR Switch in A (Auto). IF Rod Motion does NOT stop, THEN Trip the Reactor and Go To Path-1 or EOP-E-0, Reactor Trip or Safety Injection. Go To Step 5.
4.	Go To AOP-015, Secondary Load Rejection	
5.	Make PA Announcement For Procedure Entry	
6.	Go To Section C, Continuous Rod Motion	
7.	Make PA Announcement For Procedure Entry	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
8.	Determine If Multiple Rods Have Dropped As Follows: a. Analyze Indications For Multiple Rod Drop • Prompt Drop - PRESENT • More than 1 Rod Bottom Light - ILLUMINATED • More Than 1 IRPI - INDICATES ON BOTTOM	
	b. Check Multiple Dropped Rods - PRESENT	b. Go To Step 11.
9.	Check Reactor Status - MODE 1 <u>OR</u> 2	Go To Section A, Dropped Rod
10.	Trip The Reactor and Go To Path-1 or EOP-E-0, Reactor Trip Or Safety Injection.	
11.	Check T_{avg} - TRENDING TO T_{ref}	Perform Attachment 1, Turbine Load Adjustment, to restore T_{avg} within -1.5 to +1.5°F of T_{ref}.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

12.	Determine The Status Of Rods As Follows:
	
	a. Analyze the below indications for a dropped rod:
	• APP-005-A3, PR DROP ROD - ILLUMINATED
	• APP-005-F2, ROD BOTTOM ROD DROP - ILLUMINATED
	• Rod Bottom Light for affected rod - ILLUMINATED
	• Indication of Prompt Drop - PRESENT
	• Quadrant Power Tilt indications - PRESENT
	  • APP-005-F3, PR UPPER CH HI FLUX DEV/AUTO DEFEAT - ILLUMINATED
	  • APP-005-F4, PR LOWER CH HI FLUX DEV/AUTO DEFEAT - ILLUMINATED
	  • APP-005-C3, PR CHANNEL DEV - ILLUMINATED
	  • Power Range Drawer Indications	

	b. Check Dropped Rod - PRESENT	b. Observe the NOTE prior to Step 14 and Go To Step 14.
13.	Go To Section A, Dropped Rod	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

- IF there is any doubt as to IRPI failure OR actual rod misalignment, THEN assume rod misalignment is present.
- Malfunctioning IRPI(s) may be identified by erratic or drifting IRPI indication when the associated Rod Bank is not being moved, or sudden large changes in IRPI indication with no corresponding change in nuclear power or motion of other rods in the associated bank.
- ERFIS Rod Position Indication may be used for IRPI indication below.

14. Determine The Status Of IRPI As Follows:

    a. Analyze the below indications for an IRPI problem:

    - IRPI Indication
        - Indicator drift with NO flux effects
        - Erratic indicator movement with NO flux effects
        - Indicator off-scale High OR Low with NO flux effects
    - Dropped Rod Indication with no flux changes
        - Rod Bottom Light for affected rod - ILLUMINATED

          AND

        - APP-005-A3, PR DROP ROD - EXTINGUISHED

(CONTINUED NEXT PAGE)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
14.	(CONTINUED) • Simultaneous loss of ALL IRPI Indication (Power Supply Failure) - PRESENT	
	b. Check IRPI malfunction - PRESENT	b. Go To Step 16.
15.	Go To Section D, Individual Rod Position Indication Malfunction	
16.	Determine The Status Of Rods As Follows: a. Analyze below indications of An Immovable <u>OR</u> Misaligned Rod • Rod - CAN <u>NOT</u> BE MOVED • APP-005-E2, ROD CONT SYSTEM URGENT FAILURE - ILLUMINATED • Rod Indication - OUT OF ALIGNMENT WITH REMAINDER OF BANK	
	b. Check Misaligned/Immovable Rod - PRESENT	b. Reanalyze procedure entry conditions. <u>IF</u> conditions do <u>NOT</u> warrant AOP-001 use, <u>THEN</u> return to procedure and step in effect. <u>IF</u> a Rod Control malfunction exists, <u>THEN</u> Go To Step 1.
17.	Go To Section B, Immovable/Misaligned Rods	

- END -

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

(Page 1 of 23)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
1.	Check Plant Status - MODE 1	Observe CAUTION prior to Step 35 and Go To Step 35.
2.	Check Dropped Rod Location - IN CONTROLLING BANK	Observe the CAUTION prior to Step 4 and Go To Step 4.

NOTE

Key #13 is required to open the Lift Coil Disconnect Panel Door.

3. Place Lift Coil Disconnect Switch For The Dropped Rod, In The OFF Position

****

CAUTION

Equipment repairs or manipulations to correct the cause of the dropped rod prior to procedural direction could inadvertently withdraw the dropped rod.

****

4. Notify Reactor Engineering AND I&C Personnel To Perform The Following:

   a. Verify the status of the dropped rod

   b. Investigate the cause of the dropped rod

   c. Avoid ANY action that could cause inadvertent withdrawal of the affected rod

   d. Determine appropriate recovery actions

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
5.	Check APP-005-B5, ROD BANKS A/B/C/D LO LIMIT - EXTINGUISHED	Borate to clear the alarm using OP-301, Chemical and Volume Control System (CVCS), while continuing with this procedure.

NOTE

ITS LCO 3.1.4 restricts operation above 70% power when rods are misaligned greater than ITS limits.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
6.	Establish Stable Conditions At OR Below 70% Reactor Power As Follows:	
	a. Check Reactor power - GREATER THAN 70%	a. Go To Step 7.
	b. Check APP-005-E2, ROD CONT SYSTEM URGENT FAILURE - EXTINGUISHED	b. Reduce Reactor AND Turbine power to less than or equal to 70% within 2 hours using boration to maintain Tavg within -1.5 to +1.5°F of Tref using OP-301, Chemical and Volume Control System (CVCS), RCS Boration Quick Checklist, AND Attachment 1, Turbine Load Adjustment. Go To Step 7.
	c. Reduce Reactor AND Turbine power to less than or equal to 70% within 2 hours using rods and boration to maintain Tavg within -1.5 to +1.5°F of Tref using OP-301, Chemical and Volume Control System (CVCS), RCS Boration Quick Checklist, AND Attachment 1, Turbine Load Adjustment.	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

7.	Notify Load Dispatcher Of The Unit's Load Capability	
* 8.	Check Total Reactor Power Change - GREATER THAN 15% IN ANY ONE HOUR PERIOD	IF Reactor power is changed greater than 15% in any one hour period, THEN perform Step 9. Observe the NOTE prior to Step 10 and Go To Step 10.
9.	Notify Chemistry personnel of the following: a. A Reactor power change of greater than 15% in a one hour period has occurred b. Perform sampling as required by ITS SR 3.4.16.2	

NOTE

- Quadrant Power Tilt information may be obtained from Group Display QPTR LOG on ERFIS
- FMP-007, Quadrant Power Tilt provides instruction for manual QPTR calculation if ERFIS is unavailable.

10.	Monitor Quadrant Power Tilt AND Axial Flux Difference To Ensure Compliance With ITS LCO 3.2.3 and ITS LCO 3.2.4	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
11.	Determine If Axial Flux Difference (AFD) Should Be Adjusted As Follows:	
	a. Check APP-005-E2, ROD CONT SYSTEM URGENT FAILURE - EXTINGUISHED	a. Go To Step 12.
	b. Check AFD - WITHIN TARGET BAND	b. Perform one of the following: • IF AFD is below the target band, THEN borate using OP-301, Chemical and Volume Control System (CVCS), RCS Boration Quick Checklist, while withdrawing Control Rods to restore AFD to the target band. • IF AFD is above the target band, THEN dilute using OP-301, Chemical and Volume Control System (CVCS), RCS Dilution Quick Checklist, while inserting Control Rods to restore AFD to within the target band. WHEN AFD is restored to within the target band, THEN Go To Step 13.
	c. Check AFD - Within Operating Band	c. IF AFD is outside the Operating Band, AND Power is less than 90% THEN use Attachment 1 to reduce load to less than or equal to 50% within 30 minutes.
	d. Go To Step 13	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
12.	Control Reactor Power As Follows:	
	a. Check AFD - OUTSIDE TARGET BAND	a. Go To Step 13
	b. Consult with Reactor Engineering to determine expected flux shift for power change	
	c. Perform EITHER of the following at the request of Reactor Engineering: • Borate to reduce Reactor power using OP-301, Chemical and Volume Control System (CVCS), RCS Boration Quick Checklist, AND adjust Turbine load to adjust Tavg to within -1.5 to +1.5°F of Tref using Attachment 1, Turbine Load Adjustment. OR • Dilute to raise Reactor power using OP-301, Chemical and Volume Control System (CVCS), RCS Dilution Quick Checklist, AND adjust Turbine load to adjust Tavg to within -1.5 to +1.5°F of Tref using Attachment 1, Turbine Load Adjustment.	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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13. Confirm Dropped Rod As Follows:

    a. Determine if a dropped rod exists by at least ONE of the following:

    - Quadrant Power Tilt indications - PRESENT
        - APP-005-F3, PR UPPER CH HI FLUX DEV/AUTO DEFEAT - ILLUMINATED
        - APP-005-F4, PR LOWER CH HI FLUX DEV/AUTO DEFEAT - ILLUMINATED
        - APP-005-C3, PR CHANNEL DEV - ILLUMINATED
        - Power Range Drawer Indications
    - Axial Flux Difference indications
    - Incore flux map
    - Reactor Engineering or I&C determination
    - APP-005-A3, PR DROP ROD - PREVIOUSLY ILLUMINATED

    b. Check dropped rod determination - COMPLETE

    RESPONSE NOT OBTAINED: b. WHEN determination is complete, THEN Go To Step 14.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
14.	Check Dropped Rod - CONFIRMED	Perform the following: a. Place the ROD BANK SELECTOR Switch in A (Auto) <u>OR</u> M (Manual) as desired. b. Resume normal rod operations. c. Go To Section D, Individual Rod Position Indication Failure

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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NOTE

This Continuous Action step is designed to assure compliance with ITS LCO 3.1.4 if the rod can NOT be recovered within 1 hour.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
*15.	Check Rod Recovery Status - COMPLETE	IF the rod will NOT be restored to within the alignment limits within 1 hour of discovery, THEN perform the following: a. Verify SDM is within the limits specified in the COLR within 1 hour in accordance with FMP-012, Manual Determination of Shutdown Margin Boron Concentration. b. Reduce Thermal Power to less than or equal to 70% within 2 hours c. Verify SDM is within the limits provided in the COLR every 12 hours in accordance with FMP-012, Manual Determination of Shutdown Margin Boron Concentration. d. Notify Reactor Engineering to perform ITS SR 3.2.1.1 AND SR 3.2.2.1 within 72 hours e. IF the rod can NOT be realigned, THEN within 5 days, complete a Safety Analysis for continued operation with the misaligned rod.

(CONTINUED NEXT PAGE)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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15.	(CONTINUED)	
		f. IF the requirements of items a through e can NOT be achieved, THEN be in Mode 3 within 6 hours.
16.	Notify I&C To Make Repairs As Necessary To Restore Proper Operation Of The Rod Control System	
17.	Check IRPI for the dropped rod - INDICATES ROD FULLY INSERTED	Perform one of the following: • IF the rod has been confirmed to be fully inserted by Reactor Engineering, THEN perform Section D for IRPI adjustment prior to continuing with this section. OR • IF the rod has been confirmed to be partially inserted, THEN Go To Section B, Immovable/misaligned Rods

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

NOTE

The rate of rod withdrawal referred to below is in relation to the duration of time over which the rod should be recovered, NOT rod speed.

18. Contact Reactor Engineering To Obtain The Following:

    a. Power level at which recovery is to be performed

    Power Level % ____________

    b. Rate at which rod should be withdrawn

    Rate of Rod Withdrawal ________

19. Notify Manager - Operations OR His Designee Of The Following:

    a. Current plant conditions

    b. Power level required for rod alignment

    c. Approval for rod alignment is required prior to continuing

    d. Check rod recovery - APPROVED

    RESPONSE NOT OBTAINED: d. Go To Step 39.

20. Check Cause Of Dropped Rod - FOUND AND CORRECTED

    RESPONSE NOT OBTAINED: WHEN cause is found AND corrected, THEN Go To Step 21.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
21.	Determine If The Rod Control System Is Ready For Rod Recovery As Follows:	
	a. Check APP-005-E2, ROD CONT SYSTEM URGENT FAILURE - EXTINGUISHED	a. Depress the ROD ALARM RESET Pushbutton on the RTGB AND verify APP-005-E2 clears.
	b. Verify ROD BANK SELECTOR Switch - IN M (Manual)	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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22.	Make Preparations For Rod Alignment As Follows:	
	a. Monitor the highest indicating Power Range NIS Channel	
	b. Check power reduction - REQUIRED	b. Go To Step 22.d.
	c. Adjust Reactor power level as follows: • Borate to reduce Reactor power using OP-301, Chemical and Volume Control System (CVCS), RCS Boration Quick Checklist • Adjust Turbine load using Attachment 1, Turbine Load Adjustment, <u>OR</u> steam dumping rate to adjust Tavg to within -1.5 to +1.5°F of Tref	
	d. Record the following in the CO Log: • Time that rod drop occurred • Power level at which rod will be recovered • Rate of rod withdrawal to be used • Core location of dropped rod	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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23. Record The Group Step Counter Reading For The Group Associated With The Dropped Rod

    ____________________ Steps

NOTE

The P-A Converter is located in the Computer Room in RACK RPI #2 - ROD POSITION DETECTOR & BISTABLE ASSEMBLIES. Key #16 is required to unlock the cabinet door.

24. Determine If The P-A Converter Reading Needs To Be Recorded As Follows:

INSTRUCTIONS	RESPONSE NOT OBTAINED
a. Check dropped rod location - LOCATED IN ANY CONTROL BANK	a. Go To Step 25.
b. Place the DISPLAY Selector Switch in the affected bank position	
c. Record the P-A Converter reading for the affected Control Bank ____________________ Steps	
d. Place the DISPLAY Selector Switch in the OFF position	

25. Set The Group Step Counter For The Affected Group To Zero

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

NOTE

Key #13 is required to open the Lift Coil Disconnect Panel Door.

26. Place Lift Coil Disconnect Switches For All Rods In The Affected Bank As Follows:

    - Dropped Rod - ON Position
    - Unaffected Rods - OFF Position

27. Adjust Tavg To Within -1.5 TO +1.5°F Of Tref During Rod Alignment As Follows:

    - Adjust Turbine load using Attachment 1, Turbine Load Adjustment

      OR

    - Adjust boron concentration using OP-301, Chemical and Volume Control System (CVCS), RCS Boration Quick Checklist

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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NOTE

- APP-005-E2, ROD CONT SYSTEM URGENT FAILURE, will illuminate when the rod is moved due to all Lift Coil Disconnect Switches being off in the unaffected group.
- APP-005-A5, ROD BANKS A/B/C/D WITHDRAWN, may illuminate when the rod is moved due to additional counts on the P-A Converter.
- APP-005-F2, ROD BOTTOM ROD DROP, may reflash during rod recovery as the rod is stepping through the bistable setpoints.

28. Align The Affected Rod As Follows:

    a. Maintain reactor power less than or equal to 70% in subsequent steps below.

    b. IF traversing the ROD BANK SELECTOR Switch through the AUTO position is required in the next step, THEN Depress AND hold the AUTO ROD DEFEAT Pushbutton

    c. Select the affected bank with the ROD BANK SELECTOR Switch

    d. IF the AUTO ROD DEFEAT Pushbutton is depressed, THEN release the AUTO ROD DEFEAT Pushbutton

    e. Withdraw the rod at the rate specified in Step 18 to the Group Step Counter position recorded in Step 23

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

<u>SECTION A</u>

<u>DROPPED ROD</u>

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29. Establish Proper Rod Group Sequencing As Follows:

    a. Check Group 1 and Group 2 Group Step Counter readings for the affected bank - EQUAL

    RNO a. Perform one of the following:

    - <u>IF</u> the dropped rod was in Group 2, <u>THEN</u> Go To Step 29.c.

      <u>OR</u>

    - <u>IF</u> the dropped rod was in Group 1, <u>THEN</u> Go To Step 30.

    b. Check dropped rod location - WAS IN GROUP 1

    RNO b. Go To Step 30.

    c. Withdraw the rod one step

    d. Insert the rod one step

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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30. Return The Rod Control System To Normal As Follows:

   a. Place the Lift Coil Disconnect Switches for the affected bank in the ON position

   b. IF traversing the ROD BANK SELECTOR Switch through the AUTO position is required in the next step, THEN Depress AND hold the AUTO ROD DEFEAT Pushbutton

   c. Place ROD BANK SELECTOR Switch in M (Manual)

   d. IF the AUTO ROD DEFEAT Pushbutton is depressed, THEN release the AUTO ROD DEFEAT Pushbutton

   e. Depress the ROD ALARM RESET Pushbutton on the RTGB

   f. Verify APP-005-E2 clears

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

NOTE

The P-A Converter is located in the Computer Room in RACK RPI #2 - ROD POSITION DETECTOR & BISTABLE ASSEMBLIES. Key #16 is required to unlock the cabinet door.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
31.	Determine If The P-A Converter Needs To Be Reset As Follows:	
	a. Check dropped rod location - LOCATED IN CONTROL BANK	a. Observe the NOTE prior to Step 32 and Go To Step 32.
	b. Reset the P-A Converter as follows:	
	1) Place the DISPLAY Selector Switch in the affected bank position	
	2) While holding the AUTOMATIC-MANUAL Switch in MANUAL, depress the UP OR DOWN Pushbutton the required number of times to return the DISPLAY to the position recorded in Step 24	
	3) Return AUTOMATIC-MANUAL Switch to AUTOMATIC (spring return)	
	4) Place the DISPLAY Selector Switch in the OFF position	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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NOTE

Turn on code to access ERFIS ROD BANK SUPERVISION is RODUP.

32.	Check ERFIS ROD BANK SUPERVISION Function - BANK POSITIONS CORRECT	Update Bank Position Pulse Counters.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
33.	Check That Rod Motion Has Occurred As Indicated By At Least One Of The Following: • IRPI indicates rod alignment OR • Tavg changed during rod withdrawal due to rod motion OR • Flux map indicates rod alignment	Perform the following: a. Contact Plant Management to determine need for further attempts to recover the dropped rod. b. Perform The Following To Assure Compliance With ITS 3.1.4: 1) Verify SDM is within the limits provided in the COLR every 12 hours in accordance with FMP-012, Manual Determination of Shutdown Margin Boron Concentration. 2) Notify Reactor Engineering to perform ITS SR 3.2.1.1 AND SR 3.2.2.1 within 72 hours 3) IF the rod can NOT be realigned within 5 days, THEN perform a Safety Analysis for continued operation with the misaligned rod 4) IF the requirements of items 1 through 3 above can NOT be achieved, THEN be in Mode 3 within 6 hours c. Go To Step 39.
34.	Go To Step 39	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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****

CAUTION

Attempts to recover a dropped rod from a Mode 2 initial condition could result in an inadvertent return to criticality.

****

35. Check Plant Status - MODE 2 — Go To Step 37.

NOTE

AOP-007 is NOT applicable for the following step.

36. Check Turbine Status As Follows:

a. Check Turbine - ROLLING — a. Go To Step 37.

b. Depress AND hold the THINK Button

c. Manually trip the Turbine

d. Verify the following valves go closed:

- Turbine Stop Valves
- Governor Valves
- Reheat Stop Valves
- Reheat Intercept Valves

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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37. Perform The Following:

    a. Fully insert all Control Bank rods

    Response not obtained:

    a. Perform the following.

       1) IF Control Bank Rods can NOT be inserted, THEN initiate boration of the RCS using OP-301, Chemical and Volume Control System (CVCS), RCS Boration Quick Checklist.

       2) Contact Reactor Engineering to determine All Rods Out 1% Shutdown Boron Concentration.

       3) WHEN the required 1% shutdown concentration has been achieved, THEN trip the Control Rods.

       4) Go To Step 38.

    b. Fully insert SHUTDOWN BANK B rods

    c. Fully insert SHUTDOWN BANK A rods

38. Contact I&C and Reactor Engineering to troubleshoot and correct the problem.

39. Implement the EALs

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION A

DROPPED ROD

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STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
40.	Review Technical Specifications To Assure All Applicable LCO requirements Have Been Met: • ITS 3.1.1 - Shutdown Margin (SDM) • ITS 3.1.4 - Rod Alignment • ITS 3.1.5 - Shutdown Bank RIL • ITS 3.1.6 - Control Bank RIL and overlap • ITS 3.1.7 - IRPI • ITS 3.2.1 - Fq(Z) • ITS 3.2.2 - FΔh • ITS 3.2.3 - AFD • ITS 3.2.4 - QPTR	
41.	Check APP-005-A3, PR DROP ROD - EXTINGUISHED	Momentarily place the DROPPED ROD MODE Switch on the affected Power Range A Drawer to RESET, AND return to NORMAL.
42.	Return To Procedure And Step In Effect	

- END -

Facility:	HB ROBINSON	Task No.:	01000110305
Task Title:	Align SI System for Cold Leg Recirculation	JPM No.:	2011-2 NRC JPM B
K/A Reference:	006 A4.05 3.9/3.8 011 EA1.11 4.2/4.2		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom ______ Simulator __X__ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: Plant was at 100% RTP.

A Large Break LOCA occurred.

PATH-1 has been implemented.

APP-002-A3, RWST HI/LO LVL has been received with RWST level at 27%

Task Standard: Align the Safety Injection system for cold leg recirculation prior to RWST level lowering to 9%.

Required Materials: EPP-9, Transfer to Cold Leg Recirculation, Revision 33.

General References: PATH-1
EPP-9

Handouts: EPP-9

Initiating Cue: The CRS has directed you to implement cold leg recirculation IAW EPP-9.

Time Critical Task: NO

Validation Time: 16 minutes

SIMULATOR SETUP

1. Reset to IC-807
2. Open SCN: 008_JPM_NRC_B
3. Place simulator in run when directed by the examiner.

(Denote Critical Steps with an asterisk*)

START TIME: _______

CAUTION

Steps 1 through 24 must be performed without delay to accomplish switchover prior to RWST level reaching 9%.

NOTE

- Foldouts are NOT applicable during the performance of this procedure.
- Functional Restoration Procedures are NOT applicable until after Step 43.

Performance Step: 1 Check capability to establish recirculation – EXISTS (Step 1)

- Establishment of 354 inches in the CV Sump is possible

AND

- Establishment of at least one flow path from the CV Sump to the RCS is possible.

Standard: Candidate determines that the CV Sump is greater than 354 inches by observing LI-801 and LI-802 on the PAM Panel or from the ERFIS computer.

Candidate determines that at least one flow path from the CV Sump to the RCS is possible by observing RTGB indication for the required pumps and valves.

Examiner's Note:

Comment:

Performance Step: 2 Reset Safety Injection (Step 2)

Standard: Candidate depresses the Safety Injection reset pushbutton.

Examiner's Note: SI can be verified as reset by observing the SI Overridden Train A and Train B status light being illuminated and/or by the EDG WHITE start lights being extinguished.

Examiner's Cue:

Comment:

Performance Step: 3 Place the Containment Spray key switch to the OVRD/RESET position (Step 3).

Standard: Candidate places the key switch to the OVRD/RESET position.

Examiner's Note: **Annunciator APP-002-C1 will be received when this action is performed.**

Comment:

Performance Step: 4 Verify RCPs – ALL STOPPED (Step 4)

Standard: Candidate verifies that all of the RCPs have been stopped by observing the RCP status lights above the control switches on the RTGB have the GREEN off indication illuminated.

Examiner's Note:

Comment:

* **Performance Step: 5** Stop pumps to obtain the following conditions: (Step 5)

- SI Pumps – ONE RUNNING
- RHR Pumps – ALL STOPPED
- Charging Pumps – ALL STOPPED
- CV Spray Pumps – MAXIMUM ONE RUNNING

Standard:

Candidate stops one of the SI Pumps by placing the control switch to the STOP position and observing the GREEN off indication illuminated.

Candidate stops both of the RHR Pumps by placing the control switches to the STOP position and observing the GREEN off indications illuminated.

Candidate stops all of the Charging Pumps by placing the control switches to the STOP position and observing the GREEN off indications illuminated.

Candidate verifies that no more than one CV Spray Pump is operating by observing the GREEN off light is illuminated on both CV Spray Pumps.

Examiner's Note:

Comment:

<u>NOTE</u>
Attachment 1 will locally close valves that have lost power due to an electrical train failure.

Performance Step: 6 Close the discharge valves associated with any stopped CV Spray Pump: (Step 6)

- CV Spray Pump A – SI-880A and SI-880B
- CV Spray Pump B – SI-880C and SI-880D

Standard: Candidate determines the CV Spray Pumps that have been secured by observing the GREEN off indication illuminated and closes the associated discharge valves by placing the control switches for the applicable SI-880 valves to the close position and observing the GREEN close lights illuminated.

Examiner's Note: Valves SI-880A and B are parallel flow paths and both valves must be closed to isolate the path.

Valves SI-880C and D are parallel flow paths and both valves must be closed to isolate the path.

Comment:

* **Performance Step: 7** Close SI PUMP RECIRC valves (Step 7)

- SI-856A AND SI-856B

Standard: Candidate closes valves SI-856A and B by placing the control switches to the closed position and observing the GREEN closed indication illuminated **(Only one valve is required to be closed for the pathway to be isolated).**

Examiner's Note: Valves SI-856A and B are in series and the flow path will be isolated by the closure of either valve.

Booth Operator Cue:

Comment:

Performance Step: 8 Perform the following: (Step 8)

a. Dispatch an operator to perform Attachment 1

b. Inform the operator performing Attachment 1 of any electrical train failure that has occurred.

c. Dispatch a second operator to perform Attachment 2.

Standard: Candidate will communicate the need and information for Attachments 1 and 2 to be performed locally.

Examiner's Cue: Respond that the operators have the attachments and performance has been implemented.

Comment:

Performance Step: 9 Check BIT OUTLET valves – ENERGIZED

- SI-870A and SI-870B

Standard: Candidate determines that the valves are energized by observing indication available on the RTGB for the valves.

Examiner's Note:

Comment:

* **Performance Step: 10**	Establish CCW flow to the RHR Heat Exchangers as follows: (Step 10) a. Start CCW Pumps as necessary to obtain two pumps running. b. Open CC-749A and B, CCW FROM RHR HX, while continuing with this procedure.
Standard:	Candidate will start an additional CCW Pump by placing the control switch to the START position and observing the RED on indication illuminated. Candidate will open valves CCW-749A and B by placing the control switch to the OPEN position and observing the RED open indication illuminated.
Examiner's Note:	**Valves CCW-749A and B have a long travel time and will take ~2 minutes to travel open.**
Comment:	
Performance Step: 11	Check RWST level – Less than 9% (Step 11)
Standard:	Candidate determines that RWST level is above 9% by observing LI-948 and LI-969 on the RTGB and proceeds to the RNO step. Candidate proceeds to Step 13.
Examiner's Note:	
Comment:	

* **Performance Step: 12** Place the key switches for the following valves in the NORMAL position (Step 13)

- SI-862A and SI-862B
- SI-863A and SI-863B
- SI-864A and SI-864B
- SI-866A and SI-866B
- SI-869

Standard: Candidate will place the control power key switches for the valves in the NORMAL position.

Examiner's Note: **There is a key switch for each valve listed that is located in the rear of the RTGB on the ECCS Valves Control Power Defeat Panel. An AMBER light above each key switch will illuminate when the key switch is placed in the NORMAL position.**

Comment:

Performance Step: 13 Open SI-869, SI HOT LEG HDR valves (Step 14)

Standard: Candidate will open valve SI-869 by placing the control switch to the open position and observing the RED open indication illuminated.

Examiner's Note:

Comment:

* **Performance Step: 14** Close the following RWST to RHR valves (Step 15)

- SI-862A and SI-862B

Standard: Candidate will close valves SI-862A and B by placing the control switches to the close position and observing the GREEN close indication illuminated.

Examiner's Note: **Valves SI-862A and SI-862B are in series and requires only one of the valves to be closed to isolate the flow path.**

Comment:

Performance Step: 15 Check the following alarms - EXTINGUISHED (Step 16)

- APP-001-B7, RHR PMP A COOL WTR LO FLOW
- APP-001-C7, RHR PMP B COOL WTR LO FLOW
- APP-002-E1, CV SRY PMP COOL WTR LO FLOW
- APP-002-E5, SI PMP COOL WTR LO FLOW

Standard: Candidate determines that all of the annunciators listed are extinguished by observing the annunciator panels on the RTGB.

Examiner's Note:

Comment:

Performance Step: 16 Verify at least one RWST to RHR valve closed prior to proceeding to Step 18: (Step 17)

- SI-862A OR SI-862B

Standard: Candidate determines that one of the SI-862 valves is closed by observing the GREEN close indication illuminated for the applicable valve.

Examiner's Note:

Comment:

* **Performance Step: 17** Open CV SUMP TO RHR valves: (Step 18)

- SI-860A and SI-861A
- SI-860B and SI-861B

Standard: Candidate opens valves SI-860A, SI-861A, SI-860B and SI-861B by placing the control switches to the open position and observing that the RED open indication for each valve is illuminated.

Examiner's Note:

Comment:

Performance Step: 18 Check at least one train of CV SUMP TO RHR valves – OPEN: (Step 19)

- RHR Pump A – SI-860A and SI-861A
- RHR Pump B – SI-860B and SI-861B

Standard: Candidate will select one of the trains and check that the valves supporting that train are open by observing the RED open indication illuminated.

Examiner's Note:

Comment:

Performance Step: 19 Check CV water level – Greater than 354 inches (Step 20)

Standard: Candidate determines that CV water level is greater than 354 inches by observing LI-801 and LI-802 on the PAM Panel or from the ERFIS computer.

Examiner's Note:

Comment:

Performance Step: 20 Check CCW FROM RHR HX valve(s) opened in Step 10.b – OPEN (Step 21)

- CC-749A
- CC-749B

Standard: Candidate determines that both of the valves are open by observing the RED open indication illuminated.

Examiner's Note:

Comment:

Performance Step: 21 Check RCS pressure – Less than 125 PSIG (Step 22)

Standard: Candidate determines that RCS pressure is less than 125 PSIG by observing Wide Range pressure on the ICCM Subcooling Monitor on the PAM Panel.

Examiner's Note:

Comment:

Performance Step: 22 Check all of the following completed: (Step 23)

- Attachment 1 Critical Steps
- Attachment 2 Critical Steps
- Any local actions in the following areas:
  BIT Room, SI Pump Room, RHR Pit, Pipe Alley

Standard: Candidate determines that the attachments and local actions are completed by communicating with the operators assigned to perform the local activities.

Examiner's Cue: **Inform the candidate that Attachments 1 and 2 and all required local actions have been completed.**

Comment:

***Performance Step: 23** Establish recirculation flow as follows: (Step 24)

a. Verify CV SUMP TO RHR valves for the RHR Pump to be started – OPEN:
   - RHR Pump A – SI-860A and SI-861A
   - RHR Pump B – SI-860B and SI-861B

b. *Verify one RHR Pump - RUNNING

Standard: Candidate determines that both of the valves to support the selected train of RHR are open by observing the RED open indication illuminated for the valves.

Candidate starts the selected RHR Pump by placing the control switch to the START position and observing the RED on indication illuminated.

Examiner's Note:

Comment:

END OF TASK

Terminating Cue: **Cold leg recirculation has been established with one RHR Pump operating prior to the RWST lowering to 9% level .**

STOP TIME: ____________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM B

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

Plant was at 100% RTP.

A Large Break LOCA occurred.

PATH-1 has been implemented.

APP-002-A3, RWST HI/LO LVL has been received with RWST level at 27%

INITIATING CUE:

The CRS has directed you to implement cold leg recirculation IAW EPP-9.

INITIAL CONDITIONS:

Plant was at 100% RTP.

A Large Break LOCA occurred.

PATH-1 has been implemented.

APP-002-A3, RWST HI/LO LVL has been received with RWST level at 27%

INITIATING CUE:

The CRS has directed you to implement cold leg recirculation IAW EPP-9.

CONTINUOUSUSE

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 3

PART 4

END PATH PROCEDURE

EPP-9

TRANSFER TO COLD LEG RECIRCULATION

REVISION 33

EPP-9, Revision 33
Summary Of Changes (PRR 427144

Various Steps	Changed all occurances of increase and decrease to other words with the same meaning. (Generic)
Step 22 RNO	Made changes to this RNO step to make it easier to determine the intent of the step. (PRR 427144)
Step 23	Changed this step to make it more evident to the reader that the intent is to ensure personnel are out of the areas that may experience higher radiation levels once recirculation is commenced. (PRR 430444)

Purpose and Entry Conditions

(Page 1 of 1)

1. PURPOSE

   This procedure provides the necessary instructions for transferring the safety injection system and containment spray system to the recirculation mode.

2. ENTRY CONDITIONS

   When RWST level lowers to less than 27%.

- END -

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

****

CAUTION

Steps 1 Through 24 must be performed without delay to accomplish switchover prior to RWST level reaching 9%.

****

NOTE

- Foldouts are NOT applicable during the performance of this procedure.
- Functional Restoration Procedures are NOT applicable until after Step 43.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
* 1.	Check Capability To Establish Recirculation - EXISTS • Establishment of 354 inches in the CV Sump is possible AND • Establishment of at least one flow path from the CV Sump to the RCS is possible	Go To EPP-15, Loss Of Emergency Coolant Recirculation.
2.	Reset SAFETY INJECTION	
3.	Place The CONTAINMENT SPRAY Key Switch To The OVRD/RESET Position	
4.	Verify RCPs - ALL STOPPED	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

5.	Stop Pumps To Obtain The Following Conditions:
	• SI Pumps - ONE RUNNING
	• RHR Pumps - ALL STOPPED
	• Charging Pumps - ALL STOPPED
	• CV Spray Pumps - MAXIMUM ONE RUNNING
		Dispatch the BOP Operator to locally trip ANY pump that fails to stop:
		• Bus E-1
		  • SI Pump A - CMPT 21C
		  • RHR Pump A - CMPT 22A
		  • CV Spray Pump A - CMPT 19A
		  • SI Pump B - CMPT 22B
		  • Charging Pump B - CMPT 21B
		• Bus E-2
		  • SI Pump C - CMPT 23B
		  • RHR Pump B - CMPT 26B
		  • CV Spray Pump B - CMPT 25C
		  • SI Pump B - CMPT 29B
		  • Charging Pump C - CMPT 23A
		• DS Bus
		  • Charging Pump A - CMPT 34B

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

Attachment 1 will locally close valves that have lost power due to an electrical train failure.

6.	Close The DISCH Valves Associated With Any Stopped CV Spray Pump:
	• CV SPRAY PUMP A
	  • SI-880A
	  • SI-880B
	• CV SPRAY PUMP B
	  • SI-880C
	  • SI-880D
		IF a valve has failed AND failure is NOT due to an electrical train failure, THEN Dispatch an Operator to locally close the valve.

7.	Close SI PUMP RECIRC Valves • SI-856A AND • SI-856B	
8.	Perform The Following a. Dispatch an Operator to perform Attachment 1 b. Inform the Operator performing Attachment 1 of any electrical train failure that has occurred c. Dispatch a second Operator to perform Attachment 2	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
9.	Check BIT OUTLET Valves - ENERGIZED: • SI-870A AND • SI-870B	IF the de-energized BIT OUTLET Valve is OPEN, THEN dispatch an Operator to locally close the valve. (Located in BIT Room on top of platform)
10.	Establish CCW Flow To The RHR Heat Exchangers As Follows:	
	a. Start CCW Pumps as necessary to obtain two pumps running	a. IF only one CCW Pump is available, THEN open one CCW FROM RHR HX Valve, while continuing with this procedure. • CC-749A OR • CC-749B Go To Step 11.
	b. Open CC-749A & B, CCW FROM RHR HX, while continuing with this procedure	
*11.	Check RWST Level - LESS THAN 9%	WHEN RWST level is less than 9%, THEN perform Step 12. Go To Step 13.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
12.	Verify The Following: a. SI Pumps - ALL STOPPED b. CV Spray Pumps - ALL STOPPED c. CV SPRAY PUMP DISCH Valves - CLOSED: • SI-880A • SI-880B • SI-880C • SI-880D	
13.	Place the Key Switches For The Following Valves In The NORMAL Position • SI-862A • SI-862B • SI-863A • SI-863B • SI-864A • SI-864B • SI-866A • SI-866B • SI-869	
14.	Open SI-869, SI HOT LEG HDR Valve	Locally open SI-869. (Located in Pipe Alley at sleeve S-2, top row 2nd from left.)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
15.	Close The Following RWST To RHR Valves • SI-862A AND • SI-862B	Verify at least ONE valve is closing/closed. IF at least one of the valves can NOT be closed, THEN locally close SI-862A OR SI-862B. (Located in RHR Pit on platform above RHR PUMP B)
16.	Check The Following Alarms - EXTINGUISHED • APP-001-B7, RHR PMP A COOL WTR LO FLOW • APP-001-C7, RHR PMP B COOL WTR LO FLOW • APP-002-E1, CV SRY PMP COOL WTR LO FLOW • APP-002-E5, SI PMP COOL WTR LO FLOW	Establish CCW flow.
17.	Verify At Least One RWST TO RHR Valve CLOSED Prior To Proceeding To Step 18: • SI-862A OR • SI-862B	
18.	Open CV SUMP TO RHR Valves: • SI-860A • SI-860B • SI-861A • SI-861B	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

19.	Check At Least One Train Of CV SUMP TO RHR Valves - OPEN:
	• RHR PUMP A
	  • SI-860A
	  • SI-861A
	• RHR PUMP B
	  • SI-860B
	  • SI-861B
		IF at least one train of valves can NOT be opened, THEN Go To EPP-15, Loss Of Emergency Coolant Recirculation.

20.	Check CV Water Level - GREATER THAN 354 INCHES	IF RWST Level is less than 9%, THEN Go To EPP-15, Loss Of Emergency Coolant Recirculation. WHEN CV water level is greater than 354 inches, THEN Go To Step 21.
21.	Check CCW FROM RHR HX Valve(s) Opened At Step 10.b - OPEN: • CC-749A • CC-749B	WHEN the valve(s) are open, THEN Go To Step 22. IF either CC-749A OR CC-749B can NOT be opened, THEN use the opposite train RHR Pump in subsequent steps. Go To Step 22.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

22.	Check RCS Pressure - LESS THAN 125 PSIG	<u>WHEN</u> all of the following are completed, <u>THEN</u> Go To Step 26:
		• Attachment 1 Critical Steps
		• Attachment 2 Critical Steps
		• Any Local Actions in the following areas:
		  • BIT Room
		  • SI Pump Room
		  • RHR Pit
		  • Pipe Alley

23.	Check All Of The Following Completed:
	• Attachment 1 Critical Steps
	• Attachment 2 Critical Steps
	• Any local actions in the following areas:
	  • BIT Room
	  • SI Pump Room
	  • RHR Pit
	  • Pipe Alley
		<u>WHEN</u> all actions are complete, <u>THEN</u> Go To Step 24.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

24.	Establish Recirculation Flow As Follows:
	
	a. Verify CV SUMP TO RHR Valves for the RHR Pump to be started - OPEN:
	
	• RHR PUMP A
	  • SI-860A
	  • SI-861A
	• RHR PUMP B
	  • SI-860B
	  • SI-861B
	
	b. Verify one RHR Pump - RUNNING	

25.	Check Both The Following: • RVLIS Full Range - STABLE <u>OR</u> RISING <u>AND</u> • Core Exit T/Cs - STABLE <u>OR</u> LOWERING	<u>IF</u> RCS pressure is greater than 125 psig, <u>THEN</u> perform the following: a. Stop the running RHR Pump b. Go To Step 26. <u>IF</u> RCS pressure is less than 125 psig, <u>THEN</u> perform the following: a. Stop the running RHR Pump b. Start the opposite train RHR Pump.
26.	Check RWST Level - LESS THAN 9%	<u>WHEN</u> RWST level is less than 9%, <u>THEN</u> Go To Step 27.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

27.	Verify The Following:
	
	a. SI Pumps - ALL STOPPED
	
	b. CV Spray Pumps - ALL STOPPED
	
	c. CV SPRAY PUMP DISCH Valves - CLOSED:
	• SI-880A
	• SI-880B
	• SI-880C
	• SI-880D
		Dispatch the BOP Operator to locally trip ANY pump that fails to stop:
		
		• Bus E-1
		  • SI Pump A - CMPT 21C
		  • CV Spray Pump A - CMPT 19A
		  • SI Pump B - CMPT 22B
		• Bus E-2
		  • SI Pump C - CMPT 23B
		  • CV Spray Pump B - CMPT 25C
		  • SI Pump B - CMPT 29B

28.	Close RWST DISCH Valves: • SI-864A AND • SI-864B	
29.	Check RHR Pump Status - RUNNING	Go To Step 33.
30.	Check CV Pressure - GREATER THAN 10 PSIG	Go To Step 42.
31.	Check Time Elapsed Since Starting Accident - GREATER THAN 73 MINUTES	WHEN 73 minutes have elapsed, THEN Go To Step 32.
32.	Verify Both RHR Pumps - STOPPED	
33.	Close The RHR HX DISCH Valves: • RHR-759A AND • RHR-759B	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
34.	Check At Least One RWST DISCH Valve - CLOSED: • SI-864A OR • SI-864B	WHEN either RWST DISCH Valve is closed, THEN Go To Step 35.
35.	Check BOTH RHR HX DISCH Valves - CLOSED: • RHR-759A • RHR-759B	WHEN both RHR HX DISCH Valves are closed, THEN Go To Step 36. IF either RHR-759A OR RHR-759B can NOT be closed, THEN use the opposite train RHR Pump in Step Step 36 and Go To Step 36.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
36.	Establish Recirculation Flow As Follows:	
	a. Check RHR-759A - CLOSED	a. Perform the following: 1) Verify CLOSED RHR-759B. 2) Verify RHR PUMP A is stopped. 3) Open SI-863B, RHR LOOP RECIRC. 4) Close SI-863A, RHR LOOP RECIRC 5) Start RHR PUMP B. 6) Go To Step 37.
	b. Open SI-863A, RHR LOOP RECIRC.	b. Perform the following: 1) Verify RHR-759B CLOSED. 2) Open SI-863B, RHR LOOP RECIRC. 3) Close SI-863A. 4) Start RHR PUMP B 5) Go To Step 37.
	c. Start RHR PUMP A	c. Perform the following: 1) Verify RHR-759B CLOSED. 2) Open SI-863B, RHR LOOP RECIRC. 3) Close SI-863A. 4) Start RHR PUMP B
37.	Start One SI Pump	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
38.	Check Both The Following: • RVLIS Full Range - STABLE <u>OR</u> RISING <u>AND</u> • Core Exit T/Cs - STABLE <u>OR</u> LOWERING	Perform the following: a. Stop the running SI Pump b. Stop the running RHR Pump c. Use the opposite train pumps. d. Go To Step 36.
39.	Maintain SI Recirculation Flow To The RCS At All Times	
40.	Check CV Pressure - GREATER THAN 10 PSIG	Go To Step 42.
41.	Perform The Following: a. Start ONE CV Spray Pump b. Open the DISCHARGE valves for the selected CV Spray Pump • CV SPRAY PUMP A • SI-880A • SI-880B • CV SPRAY PUMP B • SI-880C • SI-880D	
*42.	Check Spray Additive Tank Level - GREATER THAN 0%	Verify Spray Additive Tank isolated as follows: • SI-845A, SAT DISCH, CLOSED • SI-845B, SAT DISCH, CLOSED • SI-845C, SAT THROTTLE VALVE, CLOSED
43.	Reset SPDS <u>AND</u> Commence Monitoring CSFSTs	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
*44.	Check <u>ANY</u> condition below - PRESENT • APP-001-D4, RHR PIT A HI-HI LEVEL - ILLUMINATED <u>OR</u> • APP-001-D5, RHR PIT B HI-HI LEVEL - ILLUMINATED <u>OR</u> • <u>EITHER</u> RTGB RHR Pit indication - GREATER THAN 24 INCHES	<u>IF</u> <u>ANY</u> of the conditions occur, <u>THEN</u> Go To EPP-24, Isolation Of Leakage In The RHR Pump Pit. Go To Step 46.
45.	Go To EPP-24, Isolation Of Leakage In The RHR Pump Pit	
46.	Makeup To RWST Using Supplement P, While Continuing With This Procedure	

****

<u>CAUTION</u>

The Operator should be sure that cavitation is taking place prior to transitioning to steps that attempt to mitigate screen blockage. The actions taken are beyond design basis <u>AND</u> should <u>NOT</u> be taken unless warranted.

****

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
*47.	Using Available Indications, Determine If RHR Pump Discharge Pressure <u>AND</u> Flow Is Stable • PI-602A • PI-602B • FI-605	<u>IF</u> indication of pump cavitation becomes present, <u>THEN</u> Go To Step 57.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
*48.	Determine CV Sump pH As Follows:	
	a. Request Chemistry Personnel obtain an RHR sample, while continuing with this procedure	
	b. Check RHR Sample Results - AVAILABLE	b. WHEN sample results are available, THEN Perform step 48.c. Go To Step 49.
	c. Check RHR pH - GREATER THAN 8.5	c. Go To Attachment 3, Increasing CV Sump pH.
*49.	Check CV Pressure - LESS THAN 4 PSIG	WHEN CV Pressure is less than 4 psig, THEN perform Step 50. Observe the NOTE prior to step 51 and Go To Step 51.
50.	Perform The Following To Secure CV Spray: a. Stop the operating CV Spray Pump b. Verify CV SPRAY PUMP DISCH Valves - CLOSED: • SI-880A • SI-880B • SI-880C • SI-880D	

NOTE

The charging and RCP seal injection lines have been isolated and will not be available for subsequent actions.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
51.	Determine Status Of Attachment 1 AND 2, Local Cold Leg Recirculation Lineups	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
52.	Check Entry To This Procedure - FROM PATH-1	Go To Step 54.
53.	Reset SPDS <u>AND</u> Return To Procedure And Step In Effect	
54.	Check RCS Subcooling - LESS THAN 35°F [55°F]	Continue operation in cold leg recirculation. Contact Plant Operations Staff to evaluate long term plant status.
55.	Check Elapsed Time Since Event Initiation - GREATER THAN 11 HOURS	<u>WHEN</u> 11 hours has elapsed, <u>THEN</u> Go To EPP-10, Transfer To Long Term Recirculation
56.	Go To EPP-10, Transfer To Long Term Recirculation.	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
57.	Determine <u>IF</u> CV Spray Pumps Are Required:	
	a. Check CV Spray Pump - RUNNING	a. Go To Step 60
	b. Check CV Pressure - LESS THAN 4 PSIG	b. <u>IF</u> greater than or equal to 3 CV RECIRC FANs are running, <u>THEN</u> Go To Step 57.c <u>IF</u> less than 3 CV RECIRC FANs are running then Go To Step 60.
	c. Verify all CV Spray Pumps - STOPPED	
	d. Close CV SPRAY PUMP DISCH Valves on any stopped pump: 1) CV SPRAY PUMP A • SI-880A • SI-880B 2) CV SPRAY PUMP B • SI-880C • SI-880D	
58.	Check RHR Pump Discharge Pressure <u>AND</u> Flow - STABLE • PI-602A • PI-602B • FI-605	Go To Step 60.
59.	Go To Step 48	
60.	Check RHR System Alignment - IN PIGGY-BACK MODE	Go To Step 32.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
61.	Determine If CV Pressure Can Be Raised:	
	a. Check CV Pressure - LESS THAN 30 PSIG	a. Go To Step 62.
	b. Perform Supplement O to Raise CV Pressure Using PAHV	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
*62.	Operate RHR <u>AND</u> SI Pumps Intermittently As Follows:	
	a. Check BOTH Trains of SI <u>AND</u> RHR Pumps - AVAILABLE	a. Go To Step 63.
	b. Stop ALL SI, CV Spray, <u>AND</u> RHR Pumps	
	c. Close CV SPRAY PUMP DISCH Valves on any stopped pump: 1) CV SPRAY PUMP A • SI-880A • SI-880B 2) CV SPRAY PUMP B • SI-880C • SI-880D	
	d. Start 1 RHR Pump <u>AND</u> 1 SI Pump on the opposite train to establish flow	
	e. Check RHR Pump Cavitation - PRESENT	e. <u>WHEN</u> RHR Pump cavitation has been eliminated, <u>THEN</u> discontinue intermittent operation of the SI <u>AND</u> RHR Pumps. Go To Step 63
	f. Stop the SI <u>AND</u> RHR Pump that was started	
	g. Wait 6 minutes	
	h. Start 1 RHR Pump <u>AND</u> 1 SI Pump on the opposite train to establish flow	

(CONTINUED NEXT PAGE)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
62.	(CONTINUED)	
	i. Check RHR Pump Cavitation - PRESENT	i. WHEN RHR Pump cavitation has been eliminated, THEN discontinue intermittent operation of the SI AND RHR Pumps. Go To Step 63
	j. Continue intermittent operation of the SI AND RHR Pumps at 6 minute intervals	
63.	Check CV Pressure - LESS THAN 30 PSIG	IF cavitation is present, THEN Go To Step 60. IF cavitation is NOT present, THEN Go To Step 48.
64.	Check RWST Level - GREATER THAN 19%	IF cavitation is present, THEN Go To Step 60. IF cavitation is NOT present, THEN Go To Step 48.
65.	Stop All SI AND RHR Pumps	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
66.	Align Valves For SI Injection As Follows: a. Verify both RHR LOOP RECIRC valves - CLOSED • SI-863A • SI-863B b. Verify both RWST DISCH Valves - OPEN • SI-864A • SI-864B c. Verify at least one BIT INLET Valve - OPEN • SI-867A • SI-867B d. Verify at least one BIT OUTLET Valve - OPEN • SI-870A • SI-870B	

NOTE

FRP-J.2, Response To Containment Flooding, is NOT applicable during intentional CV Flood.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
67.	Start One SI Pump	
68.	Check Either Condition Below Met: • RWST Level - LESS THAN 9% OR • CV Water Level - GREATER THAN 420 INCHES	WHEN either RWST level lowers below 9% OR CV Water Level becomes greater than 420 inches, THEN Go To Step 69.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
69.	Stop The SI Pump	
70.	Align Valves For Piggy-Back Mode As Follows: a. Verify both RWST DISCH Valves - CLOSED • SI-864A • SI-864B	
	b. Check <u>BOTH</u> RHR HX DISCH Valves - CLOSED: • RHR-759A • RHR-759B	b. <u>IF</u> either RHR-759A <u>OR</u> RHR-759B can <u>NOT</u> be closed, <u>THEN</u> use the opposite train RHR Pump in Step 71.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
71.	Establish Recirculation Flow As Follows:	
	a. Check RHR-759A - CLOSED	a. Perform the following: 1) Verify CLOSED RHR-759B. 2) Verify RHR PUMP A is stopped. 3) Open SI-863B, RHR LOOP RECIRC. 4) Close SI-863A, RHR LOOP RECIRC 5) Start RHR PUMP B. 6) Start one SI Pump 7) Go To Step 72.
	b. Open SI-863A, RHR LOOP RECIRC.	b. Perform the following: 1) Verify RHR-759B CLOSED. 2) Open SI-863B, RHR LOOP RECIRC. 3) Close SI-863A. 4) Start RHR PUMP B 5) Start one SI Pump 6) Go To Step 72.
	c. Start RHR PUMP A	c. Perform the following: 1) Verify RHR-759B CLOSED. 2) Open SI-863B, RHR LOOP RECIRC. 3) Close SI-863A. 4) Start RHR PUMP B
	d. Start one SI Pump	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
72.	Check RHR Pump Discharge Pressure <u>AND</u> Flow - STABLE • PI-602A • PI-602B • FI-605	Resume intermittent operation of the RHR <u>AND</u> SI Pump at 6 minutes between run cycles until discharge pressure <u>AND</u> flow are stable. Go To Step 74.
73.	Go To Step 48	
*74.	Check Supplement O - COMPLETED	<u>WHEN</u> Supplement O is complete, <u>THEN</u> Go To Step 75. Go To Step 60.
75.	Check RHR Pump Discharge Pressure <u>AND</u> Flow - STABLE • PI-602A • PI-602B	Go To Step 60.
76.	Go To Step 48	

- END -

CONTINUOUS USE

ATTACHMENT 1

Attachment 1

(Page 1 of 4)

****

CAUTION

Normal Security and Radiation Protection Procedures are not applicable during the performance of this Attachment.

****

1. The critical steps of this Attachment should be performed as rapidly as possible.

2. Obtain the following equipment as required:

   a. Two way radio OR Cell Phone

   b. Flashlight

NOTE

- SI-856A&B are located between SI Pumps B and C.
- SI-856A&B are rotated clockwise to close.

3. Perform the following valve lineup in the SI Pump Room between SI Pumps B and C:

   a. Verify SI-856A, SI PUMP RECIRC Valve - HANDWHEEL CLOSED.

   b. Verify SI-856B, SI PUMP RECIRC Valve - HANDWHEEL CLOSED.

CONTINUOUS USE

ATTACHMENT 1

Attachment 1

(Page 2 of 4)

4. IF an electrical train failure has occurred (E-1/E-2 failure), THEN manually align Spray Pump Discharge valves as follows:

   a. IF a Train A failure has occurred, THEN close Spray Pump "A" valves:

      - SI-880A, CONTAINMENT SPRAY PUMP "A" DISCHARGE
      - SI-880B, CONTAINMENT SPRAY PUMP "A" DISCHARGE

   b. IF a Train B failure has occurred, THEN close Spray Pump "B" valves:

      - SI-880C, CONTAINMENT SPRAY PUMP "B" DISCHARGE
      - SI-880D, CONTAINMENT SPRAY PUMP "B" DISCHARGE

NOTE

PS-996 is located at the South end on the West wall.

5. In Pipe Alley, open PS-996, RHR/PASS ISOLATION.

6. Notify Control Room that the Critical Steps of Attachment 1 are complete.

CONTINUOUS USE

ATTACHMENT 1

Attachment 1

(Page 3 of 4)

****

CAUTION

The Control Room will be initiating CV Sump Recirculation. This may result in high radiation in the Auxiliary Building.

****

NOTE

The following equipment will be required to perform the steps below:

- Controlled Keys 174 and 175
- Fuse Pullers

7. Isolate the RHR Pump suction as follows:

   a. At MCC-5 (CMPT-6J):

      1) Close the breaker for RHR-752A, RHR PUMP A SUCTION.

      2) Insert Key #174 in control switch for RHR-752A AND close the valve.

   b. At MCC-6 (CMPT-6J):

      1) Close the breaker for RHR-752B, RHR PUMP B SUCTION.

      2) Insert Key #175 in control switch for RHR-752B AND close the valve.

8. Deenergize The Charging Pumps As Follows:

   a. At 480V BUS E-1, remove the Control Power Fuses for CHARGING PUMP B (CMPT 21B).

   b. At 480V BUS E-2, remove the Control Power Fuses for CHARGING PUMP C (CMPT 23A).

   c. At 480V BUS DS, remove the Control Power Fuses for CHARGING PUMP A (CMPT 33A, Fuse "UP").

CONTINUOUS USE

ATTACHMENT 1

Attachment 1

(Page 4 of 4)

9. Notify Control Room that Attachment 1 is complete.

- END -

CONTINUOUS USE

ATTACHMENT 2

Attachment 2

(Page 1 of 3)

****

CAUTION

Normal Security and Radiation Protection Procedures are not applicable during the performance of this Attachment.

****

1. The critical steps of this Attachment should be performed as rapidly as possible.

2. Obtain the following equipment as required:

   a. Two way radio OR Cell Phone

   b. Flashlight

NOTE

CVC-282 is located above FCV-1930B, STEAM GENERATOR A BLOWDOWN LINE 15 feet above the floor. The blue EOP Tag is fixed to CVC-282 such that it hangs down from the valve near the FCV-1930B operator. The Charging Line enters the CV at Sleeve 17.

3. In Pipe Alley, close CVC-282, CHARGING LINE FLOW ISOL.

4. Notify Control Room that the Critical Steps of Attachment 2 are complete.

CONTINUOUS USE

ATTACHMENT 2

Attachment 2

(Page 2 of 3)

****

CAUTION

The Control Room will be initiating CV Sump Recirculation. This may result in high radiation in the Auxiliary Building.

****

NOTE

- CVC-297A, B, and C are located in the Northwest corner above Seal Inj Filter shield wall.
- CVC-293A, 293C, 292A, and 295 are located in Northwest corner outside Seal Inj Filter shield wall.
- CVC-295A is located in Northwest corner above Seal Inj Filters.
- CVC-309A and 202A are located on West wall adjacent to HCV-121.

5. Verify CLOSED the following valves in the Charging Pump Room:

   a. CVC-297A, RCP "A" SEAL WATER FLOW CONTROL VALVE.

   b. CVC-297B, RCP "B" SEAL WATER FLOW CONTROL VALVE.

   c. CVC-297C, RCP "C" SEAL WATER FLOW CONTROL VALVE.

   d. CVC-293A, SEAL INJECTION FILTER "A" OUTLET.

   e. CVC-293C, SEAL INJECTION FILTER "B" OUTLET.

   f. CVC-292A, SEAL INJECTION FILTER PIC-157 ISOLATION.

   g. CVC-295, SEAL INJECTION FILTER "A" AND "B" BYPASS.

   h. CVC-295A, SEAL INJECTION FILTERS OUTLET VENT.

   i. CVC-309A, HCV-121 BYPASS.

   j. CVC-202A, HCV-121 OUTLET.

CONTINUOUS USE

ATTACHMENT 2

Attachment 2

(Page 3 of 3)

6. Open the following valves at the IVSW Tank Area Manual Header:

   a. IVSW-16, IVSW TO PEN 24, CHARGING LINE ISOLATION.

   b. IVSW-16A, IVSW TO PEN 25, 26, & 27, RCPS SEAL INJECTION.

7. Notify Control Room that Attachment 2 is complete.

- END -

CONTINUOUS USE

ATTACHMENT 3

RAISING CV SUMP PH

(Page 1 of 5)

****

CAUTION

When applying conservatism in determining the amount of NaOH to be added, conservatism should be applied to not exceeding a PH of 10.5 since there is no way of reducing PH until CV radiation levels have lowered.

****

1. Contact Plant Operations Staff To Determine The Amount Of NaOH Needed To Restore PH To Greater Than 8.5

NOTE

- NaOH Tank Capacity is contained in Curve 8.13.
- 1044 gallons is equal to 0% level.

2. Determine Spray Additive Tank Final Level Using Table Below:

SPRAY ADDITIVE TANK LEVEL CALCULATION		
Current Level %:________ =	________	gallons (Curve 8.13)
subtract desired gallons -	________	gallons (Step 1)
gallons remaining in tank	________	gallons =
% final level	________	% (Curve 8.13)

CONTINUOUS USE

ATTACHMENT 3

RAISING CV SUMP PH

(Page 2 of 5)

* 3. Check Final Level Calculated In Step 2 - GREATER THAN 0%	Contact Plant Operations Staff to order NaOH from vender. WHEN NaOH inventory has been restored to the Spray Additive Tank, THEN Go To Step 2. Go To procedure Main Body, Step 52.
4. Check SI Pump Status - STOPPED	Go To Step 12.
5. Check Time Elapsed Since Rx Tripped - GREATER THAN 73 MINUTES	WHEN 73 minutes have elapsed, THEN Go To Step 6.
6. Verify Both RHR Pumps - STOPPED	
7. Close The RHR HX DISCH Valves: • RHR-759A • RHR-759B	
8. Check BOTH RHR HX DISCH Valves - CLOSED: • RHR-759A • RHR-759B	WHEN both RHR HX DISCH Valves are closed, THEN Go To Step 9. IF either RHR-759A OR RHR-759B can NOT be closed, THEN use the opposite train RHR Pump in Step Step 9 and Go To Step 9.

CONTINUOUS USE

ATTACHMENT 3

RAISING CV SUMP PH

(Page 3 of 5)

9. Establish Recirculation Flow As Follows:

a. Check RHR-759A - CLOSED	a. Perform the following: 1) Verify CLOSED RHR-759B. 2) Verify RHR PUMP A is stopped. 3) Open SI-863B, RHR LOOP RECIRC. 4) Close SI-863A, RHR LOOP RECIRC. 5) Start RHR PUMP B. 6) Go To Step 10.
b. Open SI-863A, RHR LOOP RECIRC.	b. Perform the following: 1) Verify RHR-759B CLOSED. 2) Open SI-863B, RHR LOOP RECIRC. 3) Close SI-863A. 4) Start RHR PUMP B 5) Go To Step 10.
c. Start RHR PUMP A	c. Perform the following: 1) Verify RHR-759B CLOSED. 2) Open SI-863B, RHR LOOP RECIRC. 3) Close SI-863A. 4) Start RHR PUMP B

CONTINUOUS USE

ATTACHMENT 3

RAISING CV SUMP PH

(Page 4 of 5)

10.	Start One SI Pump	
11.	Check FI-943, SI COLD LEG HEADER FLOW - FLOW INDICATED	Verify the following: • SI-867A AND B - OPEN • SI-870A AND B - OPEN • RCS pressure less than 1350 psig

12.	Perform The Following:
	a. Start ONE CV Spray Pump
	b. Open the DISCHARGE valves for the selected CV Spray Pump
	• CV SPRAY PUMP A
	  • SI-880A
	  • SI-880B
	• CV SPRAY PUMP B
	  • SI-880C
	  • SI-880D	

13.	Set Spray Additive Tank Flow On FI-949 To Desired Flow Rate	
*14.	Check CV Pressure - GREATER THAN OR EQUAL TO 0 PSIG	Contact Plant Operations Staff to determine a plan for CV pH control. Go To Step 16.
15.	Check Spray Additive Tank Level - BELOW CALCULATED LEVEL	WHEN Spray Additive Tank level lowers below calculated level, THEN Go To Step 16.

CONTINUOUS USE

ATTACHMENT 3

RAISING CV SUMP PH

(Page 5 of 5)

16. Perform The Following To Secure CV Spray:

    a. Verify Spray Additive Tank Isolated As Follows:

    - SI-845A, SAT DISCH - CLOSED
    - SI-845B, SAT DISCH - CLOSED
    - SI-845C, SAT THROTTLING - CLOSED

    b. Check CV Pressure - LESS THAN 4 PSIG

    b. Go To Procedure Main Body, Step 49.

    c. Stop the operating CV Spray Pump

    d. Verify CV SPRAY PUMP DISCH Valves - CLOSED:

    - SI-880A
    - SI-880B
    - SI-880C
    - SI-880D

17. Go To Procedure Main Body, Step 50

- END -

ATTACHMENT 4A

Continuous Action Steps

(Page 1 of 2)

1. IF capability for recirculation can NOT be established, THEN Go To EPP-15, Loss Of Emergency Coolant Recirculation:
   - Establishment of 354 inches in the CV Sump is NOT possible
     OR
   - Establishment of at least one flow path from the CV Sump to the RCS is NOT possible

11. WHEN RWST level is less than 9%, THEN Verify The Following:
    a. SI Pumps - ALL STOPPED
    b. CV Spray Pumps - ALL STOPPED
    c. CV SPRAY PUMP DISCH Valves - CLOSED:
       - SI-880A
       - SI-880B
       - SI-880C
       - SI-880D

42. IF Spray Additive Tank level is NOT greater than 0%, THEN verify Spray Additive Tank isolated as follows:
    - SI-845A, SAT DISCH, CLOSED
    - SI-845B, SAT DISCH, CLOSED
    - SI-845C, SAT THROTTLE VALVE, CLOSED

44. IF ANY condition below occurs, THEN Go To EPP-24, Isolation Of Leakage In The RHR Pump Pit:
    - APP-001-D4, RHR PIT A HI-HI LEVEL - ILLUMINATED
      OR
    - APP-001-D5, RHR PIT B HI-HI LEVEL - ILLUMINATED
      OR
    - EITHER RTGB RHR Pit indication - GREATER THAN 24 INCHES

47. IF indication of RHR Pump cavitation becomes present, THEN Go To Step 57.

48. WHEN RHR sample results are available, THEN perform Step 48.c.

49. WHEN CV Pressure Is Less Than 4 PSIG, THEN perform Step 50.

62. WHEN RHR Pump cavitation has been eliminated, THEN discontinue intermittent operation of the SI AND RHR Pumps.

74: WHEN Supplement O has been completed, THEN check pumps for cavitation.

ATTACHMENT 4A

Continuous Action Steps

(Page 2 of 2)

Attachment 3

Step 3: WHEN NaOH has been received, THEN continue with Attachment 3.

Step 14: IF CV pressure drops below 0 psig before required NaOH has been added, THEN stop CV Spray AND contact staff to determine plan.

ATTACHMENT 4B

Continuous Action Steps

(Page 1 of 2)

1. IF capability for recirculation can NOT be established, THEN Go To EPP-15, Loss Of Emergency Coolant Recirculation:
   - Establishment of 354 inches in the CV Sump is NOT possible
     OR
   - Establishment of at least one flow path from the CV Sump to the RCS is NOT possible

11. WHEN RWST level is less than 9%, THEN Verify The Following:
    a. SI Pumps - ALL STOPPED
    b. CV Spray Pumps - ALL STOPPED
    c. CV SPRAY PUMP DISCH Valves - CLOSED:
       - SI-880A
       - SI-880B
       - SI-880C
       - SI-880D

42. IF Spray Additive Tank level is NOT greater than 0%, THEN verify Spray Additive Tank isolated as follows:
    - SI-845A, SAT DISCH, CLOSED
    - SI-845B, SAT DISCH, CLOSED
    - SI-845C, SAT THROTTLE VALVE, CLOSED

44. IF ANY condition below occurs, THEN Go To EPP-24, Isolation Of Leakage In The RHR Pump Pit:
    - APP-001-D4, RHR PIT A HI-HI LEVEL - ILLUMINATED
      OR
    - APP-001-D5, RHR PIT B HI-HI LEVEL - ILLUMINATED
      OR
    - EITHER RTGB RHR Pit indication - GREATER THAN 24 INCHES

47. IF indication of RHR Pump cavitation becomes present, THEN Go To Step 57.

48. WHEN RHR sample results are available, THEN perform Step 48.c.

49. WHEN CV Pressure Is Less Than 4 PSIG, THEN perform Step 50.

62. WHEN RHR Pump cavitation has been eliminated, THEN discontinue intermittent operation of the SI AND RHR Pumps.

74: WHEN Supplement O has been completed, THEN check pumps for cavitation.

ATTACHMENT 4B

Continuous Action Steps

(Page 2 of 2)

Attachment 3

Step 3: WHEN NaOH has been received, THEN continue with Attachment 3.

Step 14: IF CV pressure drops below 0 psig before required NaOH has been added, THEN stop CV Spray AND contact staff to determine plan.

Facility: HB ROBINSON

Task No.: 01000106805

Task Title: PZR Pressure Control Malfunction

JPM No.: 2011-2 NRC JPM C

K/A Reference: 010 A2.02 3.9 / 3.9
027 AA1.01 4.0 / 3.9

Examinee:

NRC Examiner:

Facility Evaluator:

Date:

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom ______ Simulator __X__ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:

- The plant is operating at 50% RTP.
- No equipment is out of service.
- You are the Reactor Operator.

Task Standard: All critical tasks evaluated as SAT.

Required Materials: NONE

General References: AOP-019, Malfunction of RCS Pressure Control, Revision 16.

Handouts: NONE

Initiating Cue: Respond to plant conditions.

Time Critical Task: NO

Validation Time: 8 minutes

SIMULATOR SETUP

1. Reset to IC-808.
2. SCN: 008_NRC_JPM_C
3. Place simulator in run when directed by the Chief Examiner.
4. Execute the malfunction when directed by the Chief Examiner.

(Denote Critical Steps with a check mark)

START TIME: ____________

NOTE

Steps 1 and 2 are immediate action steps.

Performance Step: 1 Determine if PZR PORVs should be closed (Step 1)

a. Check PZR pressure – Less than 2335 PSIG

b. Verify Both PZR PORVs - Closed

Standard: Candidate determines that PZR pressure is less than 2335 psig by observing PR-444 Pen 1 and/or PI-444, 445, 455, 456 and/or 457.

Candidate determines that both PZR PORVs are closed by observing the GREEN closed indication illuminated on PCV-455C and 456.

Examiner's Note:

Comment:

Performance Step: 2 Control the normal PZR spray valves and PZR heaters to restore RCS pressure to the desired control band (Step 2)

Standard: Candidate determines that the PZR spray valves are closed by observing the GREEN closed indication on PCV-455A and 455B. Candidate determines the PZR heater status by observing all of the heaters energized on PZR Control Group and PZR Backup Groups A and B RED on indication illuminated.

Examiner's Note:

Comment:

Performance Step: 3 Make a PA announcement for procedure entry (Step 3)

Standard: Candidate makes a PA announcement by using one of the PA handsets and announcing that AOP-019 has been entered.

Examiner's Note:

Comment:

Performance Step: 4 Check PZR Pressure – Under operator control (Step 4)

Standard: Candidate determines that PZR pressure is NOT under his control and proceeds to the RNO step.

RNO step states IF PZR pressure approaches a reactor trip setpoint, THEN trip the reactor and Go To PATH-1 OR EOP-E-0, Reactor Trip or Safety Injection.

- Low PZR Pressure – 1844 psig
- High PZR Pressure – 2376 psig
- OT Delta T – Variable (TR-412)

Examiner's Note:

Comment:

Performance Step: 5 Check Pressurizer Pressure Transmitter PT-444 OR PT-445 – Failed (Step 5)

Standard: Candidate determines that PT-444 and PT-445 are indicating proper PZR pressure and proceeds to the RNO step and proceeds to Step 7.

Examiner's Note:

Comment:

Performance Step: 6 Check PC-444J, PZR PRESS – Controlling properly in AUTO (Step 7)

Standard: Candidate determines that PC-444J is operating properly in AUTO due to current PZR pressure conditions. PC-444J is indicating at the lower end of its range, attempting to raise PZR pressure back to its setpoint.

Examiner's Note:

Comment:

Performance Step: 7 Observe the NOTE prior to Step 11 and Go To Step 11 (Step 8)

.

Standard: Candidate proceeds to the NOTE prior to Step 11.

Examiner's Note:

Comment:

NOTE

The response in the following step needs to be based upon plant conditions at entry into AOP-019 to ensure the correct procedure flowpath is taken.

Performance Step: 8 Check RCS pressure – Less than required for current plant conditions (Step 11)

Standard: Candidate determines that PZR pressure is less than the nominal pressure of 2235 psig by observing PR-444 Pen 1 and/or PI-444, 445, 455, 456 and/or 457.

Examiner's Note:

Comment:

Performance Step: 9 Check PZR pressure – Less than 2205 psig (Step 12)

Examiner's Note: Candidate determines that PZR pressure is less than 2205 psig by observing PR-444 Pen 1 and/or PI-444, 445, 455, 456 and/or 457.

Examiner's Note:

Comment:

Performance Step: 10 Restore pressure to greater than 2205 psig within 2 hours OR be in Mode 2 within 6 hours (Step 13)

Standard: Candidate reads and understands the LCO conditions for the present PZR pressure.

Examiner's Note:

Comment:

Performance Step: 11 Check both PZR Spray Valves – Closed (Step 14)

- PCV-455A
- PCV-455B

Standard: Candidate determines that both PZR Spray valves are closed by observing the GREEN closed indication on PCV-455A and B.

Examiner's Note:

Comment:

Performance Step: 12 Observe the CAUTION prior to Step 20 and Go To Step 20 (Step 15)

Standard: Candidate proceeds to the CAUTION prior to Step 20.

Examiner's Note:

Comment:

CAUTION

With HCV-121, Charging Flow valve closed, throttling seal injection flow will cause the charging pump relief valves to lift.

Performance Step: 13 Perform the following: (Step 20)

a. Check CVC-311, AUX PZR SPRAY valve - Closed

Standard: Candidate determines that CVC-311 is open by observing the RED open indication illuminated on the valve and proceeds to the RNO step.

Examiner's Note:

Comment:

Performance Step: 14 Verify CVC-311 control switch is selected to CLOSE (Step 20.a.RNO)

Standard: Candidate determines that CVC-311 control switch is selected to CLOSE by observing the control switch for valve CVC-311 on the RTGB.

Examiner's Note:

Comment:

√ **Performance Step: 15** IF CVC-311 will NOT close, THEN perform the following (Step 20.a.2.a RNO)

a. Close CVC-460A and CVC-460B, LDTN LINE STOP.

Standard: Candidate closes CVC-460A and B by placing the control switch for the valves in the closed position and observing the GREEN closed indication is illuminated.

Examiner's Note: CVC-460A and B are controlled by a single control switch.

Comment:

√ **Performance Step: 16** IF CVC-311 will NOT close, THEN perform the following (Step 20.a.2.b RNO)

b. Verify only one charging pump is running.

Standard: Candidate stops one of the two running charging pumps by placing the control switch on the RTGB to STOP and observing the GREEN off indication is illuminated.

Examiner's Note: Candidate may place the charging pump speed controller in manual and lower the pump speed to minimum prior to stopping the pump.

Comment:

Performance Step: 16 IF CVC-311 will NOT close, THEN perform the following (Step 20.a.2.c RNO)

c. Place running charging pump controller in MAN and adjust to minimum speed.

Standard: Candidate verifies that the charging pump speed controller is in manual by depressing the MAN pushbutton and depresses the DOWN pushbutton until the speed controller indication is at 0%.

Examiner's Note:

Comment:

√ **Performance Step: 17** IF CVC-311 will NOT close, THEN perform the following (Step 20.a.2.d RNO)

d. Close HCV-121, CHARGING FLOW valve by slowly adjusting controller HIC-121 to 100% demand while maintaining Charging pump discharge pressure less than 2500 PSIG.

Standard: Candidate closes HCV-121 by rotating the pot in the clockwise direction until the pot will no longer turn and the position indication is at 100%.

Examiner's Note: HCV-121 pot is reverse acting – 100% indicates that the valve is closed.

Comment:

END OF TASK

Terminating Cue: **Once these actions are completed, PZR pressure is rising and evaluation of this JPM is complete.**

STOP TIME: ____________ ____________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM C

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ____________________ Date: ____________

INITIAL CONDITIONS: The plant is operating at 50% RTP.
No equipment is out of service.
You are the Reactor Operator.

INITIATING CUE: Respond to plant conditions.

JPM CUE SHEET

INITIAL CONDITIONS:

The plant is operating at 50% RTP.

No equipment is out of service.

You are the Reactor Operator.

INITIATING CUE:

Respond to plant conditions.

CONTINUOUS USE

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL
VOLUME 3
PART 5
ABNORMAL OPERATING PROCEDURE

AOP-019

MALFUNCTION OF RCS PRESSURE CONTROL

REVISION 16

AOP-019 Revision 16
Summary of Changes (PRR 464487)

Various Steps	Changed Path-1 to Path-1 or EOP-E-0 in preparation for EOP upgrade. (PRR 464487)

Purpose and Entry Conditions

(Page 1 of 1)

1. PURPOSE

   This procedure provides instructions in the event RCS pressure is higher OR lower than required for current plant conditions.

   This procedure is applicable in Modes 1, 2, and 3.

2. ENTRY CONDITIONS

   This procedure may be entered when RCS pressure deviates from the desired control band due to a fault in pressure control components. (AOP-025 covers Instrument Failure)

- END -

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
	NOTE Steps 1 and 2 are Immediate Action steps.	
* 1.	Determine If PZR PORVs Should Be Closed:	
	a. Check PZR pressure - LESS THAN 2335 PSIG	a. Verify OPEN at least one PZR PORV and associated PORV BLOCK Valve: • PCV-455C <u>AND</u> RC-536 <u>OR</u> • PCV-456 <u>AND</u> RC-535 <u>WHEN</u> RCS pressure is less than 2335 psig, <u>THEN</u> perform Step 1.b. Go To Step 2.
	b. Verify Both PZR PORVs - CLOSED	b. <u>IF</u> any PZR PORV can <u>NOT</u> be closed, <u>THEN</u> close its PORV BLOCK Valve.
2.	Control The Normal PZR Spray Valves <u>AND</u> PZR Heaters To Restore RCS Pressure To The Desired Control Band	
3.	Make PA Announcement For Procedure Entry	
* 4.	Check PZR Pressure - UNDER OPERATOR CONTROL	<u>IF</u> PZR Pressure approaches a Reactor Trip Setpoint, <u>THEN</u> trip the Reactor and Go To PATH-1 <u>OR</u> EOP-E-0, Reactor Trip or Safety Injection. • Low PZR Pressure - 1844 psig • High PZR Pressure - 2376 psig • OTΔT - Variable (TR-412)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
* 5.	Check Pressurizer Pressure Transmitter PT-444 OR PT-445 - FAILED.	IF PT-444 OR PT-445 FAIL, THEN Go to AOP-025, RTGB Instrument Failure Go To Step 7
6.	Go To AOP-025, RTGB Instrument Failure	
7.	Check PC-444J, PZR PRESS - OPERATING PROPERLY IN AUTO	Perform the following: a. Place PC-444J, PZR PRESS, in MAN. b. IF PC-444J is operating properly in manual, THEN Go To Step 9. c. IF PC-444J is NOT operating properly in manual, THEN Go To Step 10.
8.	Observe the NOTE prior to Step 11 and Go To Step 11	
9.	Operate PC-444J As Follows:	
	a. Check PZR SPRAY VALVE Controllers - IN AUTO	a. Restore the affected controllers to AUTO.
	b. Check PZR Heaters - IN NORMAL CONFIGURATION	b. Place the heaters in the desired configuration.
	c. Manually adjust PC-444J to maintain PZR pressure.	
	d. Check PZR pressure - UNDER CONTROL	d. Observe the NOTE prior to Step 11 and Go To Step 11
	e. Go To Step 29	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
10.	Control PZR Pressure As Follows:	
	a. Manually control the PZR SPRAY VALVES to maintain PZR pressure: • PCV-455A • PCV-455B	
	b. Manually control PZR Heaters to maintain PZR pressure: • PZR HTR BACK-UP GROUP A • PZR HTR BACK-UP GROUP B	
	c. Check PZR pressure - UNDER CONTROL	c. Observe the <u>NOTE</u> prior to Step 11 and Go To Step 11
	d. Go To Step 29	

<u>NOTE</u>

The response in the following step needs to be based upon plant conditions at entry into AOP-019 to ensure the correct procedure flowpath is taken.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
11.	Check RCS Pressure - LESS THAN REQUIRED FOR CURRENT PLANT CONDITIONS	Go To Step 25.
*12.	Check PZR Pressure - LESS THAN 2205 PSIG	Perform the following: • <u>IF</u> pressure lowers to less than 2205 psig, <u>THEN</u> restore pressure within 2 hours <u>OR</u> be in Mode 2 within 6 hours. • Refer to Technical Specification 3.4.1. • Go To Step 14.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
13.	Restore Pressure To Greater Than 2205 PSIG Within 2 HOURS <u>OR</u> Be In Mode 2 Within 6 HOURS	
14.	Check Both PZR SPRAY VALVES - CLOSED • PCV-455A • PCV-455B	Perform the following: a. Place the affected PZR SPRAY VALVE Controller in MAN <u>AND</u> adjust the output to zero. • PCV-455A • PCV-455B b. <u>IF</u> the affected valve will <u>NOT</u> close, <u>THEN</u> Go To Step 16. c. <u>IF</u> the affected valve has closed, <u>THEN</u> observe the <u>CAUTION</u> prior to Step 20 and Go To Step 20.
15.	Observe The <u>CAUTION</u> Prior To Step 20 and Go To Step 20	
*16.	Perform the following: a. Dispatch an Operator to Perform Attachment 1, PZR SPRAY VALVE ISOLATION b. Check PZR Pressure -APPROACHING 1844 PSIG	b. <u>IF</u> PZR Pressure approaches 1844 psig, <u>THEN</u> Go To Step 17. <u>WHEN</u> Attachment 1 has been completed, <u>THEN</u> Go To Step 29.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
17.	Perform the following:	
	a. Check Plant Conditions - IN MODE 1 OR 2	a. Go To Step 18.
	b. Trip the Reactor	
	c. Stop the RCP supplying the affected Spray Valve • RCP B - PCV-455A • RCP C - PCV-455B	
	d. Go To PATH-1 OR EOP-E-0, Reactor Trip or Safety Injection	
18.	Stop The RCP Supplying The Affected Spray Valve • RCP B - PCV-455A • RCP C - PCV-455B	
19.	Perform The Following:	
	a. Check RCP C - RUNNING	a. Maintain PZR level between 30% and 40% to provide adequate PZR spray.
	b. Go To Step 29	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

****

CAUTION

With HCV-121, CHARGING FLOW Valve closed, throttling Seal Injection Flow will cause the Charging Pump Relief Valves to lift.

****

20. Perform the following:

    a. Check CVC-311, AUX PZR SPRAY Valve - CLOSED

    RESPONSE NOT OBTAINED:

    a. Verify CVC-311 Control Switch is SELECTED TO CLOSE.

    1) IF CVC-311 is CLOSED, THEN Go to Step 21.

    2) IF CVC-311 will NOT Close, THEN perform the following:

        a) Close CVC-460A AND CVC-460B, LTDN LINE STOP.

        b) Verify only one Charging Pump is RUNNING.

        c) Place running Charging Pump Controller in MAN and adjust to minimum speed.

        d) Close HCV-121, CHARGING FLOW Valve by slowly adjusting controller HIC-121 to 100% demand while maintaining Charging Pump Discharge pressure less than 2500 PSIG.

        e) Perform Attachment 2, Placing Excess Letdown in Service.

        f) Go To Step 29

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
*21.	Check APP-003-F8, PZR LO LVL HTR OFF & LTDN SECURE - EXTINGUISHED	<u>WHEN</u> APP-003-F8 is extinguished, <u>THEN</u> reset PZR Heaters as follows: • Place the control switch for PZR HTR CONTROL GROUP to OFF <u>AND</u> return to the ON position. • Place the control switch for PZR HTR BACK-UP GROUP A to OFF <u>AND</u> return to the AUTO position. • Place the control switch for PZR HTR BACK-UP GROUP B to OFF <u>AND</u> return to the AUTO position.
22.	Determine Heater Capacity As Follows:	
	a. Contact Maintenance and Engineering to check PZR Heater capacity	
	b. Check PZR Heater capacity - REDUCED	b. Go To Step 23.
	c. Dispatch an operator to Containment to throttle the Continuous Spray Valves • RC-524, LOOP "C" CONTINUOUS SPRAY (PCV-455B BYPASS) • RC-525, LOOP "B" CONTINUOUS SPRAY (PCV-455A BYPASS)	
	d. Refer to ITS LCO 3.4.9	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
23.	Check PZR Pressure - STABLE OR TRENDING TO REQUIRED VALUE	Perform the following: a. Evaluate primary plant parameters for indications of RCS leakage. b. IF indication of RCS leakage is present, THEN Go To AOP-016, Excessive Primary Plant Leakage. c. IF leakage is NOT present, THEN Go To Step 5.
24.	Go To Step 29	
25.	Attempt To Stop Pressure Rise With Heater Control As Follows:	
	a. Verify ALL PZR Heaters in the OFF position	
	b. Check PZR pressure - STABLE OR LOWERING	b. Go To Step 26.
	c. Maintain PZR pressure using manual heater control	
	d. Go To Step 29	
26.	Check ΔT between TI-454, PRZR VAPOR TEMP, and TI-123, REGEN HX OUTLET TEMP - LESS THAN 320°F	Perform the following: a. Reduce pressure using one PZR PORV • PCV-455C • PCV-456 b. WHEN PZR pressure is reduced to the desired value, THEN close the open PZR PORV. c. Go To Step 28.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

Supplement K is available for Auxiliary Spray Enhancement if required.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
27.	Reduce Pressure Using Auxiliary Spray As Follows:	
	a. Open CVC-311, AUX PZR SPRAY Valve.	
	b. Verify CLOSED the following valves: • CVC-310A, LOOP 1 HOT LEG CHG • CVC-310B, LOOP 2 COLD LEG CHG	
	c. <u>WHEN</u> PZR pressure is reduced to the desired value, <u>THEN</u> stop the pressure reduction as follows:	
	1) Open CVC-310B	1) Open CVC-310A.
	2) Close CVC-311	
	d. Maintain PZR pressure using manual heater control	
28.	Check PZR Pressure - STABLE <u>OR</u> TRENDING TO REQUIRED VALUE	Go To Step 25.
29.	Implement The EALs	
30.	Contact I&C To Make Repairs To The PZR Pressure Control System	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
31.	Refer To ITS For Applicable LCOs • LCO 3.4.11, PZR PORV • TRM 3.4, PZR Spray ΔT • LCO 3.4.4 <u>AND</u> 3.4.5, RCS Loops • LCO 3.4.1, RCS Pressure • LCO 3.4.9, PZR Level	
32.	Return To Procedure And Step In Effect	

\- END -

CONTINUOUS USE

ATTACHMENT 1

PZR SPRAY VALVE ISOLATION

(Page 1 of 2)

****

CAUTION

The RCP Bays at power are High Radiation Areas.

****

NOTE

- Entry to high temperature environments is controlled by AP-020, Heat Stress Control Procedure.
- All actions of this attachment are performed locally in the Containment.

1. IF PCV-455A is the affected SPRAY VALVE, THEN Go To Step 2.

   IF PCV-455B is the affected SPRAY VALVE, THEN Go To Step 3.

NOTE

- A flashlight AND adjustable wrench will be required to perform the step below.
- All valves listed below are located in RCP Bay B at the top of the wall separating the Pump Bay from the PZR Cubicle.

2. Perform the following to isolate PCV-455A:

   a. Close RC-525, LOOP "B" CONTINUOUS SPRAY (PCV-455A BYPASS).

   b. Close IA-3800, PCV-455A BOOSTER ISOLATION

   c. Close IA-3627, IA TO PCV-455A I/P ISOLATION

   d. Disconnect the Swagelock Fitting at the PCV-455A Booster for the tubing connection to PCV-455A diaphragm AND vent the air from the top of the PCV-455A diaphragm.

CONTINUOUS USE

ATTACHMENT 1

PZR SPRAY VALVE ISOLATION

(Page 2 of 2)

NOTE

- A flashlight AND adjustable wrench will be required to perform the step below.
- All valves listed below are located in PZR Cubicle on the side of the PZR opposite the wall separating the Pump Bay from the PZR Cubicle.

3. Perform the following to isolate PCV-455B:

   a. Close RC-524, LOOP "C" CONTINUOUS SPRAY (PCV-455B BYPASS).

   b. Close IA-3799, PCV-455B BOOSTER ISOLATION

   c. Close IA-3798, PCV-455B I/P ISOLATION

   d. Disconect the Swagelock Fitting at the PCV-455B Booster for the tubing connection to PCV-455B diaphragm AND vent the air from the top of the PCV-455B diaphragm.

4. Notify the Control Room that Attachment 1 has been completed.

- END -

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

CONTINUOUS USE

ATTACHMENT 2

PLACING EXCESS LETDOWN IN SERVICE

(Page 1 of 2)

1. Verify CC-739, CCW FROM EXCESS LTDN HX - OPEN

2. Verify CVC-389, EXCESS LTDN DIV, - IN THE RCDT POSITION

3. Open CVC-387, EXCESS LTDN STOP

****

CAUTION

IF Excess Letdown Heat Exchanger outlet temperature exceeds 195°F, THEN damage could result.

****

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
4.	Slowly open HIC-137, EXCESS LTDN FLOW	
5.	Check Excess Letdown Heat Exchanger Outlet Temperature - GREATER THAN 195°F	IF temperature exceeds 195°F, THEN perform Step 6. Observe the NOTE prior to Step 7 and Go To Step 7.
6.	Reduce Flow From Excess Letdown Using HIC-137 To Maintain Temperature Less Than 195°F.	

NOTE

PZR level will rise if total Charging flow exceeds total Letdown flow AND RCP Seal Leakoff flow.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
* 7.	Check PZR Level - RISING	IF PZR Level begins to rise, THEN perform Steps 8 AND 9. Go To Step 10.
8.	Verify The Running Charging Pump - AT MINIMUM SPEED	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

CONTINUOUS USE

ATTACHMENT 2

PLACING EXCESS LETDOWN IN SERVICE

(Page 2 of 2)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
9.	Contact Chemistry To Purge The PZR Liquid Sample Line With Full Flow To The VCT Using CP-003, Systems Sampling Procedure	
*10.	Check PZR Level - GREATER THAN 63%	IF PZR level rises to 63%, THEN perform Step 11. Go To Step 12.
11.	Reduce PZR Level Below 63%	Perform the following: a. Be in Mode 3 with the Trip Breakers open within 6 hours. b. Be in Mode 4 within 12 hours.
*12.	Check PZR Level - APPROACHING 91%	IF PZR level approaches 91%, THEN Go To Step 13. Go To Step 14.
13.	Trip The Reactor And Go To PATH-1 OR EOP-E-0, Reactor Trip or Safety Injection	
14.	Inform The CRS That Excess Letdown Is In Service AND That Continuous Action Steps Are In Effect	

- END -

ATTACHMENT 3A

Continuous Action Steps

(Page 1 of 1)

MAIN BODY

1. WHEN RCS pressure is less than 2335 psig, THEN perform Step 1.b

4. IF PZR Pressure approaches a Reactor Trip Setpoint, THEN trip the Reactor and Go To PATH-1 OR EOP-E-0, Reactor Trip or Safety Injection.

5. IF PT-444 OR PT-445 FAIL, THEN Go to AOP-025, RTGB Instrument Failure.

12. IF pressure lowers to less than 2205 psig, THEN restore pressure within 2 hours OR be in Mode 2 within 6 hours.

16. IF PZR Pressure approaches 1844 psig, THEN Go To Step 17.

21. WHEN APP-003-F8 is extinguished, THEN reset PZR Heaters as follows.

ATTACHMENT 2

7. IF PZR Level begins to rise, THEN perform Steps 8 AND 9.

10. IF PZR Level rises to 63%, THEN perform Step 11.

12. IF PZR Level rises to 91%, THEN Go To Step 13.

ATTACHMENT 3B

Continuous Action Steps

(Page 1 of 1)

MAIN BODY

1. WHEN RCS pressure is less than 2335 psig, THEN perform Step 1.b

4. IF PZR Pressure approaches a Reactor Trip Setpoint, THEN trip the Reactor and Go To PATH-1 OR EOP-E-0, Reactor Trip or Safety Injection.

5. IF PT-444 OR PT-445 FAIL, THEN Go to AOP-025, RTGB Instrument Failure.

12. IF pressure lowers to less than 2205 psig, THEN restore pressure within 2 hours OR be in Mode 2 within 6 hours.

16. IF PZR Pressure approaches 1844 psig, THEN Go To Step 17.

21. WHEN APP-003-F8 is extinguished, THEN reset PZR Heaters as follows.

ATTACHMENT 2

7. IF PZR Level begins to rise, THEN perform Steps 8 AND 9.

10. IF PZR Level rises to 63%, THEN perform Step 11.

12. IF PZR Level rises to 91%, THEN Go To Step 13.

Facility:	HB ROBINSON	Task No.:	01045100401
Task Title:	Startup, Parallel, and Load the Main Generator	JPM No.:	2011-2 NRC JPM D
K/A Reference:	045 A4.02	2.7/2.6	

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom ______ Simulator __X__ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:

- Plant startup is in progress IAW GP-005, Power Operation.
- Turbine is operating at 1800 RPM.
- GP-005, Revision 102, is completed up to Step 8.4.2.

Task Standard: Pickup turbine load to at least 20 MWe to prevent the actuation of the Generator Lockout.

Required Materials: GP-005, Power Operation, Revision 102

General References: GP-005, Power Operation, Revision 102

Handouts: GP-005, Power Operation, Revision 102

Initiating Cue: The CRS has directed you to place the voltage regulator in service and place the unit on line IAW GP-005, Section 8.4, starting at Step # 8.4.2.

Time Critical Task: NO

Validation Time: 10 minutes

SIMULATOR SETUP

1. Reset to IC-809
2. Open SCN: 008_11_2_JPM_D
3. Place simulator in run when directed by the examiner.

(Denote Critical Steps with an asterisk*)

START TIME: _______

* **Performance Step: 1** CLOSE the Exciter Field Breaker (Step 8.4.2)

Standard: Candidate will close the Exciter Field Breaker by placing the control switch to the CLOSE position and observing the RED closed indication illuminated and the GREEN open indication extinguished.

Examiner's Note:

Comment:

NOTE: The Exciter Field Breaker may trip if Generator voltage exceeds 22.0 KV.

* **Performance Step: 2** PLACE the Voltage Regulator in service as follows: (Step 8.4.3.a)

a. Slowly ADJUST Generator voltage, as indicated on GEN Phase A – Phase B VOLTS OR ERFIS point ELV2800A, to 22.0 KV using the Manual Field Current Adjuster.

Standard: Candidate adjusts the generator voltage by placing the Field Current Adjuster control switch to the RAISE position and monitors the generator voltage, not to exceed 22.0 KV.

Examiner's Note: The Field Current Adjuster control switch has the word "MANUAL" directly under the applicable control switch.

Examiner's Cue:

Comment:

Performance Step: 3 PLACE the Voltage Regulator in service as follows: (Step 8.4.3.b)

b. IF the Regulator Balance Meter does NOT indicate 0, THEN NOTIFY engineering for further guidance prior to proceeding.

Standard: Candidate observes the Regulator Balance meter at 0 and N/As the step.

Examiner's Note:

Comment:

NOTE: Placing the VOLTAGE REGULATOR in the TEST position disables the voltage followers. The time spent with the Voltage Regulator in the TEST position should be minimized.

Performance Step: 4 PLACE the Voltage Regulator in service as follows: (Step 8.4.3.c)

c. PLACE VOLTAGE REGULATOR in AUTO.

Standard: Candidate places the Voltage Regulator control switch from the OFF to the AUTO position and observes the RED on indication illuminated and the GREEN off indication extinguished.

Examiner's Note:

Comment:

*** Performance Step: 5** PLACE the MAIN GENERATOR Synchroscope key switch in the GEN NORTH position (Step 8.4.4)

Standard: Candidate places the MAIN GENERATOR synchroscope key switch in the GEN NORTH position.

Examiner's Note: **This will energize the synchronizing circuit and cause the synchroscope to move.**

Comment:

NOTE: If Generator voltage is less than Switchyard voltage then adjusting the VOLTAGE ADJUSTER in the "raise" direction will cause % DIFF VOLTS to lower. If Generator voltage is greater than Switchyard voltage then adjusting the VOLTAGE ADJUSTER in the "raise" direction will cause % DIFF VOLTS to rise.

Performance Step: 6 ADJUST the % DIFF VOLTS to zero using the VOLTAGE ADJUSTER (Step 8.4.5)

Standard: Candidate determines whether the generator voltage is less than or greater than switchyard voltage by observing the % DIFF VOLTS meter and adjusts the difference in voltage to zero.

Examiner's Note:

Comment:

Performance Step: 7 ADJUST Turbine speed using the REF DOWN and/or REF UP AND GO pushbuttons so that the Synchroscope is rotating SLOWLY in the FAST DIRECTION (Step 8.4.6)

Standard: Candidate adjusts the speed of the turbine to ensure that the synchroscope is rotating slowly in the FAST direction.

Examiner's Note: This adjustment normally requires that the turbine speed be raised several RPM above 1800 RPM to have the synchroscope rotating properly.

Comment:

CAUTION

The assumptions in EC 63785 allow Reactor Power above 10% for short periods of time as long as it is maintained < 15%. Maintaining Reactor Power < 10% prior to Generator synchronizing ensures a margin to this limit.

The AT-POWER Reactor Trips are automatically unblocked as Reactor power or Turbine load is raised above 10% (Permissive circuit P-7). Conversely, these trips are automatically blocked as Reactor power and Turbine load are lowered below the P-7 setpoint. The AT-POWER Reactor Trips are:

- Pressurizer High Level
- Pressurizer Low Pressure
- Reactor Coolant Low Flow
- Reactor Coolant Pump Bus Undervoltage and Underfrequency
- Reactor Coolant Pumps tripped

Performance Step: 8 VERIFY Tavg is at the high end of the 547°F to 551°F band AND Reactor Power is 6% to 10% (Step 8.4.7)

Standard: Candidate determines that the reactor is at 8% power as indicated on Recorder NR-45 and/or the Power Range Nuclear Instrument drawers.

Examiner's Note:

Comment:

NOTE

The sequence of actions necessary to synchronize the unit to the grid is TIME CRITICAL. The RO, BOP, and Feedwater Operator shall verbally rehearse the actions of the following step and coordinate their actions at all times while synchronizing to the grid and loading the unit. It would be beneficial to have a dedicated stop watch operator to ensure contingency actions are not missed.

To reduce the magnitude of the transient when synchronizing to the grid, Tavg should be greater than 547°F and rising.

Experience has shown that a Control Rod withdrawal of 10 steps is optimum.

Performance Step: 9 SYNCHRONIZE the Main Generator to the 230 KV Grid as follows: (Step 8.4.8.a)

a. WITHDRAW Control Rods to raise Tavg

Standard: Candidate is instructed that the additional operator will ensure that the control rods are withdrawn as directed in the procedure.

Examiner's Cue: **The additional operator will perform the actions necessary to control reactor power and S/G levels as directed by the procedure.**

Comment:

*** Performance Step: 10**

SYNCHRONIZE the Main Generator to the 230 KV Grid as follows: (Step 8.4.8.b)

b. WHEN the synchroscope is rotating SLOWLY in the FAST DIRECTION AND reaches a point equivalent to 5 minutes before the 12 o'clock position, THEN CLOSE the NORTH OCB BKR 52/9. Time ______

Standard:

Candidate will ensure that the synchroscope is rotating slowly in the FAST direction and close the NORTH OCB 52/9 by placing the control switch to the CLOSE position and observing the RED closed indication illuminated and the GREEN open indication extinguished.

Examiner's Note:

The EH Panel indication will shift from Speed Control to Load Control when the OCB is closed.

The synchroscope will indicate 12 o'clock (midnight) when the OCB is closed.

Comment:

CAUTION

If GV#1 (GLU) and GV#3 (GLL) are not off their closed seats (Closed position lights EXTINGUISHED) within 1 minute of closing the NORTH OCB BKR 52/9 when paralleling to the Grid, a Generator Lockout will occur. Turbine Control may be placed in TURB MAN and GV UP and GV DOWN pushbuttons used as necessary IF OPER AUTO is not available or to pick up additional load.

IF it is necessary to re-open a Generator Output OCB, the THINK BUTTON must be held in the DEPRESSED position until the OCB indicates open.

* **Performance Step: 11** SYNCHRONIZE the Main Generator to the 230 KV Grid as follows: (Step 8.4.8.c)

c. IF GV#1 (GLU) OR GV#3 (GLL) remain CLOSED, THEN within 30 seconds, ADJUST Turbine load UP (NOT to exceed 70 MWe) until GV#1 (GLU) AND GV#3 (GLL) are off their closed seats (Closed position lights EXTINGUISHED.)

Standard:

Candidate will determine that GV#1 and GV#3 indicate closed by the GREEN closed lights illuminated for the valve positions. Candidate is expected to perform one of the following actions to pick up at least 20 MWe load and not exceed 70 MWe load:

1. Raise the setter by depressing the REF UP pushbutton and GO pushbutton to raise the turbine load with the turbine controls in IOPER AUTO.
2. Depress the TUR MAN and GV UP pushbutton to raise the turbine load.

Examiner's Note:

With the turbine in OPER AUTO, the candidate may choose to raise the loading rate to greater than 1%/MIN, NOT to exceed 5%/MIN.

With the turbine in TUR MAN, the candidate may depress the GV UP and FAST action pushbuttons simultaneously to raise load.

Comment:

END OF TASK

Terminating Cue: **Main Generator has been synchronized to the grid with the minimum load picked up.**

STOP TIME: ____________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM D

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

- Plant startup is in progress IAW GP-005, Power Operation.
- Turbine is operating at 1800 RPM.
- GP-005, Revision 102, is completed up to Step 8.4.2.

INITIATING CUE:

The CRS has directed you to place the voltage regulator in service and place the unit on line IAW GP-005, Section 8.4, starting at Step # 8.4.2.

INITIAL CONDITIONS:

- Plant startup is in progress IAW GP-005, Power Operation.
- Turbine is operating at 1800 RPM.
- GP-005, Revision 102, is completed up to Step 8.4.2.

INITIATING CUE:

The CRS has directed you to place the voltage regulator in service and place the unit on line IAW GP-005, Section 8.4, starting at Step # 8.4.2.

Progress Energy

	C **Continuous Use**

H. B. ROBINSON STEAM ELECTRIC PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 3

GP-005

POWER OPERATION

REVISION 102

CAUTION

OPS-NGGC-1306 defines planned changes in Reactor Power ≥10% Power as a Major Reactivity Manipulation (R1).

SUMMARY OF CHANGES
PRR 462937
GP-005, Revision 102

STEP	REVISION COMMENTS
2.3.29, 5.34, 8.2.6. 8.3.13.d(3)	Changed GP-006 to GP-006-1. GP-006 is being cancelled. (PRR 462936)

TABLE OF CONTENTS

1.0 PURPOSE

To provide the initial conditions, precautions, and instructions to permit a safe, normal Plant Start-up from MODE 2 to MODE 1 at 100% power. Included in this procedure are instructions for warming up the Secondary, rolling the Turbine, loading the Generator, and raising Turbine load.

R1 REACTIVITY EVOLUTION

2.0 REFERENCES

2.1. NRC, INPO and Other Related Industry Documents

1. Westinghouse Turbine/Generator Operating Instructions and Load Curves
2. Areva Technical Document 64-9047834-000, Non-B&W Power Operations Guidelines
3. SOER 94-01, Conservative Decision Making
4. SOER 90-003, Nuclear Instrument Miscalibration
5. SOER 90-2, Nuclear Fuel Defects (Recommendation 2C)
6. SOER 99-01, Loss Of Grid, Recommendation 2A, Fleet Item 3
7. SOER 07-1, Reactivity Management, Recommendation #1, Standards and Expectations
8. OE25981, Maximum Allowable Short Term Power Limit Exceeded Following Return to 100% Power Due to Personnel Error (Calvert Cliffs)
9. SOER 96-2, Design and Operating Considerations for Reactor Cores (Recommendation 1)
10. SOER 10-1, Large Power Transformer Reliability (Replaces SOER 02-3)
11. OE28665, Tube Leaks in Low Pressure Feed Water Heater (Arkansas Nuclear One)

2.2. Nuclear Generation Group (NGG) Procedures and Documents

1. OPS-NGGC-1306, Reactivity Management Program
2. ADM-NGGC-0006, Online EOOS Models for Risk Assessment
3. OPS-NGGC-1308, Plant Status Control
4. EGR-NGGC-1020, Conduct of Reactor Engineering and Nuclear Fuels Management
5. NFP-NGGC-0029, Reactivity Manipulation Plan Development

2.3. Robinson Plant Procedures and Documents

1. UFSAR Section 4.2.1.2.2, Clad Stress Limits
2. Improved Technical Specifications (ITS)
3. PLP-100, Technical Requirements Manual (TRM)
4. Station Curve Book
5. OP-001, Reactor Control and Protection System
6. OP-301, Chemical and Volume Control System (CVCS)
7. OP-401, Auxiliary Heating System
8. OP-405, Main and Reheat Steam System
9. OP-406, Steam Generator Blowdown/Wet Layup System
10. OP-407, Heater Drains and Vents
11. OP-408, Miscellaneous Drains System
12. OP-501, Condensate System
13. OP-502, Gland Seal Steam and Drain
14. OP-503, E.H. Fluid System
15. OP-504, Condenser Air Removal
16. OP-505, Hydrogen Seal Oil System
17. OP-506, Turbine Lube Oil
18. OP-507, Generator Hydrogen System
19. OP-509-1, Condensate Polishing System
20. OP-601, DC Supply System
21. OP-603, Electrical Distribution
22. OP-903, Service Water System
23. OP-904, Circulating Water System

2.3 Robinson Plant Procedures and Documents (continued)

24. OP-916, Secondary Chemical Addition
25. OP-917, Secondary Sampling System
26. OP-923, Containment Integrity
27. GP-002, Cold Shutdown to Hot Subcritical at No Load Tavg
28. GP-003, Normal Plant Startup from Hot Shutdown to Critical
29. GP-006-1, Normal Plant Shutdown From Power Operation to Hot Shutdown
30. OST-010, Power Range Calorimetric During Power Operation (ERFIS)
31. OST-202, Steam Driven Auxiliary Feedwater System Component Test
32. OST-206, Steam Driven Auxiliary Feedwater Pump Flow Test
33. OST-551-1, Turbine Valve Test
34. OST-551-2, Turbine Trip Functional Test (Quarterly During Power Operation)
35. OST-553, Turbine Mechanical Overspeed Trip Test
36. OST-554, Turbine Bearing Oil System and E-H Control System Hydraulic Components Test
37. OST-623, Fire Barrier Penetration Seal Inspection
38. OST-920, Operations Cold Shutdown Test Procedure
39. EST-067, Intermediate Range Detector Setpoint Determination
40. EST-052, Operational Alignment of Process Temperature Instrumentation
41. EST-105, Post-Refueling Power Escalation Procedure
42. RNPD/89-4365, Special Directive for Limitations for ON-LINE
43. RNPD/89-4329, Coordination of Voltage Schedules and MVAR Generation at Robinson Plant

2.3 Robinson Plant Procedures and Documents (continued)

44. FMP-009, Power Distribution Control

45. PLP-037, Conduct of Infrequently Performed Tests or Evolutions and Pre-Job Briefs

46. PM-166, Blowdown of Feedwater and Steam Flow Transmitters, S/G Level Transmitters, and S/G Feedwater Flow Bartons.

47. OMM-001-12, Minimum Equipment List and Shift Relief

48. OST-020, Shiftly Surveillances

49. OST-021, Daily Surveillances

50. OST-022, Weekly Surveillances

51. OST-023, Monthly Surveillances

52. RCP-131, Actions for Startups, Shutdowns, and Greater Than or Equal to 15 Percent Reactor Power Changes

53. OMM-048, Work Coordination and Risk Assessment

54. AOP-006, Turbine Eccentricity/Vibration

55. AOP-007, Turbine Trip Below P-8

56. APP-005, NIS & Reactor Control

57. APP-008, SW, CW & Turb. Gen. Aux.

58. FMP-007, Quadrant Power Tilt

59. OMM-001-9, Equipment Tagging

60. Control Wiring Diagrams (CWD) B-190628:

    a. Sheet 670, Quenching Valves FCV-1596 and FCV-1597

    b. Sheet 732, Bearing Oil Lift Pump

    c. Sheet 855, Turbine Annunciation

61. SORMC-NUC-030, Robinson Plant Voltage Support Coordination

2.4. Adverse Condition Reports (ACR's), Nuclear Condition Reports (NCR's) and Other Related Documents

1. ACR 93-284, Power Range Nuclear Instrumentation Indication Error
2. ACR 93-348, PLP-037 Not Performed for GP-005 Prior to Plant Startup
3. ACR 93-312, Main Electrical Generator Meggar Very Low and Unstable (due to moisture in Iso-Phase Bus Duct)
4. ACR 94-01276, Steam Line Drains Found Out of Position
5. ACR 94-00310, Turbine Governor Valve Leakage
6. CR 95-02020, TM Log Not Reviewed Prior to Exceeding 2% Power
7. Operability Determination 95-015 Rev. 2, PZR Spray Valve PCV-455A
8. CAPS Project CR 95-02365, Incorporation of OD 95-015 Recommendations
9. CR 96-00002, Control of Instructional Aids
10. NCR 329164, Cylinder Heating Steam Issues
11. NCR 329223, Unplanned Turbine Trip and AOP-007 Entry
12. NCR 364964, Governor Valve #2 (GRU) Failed to Open
13. OPEX 332815, OE28665, Tube Leaks in Low Pressure Feed Water Heater
14. NCR 364929, Plant Startup Delays Due to Main Steam Valve Seat Leakage
15. NCR 364940, R-11 and SRNI Spike While Closing OCB Disconnects
16. OPEX 388359, SOER 10-1, Large Power Transformer Reliability (Replaces OPEX 189399 for SOER 02-3)
17. NCR 433833, Turbine Would Not Increase Speed > 1020 RPM

2.5. Modifications (MOD's), Engineering Changes (EC's) and Other Related Documents

1. ESR 96-00201, Efficiency Improvement
2. ESR 98-00395, Cycle 20 Core Reload
3. ESR 99-00372, Use high content graphite packing in Condensate Pump
4. ESR 00-00208, FIS-1446 Replacement
5. EC 47069, Main Steam N-16 Monitors
6. EC 47139, HP Turbine Rotor Replacement
7. EC 47152, Ultrasonic Feedwater Flow Measurement
8. EC 47160, NSSS and BOP Analysis to Support Appendix K Uprate
9. EC 47162, Set-Points, Uncertainty Calc Changes For Appendix K Uprate
10. EC 47208, NR-45 Recorder Replacement
11. EC 53914, Turbine Generator TSI Upgrade
12. EC 67727, Installation of Replacement Feedwater Heaters 4A and 4B
13. EC 69831, LP Turbine Steam Path Replacement
    a. EC 74557, EC 69831 Child EC #2 performed during RFO-26
14. EC 63785, Change P-7 to P-8 Relative to Turbine Trip vs. Reactor Trip
15. EC 71678, Auxiliary Transformer Replacement

3.0 RESPONSIBILITIES

1. Operations is responsible for the overall performance and coordination of this procedure.

2. Reactor Engineering is responsible for the development and distribution of the Reactivity Management Plan as described in OPS-NGGC-1306, Reactivity Management Program, and EGR-NGGC-1020, Conduct of Reactor Engineering and Nuclear Fuels Management.

4.0 PREREQUISITES

1. GP-003 is complete as necessary with Reactor power stabilized at $5x10^{-9}$ to $5x10^{-8}$ amps; or the Reactor has remained critical following a Secondary side (Turbine) shutdown.

5.0 PRECAUTIONS AND LIMITATIONS

1. Planned/scheduled power changes will have a Risk Assessment performed IAW OMM-048, Work Coordination and Risk Assessment, and ADM-NGGC-0006, Online EOOS Models for Risk Assessment.

2. The Reactor trips on Low Primary Coolant Flow in one of three loops and Turbine Trip are automatically unblocked as nuclear power is raised above 40 percent (P-8).

3. Failure of two of four Power Ranges results in a false P-10 signal preventing operation of Source Range instruments.

4. The AT-POWER Reactor Trips are automatically unblocked as Reactor power or Turbine load is raised above 10% (permissive circuit P-7). Conversely, these trips are automatically blocked as Reactor power and Turbine load are lowered below the P-7 setpoint. The AT-POWER Reactor Trips are:

   - Pressurizer High Level
   - Pressurizer Low Pressure
   - Reactor Coolant Low Flow
   - Reactor Coolant Pump Bus Undervoltage and Underfrequency
   - Reactor Coolant Pumps tripped

5. Before transferring to Automatic Rod Control, T_{avg} should be adjusted to within 0.5°F of the reference temperature to avoid a transient following the transfer.

6. During MODE 1 and MODE 2, all Rod Position Indicators and Nuclear Power Range Channels should be periodically monitored for indications of control rod misalignment and abnormal power tilts.

7. LR-477, Wide Range S/G Levels, should be used for trending of Steam Generator levels only when in manual level control.

8. The Feedwater Regulating Valves FCV-478, FCV-488, FCV-498, and Rod Control should be placed in MANUAL when switching Turbine first stage pressure channels. The Feedwater Regulating Valves FCV-478, FCV-488, FCV-498, should be placed in MANUAL when switching steam flow channels, or feedwater flow channels.

5.0 PRECAUTIONS AND LIMITATIONS (continued)

9. During start-up and loading of the Turbine, S/G water level is very unstable and has a tendency to swell. S/G levels should be maintained from 40% to 50% on narrow range level indication for better control. The wide range and narrow range tend to disagree slightly when there is a transient level condition. Wide range level indication should be used to observe which direction the level is moving. If the narrow range level approaches the High or LO-LO Level trip point, Turbine loading should be stopped until S/G level recovers. Wide swings in Feedwater Regulating Valve positions, in the open or closed direction, should be avoided, as this can cause water level to shrink or swell out of control. Sustained Turbine operation at less than 5% of rated load should be avoided.

10. For Turbine startups and scheduled load changes, the heatup and loading rates specified in Curves 7.8, 7.9, and 7.10 should be followed.

11. Power Ramp Rate Limits are restricted after core fuel movement to 3.5%/hr from 50% to 100% power. During subsequent power escalations, this ramp limit may apply depending on the maximum power level achieved and length of operation at that power level. Specifically, this requirement can be removed for reactor power levels below a given power level P (50 % < P $\leq$ 100 %), provided that the plant has operated at or above power level P for at least 72 cumulative hours out of any seven day operating period following the shutdown. (ESR 98-00395, SOER 90-2, Rec. 2C and UFSAR 4.2.1.2.2)

12. Fuel is considered "preconditioned" at a specific power level when that power level (or higher) has been maintained for at least 72 hours. When the fuel is preconditioned, the maximum Ramp Rate Limit is 30% per hour.

    When operating with a fuel defect the following conservative ramp rates will be implemented: for power escalations from power levels below 90% power with conditioned fuel, the ramp rate will be restricted to 10% per hour below 90% power and 3.5% per hour above 90% power. Additional Ramp Rate Limits or other operating conditions, such as elevated letdown, may be implemented as a result of a fuel defect.

13. Following a significant (10 ppm or more) change in RCS Boron concentration, additional PZR heaters should be energized. This will permit opening of the PZR spray valves and allow the Boron concentration between the PZR and the RCS loops to equalize.

5.0 PRECAUTIONS AND LIMITATIONS (continued)

14. The RCS Design Basis Document states that the PZR Spray Valves are designed to prevent PZR pressure from reaching the lift setpoint of the PZR PORVs following a step reduction of 10% of full power under automatic Reactor control during normal plant operations. Normal loading and unloading is 5% of full power per minute. Operability Determination 95-015 Rev 2 identifies that when one PZR Spray Valve is out of service, step changes should be limited to 5% of full power to reduce the potential for challenging the PZR PORVs. (CAPS Project CR 95-02365)

15. Exhaust hood temperature should not be allowed to exceed 175°F with exhaust hood spray out of service. If the temperature cannot be reduced to less than 175°F, the unit should be shutdown and the trouble corrected. The maximum exhaust hood temperature permitted is 250°F for a maximum of 15 minutes. A manual Turbine trip is required if any Exhaust Hood indication shows a valid temperature of 250°F or greater for greater than 15 minutes. (EC 69831, EC 74557, APP-008)

16. The Turbine Oil Coolers should maintain oil temperature **leaving** the bearings within the limits of the Expected Bearing Oil Return and Metal Temperature section of OP-506.

17. During power ascension, Gland Seal Pressure should be maintained in the normal operating band (3 to 6 psig) as indicated on the Gland Seal Header Pressure (PI-4004, PI-1382 or ERFIS Pt GSP2095A). This may require throttling GS-36, MANUAL GLAND SEAL DUMP to maintain pressure.

18. The EH Turbine Control should be maintained in the IMP IN position when changing power and during turbine valve tests. However, should plant conditions dictate, power changes may be made in the IMP OUT position. The EH Turbine Control should be maintained in IMP OUT whenever stable plant conditions exist.

19. The OVERSPEED PROTECT CONTROL LIGHT on the Turbine EH Display Panel may be illuminated when operating at low power conditions (< 10%) and may result in intermittent alarms on APP-009-E2, GOV CAB MONITOR TROUBLE. This will clear after the unit is synchronized to the grid and power > 10%.

20. The SPEED CHAN light on the Turbine EH Display Panel may flash at turbine speeds less than 600 rpm and may result in intermittent alarms on APP-009-E2, GOV CAB MONITOR TROUBLE.

5.0 PRECAUTIONS AND LIMITATIONS (continued)

21. The Unit 2 generator should be operated IAW the SORMC-NUC-030, Robinson Plant Voltage Support Coordination, VAR loading should be coordinated with Unit 1.

22. The OPEN indication (green light) for OCBs 52/8 and 52/9 requires all three phases to be OPEN. The CLOSED indication (red light) could be illuminated with one or two phases closed, however if there is pole disagreement for 3 cycles a trip signal to the breaker is generated. (SER 8-97)

23. Steam shall not be used to raise the Main Turbine speed above 600 rpm until RCS T_{AVG} is $\geq$ 547°F.

24. During power ascension, all indications of reactor power level should be monitored and compared at 10% intervals. Indications such as core ΔT and Turbine First-Stage Pressure should be compared to NI indications and Continuous Calorimetric Program percent power. If all indications do not agree within 5% of each other, then Reactor Power should be stabilized, OST-010 performed, and plant management contacted for further instructions. (SOER 90-003, Recommendation 1a)

25. The NI channel which has the highest indication on NR-45 should be monitored to provide for conservative action by the operator. Approximately every 10% rise in power, the operator should verify the NR-45 indication is in agreement with the power range drawer within 3%. Work requests should be written to correct inaccurate indications. (SOER 90-003)

26. Management approval, in ALL CASE I activities, is defined as approval by the Management Designated Monitor (MDM), who shall be senior to the SM and designated by the Plant General Manager. It is not intended for the MDM to compromise the responsibilities of the SM, which include maintaining the plant in a safe operating condition at all times and the authority to shut down the plant as necessary to ensure safe operations.

5.0 PRECAUTIONS AND LIMITATIONS (continued)

27. ITS SR 3.4.16.2 requires that RCS dose equivalent I-131 specific activity be verified $\leq$ 0.25 μCi/gm within 2 to 6 hours after every thermal power change of $\geq$15% in any one hour period. E&C will perform these actions IAW procedure RCP-131.

    - Every time the power level of the Reactor is changed 15% or more in any one hour, E&C shall be notified of the power change, including the time started and the expected duration of the transient. Do not wait until after an hour of changing power before notifying E&C. Additionally, E&C shall be notified when the transient is completed.
    - A power level change shall be defined for sampling purposes as an absolute value of 15%/hr in one direction only, (i.e. 95% to 80% = 15%, or 95% to 85% to 90% = 10%). This includes controlled changes, runbacks, transients, and trips that result in changes greater than 15% in any one hour period.
    - Tracking of Notifications and Sample Results should be performed using Attachment 10.2, Power Change Tracking Log, or a similar method of Electronic Tracking such as Autolog (CR 23734). The intent is to ensure timely notification of power changes and operations verification that sampling has been performed and the results verified within the required sampling frequency of 2 to 6 hours.

28. The following applies to the Exciter air temperature:

    - Maximum allowable Exciter air discharge temperature is 80°C as indicated on the RTGB.
    - Maximum allowable Exciter air inlet temperature is 125°F(52°C) as indicated on ERFIS points TGT3310A and TGT3311A.
    - Exciter air discharge temperature should be maintained between 48°C and 60°C as indicated on the RTGB with the unit in service.
    - Even though there are no vendor recommended minimum temperature limits, temperatures below 48°C should be avoided with the unit in service to avoid condensation buildup.
    - Temperatures above 60°C should be avoided as this may reduce the life of the electrical components.
    - Exciter air temperatures exceeding any of these values with the unit in service should be investigated by Engineering.

5.0 PRECAUTIONS AND LIMITATIONS (continued)

29. Smoke may come out of the stuffing box when starting a Heater Drain Pump. This is a normal occurrence with the graphite packing that has been installed.

30. Main Steam Line N-16 Monitor R-24 is not compensated for power levels below 40% Reactor power. GPD indication will initially be low and rise as power is raised to 40%. Recorder trends below 40% power are only reliable when constant reactor power has been maintained during the trend.

31. The ultrasonic feedwater flow instrumentation may provide a calorimetric determination of power between 15% and 100% power.

32. When changing from IMP IN to IMP OUT or IMP OUT to IMP IN relatively large swings (10 MW) in thermal power may occur.

33. It may be difficult to maintain the Reactor critical due to rapid changes in Xenon following a large power change. If the Reactor can NOT be stabilized due to operating limitations of the reactivity controlling systems, the Reactor shall be shutdown. Time spent with the Reactor critical and the secondary (turbine) secured should be minimized. If at any time the Reactor cannot be maintained stable and critical, then the Reactor shall be shutdown IAW GP-006-1. (SOER 07-1, Recommendation #1)

34. When withdrawing control rods in MODES 1 and 2, RPI should be maintained within the ITS alignment limits. Rod motion should be stopped and adjustments made, as allowed, to maintain indication within the limits. ERFIS should be used to monitor RPI.

35. When above 98% power, reactivity should not be changed by more than one method at a time (control rods, turbine steam demand, or boron dilution), to prevent exceeding 100% power. (OPEX 266297)

5.0 PRECAUTIONS AND LIMITATIONS (continued)

36. As described in OPS-NGGC-1306 and NFP-NGGC-0029, Reactor Engineering will provide a Reactivity Management Plan for all planned power changes of 10% or greater. This plan is useful to the Control Room team so that they can anticipate the response of the Reactor to Control Rod insertions and withdrawals and RCS borations and dilutions.

    The Reactivity Management Plan should be considered a "Living Document" that the Reactor Engineers can and will update as actual core response is observed and recorded. The Reactivity Management Plan is guidance for the anticipated response of the Reactor Core given the known conditions at the time the plan is developed. The Reactivity Management Plan is not an approved procedure.

    The Control Room Operators must exercise prudent, conservative, judgment and decision making while changing and adjusting Reactor parameters and **NOT** rely solely on the Reactivity Management Plan for expected Reactor response.

37. EC 63785 makes the following assumptions concerning Reactor Power control and operations while preparing to latch the Turbine and synchronizing the Generator to the grid:

    a. Reactor Power should be maintained below 10% Power by highest indication while using just the Steam Dumps to control Reactor Power and Temperature.

    b. Reactor Power may be raised above 10% Power but not to exceed 15% Power while preparing to latch the Turbine and synchronize the Generator to the grid.

    c. Extended Steam Dump operation (greater than approximately six to twelve hours) to maintain Reactor Power >10% is outside the scope of EC 63785.

    d. Simulator validation of EC 63785 shows that the Steam Dumps Controls must stay in the Steam Pressure mode until Reactor Power is ≥20% power. This is necessary to ensure proper Steam Dump operation if a Turbine Trip were to occur at power levels below 20% power. The amount of pressure change required in Turbine 1st Stage Pressure may not be enough to give an arming signal when the Turbine is less than 20% loaded and Steam Dump Controls are in the T_{avg} Mode.

5.0 PRECAUTIONS AND LIMITATIONS (continued)

38. OP-405 for the Main Steam System contains the following information concerning the HP Turbine Cylinder Heating System (NCR 329164):

    a. PI-1380A, HP TURBINE STEAM TO PCV-1380 and PI-1381A, HP TURBINE STEAM TO PCV-1381 INDICATOR indicate the HP turbine outlet pressure. PI-1380B, HP TURBINE STEAM RETURN FROM PCV-1380 and PI-1381B, HP TURBINE STEAM RETURN FROM PCV-1381 INDICATOR indicate pressure in the Cylinder heating gland. Gland pressure must be slightly above that of the HP outlet. Therefore, PI-1380B should read higher than PI-1380A **AND** PI-1381B should read higher than PI-1381A. If water is present where the rotor exits the gland, it is an indication that cylinder heating is **NOT** adequate and that differential pressure should be raised.

    b. Cylinder Heating Steam pressure may **NOT** be stable with Turbine loads less than 100% therefore, adjustments should be made only after consulting with RES.

39. The shell sides of the Feedwater Heaters are vented to remove non-condensable gasses. This is done to improve heater efficiency and to reduce the potential for corrosion and corrosion related failures. The following precautions apply while venting the Feedwater Heaters (OPEX 329815, OE28665):

    a. Depending on the vent line configuration and length, it is possible for hot water to exit the vent prior to the venting of steam and non-condensable gasses.

    b. Venting of Feedwater Heaters is performed starting with the highest pressure heaters, 6A and 6B, and then working down to the lowest pressure heaters.

    c. Venting of individual Feedwater Heaters to atmosphere should be done only after the shell side pressures are above 5 psig. This will ensure non-condensable gasses are forced out.

    d. Feedwater Heaters 3A & B and 4A & B may have a partial vacuum at low loads. It may be necessary to wait until Unit Load is >30% power for the closure of the respective start-up vents to ensure these heaters have a positive shell pressure.

5.0 PRECAUTIONS AND LIMITATIONS (continued)

40. Normally 2 boilers are operated to maintain gland seal pressure. Depending on the wear condition of the Main Turbine Gland Seals and the Auxiliary Steam (AS) System loads, it may be necessary to run all three Aux. Boilers to maintain stable Gland Seal pressure while Aux. Steam is supplying Gland Seal Steam. Loss of Gland Seal pressure could lead to a loss of Main Condenser Vacuum. Loss of Main Condenser Vacuum would result in a loss of temperature control when using the Steam Dumps. This will complicate the Turbine start-up and cause unnecessary distractions while various plant systems are in manual.

41. APP-005-D6, Δ Flux Warning / Status, and APP-005-E4, Δ Flux Alarm, are driven by the ERFIS Computer System. IF ERFIS is Out of Service (OOS) then these alarms are also OOS. FMP-009, Power Distribution Control, provides the necessary guidance when these alarms are OOS.

42. APP-005-F3, PR Upper CH Hi Flux Dev / Auto Defeat, and APP-005-F4, PR Lower CH High Flux Dev / Auto Defeat, are driven by the signals from the Detector Current Comparator sections of the Miscellaneous Control and Indication Panel located above the Power Range N-44 drawers. If the Reactor flux profile is significantly above or below zero (Reactor midplane), it is possible for a section to show that all channels are below 50% when actual Reactor Power is >50% power. FMP-007, Quadrant Power Tilt, and ITS SR 3.2.4.1 give the necessary guidance for these conditions.

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

N/A

INIT

8.0 INSTRUCTIONS

8.1. Initial Conditions

NOTE:	This section has been screened IAW PLP-037 criteria and determined N/A to PLP-037.

1. This revision has been verified to be the latest revision available.

   Today
   Date

NOTE:	Steps in the remainder of this section are not sequence dependent and can be performed in any order.

2. **VERIFY** the Condensate Polishing System is in service IAW OP-509-1 to support current Plant conditions.

3. **VERIFY** AMSAC is in service IAW OP-001 section for Placing AMSAC in Service.

4. **VERIFY** the following lineups are completed:

   – OP-407: Heater Drains and Vents Checklist

   – OP-408: Miscellaneous Drains System Valve Checklist

   – OP-501: Condensate System Checklist

   – OP-503: E. H. Fluid System Valve Checklist

   – OP-504: Condenser Air Removal Valve Checklist

   – OP-505: Hydrogen Seal Oil System Valve Checklist

   – OP-506: Turbine Lube Oil System Checklist

   – OP-507: Generator Hydrogen System Checklist

   – OP-904: Circulating Water System Valve Checklist

   – OP-916: Secondary Chemical Addition Valve Checklist

   – OP-917: Secondary Sampling System Checklist

INIT

5. **VERIFY** all Steam Generator water levels are 40 – 50%.

6. **VERIFY** Station Battery "C" **AND** its DC Distribution System are in service IAW OP-601.

NOTE:	The ITS Bases states that the 31 day frequency on a STAGGERED TEST BASIS results in testing each pump once every 3 months.

7. **IF** OST-202 was **NOT** completed within the STAGGERED TEST BASIS of SR 3.7.4.2, **THEN PERFORM** OST-202.

   Completion date of latest OST-202: 11/28/14

8. **IF** OST-553 is scheduled, **THEN ENSURE** OST-551-2, Overspeed Trip Test is performed before OST-553. N/A

9. **IF** either of the following applies, **THEN SCHEDULE** OST-553:

   – This power escalation is following a refueling **AND** OST-553 was **NOT** performed during the shutdown. N/A

   – While shutdown, maintenance has been performed on the Mechanical Overspeed Trip Mechanism. N/A

10. **VERIFY** that the cooling fans for the following Electrical System components are aligned as follows:

    a. The following dampers are full open unless Plant conditions justify otherwise:

       – Isolated Phase Bus Heat Exchanger Fan "A" suction damper

       – Isolated Phase Bus Heat Exchanger Fan "B" suction damper

INIT

8.1.10 (Continued)

b. Control switches for these components should be placed in the AUTO position unless Plant conditions justify otherwise:

– Isolated Phase Bus Heat Exchanger Fan "A"	AUTO	Jm
– Isolated Phase Bus Heat Exchanger Fan "B"	AUTO	Jm
– Main Transformer "A" Heat Exchanger	43-1 AUTO	Jm
	43-2 AUTO	Jm
– Main Transformer "B" Heat Exchanger	43-1 AUTO	Jm
	43-2 AUTO	Jm
– Main Transformer "C" Heat Exchanger	43-1 AUTO	Jm
	43-2 AUTO	Jm

> **NOTE:** When the Auxiliary Transformer Control Switch 43M is in AUTO, one bank of cooling fans should be running.
>
> The 43C switch will always be in either the Lead Cooler #1 or #2 Position. The "As Found" position is documented for configuration control purposes.

c. The switches for the Auxiliary Transformer Cooling Fans should be placed in the following position unless Plant conditions justify otherwise:

– 43C Switch Position	COOLER #1 / COOLER #2 (Circle One)	Jm
– Aux Transformer Cooling Fans Control Switch 43M	AUTO	Jm

NOTE:	To fully close the disconnects the operator must continue to crank them closed after they make contact with the buss bar until they make a 90° turn that locks them into the closed position. The Plant Transmission Activity Coordinator (PTAC) is responsible for scheduling thermography of the 230KV Switchyard Disconnects once all disconnect operations are complete. (NCR 364940)

CAUTION

There will be a static discharge as the 230KV disconnects are approaching the closed position. This discharge will cause spiking of the Source Range Nuclear Instruments and various Radiation Monitoring Instruments. (NCR 364940)

11. **PERFORM** the following actions in the 230KV Switchyard:

    a. **INFORM** the Control Room to expect spiking on Source Range NIS and various RMS instruments while operating 230KV Disconnects. JM

    b. **VERIFY CLOSED** the following disconnects:

    – North OCB 52/9 South Disconnect (Unit side) JM

    – South OCB 52/8 North Disconnect (Unit side) JM

12. **INFORM** the Unit #2 PTAC to schedule thermography of the 230KV Switchyard Disconnects.
    (Print name of person contacted) Keith Beatty JM

13. **VERIFY** RCS temperature is being maintained between 547°F **AND** 551°F using one of the following (N/A the method **NOT** used): (ACR 94-01276)

    – Controlling RCS Temperature section of OP-405 N/A

    – Steam Dump operation in STEAM PRESS mode JM

14. **IF** Condenser Vacuum has **NOT** been established, **THEN PERFORM** OP-504 section for Placing the Condenser Air Removal System in Service. N/A

INIT

15. **IF** the Reactor has remained critical following a Secondary side (Turbine) shutdown, **THEN REVIEW** the Temporary Equipment Modification Log to verify that conditions do **NOT** exist that would jeopardize the operability of ITS or TRM required equipment. (CR 95-02020) N/A

16. **VERIFY** that the Plant Risk Profile has been updated IAW OMM-048 for the start-up activities.

17. **VERIFY** the following:

    a. OMM-001-12 MODE 1 Checklist is completed.

    b. MODE 1 required SRs identified in the following tests are completed:

    – OST-020

    – OST-021

    – OST-022

    – OST-023

18. **VERIFY** the following: (NFP-NGGC-0029 and SOER 96-2, Recommendation 4)

    a. Reactor Engineering has provided technical guidance IAW NFP-NGGC-0029.

    b. A Reactor Engineer is present in the Control Room to support the power rise.

19. **IF** the reactor will be maintained critical with the secondary (turbine) shutdown, **THEN CONTACT** Reactor Engineering to provide technical guidance. (SOER 07-1, Recommendation #1)

N/A
Engineering Contact (Print name) N/A

INIT

20. **IF NOT** previously energized, **THEN VERIFY** the Feedwater Ultrasonic Flow Measurement (FWUFM) system is ENERGIZED IAW OP-403 section for Startup Of FWUFM System. N/A

21. **CONTACT** Engineering to determine if a Turbine Valve/Trip Test is required at 1800 rpm.

Rick Dayton
Engineering Contact (Print name). Test Required Yes / No (Circle one)

22. **CONTACT** Engineering to determine if EST-105 is required.

Scott Jackson
Engineering Contact (Print name) Test Required Yes / No (Circle one)

INIT

NOTE:	All steps shall either be initialed when performed or, if the procedure intent is met by existing Plant conditions, the step shall be marked N/A and initialed by the SM. If the safe, efficient operation of the Plant so dictates, the steps may be performed simultaneously or out of sequence

8.2. Warming Up the Secondary

NOTE:	The remainder of this procedure has been determined to involve PLP-037 Case II activities.

1. A Management Designated Monitor (MDM) shall be assigned **AND** shall give permission to perform this evolution as documented by having performed the Pre-Job briefing.

   – ______________________
   Management Designated Monitor signature

BEGIN CRITICAL STEPS

NOTE:	Maximizing Letdown promotes additional mixing of RCS boron concentration **AND** allows for larger primary water addition rates.

2. **IF** additional letdown flow is desired, **THEN PERFORM** the following IAW OP-301 section for Charging and Letdown Operations with Normal Pressurizer Level:

   – **START** additional Charging Pumps as necessary. ______

   – **PLACE** additional letdown orifice in service. ______

3. **ENERGIZE** all available Pressurizer heaters to equalize boron concentration in the Pressurizer.

   – PZR HTR CONTROL GROUP ON ______

   – PZR HTR BACK-UP GROUP "A" ON ______

   – PZR HTR BACK-UP GROUP "B" ON ______

INIT

NOTE:	The Point Of Adding Heat (POAH) is that power level identified by **NO** control rod motion and: - If MTC is negative, then SUR will be LOWERING - If MTC is positive, then SUR will be RISING - Onset of RCS temperature rise, Onset of PZR pressure rise, Onset PZR level rise. - Reduction in AUTO Charging Pump speed demand. - Rising indication of AUTO Steam Dump demand on PC-464B, Steam Header Pressure, when Steam Dumps are being used for RCS Temperature Control. - Small rise in Steam Generator Steam flow.

CAUTION

Startup Rate shall not exceed 1.0 dpm. Maximum Reactor power is 5%.

The Point Of Adding Heat should be approached slowly and cautiously. When the MSIVs are closed, heat removal capability of the Main Steam Line drains is limited.

4. **ADJUST** Control Rod position as necessary to establish a positive SUR **AND RAISE** reactor power to the POAH.

5. **ADJUST** control rods as necessary to achieve the following while continuing with this procedure:

   - RCS T_{avg} between 547°F and 551°F
   - Maintain Reactor Power ≤ 5%.

NOTE:	It may be difficult to maintain the Reactor critical due to rapid changes in Xenon following a large power change. If the Reactor can NOT be stabilized due to operating limitations of the reactivity controlling systems, the Reactor shall be shutdown. Time spent with the Reactor critical and the secondary (turbine) secured should be minimized. If at any time the Reactor cannot be maintained stable and critical, then the Reactor shall be shutdown IAW GP-006-1. (SOER 07-1, Recommendation #1)

6. **IF** 0% Power Activities are required IAW EST-105, **THEN MAINTAIN** Reactor Power **AND COMMENCE** EST-105 as recommended by the Reactor Engineer. N/A

NOTE:	The following step may be performed when conditions permit while continuing with this procedure.

7. **WHEN** Reactor power is greater than 1%, **THEN NOTIFY** Reactor Engineering to COMMENCE logging data required by EST-067. Tox

NOTE:	ITS LCO 3.4.2 identifies RCS Minimum Temperature for Criticality as 530°F. RCS temperature shall be monitored to ensure compliance with this LCO.

8. **IF** a Cold Shutdown preceded this startup **AND** OST-206 has **NOT** been performed within the previous 30 days, **THEN:** (SR 3.7.4.5)
   a. **PERFORM** OST-206. N/A
   b. **UPDATE** OST-920. N/A
9. **IF** the Main Steam Isolation Valves are **NOT** open, **THEN PERFORM** the following:
   a. **VERIFY** RCS temperature is being controlled IAW OP-405 section for Controlling RCS Temperature **OR** Controlling RCS Temperature With the MSIVs Closed. N/A

NOTE:	The MSIV Bypass Valves have been determined to be Containment Isolation valves. Anytime these valves are not closed, the Main Steam attachment of OP-923 shall be performed and a dedicated operator stationed. Closing the breaker for the MSIV Bypass Valve(s) is controlled and documented by OMM-007, Equipment Inoperable Record.

CAUTION

Restoring power to a Main Steam Isolation Valve (MSIV) Bypass Valve will require entry into ITS LCO 3.6.3, Condition "C."

   b. **UNLOCK AND CLOSE** the breakers for the MSIV Bypass Valves on MCC-8:
      – MS-353A, MSIV V1-3A BYPASS (MCC-8 CMPT 1C) N/A
      – MS-353B, MSIV V1-3B BYPASS (MCC-8 CMPT 2C) N/A
      – MS-353C, MSIV V1-3C BYPASS (MCC-8 CMPT 3C) N/A

8.2.9 (Continued)

INIT

c. **RECORD** the time of ITS LCO 3.6.3 entry. TIME N/A N/A

d. Locally **UNLOCK** the handwheel for each MSIV Bypass Valve:

- MS-353A, MSIV V1-3A BYPASS N/A
- MS-353B, MSIV V1-3B BYPASS N/A
- MS-353C, MSIV V1-3C BYPASS N/A

e. **WHEN** the steam lines have been drained of condensate IAW Attachment 10.4, **THEN CYCLE** the MSIV Bypass Valves as necessary to warm up the Main Steam Lines **AND EQUALIZE** pressure across the MSIVs:

- MS-353A, MSIV VI-3A BYPASS N/A
- MS-353B, MSIV V1-3B BYPASS N/A
- MS-353C, MSIV V1-3C BYPASS N/A

NOTE:	When steam line pressure is within 50 psig of steam header pressure **AND** the MSIV switches are in the OPEN position, the MSIVs will open.

f. **PLACE** the MSIV switches in the OPEN position.

- V1-3A, MSIV N/A
- V1-3B, MSIV N/A
- V1-3C, MSIV N/A

g. **VERIFY** the three MSIVs OPEN when header **AND** line pressure are within 50 psig of each other:

- V1-3A, MSIV N/A
- V1-3B, MSIV N/A
- V1-3C, MSIV N/A

9 (Continued)

		INIT	VERI
h.	**WHEN** the MSIVs have opened, **THEN PERFORM** the following:		
(1)	**CLOSE** the MSIV Bypass Valves:		
	– MS-353A, MSIV V1-3A BYP	N/A	N/A
	– MS-353B, MSIV V1-3B BYP	N/A	N/A
	– MS-353C, MSIV V1-3C BYP	N/A	N/A
(2)	**LOCK OPEN** the breakers for the MSIV Bypass Valves:		
	– MS-353A on MCC-8 CMPT 1C	N/A	N/A
	– MS-353B on MCC-8 CMPT 2C	N/A	N/A
	– MS-353C on MCC-8 CMPT 3C	N/A	N/A
(3)	**LOCK** the handwheels for the MSIV Bypass Valves:		
	– MS-353A	N/A	N/A
	– MS-353B	N/A	N/A
	– MS-353C	N/A	N/A
(4)	**RECORD** the time of ITS LCO 3.6.3 exit. TIME N/A		N/A
(5)	**DRAIN** any moisture which may have collected in the MSIV Supply Filters using the filter drain valves.		
	– F-55A Filter	N/A	
	– F-55B Filter	N/A	
	– F-55C Filter	N/A	

INIT

10. **VERIFY** Steam Dump controls are aligned as follows:

NOTE: A PC-464B, MS STEAM HDR PRESS AUTO/MAN STATION, potentiometer setting of 7.17 equates to a steam pressure of 1005 psig and a saturation temperature of approximately 547°F.

CAUTION

Prior to rolling the Turbine, the Reactor should be maintained at less than 8% power and T_{avg} between 547°F and 551°F.

- PC-464B, MS STEAM HDR PRESS AUTO/MAN STATION, potentiometer is set to maintain 547°F to 551°F
- STEAM DUMP CONTROL switch to ON
- STEAM DUMP MODE switch to STEAM PRESS
- PC-464B, MS STEAM HDR PRESS AUTO/MAN STATION, is in AUTO
- ADJUST PC-464B as necessary to maintain 547°F to 551°F
- **WHEN** Steam Dump is controlling RCS temperature, **THEN VERIFY** the Controlling RCS Temperature section of OP-405 is completed.

INIT

11. **VERIFY** the Gland Seal Steam and Drain System is aligned IAW OP-502, using Main Steam as the supply, while continuing with this procedure.

NOTE: PI-1380A, HP TURBINE STEAM TO PCV-1380 and PI-1381A, HP TURBINE STEAM TO PCV-1381 INDICATOR indicate the HP turbine outlet pressure. PI-1380B, HP TURBINE STEAM RETURN FROM PCV-1380 and PI-1381B, HP TURBINE STEAM RETURN FROM PCV-1381 INDICATOR indicate pressure in the Cylinder heating gland. Gland pressure must be slightly above that of the HP outlet. Therefore, PI-1380B should read higher than PI-1380A **AND** PI-1381B should read higher than PI-1381A. If water is present where the rotor exits the gland, it is an indication that cylinder heating is **NOT** adequate and that differential pressure should be raised.

Cylinder Heating Steam pressure may **NOT** be stable with Turbine loads less than 100% therefore, adjustments should be made only after consulting with RES. (OP-405, NCR 329164.)

CAUTION

Transferring Gland Seal Steam supply from Auxiliary Steam to Main Steam may disrupt the balance between Cylinder Heating Steam and Gland Seal Steam. This may lead to elevated Turbine vibrations/eccentricity and/or hot water blowing out of the HP Turbine Glands. Step 8.2.12 is a continuous action step that shall be performed as Cylinder Heating Steam conditions indicate. (NCR 329164)

12. **VERIFY** Cylinder Heating Steam operation as follows:

    a. Using PIC-1380 and PIC-1381, **DETERMINE AND ADJUST** the pressure difference between the cylinder heating gland and high pressure turbine outlet to approximately 5 psid.

    b. **IF** required to maintain adequate sealing steam pressure, **THEN THROTTLE** MS-72, REAR CYLINDER HEATING REG BYPASS, as necessary. N/A

    c. **IF** required to maintain adequate sealing steam pressure, **THEN THROTTLE** MS-61, FRONT CYLINDER HEATING REG BYPASS, as necessary.

    d. **LOG** any adjustments in Autolog.

INIT

13. **PERFORM** Attachment 10.3, Venting the Feedwater Heaters, while continuing with this procedure.

14. **CYCLE** S/G Feedwater Regulating Valves, as follows:

    a. **VERIFY CLOSED** the Feedwater Header Section Valves:

    - V2-6A, FW HDR SECTION
    - V2-6B, FW HDR SECTION
    - V2-6C, FW HDR SECTION

    b. **STATION** an Operator to observe FRV cycling.

    c. **STROKE** the Feedwater Regulating Valves to full open, then to full closed.

    - FCV-478 — **OPEN** / **SHUT**
    - FCV-488 — **OPEN** / **SHUT**
    - FCV-498 — **OPEN** / **SHUT**

15. **DRAIN** the steam headers using Attachment 10.4, Draining the Steam Headers.

NOTE:	The accumulation of sediment and air in the sensing lines may cause the feed flow and steam flow transmitters to indicate improperly. PM-166 may need to be performed any time the BOP is cooled down and depressurized to ensure the transmitters are properly vented.

16. **IF** the accuracy of the feed flow **AND** steam flow indicators is suspect, **THEN BLOWDOWN** the Steam Flow **AND** Feed Flow transmitters IAW PM-166. N/A I&C

17. **WHEN** Steam is supplied to the secondary, **THEN VERIFY** the HDT Level Controller (LC-1530) is operating properly.

INIT

8.3. Rolling the Turbine

NOTE:	During power ascension, all indications of reactor power level should be monitored and compared at 10% intervals. Indications such as core ΔT and Turbine First-Stage Pressure should be compared to NI indications and Continuous Calorimetric Program percent power. If all indications do not agree within 5% of each other, then Reactor Power should be stabilized, OST-010 performed, and plant management contacted for further instructions. (SOER 90-003, Recommendation 1a)

1. **PLACE** the EH Fluid System in service IAW OP-503, E. H. Fluid System, the section entitled, "Placing the E.H. Fluid System in Service for Turbine Operation." Jln

NOTE:	The following step may be performed at any time during this procedure.

2. **IF NOT** performed during the previous month, **THEN PERFORM** OST-554, Turbine Bearing Oil System and E-H Control System Hydraulic Components Test (Monthly).

Date last performed 11/28/11 Jln

CAUTION

Prior to rolling the Turbine, the Reactor should be maintained at less than 8% power and T_{avg} between 547°F and 551°F.

The AT-POWER Reactor Trips are automatically unblocked as Reactor power or Turbine load is raised above 10% (permissive circuit P 7). Conversely, these trips are automatically blocked as Reactor power and Turbine load are lowered below the P-7 setpoint. The AT-POWER Reactor Trips are:

- Pressurizer High Level
- Pressurizer Low Pressure
- Reactor Coolant Low Flow
- Reactor Coolant Pump Bus Undervoltage and Underfrequency
- Reactor Coolant Pumps tripped

3. **STATION** a dedicated Feedwater Operator to control S/G levels between 40% and 50% until the Feedwater Regulating Valves are in AUTO. Jln

INIT VERI

4. **WHEN** the normal Feedwater Flow has been established **AND** the MDAFW Pumps are no longer being used to feed the S/Gs, **THEN PERFORM** the following to prevent back-leakage from the S/Gs.

   a. **OPEN** V2-16A, AFW HDR DISCH.

   b. **CLOSE** V2-16A, AFW HDR DISCH.

   c. **OPEN** V2-16B, AFW HDR DISCH.

   d. **CLOSE** V2-16B, AFW HDR DISCH.

   e. **OPEN** V2-16C, AFW HDR DISCH.

   f. **CLOSE** V2-16C, AFW HDR DISCH.

NOTE:	During turbine roll and trip testing activities several transitions between Mode 1 and Mode 2 may occur. Completion of a Mode Checklist for each transition is not required provided the conditions established for Mode 2 and Mode 1 entry have been maintained.

5. **WHEN** Reactor Power approaches 5%, **THEN PERFORM** the following:

   a. **MAKE** a plant announcement that MODE 1 has been entered.

   b. **CHANGE** ERFIS Mode Indication to display MODE 1.

6. **ADJUST** Control Rods to maintain Reactor Power between 5% and 8% while continuing with this procedure.

INIT

NOTE:	Steps 8.3.7 through 8.3.10 may be performed concurrently.

7. **VERIFY** cooling water is being supplied to the following components IAW OP-903, Placing Secondary Coolers in Service:

   a. Generator Hydrogen Coolers

   b. H_2 Seal Oil Coolers

   c. Turbine Lube Oil Coolers

   d. Exciter Air Coolers

NOTE: The Turbine Generator recorders and instruments are normally stopped and started via the clearance process for work on the Turbine and/or Generator.

The Generator Temperature Recorder may have been shutdown independent of the clearance process due to nuisance (false) alarms on APP-009-E3, GEN STATOR HI DELTA TEMP.

Re-start of the Generator Temperature Recorder may cause APP-009-E3 to go into alarm while the internal math processer re-starts and the various circuits perform their self-test.

8. **IF** the Generator Temperature Recorder is shutdown, **THEN** re-start the recorder as follows:

   a. **OPEN** the small, drop-down, keypad cover to expose the numeric keypad and control buttons.

   b. **PRESS** the START button to re-start the recorder.

   c. **CHECK** that the recorder performs its automatic re-start self-tests.

   d. **VERIFY** the recorder is displaying the desired indications.

   e. **IF** an OPS-NGGC-1308 Status Control Tag was placed on the recorder at the time of recorder shutdown, **THEN** remove the tag IAW OPS-NGGC-1308.

INIT

9. **VERIFY** the following recorders **AND** associated instruments monitoring the Turbine Generator are energized **AND** functional to the point necessary to support Turbine operation:

   a. Turbine Generator Supervisory Recorder

   b. Turbine MSR Temperature Recorder

   c. Turbine Supervisory Alarm Mimic Display

   d. Generator Temperature Recorder

NOTE:	APP-008-A8, Turbine Supervisory Instrument, will alarm when the Turbine Supervisory Instrumentation (TSI) is sensing an eccentricity >3 mils (0.003 inches). AOP-006, Turbine Eccentricity/Vibration, is applicable after the Turbine is latched. The Turbine is latched in Step 8.3.14.

10. **IF** Turbine rotor eccentricity is greater than or equal to 0.003 inches (3.0 mils) as indicated on the Turbine Generator Supervisory Recorder, ECCENTRICITY (HP ROTOR), **OR** in alarm on the RTGB Mimic Display, **THEN PERFORM** the following:

    a. **NOTIFY** Engineering to evaluate acceptance of rolling the turbine. N/A

    b. **REQUEST** Engineering provide recommended actions **PRIOR** to exceeding 600 RPM. N/A

    c. **IF** Engineering determines that actual rotor eccentricity is **NOT** acceptable to roll the turbine, **THEN PERFORM** the following:

       (1) **NOTIFY** the SM N/A

       (2) **RESOLVE** prior to continuing with this procedure. N/A

       (3) **DOCUMENT** the problems encountered via a Nuclear Condition Report (NCR).
       NCR # N/A N/A

INIT

NOTE: Turbine warmup times as required by Curve 7.8 of the Station Curve Book shall be observed. The minimum time to accelerate to synchronous speed should be greater than 10 minutes. Data from Curve 7.8 is provided in Attachment 10.6, Turbine Recommended Start-Up and Loading Times.

CAUTION

Turbine speed shall **NOT** be held in a resonant speed range as indicated on Curve 7.10 of the Station Curve Book.

There may be a small rise in Steam Flow as the Turbine is latched. This is acceptable since the Steam Dump system will automatically make adjustments to maintain Steam Pressure and, thus, T_{avg} and Reactor Power. The analysis in EC 63785 assumes that Reactor Power will stay less than 10% while making preparations to latch the Turbine and using Steam Dumps to control Reactor Power and Temperature with an allowance for operation up to 15% for short periods. Maximum allowed Reactor Power prior to latching the Turbine is 8% power.

11. Using Curve 7.8 or Attachment 10.6, **DETERMINE** the Time Required to Accelerate to Sync Speed based on TURBINE MSR TEMPERATURE RECORDER point #3, IMPULSE CHAMBER METAL indicated initial temperature.

    – Temperature: 210 °F Time: 10 minutes Ka

12. **DEPRESS** the VALVE POSITION LIMIT ▿ (lower) pushbutton until the VALVE POSITION LIMIT indicator registers 0% Valve Limit Position. Ka

INIT

NOTE:	Engineering personnel will monitor the turbine startup following replacement or repair of any Turbine Shaft components or bearings and will coordinate closely with the Control Room to ensure turbine limitations are not exceeded. Step 8.3.13 is a Continuous Action Step and is applicable from the start of turbine latch activities until the turbine is stable at 1800 RPM with acceptable vibration indications. Indications of excessive Turbine Governor Valve leakage include, but are not limited to, inability to raise RCS temperature with all Steam Dumps closed **OR** Turbine speed rising to a speed >100 RPM. (NCR 364929)

13. **IF** during the turbine startup it is required to stop the turbine to perform balancing activities, **OR IF** Turbine Governor Valve leakage is excessive, **THEN PERFORM** the following:

a. **VERIFY** Reactor Trip Block P-8 Permissive illuminated. N/A

b. **MANUALLY TRIP** the turbine by simultaneously depressing the THINK **AND** the TURBINE TRIP pushbuttons. N/A

c. **GO TO** AOP-007, Turbine Trip Below P-8, concurrently while continuing with Step 8.3.13.d if required. N/A

d. **IF** Turbine Stop Valve leakage requires closing the MSIVs, **THEN PERFORM** the following:

NOTE:	Refer to Precaution and Limitation 5.0.40 concerning Auxiliary Boiler capacity while continuing with this step.

(1) **VERIFY** sufficient Auxiliary Boilers are operating IAW OP-401 to provide Auxiliary Steam for Gland Seal. N/A

(2) **ALIGN** Gland Seal with Auxiliary Steam as the supply IAW OP-502 section for Placing the Gland Seal Steam and Drain System in Service Using Auxiliary Steam. N/A

8.3.13.d (Continued)

INIT

NOTE: It may be difficult to maintain the Reactor critical due to rapid changes in Xenon following a large power change. If the Reactor can **NOT** be stabilized due to operating limitations of the reactivity controlling systems, the Reactor shall be shutdown. Time spent with the Reactor critical and the secondary (turbine) secured should be minimized. If at any time the Reactor can **NOT** be maintained stable and critical, then the Reactor shall be shutdown IAW GP-006-1. (SOER 07-1, Recommendation #1)

Operation of Main Steam PORVs **OR** the above and below seat drains for temperature control will require the use of a dedicated operator and the implementation of OP-923.

(3) **MAINTAIN** Reactor Power at approximately 1% to 3%. N/A

(4) **TRANSFER** RCS temperature control to the Above and Below Seat Drains IAW OP-405 section for Controlling RCS Temperature. N/A

(5) **ADJUST** Steam Generator Blow Down flow as required to assist in RCS temperature control. N/A

(6) **IF** required, **THEN PERFORM** OP-405 section for Controlling RCS Temperature With the MSIVs Closed to assist in RCS temperature control. N/A

(7) **CLOSE** MSIV V1-3A, V1-3B, and V1-3C. N/A

(8) **WHEN** Turbine repairs are complete **AND** it is desired to open the MSIVs, **THEN PERFORM** an additional Section 8.2 **AND ATTACH** it to this procedure. N/A

(9) **N/A** the remainder of Section 8.3. N/A

e. **WHEN** turbine balancing activities are complete, **AND** it is desired to roll the turbine, **THEN PERFORM** an additional Section 8.3 **AND ATTACH** it to this procedure. N/A

f. **N/A** the remainder of Section 8.3. N/A

INIT

NOTE:	An Operator should be stationed at the Turbine prior to latching and during Turbine startup to detect rubbing or other abnormal noises when the Turbine is rolled and to perform the local turbine operations as directed by the Control Room. The OVERSPEED PROTECT CONTROL light on the Turbine EH Display Panel may be illuminated when operating at low power conditions (<10%) and may result in intermittent alarms on APP-009-E2, GOV CAB MONITOR TROUBLE. This will clear after the unit is synchronized to the grid and power is > 10%. However, if the alarm is received, the APP should be referenced to ensure other possible causes of the alarm do not exist. The SPEED CHAN light on the Turbine EH Display Panel may flash at turbine speeds less than 600 rpm and may result in intermittent alarms on APP-009-E2, GOV CAB MONITOR TROUBLE. The guidance and direction found in AOP-006, Turbine Eccentricity/Vibration, is applicable once the Turbine is latched.

14. **DEPRESS AND HOLD** the Turbine LATCH pushbutton until local indication PI-63ASO, AUTO STOP OIL PRESS, is >80 psig.

15. **WHEN** PI-63ASO, AUTO STOP OIL PRESS, is >80 psig, **THEN VERIFY** the following:

    – SL, and SR, Turbine Stop Valves, indicate OPEN on the EH TURBINE CONTROL panel.

    – 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves, indicate OPEN on the EH TURBINE CONTROL panel.

    – 1IL, 2IL, 1IR, 2IR, Intercept Valves, indicate OPEN on the EH TURBINE CONTROL panel.

    – GLU, GLL, GRU, GRL, Governor Valves, indicate CLOSED on the EH TURBINE CONTROL panel.

    – Green LATCH light is ILLUMINATED.

    – UNIT TRIP light is EXTINGUISHED.

INIT

NOTE:	Higher than expected EH Pump discharge and/or drain flows indicate an EH Dump Valve may be failed open. This condition will prevent the opening of one or more Turbine Governor Valves.

16. **RECORD** the following data from the EH Pump (Governor Fluid Pump) local flow indications:

    – E H OIL PUMP "A" DISCHARGE FLOW FI-4428A — 3.8 GPM JR

    – E H OIL PUMP "A" DRAIN FLOW FI-4427A — 0.8 GPM JR

    – E H OIL PUMP "B" DISCHARGE FLOW FI-4428B — 3.4 GPM JR

    – E H OIL PUMP "B" DRAIN FLOW FI-4427B — 1.2 GPM JR

17. **IF** either EH Pump Discharge Flow reads >6 GPM **OR IF** either EH Pump Drain Flow >4 GPM **THEN CONTACT** the responsible system engineer for assistance.

    N/A
    (Print name of person contacted) N/A

INIT

> **CAUTION**
>
> The maximum time the Turbine shaft can be stationary with gland seal applied is 15 minutes.

18. **IF** the Turbine has rolled off the Turning Gear **AND** it is desired to place the Turbine back on the Turning Gear, **THEN PERFORM** the following: (ACR 94-00310)

    a. **TRIP** the Turbine by simultaneously depressing the THINK **AND** TURBINE TRIP pushbuttons. N/A

    b. **CHECK** the following valves have CLOSED:

    - SL and SR, Turbine Stop Valves N/A
    - 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves N/A
    - 1IL, 2IL, 1IR, 2IR, Intercept Valves N/A

    c. **DEPRESS AND HOLD** the Turbine LATCH pushbutton until local indication PI-63ASO, AUTO STOP OIL PRESS, is >80 psig. N/A

    d. **WHEN** PI-63ASO, AUTO STOP OIL PRESS, is >80 psig, **THEN VERIFY** the following:

    (1) SL and SR, Turbine Stop Valves, indicate OPEN on the EH TURBINE CONTROL panel N/A

    (2) 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves, indicate OPEN on the EH TURBINE CONTROL panel N/A

    (3) 1IL, 2IL, 1IR, 2IR, Intercept Valves, indicate OPEN on the EH TURBINE CONTROL panel N/A

    (4) GLU, GLL, GRU, GRL, Governor Valves, indicate CLOSED on the EH TURBINE CONTROL panel N/A

    (5) Green LATCH light is ILLUMINATED N/A

    (6) UNIT TRIP light is EXTINGUISHED N/A

    e. **VERIFY** the Turbine back is on the Turning Gear. N/A

8.3.18 (Continued)

INIT

f. **IF** the Turning Gear does **NOT** engage, **THEN PERFORM** the following:

(1) IF PI-2096A, TURBINE BEARING OIL PRESSURE INDICATOR, is > 6 psig AND the Bearing Oil Lift Pump is operating, THEN PERFORM the following:

(a) **PLACE** the TURNING GEAR in OFF. N/A

(b) Locally **PLACE** the TURNING GEAR ENG/DISENG lever in the ENGAGED position. N/A

(c) **PLACE** the TURNING GEAR in MANUAL. N/A

(2) **IF** the Turning Gear **AND** Bearing Oil Lift Pumps are **NOT** operating, **THEN CONTACT** Engineering. N/A

NOTE:	The Turbine Valve/Trip Test shall be performed prior to startup IAW TRM TR 4.4.1.

19. **PERFORM** the Turbine Valve/Trip Test:

a. **TRIP** the Turbine by simultaneously depressing the THINK **AND** TURBINE TRIP pushbuttons.

b. **CHECK** the following valves have CLOSED:

(1) SL and SR, Turbine Stop Valves

(2) 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves

(3) 1IL, 2IL, 1IR, 2IR, Intercept Valves

c. **DEPRESS AND HOLD** the Turbine LATCH pushbutton until local indication PI-63ASO, AUTO STOP OIL PRESS, is >80 psig.

8.3.19 (Continued)

INIT

d. **WHEN** PI-63ASO, AUTO STOP OIL PRESS, is >80 psig, **THEN VERIFY** the following:

(1) SL and SR, Turbine Stop Valves, indicate OPEN on the EH TURBINE CONTROL panel

(2) 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves, indicate OPEN on the EH TURBINE CONTROL panel

(3) 1IL, 2IL, 1IR, 2IR, Intercept Valves, indicate OPEN on the EH TURBINE CONTROL panel

(4) GLU, GLL, GRU, GRL, Governor Valves, indicate CLOSED on the EH TURBINE CONTROL panel

(5) Green LATCH light is ILLUMINATED

(6) UNIT TRIP light is EXTINGUISHED

e. **DIRECT** an Operator to trip the Turbine LOCALLY at the Turbine Front Standard by positioning the Turbine Trip Lever to the TRIP position.

f. **CHECK** the following valves have CLOSED.

- SL and SR, Turbine Stop Valves
- 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves
- 1IL, 2IL, 1IR, 2IR, Intercept Valves

g. **DIRECT** the Operator at the Turbine Front Standard to reset the Turbine LOCALLY by placing the Turbine Trip Lever to RESET and HOLDING (lever will be released in Step 8.3.19.i).

8.3.19 (Continued)

INIT

h. **CHECK** the following:

- SL and SR, Turbine Stop Valves, indicate OPEN on the EH TURBINE CONTROL panel
- 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves, indicate OPEN on the EH TURBINE CONTROL panel
- 1IL, 2IL, 1IR, 2IR, Intercept Valves, indicate OPEN on the EH TURBINE CONTROL panel
- GLU, GLL, GRU, GRL, Governor Valves, indicate CLOSED on the EH TURBINE CONTROL panel
- Green LATCH light is ILLUMINATED
- UNIT TRIP light is EXTINGUISHED

i. **WHEN** PI-63ASO, AUTO STOP OIL, indicates greater than 80 psig, **THEN POSITION** the Turbine Trip Lever to NORMAL.

NOTE:	Step 8.3.21 is **NOT** required as long as PIC-838, TURBINE VALVE LIMIT SWITCH ADJUSTMENT, **AND** MST-551, TURBINE TRIP LOGIC CHANNEL TESTING, were satisfactorily completed during the Refueling Outage and as approved by the System Engineer.

20. **RECORD** date PIC-838 **AND** MST-551 completed.

Date PIC-838 7/14/10

Date MST-551 7/3/10

21. **IF** required, **THEN TEST** the OVERSPEED PROTECTION CONTROLLER as follows:

a. **TURN** the OVERSPEED PROTECTION CONTROLLER switch to TEST, **AND CHECK** all Intercept Valves close rapidly.

- 1IL CLOSED
- 1IR CLOSED
- 2IL CLOSED
- 2IR CLOSED

8.3.21 (Continued)

INIT

b. **TURN** the OVERSPEED PROTECTION CONTROLLER switch to IN SERVICE, **AND CHECK** all Intercept Valves reopen.

- 1IL OPEN
- 1IR OPEN
- 2IL OPEN
- 2IR OPEN

22. **DEPRESS** the VALVE POSITION LIMIT Δ (raise) pushbutton until the VALVE POSITION LIMIT indicator stops rising.

23. **DEPRESS** the OPER AUTO pushbutton.

CAUTION

If the AVP cards are **NOT** in Automatic, they should **NOT** be restored to Automatic while the Turbine is latched. Restoration while latched could result in governor valve swings and Reactor Power swings.

24. At the E-H Cabinet, **CHECK** the AVP cards are in Automatic. (Refer to Attachment 10.7, EH AVP CARDS) (NCR 433833)

25. **SET** a speed of 520-570 rpm in the SETTER display using the REF ∇ and/or REF Δ pushbuttons.

26. **SET** the ACCELERATION RATE thumbwheel to 50 rpm/minute.

NOTE: When the REFERENCE display has reached the indicated SETTER value, the GO lamp will extinguish and the rotor speed will approximately equal the indicated REFERENCE speed.

Governor Valve leakage may cause Turbine speed to rise above the value placed into the SETTER. Transferring Turbine E-H Controls to MANUAL has proven to be successful in controlling this situation. (NCR 329223)

CAUTION

The Turbine will roll off the Turning Gear as speed rises. Turbine speed shall be monitored closely and take actions necessary to avoid prolonged operation in resonant speed ranges as shown on Curve 7.10.

Turbine speed shall **NOT** be allowed to exceed 1000 rpm unless speed is positively controlled by the Operator and the EHC System.

Reactor Power should be maintained <15% power prior to synchronizing the Generator to the grid.

The AT-POWER Reactor Trips are automatically unblocked as Reactor power or Turbine load is raised above 10% (permissive circuit P 7). Conversely, these trips are automatically blocked as Reactor power and Turbine load are lowered below the P-7 setpoint.

The AT-POWER Reactor Trips are:

- Pressurizer High Level
- Pressurizer Low Pressure
- Reactor Coolant Low Flow
- Reactor Coolant Pump Bus Undervoltage and Underfrequency
- Reactor Coolant Pumps tripped

27. **WHEN** steam inlet pressure is at least 600 psig as indicated on PI-1304, HP TURB THROTTLE PRESS, **AND** Condenser back pressure is less than or equal to 5 inches Hg Abs on PI-1310, LP TURB "A" COND PRESS INDICATOR, and PI-1311, LP TURB "B" COND PRESS INDICATOR, **THEN DEPRESS** the GO pushbutton to raise speed.

INIT

28. **PERFORM** the following as Turbine speed rises:

   a. **VERIFY** Turning Gear disengages.

   b. **IF** Governor Valve leakage is causing Turbine speed to raise above the speed set into the SETTER, **THEN** place the Turbine E-H Control into MANUAL (depress the TURB MANUAL button) in attempt to match the Reference Counter to actual Turbine speed. (NCR 329223) N/A

   c. **IF** Turbine speed stabilizes in a resonant speed range, **THEN RAISE** speed as necessary to stabilize in a non-resonant speed range IAW Curve 7.10. N/A

   d. **IF** Turbine speed exceeds 1000 rpm **AND** is **NOT** under positive control of the Operator, **THEN GO TO** Step 8.3.13. N/A

29. **WHEN** Turbine speed stabilizes, **THEN PERFORM** the following steps concurrently:

   a. **CHECK** the following Turbine Supervisory instruments for normal turbine operation:

      – Turbine Generator Supervisory Recorder
      – Turbine MSR Temperature Recorder
      – Turbine Supervisory Alarm Mimic Display
      – Generator Temperature Recorder

8.3.29 (Continued)

INIT

CAUTION

OP-506 contains the limits for Turbine Bearing temperatures. APP-008-E1, LUBE OIL HI TEMP, contains directions if there are concerns about Turbine Bearing Temperatures. A manual Turbine Trip is recommended if any Turbine Bearing Metal temperatures exceed 225°F.

Exhaust hood temperature should not be allowed to exceed 175°F with exhaust hood spray out of service. If the temperature cannot be reduced to less than 175°F, the unit should be shutdown and the trouble corrected. The maximum exhaust hood temperature permitted is 250°F for a maximum of 15 minutes. A manual Turbine trip is required if any Exhaust Hood indication shows a valid temperature of 250°F or greater for greater than 15 minutes. (EC 69831, EC 74557, APP-008)

b. **DIRECT** an Operator to locally check the following:

- Proper lube oil flow in each bearing sightglass
- Bearing oil return temperatures IAW OP-506 Attachment 10.2
- Exhaust Hood temperatures at the South side of the Turbine
- Rubs and other unusual noises

c. **IF** Turbine Rotor Supervisory Alarms are received as indicated locally **OR** on the Turbine Generator Supervisory Recorder **OR** in alarm on the RTGB Mimic Display, **THEN NOTIFY** Engineering prior to raising turbine speed. N/A

30. **WHEN** the Turbine Supervisory Instrument checks and local Turbine checks are completed **AND** conditions are satisfactory for Turbine acceleration, **THEN PERFORM** the following:

a. **IF** Turbine E-H Controls were placed into TURB MANUAL to control the Turbine Speed, **THEN** return the E-H Controls to AUTO by depressing the OPER AUTO button. N/A

b. **IF** E-H Controls were transferred from TURB MANUAL to OPER AUTO, **THEN** check that the Turbine Speed numbers in the REFERENCE and SETTER windows are in agreement.

8.3.30 (Continued)

INIT

c. **SET** a speed of 950-1000 rpm in the SETTER display.

NOTE:	With the Bearing Oil Lift Pump Control Switch in the AUTO position, the Bearing Oil Lift Pump should stop when Bearing Oil Pressure is above the setpoint for pressure switch 63TG. This occurs at a turbine speed of approximately 600 RPM and rising. (Reference CWD B-190628, Sheet 732) The Turbine Supervisory Recorder will transfer from monitoring Turbine Eccentricity to Turbine Vibration when the Turbine speed is approximately 600 RPM and rising. This is controlled through the Turbine Supervisory Instrumentation (TSI) cabinets.

31. **DEPRESS** the GO pushbutton to raise speed.

32. **WHEN** Turbine speed is >600 RPM and rising, **THEN CHECK** the following actions have automatically occurred:

    - The Bearing Oil Lift Pump is **STOPPED**.

    - The Turbine Supervisory Recorder has **TRANSFERRED** from recording Turbine Eccentricity to Turbine Vibration.

33. **VERIFY** the Turbine speed stabilizes at 950-1000 rpm.

NOTE:	An elevated acceleration rate is required between 1000 **AND** 1300 rpm to minimize the time the turbine remains in the LP turbine resonant speed ranges.

34. **SET** the ACCELERATION RATE thumbwheel to 300 rpm/min.

35. **SET** a speed of 1300-1400 rpm in the SETTER display.

36. **DEPRESS** the GO pushbutton to raise speed.

37. **WHEN** Turbine speed is 1300-1400 rpm, **THEN VERIFY** the Turbine speed stabilizes at 1300-1400 rpm.

38. **IF** the time for heat soak recorded in Step 8.3.11 has **NOT** elapsed, **THEN ALLOW** turbine temperatures to stabilize. N/A

39. **WHEN** the time recorded in Step 8.3.11 has elapsed, **THEN SET** a speed of 1800 rpm in the SETTER display.

INIT

NOTE:	Due to the HP turbine rotor critical speed and LP turbine resonant speed ranges, it is desired to accelerate at 100 rpm/minute through the 1400 rpm to 1700 rpm range.

40. **SET** the ACCELERATION RATE to 100 rpm/minute.
41. **DEPRESS** the GO pushbutton as necessary to raise speed.
42. **VERIFY** the Turbine speed stabilizes at 1800 rpm.
43. **WHEN** Steam is supplied to the secondary, **THEN VERIFY** the HDT Level Controller (LC-1530) is operating properly.
44. **IF** Engineering requires a Turbine Valve/Trip Test from 1800 rpm, **THEN PERFORM** the following:
    a. **VERIFY** the Turbine is at 1800 rpm.
    b. **TRIP** the Turbine by simultaneously depressing the THINK **AND** TURBINE TRIP pushbuttons.
    c. **CHECK** the following valves have CLOSED:
        – SL and SR, Turbine Stop Valves
        – 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves
        – 1IL, 2IL, 1IR, 2IR, Intercept Valves
    d. **DEPRESS** the VALVE POSITION LIMIT ▽ (lower) pushbutton until the VALVE POSITION LIMIT indicator registers 0% Valve Limit Position.
    e. **DEPRESS AND HOLD** the Turbine LATCH pushbutton **UNTIL** local indication PI-63ASO, AUTO STOP OIL PRESS, is > 80 psig.

8.3.44 (Continued)

INIT

f. **WHEN** PI-63ASO, AUTO STOP OIL PRESS, is > 80 psig, **THEN VERIFY** the following:

- SL and SR, Turbine Stop Valves, indicate OPEN on the EH TURBINE CONTROL panel
- 1RL, 2RL, 1RR, 2RR, Reheat Stop Valves, indicate OPEN on the EH TURBINE CONTROL panel
- 1IL, 2IL, 1IR, 2IR, Intercept Valves, indicate OPEN on the EH TURBINE CONTROL panel
- GLU, GLL, GRU, GRL, Governor Valves, indicate CLOSED on the EH TURBINE CONTROL panel
- Green LATCH light is ILLUMINATED
- UNIT TRIP light is EXTINGUISHED

g. **DEPRESS** the VALVE POSITION LIMIT Δ (raise) pushbutton until the VALVE POSITION LIMIT indicator stops rising.

h. **DEPRESS** OPER AUTO pushbutton.

i. **IF** Turbine speed is ≤ 1000 rpm, **THEN PERFORM** the following:

(1) **SET** a speed of 950 – 1000 rpm in the Setter display. N/A

(2) **IF** required, **THEN DEPRESS** the GO pushbutton to raise speed. N/A

(3) **WHEN** Turbine speed is 950-1000 rpm, **THEN VERIFY** the Turbine speed stabilizes at 950-1000 rpm. N/A

8.3.44 (Continued)

INIT

> **NOTE:** Higher acceleration rate is required between 1000 **AND** 1300 rpm to minimize the time the turbine remains in the LP turbine resonant speed ranges.

j. **IF** Turbine speed was ≤ 1400 rpm after trip testing, **THEN PERFORM** the following:

(1) **SET** the ACCELERATION RATE thumbwheel to 300 rpm/min. N/A

(2) **SET** a speed of 1300-1400 rpm in the SETTER display. N/A

(3) **DEPRESS** the GO pushbutton as necessary to raise speed. N/A

(4) **WHEN** Turbine speed is 1300-1400 rpm, **THEN VERIFY** the Turbine speed stabilizes at 1300-1400 rpm. N/A

> **NOTE:** Due to the HP turbine rotor critical speed and LP turbine resonant speed ranges, it is desired to accelerate at 100 rpm/minute through the 1400 rpm to 1700 rpm range.

k. **VERIFY** the ACCELERATION RATE **SET** to 100 rpm/minute.

l. **SET** a speed of 1800 rpm in the SETTER display.

m. **DEPRESS** the GO pushbutton as necessary to raise speed.

INIT

CAUTION

If the Generator can **NOT** be synchronized and loaded within 5 minutes after reaching 1800 RPM, then the Exhaust Hood Temperature should be monitored locally. The maximum exhaust hood temperature permitted is 250°F. A manual Turbine trip is required if any Exhaust Hood indication shows a valid temperature of 250°F or greater for 15 minutes. (EC 69831, APP-008)

45. At 1800 rpm, **PERFORM** the following:

a. **RECORD** the Main Oil Pump Discharge pressure from PI-63MOP on the Front Standard. 380 psig

b. **IF** Main Oil Pump pressure is less than 350 psig, **THEN CONTACT** Engineering **AND RESOLVE** the discrepancy before continuing with this procedure. N/A

N/A
Engineering Contact (Print name)

c. **STOP** the TURNING GEAR AND SEAL OIL BACKUP PUMPS **AND PLACE** the control switch in the AUTO position.

d. **STOP** one of the two running GOV FLUID PUMPS **AND PLACE** the control switch in the AUTO position.

- GOV FLUID PUMP A LEFT RUNNING
- GOV FLUID PUMP B STOPPED with switch in AUTO

e. **VERIFY** the BEARING OIL LIFT PUMP control switch is in the AUTO position.

46. **IF** scheduled, **OR** if required for for PMT, **THEN PERFORM** OST-551-2.

INIT

8.4. Electrical Startup and Loading of Generator

1. **CONTACT** the Load Dispatcher (LD) for the following: (References: 2.1.10, SOER 10-1, Recommendation #6, and 2.4.16, OPEX 388359)

   – **NOTIFY** the LD that Robinson Unit 2 will be synchronized to the grid. ____

   – **CONFIRM** that voltage support will be maintained above minimum required voltage to support a Loss Of Coolant Accident (maintain Voltage Schedule). (SOER 99-01, Add. 1 Rec. 2a Fleet Item 3) ____

2. **CLOSE** the Exciter Field Breaker. ____

3. **PLACE** the Voltage Regulator in service as follows:

NOTE:	The Exciter Field Breaker may trip if Generator voltage exceeds 22.0 KV.

   a. Slowly **ADJUST** Generator voltage, as indicated on GEN ⌀A-⌀B VOLTS **OR** ERFIS point ELV2800A, to 22.0 KV using the Manual Field Current Adjuster. ____

   b. **IF** the Regulator Balance Meter does **NOT** indicate 0, **THEN NOTIFY** engineering for further guidance prior to proceeding. ____

NOTE:	Placing the VOLTAGE REGULATOR in the TEST position disables the voltage followers. The time spent with the Voltage Regulator in the TEST position should be minimized.

   c. **PLACE** VOLTAGE REGULATOR in AUTO. ____

INIT

4. **PLACE** the MAIN GENERATOR Synchroscope key switch in the GEN NORTH position. ____

NOTE:	If Generator voltage is less than Switchyard voltage then adjusting the VOLTAGE ADJUSTER in the "raise" direction will cause % DIFF VOLTS to lower. If Generator voltage is greater than Switchyard voltage then adjusting the VOLTAGE ADJUSTER in the "raise" direction will cause % DIFF VOLTS to rise.

5. **ADJUST** the % DIFF VOLTS to zero using the VOLTAGE ADJUSTER. ____

6. **ADJUST** Turbine speed using the REF ∇ and/or REF Δ **AND** GO pushbuttons so that the Synchroscope is rotating SLOWLY in the FAST DIRECTION. ____

CAUTION

The assumptions in EC 63785 allow Reactor Power above 10% for short periods of time as long as it is maintained <15%. Maintaining Reactor Power <10% prior to Generator synchronizing ensures a margin to this limit.

The AT-POWER Reactor Trips are automatically unblocked as Reactor power or Turbine load is raised above 10% (permissive circuit P-7). Conversely, these trips are automatically blocked as Reactor power and Turbine load are lowered below the P-7 setpoint. The AT-POWER Reactor Trips are:

- Pressurizer High Level
- Pressurizer Low Pressure
- Reactor Coolant Low Flow
- Reactor Coolant Pump Bus Undervoltage and Underfrequency
- Reactor Coolant Pumps tripped

7. **VERIFY** T_{avg} is at the high end of the 547°F to 551°F band **AND** Reactor Power is 6% to 10%. ____

INIT

NOTE:	The sequence of actions necessary to synchronize the unit to the grid is TIME CRITICAL. The RO, BOP, and Feedwater Operator shall verbally rehearse the actions of the following step and coordinate their actions at all times while synchronizing to the grid and loading the unit. It would be beneficial to have a dedicated stop watch operator to ensure contingency actions are not missed. To reduce the magnitude of the transient when synchronizing to the grid, T_{avg} should be greater than 547°F and rising. Experience has shown that a Control Rod withdrawal of 10 steps is optimum.

8. **SYNCHRONIZE** the Main Generator to the 230 KV Grid as follows:

   a. **WITHDRAW** Control Rods to raise $T_{avg.}$ ____

   b. **WHEN** the synchroscope is rotating SLOWLY in the FAST DIRECTION **AND** reaches a point equivalent to 5 minutes before the 12 o'clock position, **THEN CLOSE** the NORTH OCB BKR 52/9. Time _____ ____

CAUTION

If GV#1 (GLU) and GV#3 (GLL) are not off their closed seats (Closed position lights EXTINGUISHED.) within 1 minute of closing the NORTH OCB BKR 52/9 when paralleling to the Grid, a Generator Lockout will occur. Turbine Control may be placed in TURB MAN and the GV Δ and GV ∇ pushbuttons used as necessary **IF** OPER AUTO is not available or to pick up additional load.

IF it is necessary to re-open a Generator Output OCB, the THINK BUTTON must be held in the DEPRESSED position until the OCB indicates open.

   c. **IF** GV#1 (GLU) **OR** GV#3 (GLL) remain CLOSED, **THEN**, within 30 seconds, **ADJUST** Turbine Load UP (**NOT** to exceed 70 MWe) until GV#1 (GLU) **AND** GV#3 (GLL) are off their closed seats (Closed position lights EXTINGUISHED.) ____

   d. **IF** the turbine can **NOT** pick up at least 20 MWe, **THEN SIMULTANEOUSLY DEPRESS AND HOLD** the THINK BUTTON **AND RE-OPEN** the NORTH OCB BKR 52/9. ____

8.4.8 (Continued)

INIT

e. **IF** the NORTH OCB BKR 52/9 was opened in the previous step, **THEN INFORM** the SM **AND DO NOT** continue with this procedure without management approval. ____

f. **IF** the unit is at 70 MWe **AND IF** either GV#1 (GLU) **OR** GV#3 (GLL) remains CLOSED, **THEN** within the next 30 seconds **PERFORM** the following:

- **PLACE** Turbine Control in TURB MANUAL **AND USE** the GV ∇ pushbutton as necessary to shed load to minimum. ____
- **VERIFY** Reactor Power is less than 10%. ____
- **SIMULTANEOUSLY DEPRESS AND HOLD** the THINK BUTTON **AND OPEN** the NORTH OCB BKR 52/9. ____

g. **IF** the NORTH OCB BKR 52/9 was opened in the previous step, **THEN INFORM** the SM **AND DO NOT CONTINUE** with this procedure without management approval. ____

9. **PLACE** the MAIN GENERATOR synchroscope key switch in the GEN SOUTH position. ____

10. **CLOSE** the SOUTH OCB BKR 52/8. Time ______ ____

11. **TURN** the synchroscope key switch to the mid-position. ____

12. **VERIFY CLOSED** the Feedwater Regulating Valves:

- FCV-478 ____
- FCV-488 ____
- FCV-498 ____

CAUTION

PPP-007, Feedwater Leakage Test, allows the Feedwater Regulating Valves to leak by at rates up to 735 gpm each. Opening the Feedwater Header Section valves may cause an over feed condition.

13. **OPEN** the Feedwater Header Section valves:

- V2-6A, FW HDR SECTION ____
- V2-6B, FW HDR SECTION ____
- V2-6C, FW HDR SECTION ____

INIT

NOTE: Electrical load and Reactor power should be raised simultaneously to maintain the normal T_{avg}-T_{ref} program.

During power ascension, all indications of reactor power level should be monitored and compared at 10% intervals. Indications such as core ΔT and Turbine First-Stage Pressure should be compared to NI indications and Continuous Calorimetric Program percent power. If all indications do not agree within 5% of each other, then Reactor Power should be stabilized, OST-010 performed, and plant management contacted for further instructions. (SOER 90-003, Recommendation 1a) [CAPR ACR 93-284]

14. **STABILIZE** the Unit at 10% to 15% Reactor Power. ____

NOTE: The following AT-POWER reactor trips are automatically unblocked when the REACTOR TRIP BLOCK P-7 permissive status light is extinguished: Pressurizer High Level, Pressurizer Low Pressure, Reactor Coolant Low Flow, Reactor Coolant Pump Bus Undervoltage and Underfrequency and Reactor Coolant Pumps Tripped.

If the unit is stabilized at greater than 10% Reactor Power, then Steps 8.4.15 through 8.4.26 may be performed when the specific conditions for each step are met while the heat soak is in progress. Intent is to allow performance of steps that **DO NOT** raise Turbine load while completing the heat soak.

15. **WHEN** two Power Range detectors indicate greater than 10%, **THEN PERFORM** the following:

    a. **CHECK** POWER ABOVE P-10 permissive light ILLUMINATES. (ITS SR 3.3.1.8, Table 3.3.1-1 Items 2.b and 3) ____

    b. **CHECK** REACTOR TRIP BLOCK P-7 permissive status light is EXTINGUISHED. (ITS SR 3.3.1.1, Table 3.3.1-1 Item 17.e) ____

    c. **VERIFY** one decade overlap exists between the Power Range **AND** Intermediate Range. ____

8.4.15 (Continued)

INIT

d. **BLOCK** the Intermediate Range High Power Trip as follows:

(1) **DEPRESS** the INTERMEDIATE RANGE LOGIC TRIP DEFEAT TRAIN A pushbutton. ____

(2) **DEPRESS** the INTERMEDIATE RANGE LOGIC TRIP DEFEAT TRAIN B pushbutton. ____

(3) **CHECK** the INTERM RANGE TRIP BLOCKED permissive light is ILLUMINATED. ____

e. **BLOCK** the Power Range Reactor Trip - Low Setpoint as follows:

(1) **DEPRESS** the POWER RANGE LOGIC TRIP DEFEAT TRAIN A pushbutton. ____

(2) **DEPRESS** the POWER RANGE LOGIC TRIP DEFEAT TRAIN B pushbutton. ____

(3) **CHECK** the LO POWER RANGE TRIP BLOCKED permissive light is ILLUMINATED. ____

NOTE: Balance of Plant operations are typically related to specific turbine loads. Due to the unavailability of "% Turbine Load" indications, BOP operations are related to Reactor Power and assumes that T_{avg} is maintained IAW the normal T_{avg}-T_{ref} program.

The Moisture Separator Reheater Purge Valves will remain open as long as Reactor Power remains above 10%.

f. **WHEN** greater than 10% power, **THEN PERFORM** the following:

(1) **VERIFY** the toggle switch inside the MSR TIMER VALVE CONTROLLER is in the ON position. ____

8.4.15.f (Continued)

INIT

(2) **POSITION** the Moisture Separator PURGE VALVES switch to OPEN **AND HOLD** until the following valves open, as indicated on the RTGB:

VALVES	INIT
FCV-1334A, MSR 1A TUBESIDE VENT TO CONDENSER	
FCV-1334B, MSR 1B TUBESIDE VENT TO CONDENSER	
FCV-1334C, MSR 2A TUBESIDE VENT TO CONDENSER	
FCV-1334D, MSR 2B TUBESIDE VENT TO CONDENSER	
V1-6-1A, MSR STEAM PURGE VALVE	
V1-6-2A, MSR STEAM PURGE VALVE	
V1-6-1B, MSR STEAM PURGE VALVE	
V1-6-2B, MSR STEAM PURGE VALVE	

16. **CHECK** the following:

    – SPEED CONTROL light is EXTINGUISHED. ____

    – LOAD CONTROL light is ILLUMINATED. ____

17. **IF** Turbine E-H Controls were placed in TURB MAN to pick up additional load **AND** OPER AUTO is available, **THEN** return Turbine E-H Controls to AUTO by depressing the OPER AUTO button. ____

18. **VERIFY** the LPMS switch on the RTGB is in the NORM position **AND REGARD** all further alarms. ____

19. Prior to exceeding 15% power, **VERIFY** AFD within limits for each operable excore NI channel. (ITS SR 3.2.3.1) ____

    a. **IF** AFD is **NOT** within limits, **THEN CONTACT** Reactor Engineering for technical guidance prior to exceeding 15% power. ____

INIT

NOTE:	APP-005-D6, Δ Flux Warning / Status, should alarm within approximately one minute of average Power Range Power on ERFIS reading >15% Power. ERFIS will give a printout of the current conditions. FMP-009, Power Distribution Control, contains the necessary logs and compensatory actions **IF** the ERFIS Continuous Axial Offset Calculation program is not working.

CAUTION

ITS SR 3.2.3.2 requires manual monitoring of Axial Flux Difference (AFD) within one hour of determining that the ERFIS Continuous Axial Offset Calculation program is not working correctly. This is an hourly log requirement while Reactor Power is <90% power. When Reactor Power is ≥90% **AND** ERFIS Continuous Axial Offset Calculation is OOS, this becomes a 15 minute log requirement. (Reference: FMP-009, Manual Monitoring of AFD)

20. **WHEN** Reactor Power is greater than 15%, **THEN PERFORM** the following:

    a. **CHECK** that APP-005-D6 is received. ____

    b. **IF** APP-005-D6 is **NOT** received within 5 minutes of exceeding 15% power, **THEN PERFORM** the following:

    (1) **INFORM** the Reactor Engineer that ERFIS Continuous Axial Offset Calculation is not working correctly.

    ______________________ ____
    (Print name of contact)

    (2) **INFORM** the on-call ERFIS Computer Support (Nuclear Information Technology) person that ERFIS Continuous Axial Offset Calculation is not working correctly.

    ______________________ ____
    (Print name of contact)

    (3) **COMMENCE** the required compensatory actions of FMP-009 section for ERFIS Out Of Service. ____

8.4.20.b (Continued)

INIT

(4) **LOG** the following items:

(a) Time problem identified: ____________ ____

(b) Time of first FMP-009 Log entry. ____________ ____

(c) NCR number for ERFIS Continuous Axial Offset Calculation. ____________ ____

NOTE:	ITS SR 3.3.1.2 requires a calorimetric be performed within 12 hours of exceeding 15% Reactor Power.

c. **PERFORM** OST-010, Power Range Calorimetric during Power Operation Daily, within 12 hours. ____

Time power exceeds 15% ________

Time OST-010 complete ________

d. **IF** OST-010 can **NOT** be performed immediately, **THEN INITIATE** a Required Event Tracking EIR IAW OMM-007. ____

e. **PERFORM** Attachment 10.5, Feedwater Heater Alignment. ____

NOTE: Step 8.4.21 is a continuous action step that should be performed whenever plant conditions require Feedwater flow through the FRVs and conditions are suitable for automatic S/G water level control.

Feedwater Regulating Valves should be transferred to automatic control one at a time.

FCV-1446, CONDENSATE RECIRC, is controlled by FS-1446, COND PMP RECIRC VLV FLOW SWITCH. FS-1446 is set to open FCV-1446 at a flow of 1050 gpm with the valve closing at a Condensate System flow of 4200 gpm flow through the GS Condenser and SGBD Heat Exchangers. (ESR 00-00208)

The Push Button to reset FS-1446 is located in the same enclosure as FS-1446. This enclosure is located approximately 15 feet northwest of FCV-1446 on a concrete column.

21. **WHEN** Reactor Power is 15% to 20%, **OR** the Feedwater Regulating Bypass Valves are at 60% to 90% demand signal, **THEN SHIFT** each Feedwater Regulating Valve to AUTO as follows:

    a. **CHECK** CLOSED FCV-1446, CONDENSER RECIRC. ____

    b. **IF** FCV-1446 does not indicate shut, **THEN PERFORM** the following:

        (1) **DEPRESS AND HOLD** the FS-1446 Push Button. ____

        (2) **WHEN** FCV-1446 indicates full shut, **THEN** release the FS-1446 Push Button. ____

CAUTION

Shutting either C-18A, FCV-1446 INLET, or C-18B, FCV-1446 OUTLET, could cause a running Condensate Pump to overheat on a low flow condition **IF** unit load is reduced prior to correcting the problem with FCV-1446.

        (3) **IF** FCV-1446 is failed open **OR** reopens when it should stay closed, **THEN** SHUT either

- C-18A ____
  OR
- C-18B ____

8.4.21.b (Continued)

INIT

(4) **IF EITHER** C-18A **OR** C-18B were shut in Step 8.4.21.b(3), **THEN HANG** either an OFF NORMAL TAG IAW OPS-NGGC-1308 **OR** a CAUTION TAG IAW OMM-001-9 while continuing with this procedure.

TAG NUMBER ______________ ____

c. **VERIFY** Feed Flow is trending with Steam Flow **AND** S/G Levels are within 1% of program level.

S/G A ____
S/G B ____
S/G C ____

d. **DEPRESS** the AUTO pushbutton on the FRV controller. ____

FCV-478, FEED REG VALVE "A" ____

FCV-488, FEED REG VALVE "B" ____

FCV-498, FEED REG VALVE "C" ____

– **IF** the respective Feedwater Regulating Bypass Valve is **NOT** closed, **THEN** slowly close it.

FCV-479, FEED REG BYPASS "A" ____

FCV-489, FEED REG BYPASS "B" ____

FCV-499, FEED REG BYPASS "C" ____

e. **VERIFY** each FRV in AUTO is maintaining programmed S/G level.

FCV-478, FEED REG VALVE "A" ____

FCV-488, FEED REG VALVE "B" ____

FCV-498, FEED REG VALVE "C" ____

Facility:	HB ROBINSON	Task No.:	01000105805
Task Title:	Respond to RHR Leakage With the Unit on RHR Cooling	JPM No.:	2011-2 NRC JPM E
K/A Reference:	025 AA2.02 3.4 / 3.8		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom ______ Simulator __X__ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:

- The plant is in Mode 5.
- RHR is in service for core cooling.
- Charging Pump A is cleared and tagged.

Task Standard: Isolate RHR system to stop leakage to the PRT

Required Materials: AOP-020, Loss of Residual Heat Removal, Revision 32
OP-201, Residual Heat Removal System, Revision 64

General References: AOP-020, Loss of Residual Heat Removal, Revision 32
OP-201, Residual Heat Removal System, Revision 64

Handouts: OP-201, Section 8.2.3 with Steps 8.2.3.1a and 1b completed

Initiating Cue: You are the RO. The CRS has directed you to swap to RHR Pump A in service IAW OP-201, Section 8.2.3 to equalize run time on the pumps.

Time Critical Task: NO

Validation Time: 10 minutes

SIMULATOR SETUP

1. Reset to IC-810
2. “A” Charging Pump inoperable

(Denote Critical Steps with a check mark)

START TIME: ___________

Performance Step: 1 PLACE FC-605, RHR HX BYPASS FLOW in MAN (OP-201, Step 8.2.3.2.a)

Standard: Candidate places FC-605 in manual by depressing the MAN pushbutton on the controller and observing that the MAN light is illuminated and the AUTO light is extinguished.

Examiner's Note:

Comment:

√ **Performance Step: 2** START the Standby RHR Pump (OP-201, Step 8.2.3.2.b)

Standard: Candidate starts RHR Pump A by placing the START / STOP control switch to the START position and observing that the RED on indication is illuminated and the GREEN off indication is extinguished.

Examiner's Note:

Comment:

Performance Step: 3 VERIFY proper operation of RHR Pump previously started on Step 8.2.3.2.b (OP-201, Step 8.2.3.2.c)

Standard: Candidate determines that RHR Pump A is operating properly by observing that the proper indication is received, no annunciators are received.

Examiner's Note: When RHR Pump A is started, RHR relief valve RHR-706 opened and is relieving to the PRT. The candidate should note that PZR level is lowering.

Comment:

Performance Step: 4 STOP the previously running RHR Pump (OP-201, Step 8.2.3.2.d)

Standard: Candidate stops RHR Pump B by placing the START / STOP control switch to the STOP position and observing that the GREEN off indication is illuminated and the RED on indication is extinguished.

Examiner's Note:

Comment:

Performance Step: 5 After RHR flow has stabilized as indicated on FI-605, PLACE FC-605, RHR HX BYPASS FLOW, in AUTO AND CHECK FCV-605 for proper operation (OP-201, Step 8.2.3.2.e)

Standard: Candidate places FC-605 in AUTO by depressing the AUTO pushbutton on the controller and observing the AUTO light illuminated and the MAN light extinguished.

Examiner's Note: Candidate will determine that RCS inventory is lowering and enter AOP-020, Loss of Residual Heat Removal (Shutdown Cooling)

Comment:

Performance Step: 6 Check RCS Level – LESS THAN -72 INCHES (69% FULL RANGE RVLIS) (Step 1)

Standard: Candidate determines that RCS level is above -72 inches by observing RCs inventory in the PZR and transitions to Step 1 RNO and proceeds to Step 3.

Examiner's Note:

Comment:

Performance Step: 7 Make PA announcement for procedure entry (Step 3)

Standard: Candidate makes the PA announcement by using an available PA handset and announcing that AOP-020 has been entered due to lowering RCS inventory.

Examiner's Note:

Comment:

NOTE

FRP-S.1 is NOT applicable for this event unless directed by the CSFSTs.

Performance Step: 8 From the RTGB, verify reactor tripped as follows: (Step 4)

- Reactor Trip Main and Bypass Breakers - OPEN
- Rod Position Indication - ZERO
- Rod Bottom Lights - ILLUMINATED

Standard: Candidate verifies that the reactor trip breakers are open by the GREEN open lights illuminated on the reactor trip breakers and no indication available on the reactor trip bypass breakers due to the breakers being racked out with the fuses removed.

Examiner's Note: Rod position indication and rod bottom lights are extinguished due to the rod control system being de-energized with the plant in Mode 5.

Comment:

Performance Step: 9 Check PZR PORV – Failed open from loss of power or malfunction (Step 5).

Standard: Candidate determines that both PZR PORVs are closed by observing the GREEN closed lights illuminated on PCV-455C and 456. Proceeds to RNO and Step 7.

Examiner's Note:

Comment:

Performance Step: 10 Check RCPs – Any running (Step 7)

Standard: Candidate determines that 1 of the RCPs is operating by observing the RED on light above the RTGB control switch for the RCP.

Examiner's Note:

Comment:

Performance Step: 11 Check RCP No. 1 Seal D/P – Less than 210 PSID. (Step 8)

Standard: Candidate determines that all RCP No. 1 seal D/P are greater than 210 PSID by observing PI-156A, PI-155A and PI-154A. Candidate proceeds to Step 8 RNO.

Examiner's Note:

Comment:

Performance Step: 12 Observe the NOTE prior to Step 10 and Go To Step 10. (Step 8 RNO)

.

Standard: Candidate observes the NOTE prior to Step 10 anf proceeds to Step 10.

Examiner's Note:

Comment:

<u>NOTE</u>

The RCS level trend should be carefully evaluated. A loss of RCS inventory as a result of a failed open PZR PORV that has been closed should result in a transition to Section E.

Performance Step: 13 Check RCS level – Lowering (Step 10)

- Pressurizer Level **OR**
- RCS loop standpipe level **OR**
- RVLIS **OR**
- Refueling Cavity Watch report.

Standard: Candidate determines that PZR level is lowering by observing PZR level recorder LR-459 Pen 1 and/or LI-459A, 460, 461 or 462.

Examiner's Note:

Comment:

√ **Performance Step: 14** Verify all letdown flowpaths isolated as follows: (Step 11)

- LCV-460A and B, LTDN LINE STOP valves – Closed.
- HIC-142, PURIFICATION FLOW controller – Adjusted to 0%.
- HIC-137, EXCESS LTDN FLOW controller – Adjusted to 0%.
- CVC-387, EXCESS LTDN STOP – Closed.

Standard: Candidate verifies that the control switches for LCV-460A and B and CVC-387 are placed to the closed position and the GREEN closed indication is illuminated.

Candidate verifies that the pots for HIC-142 and HIC-137 are rotated in the counterclockwise direction until the pot will no longer turn and the indication is showing 0%.

Examiner's Note: LCV-460A and B are both controlled by a single control switch.

Comment:

Performance Step: 15 Check Charging Pump status – All stopped (Step 12).

Standard: Candidate determines that 2 Charging Pumps are running by observing the RED on status lights illuminated and proceeds to Step 12 RNO. Candidate raises the speed on the running Charging pumps to maximum by selecting manual on the pump speed controllers and depressing the UP pushbutton until the speed indicators indicate 100%.
Candidate proceeds to Step 17.

Examiner's Note:

Comment:

Performance Step: 16 Check RCS Level – Lowering (Step 17)

Standard: Candidate determines that PZR level is lowering by observing PZR level recorder LR-459 Pen 1 and/or LI-459A, 460, 461 or 462.

Examiner's Note:

Comment:

Performance Step: 17 Start one additional Charging Pump (Step 18)

Standard: Candidate determines that no additional charging pumps are available and proceeds to Step 24 from the RNO step.

Examiner's Note:

Comment:

Performance Step: 18 Check RCS temperature prior to event start – Less than or equal to 200°F (Step 24)

Standard: Candidate determines that RCS temperature was less than 200°F when the event occurred by observing TR-410, TR-413 and/or Core Exit Thermocouples.

Examiner's Note:

Comment:

√ **Performance Step: 19** Stop RHR Pumps (Step 25)

Standard: Candidate stops the running RHR pump by placing the control switch to the STOP position and observing the GREEN off lights illuminated for both of the RHR pumps.

Examiner's Note:

Comment:

√ **Performance Step: 20** Isolate RHR by closing the following valves: (Step 26)

- RHR-750, RHR LOOP SUPPLY
- RHR-751, RHR LOOP SUPPLY
- RHR-744A, RHR COLD LEG INJ
- RHR-744B, RHR COLD LEG INJ

Standard: Candidate isolates RHR system by placing the control switches for the following valves in the closed position and observing the GREEN closed indication illuminated.

- RHR-750 and 751, RHR LOOP SUPPLY
- RHR-744A and 744B, RHR COLD LEG INJ

Examiner's Note:

Comment:

√ **Performance Step: 21** Verify All RCPs - STOPPED (Step 27)

Standard: Candidate stops the running RCP by placing the control switch to the STOP position and observing the GREEN off lights illuminated for all of the RCPs.

Examiner's Note:

Comment:

<u>END OF TASK</u>

Terminating Cue: **When PZR level is stable or increasing: Evaluation on this JPM is complete.**

STOP TIME: ____________ ____________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM E

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ____________________ Date: ____________

INITIAL CONDITIONS:

- The plant is in Mode 5.
- RHR is in service for core cooling.
- Charging Pump A is cleared and tagged.

INITIATING CUE:

You are the RO. The CRS has directed you to swap to RHR Pump A in service IAW OP-201, Section 8.2.3 to equalize run time on the pumps.

JPM CUE SHEET

INITIAL CONDITIONS:

- The plant is in Mode 5.
- RHR is in service for core cooling.
- Charging Pump A is cleared and tagged.

INITIATING CUE:

You are the RO. The CRS has directed you to swap to RHR Pump A in service IAW OP-201, Section 8.2.3 to equalize run time on the pumps.

INIT

8.2.3 Switching RHR Pumps in the Core Cooling Mode

1. Initial Conditions

   a. This revision has been verified to be the latest revision available. Today Date Ta

   b. The prerequisites of Section 4.0 have been completed. Ta

2. Instructions

   a. **PLACE** FC-605, RHR HX BYPASS FLOW in MAN. ____

   b. **START** the Standby RHR Pump. "A" / "B" (Circle one) ____

   c. **VERIFY** proper operation of RHR Pump previously started on step 8.2.3.2.b. ____

   d. **STOP** the previously running RHR Pump. "A" / "B" (Circle one) ____

   e. After RHR flow has stabilized as indicated on FI-605, **PLACE** FC-605, RHR HX BYPASS FLOW, in AUTO **AND CHECK** FCV-605 for proper operation.

      FC-605 AUTO ____

      FCV-605 PROPER OPERATION ____

INIT

CAUTION
When both RHR-757C and RHR-757D are open, 3750 gpm total per running pump as read from FI-605, FI-608A and FI-608B shall **NOT** be exceeded, except as allowed/required by approved test procedures for which total flowrates may be as high as 4200 gpm for one pump or 8400 gpm for two pumps. RHR pump flowrates of less than 2,800 gpm have been shown to increase pressure and flow fluctuations and should be avoided when plant conditions permit. This does **NOT** apply during recirculation operation. (ACR 91-078)

f. **ADJUST** FC-605 in AUTO to maintain RHR Flow 3500 to 3750 GPM. ____

	Initials	Name (Print)	Date
Performed by:	Ron	R.O. Moore	Today

Approved by: ________________ Shift Manager ________ Date

CONTINUOUS USE

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL
VOLUME 3
PART 5
ABNORMAL OPERATING PROCEDURE

AOP-020

LOSS OF RESIDUAL HEAT REMOVAL (SHUTDOWN COOLING)

REVISION 32

AOP-020, Revision 32

Summary of Changes PRR 432553

General:	Throughout the procedure, changed SSO to SM and CRSS to CRS (Editorial)
	Throughout the procedure, changed increase and decrease to variations of raise and lower. (Editorial)
	Throughout the procedure, added nomenclature for flow and pressure instruments and valves. (Editorial) (PRR 430310)
	Throughout the procedure, added a cooldown rate limit to steps which stated "establish cooldown." (PRR 430310)
Entry Conditions	Added loss of instrument bus to the entry conditions. A loss of Instrument Bus 6 or Instrument Bus 8 may not have an immediate affect on RHR operation but will adversely affect FCV-605 and HIC-758 operation.
Main Body	
Steps 5 & 6	Removed the actions associated with a failed open PORV as a result of a loss of power to PT-500/PT-501 from OLD step 5 RNO and made the action into two steps. Provided an RNO to close the PORV Block valve. (PRR 383281)
Steps 7, 8, & 9	Added steps to check RCPs running and a C/A step to support stopping running RCPs if insufficient seal d/p is not available. (PRR 431685)
Note 10	Added a note to alert the operator that the failed open PORV resulted in a loss of mass from the RCS. If the PORV is closed, the transition should be made to Section E.
Step 13	Added additional detail for establishing boric acid addition. (PRR 430310)

AOP-020, Revision 32
Summary of Changes PRR 432553
Continued

Main Body (Continued)

Steps 18 &21	Added "additional" to the steps regarding starting charging pumps.
Steps 28a RNO & 30a RNO	Modified the step to state adjust and provided a minimum VCT level. Maintaining a minimum VCT level will maintain Charging Flow within the makeup system capacity. (PRR 430310)
Step 28c RNO	Split the step with two actions into two steps. (Editorial) (PRR 430310)
Section A Note 4	Added a note to remind the operators that it may be necessary to completely refill the Reactor Vessel before Core Exit Thermocouples start to lower. (PRR 293036)
Step 11b and 12b	Changed step to Verify one SI Pump - RUNNING fromStart one SI Pump based upon comments from a CDBI inspection. (PRR 240036)
Step 12c	Changed step to have SI-866B be the first choice for Hot Leg Injection based upon injection into Loop 2 versus Loop 3, which is where the Pzr Surge Line connects to the RCS. (PRR 293076)
Step 21	Added indications for RHR Pump Air binding. (PRR 430310)

Section B

Step 4	Incorporated portions of step 3 into step 4 so the requirements for closing the SFP Gate Valve are in the same step. (PRR 264089)
Step 5	New step added to Refer to AOP-036 if SFP Lo Level Alarm is received. (PRR 375167)
Step 20	Added the values for normal refueling cavity level to the step. (PRR 430310)

AOP-020, Revision 32
Summary of Changes PRR 432553
Continued

Section B (Continued)

Step 22	Added indications for RHR Pump Air binding. (PRR 430310)

Section C

Note 7	New Note to remind the operator that LOOP 2 Hot Leg Injection is preferred. (PRR 293076)
Step 7a RNO	Added PZR Safety Valve or PZR Manway removed. based upon plant conditions, a PORV could be under maintenance in this plant condition. (PRR 430310)
Step 7c RNO and 10a	Changed step to Verify one SI Pump - RUNNING from "Start one SI Pump based upon comments from a CDBI inspection. (PRR 240036)
Step 7d RNO	Changed step to have SI-866B be listed first for Hot Leg Injection based upon injection into Loop 2 versus Loop 3, which is where the Pressurizer Surge line connects to the RCS. (PRR 293076)
Step 9 RNO	Added PZR Safety Valve or PZR Manway removed. based upon plant conditions, a PORV could be under maintenance in this plant condition. (PRR 430310)
Step 15	Added indications for RHR Pump Air binding. (PRR 430310)
Step 20e	Added "as directed by the GP in effect" to the step. (PRR 430310)

Section D

Step 12b and 13b	Changed step to Verify one SI Pump - RUNNING from "Start oneSI Pump" based upon comments from a CDBI inspection. (PRR 240036)

AOP-020, Revision 32
Summary of Changes **PRR 432553**
Continued

Section D (Continued)

Step 13c	Changed step to have SI-866B be the first choice for Hot Leg Injection based upon injection into Loop 2 versus Loop 3, which is where the Pzr Surge Line connects to the RCS. (PRR 293076)
Step 23	Added cooldown rate limits to the step. Based upon the potential to be in natural circulation. (PRR 430310)
Step 24 & 37	Added indications for RHR Pump Air binding. (PRR 430310)
Step 26e & 40e	Added additional guidance for adjusting PC-145 to address the lower limit of pressure for RCP operation. (PRR 430310)
Step 43d	Added "as directed by the GP in effect" to the step. (PRR 430310)

Section E

Step 2	Added a new step to check for a PORV LTOPP being defeated. (PRR 383281)
Note 3	This is a note that states the power supplies for PT-500 and PT-501. (PRR 383281)
Steps 3 & 4	These steps were added to the procedure to make sure that the LTOPP system gets restored when power is restored to the pressure instruments. (PRR 383281)
Note 6	New note to provide additional clarity regarding step 6.
Step 6	Revised the step wording to more clearly describe the intent of the step. RNO changed to provide action for OMM-033 closure.
Step 11	Added loss of instrument bus to the step.

Section E (Continued)

Step 13 RNO	Changed the transition in the RNO to step 43 based upon multiple comments. (PRR 383281)
Step 14	New step added to ensure that IA Compressors and Battery Chargers are restored to prevent future problems from a loss of air or DC. CDBI Inspection Comment. If a charging was running, it is restarted. (PRR 240036)
Note 15	This note clarifies what an IDLE RHR Pump is in the following steps. (PRR 432553)
Steps 15, 16, & 17	These steps support restoration of an IDLE RHR Pump if one is aligned per GP-002 or GP-007. (PRR 432553)
Step 18f RNO	Added instructions to start a standby RHR Pump in the step. (PRR 398103)
Step 18h	Added guidance to restore FC-605 to automatic (PRR 455770)
Step 18d and 18j	New steps added to close and reopen HCV-142 (HIC-142) (PRR 216797)
Step 21	Added loss of instrument bus to the RNP to support conditions where the further actions are needed but the low flow alarm was not illuminated.
Notes 24	Added multiple notes regarding the power supply for FC-605 M/A Station, FC-605 Controller, FT-605, and HIC-758. The RNO addresses powering the instruments. (PRR 430310 PRR 408570)
Step 24a	Added instructions to check for power available to controllers and indicator and actions to perform if the components are de-energized. (PRR 408570, PRR 430310)

AOP-020, Revision 32
Summary of Changes PRR 432553
Continued

Section E (Continued)

Step 25	New step to restore FCV-605 to auto mode along with a prompt for other controllers.
Step 29	Added HIC-758 to the step as a potential means to maintain RCS Temperature.
Step 43d RNO	Added a step to implement DSP-009, which will provide RHR Total flow indication with FT-605 de-energized. (PRR 383281)
Step 52	Added guidance to restore FC-605 to auto.
Step 63b and 64b	Changed step to Verify one SI Pump - RUNNING from Start One SI Pump based upon comments from a CDBI inspection. (PRR 240036)
Step 64c	Changed step to have SI-866B be the first choice for Hot Leg Injection based upon injection into Loop 2 versus Loop 3, which is where the Pzr Surge Line connects to the RCS. (PRR 293076)
Attachment 1	Added a note before step 3 to state that RHR-754A is operated by a reach rod and care must be taken to ensure correct position. (PRR 409565)
Attachment 2	Added a note before step 3 to state that RHR-754B is operated by a reach rod and care must be taken to ensure correct position. (PRR 409565)

AOP-020, Revision 32
Summary of Changes PRR 432553
Continued

Attachment 3

Step 6b and 14c	Changed step to have SI-866B be the first choice for Hot Leg Injection based upon injection into Loop 2 versus Loop 3, which is where the Pzr Surge Line connects to the RCS. (PRR 293076)
Step 8 RNO	Added PZR Safety Valve or PZR Manway removed. based upon plant conditions, a PORV could be under maintenance in this plant condition. (PRR 430310)
Step 13b and 14b	Changed step to Verify one SI Pump - RUNNING from Start one SI Pump based upon comments from a CDBI inspection. (PRR 240036)
Attachment 10	Attachment 10 is a new attachment to support aligning an Idle RHR Pump for service if the pump is "idled" per GP-002 or GP-007. (PRR 432553)
Attachments 11A and 11B	Updated Continuous Action Attachment numbers and Step Numbers based upon new attachment 10 and new C/A steps.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

1. PURPOSE

This procedure provides the instructions necessary to mitigate the loss of RHR in all conditions for which RHR can be aligned to provide shutdown cooling. This includes loss of RHR cooling for reasons such as RCS leakage, loss of power, loss of Service Water or Component Cooling Water, RHR pump cavitation, and inadequate RHR flow or abnormal reductions in RHR cooling.

This procedure is applicable in Modes 4, 5, and 6 when fuel is in the vessel.

2. ENTRY CONDITIONS

Direct entry from any condition resulting in a loss of RHR pump(s), RHR pump cavitation, abnormal RHR flow or temperature control, loss of instrument bus, or excessive loss of RCS inventory while RHR is aligned for shutdown cooling.

As directed by the following other procedures:

- AOP-005, Radiation Monitoring System, when a low level in the SFP exists due to an RCS leak with the SFP GATE VALVE open.
- AOP-014, Component Cooling Water System Malfunction, resulting in stopping of the RHR Pumps while in CSD.
- AOP-016, Excessive Primary Plant Leakage, if less than 200°F and leakage exceeds Charging Capacity.
- AOP-017, Loss Of Instrument Air, if the loss of Instrument Air has affected core cooling while on RHR.

- END -

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
* 1.	Check RCS Level - LESS THAN -72 INCHES (69% FULL RANGE RVLIS)	IF RCS Level becomes less than -72 inches (69% FULL RANGE RVLIS), THEN verify BOTH RHR Pumps stopped. Go To Step 3.
2.	Verify BOTH RHR Pumps - STOPPED	
3.	Make PA Announcement For Procedure Entry	

NOTE

FRP-S.1 is NOT applicable for this event unless directed by the CSFSTs.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
4.	From The RTGB, Verify Reactor Tripped As Follows: • REACTOR TRIP MAIN AND BYP - OPEN • Rod Position indication - ZERO • Rod Bottom lights - ILLUMINATED	IF the reactor does NOT trip, THEN dispatch an Operator to the Rod Drive MG Set Room to Open REACTOR TRIP BREAKERS A AND B.
5.	Check PZR PORV - FAILED OPEN FROM LOSS OF POWER OR MALFUNCTION	Go To Step 7
6.	Place LTOPP Arming Switch in NORMAL • PT-500 - PZR PORV PCV-456 OR • PT-501 - PZR PORV PCV-455C	Close the PORV Block valve. • RC-535, PORV BLOCK OR • RC-536, PORV BLOCK
7.	Check RCPs - ANY RUNNING	Observe the NOTE prior to Step 10 and Go To Step 10

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
* 8.	Check RCP No. 1 Seal D/P - LESS THAN 210 PSID.	<u>IF</u> RCP No. 1 Seal D/P lowers to less than 210 psid, <u>THEN</u> perform Step 9. Observe the <u>NOTE</u> prior to Step 10 and Go To Step 10
9.	Stop Any Running RCP(s)	

<u>NOTE</u>

The RCS Level trend should be carefully evaluated. A loss of RCS inventory as a result of a failed open PZR PORV that has been closed should result in a transition to Section E.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
10.	Check RCS Level - LOWERING: • Pressurizer level <u>OR</u> • RCS loop standpipe level <u>OR</u> • RVLIS <u>OR</u> • Refueling Cavity Watch report	<u>IF</u> the event does <u>NOT</u> involve a continuing loss of Inventory, <u>THEN</u> Go To Section E, Loss Of RHR Flow Or Temperature Control. <u>IF</u> RHR Pumps have been stopped due to loss of Inventory, <u>THEN</u> Go To Step 11.
11.	Verify All Letdown Flowpaths Isolated As Follows: • LCV-460A & B, LTDN LINE STOP Valves - CLOSED • HIC-142, PURIFICATION FLOW Controller - ADJUSTED TO 0% • HIC-137, EXCESS LTDN FLOW Controller - ADJUSTED TO 0% • CVC-387, EXCESS LTDN STOP - CLOSED	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
12.	Check Charging Pump Status - ALL STOPPED	Raise speed on the running Charging Pump to maximum. Go To Step 17.
13.	Establish Charging Flow As Follows:	
	a. Check VCT Level - GREATER THAN 12.5 INCHES	a. Perform the following: 1) Verify OPEN LCV-115B, EMERG MU TO CHG SUCT. 2) Verify CLOSED LCV-115C, VCT OUTLET. 3) Go To Step 13.e.
	b. Verify RCS makeup concentration set to value greater than current RCS boron. 1) FCV-113A, BORIC ACID FLOW Controller - POT SET AT 10.0 2) FCV-113A, BORIC ACID FLOW Controller - IN AUTO	
	c. Verify LCV-115C, VCT OUTLET - OPEN	
	d. Verify LCV-115B, EMERG MU TO CHG SUCT - CLOSED	
	e. Verify HIC-121, CHARGING FLOW Controller - ADJUSTED TO 0% (OPEN)	
	f. Verify CVC-310B, LOOP 2 COLD LEG CHG - OPEN	f. Verify OPEN CVC-310A, LOOP 1 HOT LEG CHG.
14.	Start One Charging Pump	
15.	Observe charging flow on FI-122A	
16.	Raise Speed On The Running Charging Pump To Maximum	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
17.	Check RCS Level - LOWERING	<u>IF</u> the RHR System is still in service, <u>THEN</u> Go To AOP-016, Excessive Primary Plant Leakage. <u>IF</u> the operating RHR Pump has been stopped, <u>THEN</u> Go To Step 24.
18.	Start One Additional Charging Pump	<u>IF</u> no other Charging Pumps are available, <u>THEN</u> Go To Step 24.
19.	Raise Speed On The Running Charging Pump To Maximum	
20.	Check RCS Level - LOWERING	<u>IF</u> the RHR System is still in service, <u>THEN</u> Go To AOP-016, Excessive Primary Plant Leakage. <u>IF</u> the operating RHR Pump has been stopped, <u>THEN</u> Go To Step 24.
21.	Start One Additional Charging Pump	<u>IF</u> no other Charging Pumps are available, <u>THEN</u> Go To Step 24.
22.	Raise Speed On The Running Charging Pump To Maximum	
23.	Check RCS Level - LOWERING	<u>IF</u> the RHR System is still in service, <u>THEN</u> Go To AOP-016, Excessive Primary Plant Leakage. Go To AOP-033, Shutdown LOCA.
24.	Check RCS Temperature Prior To Event Start - LESS THAN <u>OR</u> EQUAL TO 200°F	
25.	Stop RHR Pumps	
26.	Isolate RHR By Closing The Following Valves: • RHR-750, RHR LOOP SUPPLY • RHR-751, RHR LOOP SUPPLY • RHR-744A, RHR COLD LEG INJ • RHR-744B, RHR COLD LEG INJ	
27.	Verify All RCPs - STOPPED	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
*28.	Check Charging Pump Suction - ALIGNED TO VCT	IF RWST level lowers to 9%, THEN perform the following: a. Adjust total charging flow to maintain VCT level - GREATER THAN 20 INCHES. b. Verify OPEN LCV-115C, VCT OUTLET. c. Verify CLOSED LCV-115B, EMERG MU TO CHG SUCT d. Verify CLOSED CVC-358, RWST TO CHARGING PUMP SUCTION. Observe NOTE prior to Step 31 and Go To Step 31.
*29.	Check VCT Level - LESS THAN 12.5 INCHES	IF VCT level lowers to less than 12.5 inches, THEN perform Step 30. Observe NOTE prior to Step 31 and Go To Step 31.
30.	Align Charging Pump Suction From The RWST As Follows:	
	a. Check RWST level - GREATER THAN 9%	a. Perform the following: 1) Adjust total charging flow to maintain VCT level - GREATER THAN 20 INCHES. 2) Observe NOTE prior to Step 31 and Go To Step 31.
	b. At the RTGB, verify OPEN LCV-115B, EMERG MU TO CHG SUCT	b. Verify OPEN CVC-358, RWST TO CHARGING PUMP SUCTION, prior to continuing.
	c. Verify CLOSED LCV-115C, VCT OUTLET	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

The intent of this procedure is to maintain the CV Purge in service if the Equipment Hatch is not installed.

31. Initiate CV Closure Using OMM-033, CV Closure

32. Dispatch An Operator To Open The Breakers For Containment Sump Pumps A and B:

    - CV SUMP PUMP A - MCC-2
    - CV SUMP PUMP B - MCC-1

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

The RCS Loops are considered filled if the RCS is capable of being pressurized such that a secondary heat sink can be established through natural circulation.

****

CAUTION

Changes in RCS pressure may result in inaccuracies in RCS Loop Standpipe indications.

****

33.	Check RCS Level Prior To Event Start - BELOW -36 INCHES	Perform the following: a. Implement the EALs. b. Notify the SM <u>OR</u> STA that Attachment 9, Potential Technical Specifications, is available for reference. c. <u>IF</u> the Reactor Vessel Head is removed, <u>THEN</u> Go To Section B, Loss Of RHR Inventory - Vessel Head Off. d. <u>IF</u> the Reactor Vessel Head is installed <u>AND</u> the RCS Loops <u>NOT</u> filled, <u>THEN</u> Go To Section C, Loss Of RHR Inventory - Vessel Head On. e. <u>IF</u> the RCS Loops are filled, <u>THEN</u> Go To Section D, Loss Of RHR Inventory - Level Stable Or Rising.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
34.	Perform the following: a. Implement the EALs b. Notify the SM OR STA that Attachment 9, Potential Technical Specifications, is available for reference c. Go To Section A, Loss Of RHR While At Reduced Inventory	

- END -

Facility: HB ROBINSON

Task No.: 01026100101

Task Title: CV Isolation Phase B and CV Spray Alignment

JPM No.: 2011-2 NRC JPM F

K/A Reference: 026 A4.01 4.5 / 4.3
103 A2.03 3.5 / 3.8

Examinee:

NRC Examiner:

Facility Evaluator:

Date:

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom ______ Simulator __X__ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:

- The plant was operating at 100% RTP when a Large Break LOCA occurred.
- Automatic Reactor Trip and Safety Injection actuated.
- PATH-1 has been implemented.
- Grid Location B-7, CV PRESS REMAINED BELOW 10 PSIG, has been answered as "NO."

Task Standard: Align Phase B Isolation valves and CV Spray valves IAW Supplement B.

Required Materials: Supplement B, Phase B and CV Spray Component Alignment.

General References: PATH-1, Revision 22
Supplement B, Revision 41

Handout: NONE

Initiating Cue:	The CRS has directed you to perform Supplement B to verify the Phase B and CV Spray components alignment.
Time Critical Task:	NO
Validation Time:	5 minutes

SIMULATOR SETUP

1. Reset to IC-811
2. No SCN required.
3. Place simulator in RUN when directed by the examiner.

(Denote Critical Steps with a check mark)

START TIME: ____________

Performance Step: 1 Obtain a copy of the appropriate procedure.

Standard: Candidate obtains a copy of Supplement B, Phase B and CV Spray Component Alignment.

Examiner's Note: **EPP Foldouts and Supplements are located under the RTGB apron at 2 different locations, in the book holder with APP-001 / 002 and in the book holder with APP-009 / 010.**

Comment:

Performance Step: 2 To establish Phase B Containment Isolation, verify the following valves – CLOSED (Supplement B, Step 1)

a. RCP Cooling

- CVC-381, SEAL WTR RTRN ISO
- FCV-626, THERM BAR FLOW CONT
- CC-735, THERM BAR OUT ISO
- CC-716A, CCW TO RCP ISO
- CC-716B, CCW TO RCP ISO
- CC-730, BRG OUTLET ISO

Standard: Candidate determines that valves CVC-381, FCV-626, CC-735, CC-716A, CC-716B and CC-730 are closed by observing the GREEN closed indication for the valves illuminated and the RED open indication extinguished.

Examiner's Note: **Candidate may use the Containment Isolation Phase B status panel to verify the valves in the proper position except for valve FCV-626, which must be verified using the RTGB indication.**

Candidate may use the Containment CSFST indication for Phase "B" Isolation Valve Status to determine the valve positions. This information is obtained by paging over to the Containment CSFST and using the UP or DOWN arrows to access the applicable panel.

Comment:

√ **Performance Step: 3** To establish Phase B Containment Isolation, verify the following valves – CLOSED (Supplement B, Step 1)

b. MSIV AND MSIV BYPs - CLOSED

Standard: Candidate observes the RTGB indication for MSIV valves V1-3A, V1-3B and V1-3C and observes that the RED open indication is illuminated and the GREEN closed indication is extinguished.

Candidate will place the control switches for the MSIV valves V1-3A, V1-3B and V1-3C to the close position and observe that the GREEN closed indication is illuminated and the RED open indication is extinguished.

Candidate will observe that NO RTGB indication is available for the MSIV Bypass valves MS-353A, MS-353B and MS-353C exists due to the breakers for the valves being in the locked open position.

Examiner's Note: **Candidate may use the Containment CSFST indication for MSIV and MSIV Bypass valve positions. The MSIV Bypass valves MS-353A, MS-353B and MS-353C will show INVALID due to the breakers being locked open for the valves.**

The MSIV Bypass valves MS-353A, MS-353B and MS-353C breakers are normally locked open with NO RTGB indication available. If any of the valves are open, OP-923, CV Integrity, attachment will be in place tracking the out of position CV Isolation valve.

Comment:

√ **Performance Step: 4** To establish CV Spray, perform the following: (Supplement B, Step 2)

a. Verify valves positioned as follows:

- SI-844A, PUMP A INLET – OPEN
- SI-844B, PUMP B INLET – OPEN
- SI-845A, SAT DISCH – OPEN
- SI-845B, SAT DISCH – OPEN
- SI-845C, SAT THROTTLING – THROTTLED TO APPROXIMATELY 12 GPM
- SI-880A, PUMP A DISCH – OPEN
- SI-880B, PUMP A DISCH – OPEN
- SI-880C, PUMP B DISCH – OPEN
- SI-880D, PUMP B DISCH – OPEN

Standard: Candidate determines that valves SI-844A, SI-844B, SI-845B, SI-880A and SI-880B are open by observing the RTGB valve indication RED open lights are illuminated and the GREEN closed indication is extinguished.

Candidate determines that valves SI-845A, SI-880C and SI-880D are closed by observing the GREEN closed indication illuminated and the RED open indication extinguished. He will place the control switches for the valves to the OPEN position and verify that the RED open indication is illuminated and the GREEN closed indication is extinguished.

Candidate determines that Spray Additive Flow is greater than 12 GPM by observing FI-949, Spray Additive Flow, and throttles flow to ~ 12 GPM by momentarily placing the control switch for valve SI-845C, SAT Throttling, in the CLOSE position until the desired flow is established.

Examiner's Note: **Candidate may use the Containment Spray status panel to verify that valves SI-880A, SI-880B, SI-880C and SI-880D are open.**

Candidate may use the Containment CSFST indication for Containment Spray Status to determine the valve positions. This information is obtained by paging over to the Containment CSFST and using the UP or DOWN arrows to access the applicable panel.

Comment:

Performance Step: 5 To establish CV Spray, perform the following: (Supplement B, Step 2)

b. Return to procedure and step in effect.

Standard: Candidate has completed the actions in Supplement B and should report the completion of the supplement to the CRS.

Examiner's Cue: **Respond by acknowledging that Supplement B has been completed**

Comment:

END OF TASK

Terminating Cue: **When the candidate reports that Supplement B has been completed, evaluation on this JPM is complete.**

STOP TIME: ____________ ____________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM F

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

- The plant was operating at 100% RTP when a Large Break LOCA occurred.
- Automatic Reactor Trip and Safety Injection actuated.
- PATH-1 has been implemented.
- Grid Location B-7, CV PRESS REMAINED BELOW 10 PSIG, has been answered as "NO."

INITIATING CUE:

The CRS has directed you to perform Supplement B to verify the Phase B and CV Spray components alignment.

INITIAL CONDITIONS:

- The plant was operating at 100% RTP when a Large Break LOCA occurred.
- Automatic Reactor Trip and Safety Injection actuated.
- PATH-1 has been implemented.
- Grid Location B-7, CV PRESS REMAINED BELOW 10 PSIG, has been answered as "NO."

INITIATING CUE:

The CRS has directed you to perform Supplement B to verify the Phase B and CV Spray components alignment.

CONTINUOUS USE

Supplement B

Phase B And CV Spray Component Alignment

(Page 1 of 1)

1. To establish Phase B Containment Isolation, verify the following valves - CLOSED

   a. RCP Cooling

      - CVC-381, SEAL WTR RTRN ISO
      - FCV-626, THERM BAR FLOW CONT
      - CC-735, THERM BAR OUT ISO
      - CC-716A, CCW TO RCP ISO
      - CC-716B, CCW TO RCP ISO
      - CC-730, BRG OUTLET ISO

   b. MSIV AND MSIV BYPs - CLOSED

2. To establish CV Spray, perform the following:

   a. Verify valves positioned as follows:

      - SI-844A, PUMP A INLET - OPEN
      - SI-844B, PUMP B INLET - OPEN
      - SI-845A, SAT DISCH - OPEN
      - SI-845B, SAT DISCH - OPEN
      - SI-845C, SAT THROTTLING - THROTTLED TO APPROXIMATELY 12 GPM
      - SI-880A, PUMP A DISCH - OPEN
      - SI-880B, PUMP A DISCH - OPEN
      - SI-880C, PUMP B DISCH - OPEN
      - SI-880D, PUMP B DISCH - OPEN

   b. Return to procedure and step in effect.

- END -

Facility:	HB ROBINSON	Task No.:	01015100501
Task Title:	Remove Source Range Instrument From Service	JPM No.:	2011-2 NRC JPM G
K/A Reference:	015 A4.03 3.8 / 3.9		

Examiner: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom ______ Simulator __X__ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:

- The plant is in Mode 3 at 547°F.
- Source Range Channel N-31 has failed and has been declared inoperable by the CRS.

Task Standard: N-31 removed from service IAW OWP-011, NI-5.

Required Materials: OWP-011, NI-5

General References: OWP-011, Nuclear Instrumentation, Revision 22

Handouts: OWP-011, NI-5

Initiating Cue: The CRS has directed you to remove N-31 from service IAW OWP-011, NI-5.

Time Critical Task: NO

Validation Time: 6 minutes

SIMULATOR SETUP

1. Reset to IC-812
2. No SCN required.

(Denote Critical Steps with a check mark)

START TIME: ____________

Performance Step: 1 Remove NI-31 from ERFIS SCAN: NIN0031A – REMOVED (OWP-011, NI-5, 1st Step)

Standard: Candidate removes the point from ERFIS scan by performing the following steps:

Delete the ERFIS point from scan

- Access the Delete function by typing DR (Delete/Restore).
- Click on DELETE SCAN
- Enter NIN0031A

Examiner's Note:

Comment:

√ **Performance Step: 2** AUDIO COUNT RATE CHANNEL – CHANNEL SELECTOR switch: Selected to SR 32 (OWP-011, NI-5, 2nd Step)

Standard: Candidate places the Audio Count Rate Channel Selector switch to the SR 32 position and notes the proper audio count rate.

Examiner's Note: **This switch must be pulled out to rotate between the different positions.**

Comment:

Performance Step: 3 START UP RATE CHANNEL SELECT Switch – Selected to NI____ (OWP-011, NI-5, 3rd Step)

Standard: Candidate determines that the Startup Rate Channel selector switch is NOT selected to N-31.

Examiner's Note: **The Startup Rate Selector switch is normally selected to one of the Intermediate Range Channels N-35 or N-36 and is NOT affected by the Source Range failure.**

Comment:

√ **Performance Step: 4** LEVEL: TRIP Switch: BYPASS (OWP-011, NI-5, 4th Step)

Standard: Candidate rotates the Level Trip Bypass switch on the N-31 drawer front to the Bypass position.

Examiner's Note: **APP-005-D4, NIS TRIP / DROP ROD BYPASS, will be received when the level trip switch is positioned to the bypass position.**

Level Trip Bypass will be illuminated on the front of the N-31 drawer.

Comment:

Performance Step: 5 NIS TRIP BYPASS NI-31 Status Light: ILLUM (OWP-011, NI-5, 5th Step)

Standard: Candidate observes that the 2X2 status light on the RTGB is illuminated.

Examiner's Note: **NIS TRIP BYPASS NI-31 Status Light was illuminated when the N-31 Bypass switch was selected to Bypass position.**

Comment:

√ **Performance Step: 6** HIGH FLUX AT SHUTDOWN Switch: BLOCK (OWP-011, NI-5, 6th Step)

Standard: Candidate rotates the High Flux at Shutdown switch on the N-31 drawer front to the BLOCK position.

Examiner's Note: **APP-005-B1, HI FLUX AT SHUTDOWN ALARM BLOCK, annunciator will be received on the RTGB.**

Comment:

<u>END OF TASK</u>

Terminating Cue: **When Source Range Channel N-31 has been removed from service IAW OWP-011, NI-5, evaluation on this JPM is complete.**

STOP TIME: ____________ ____________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM G

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________________ Date: ____________________

INITIAL CONDITIONS:

- The plant is in Mode 3 at 547°F.
- Source Range Channel N-31 has failed and has been declared inoperable by the CRS.

INITIATING CUE:

The CRS has directed you to remove N-31 from service IAW OWP-011, NI-5.

INITIAL CONDITIONS:

- The plant is in Mode 3 at 547°F.
- Source Range Channel N-31 has failed and has been declared inoperable by the CRS.

INITIATING CUE:

The CRS has directed you to remove N-31 from service IAW OWP-011, NI-5.

NI-31, Source Range

1. This revision has been verified to be the latest revision available.

   ______________ (Print) ______________ ________
   Name Signature Date

2. System: NI Work Request No:____________

3. Component: NI-31, Source Range

4. Scope of Work:

   Perform maintenance on Nuclear Instrument NI-31.

5. Testing required on redundant equipment prior to rendering component inoperable:

   N/A

6. Precaution:

   1) Refer to ITS Table 3.3.1-1 for Source Range applicability and operability requirements when not in the Refueling condition (MODE 6)
   2) Reference ITS LCO 3.9.2 during Refueling Operations (MODE 6).
   3) Removal of control power fuses below P-6 will cause a reactor trip signal.
   4) This OWP has been screened in accordance with PLP-037 criteria and determined to be a Case Three activity.

7. Valve/Breaker/Switch lineup has been completed.

   ______________/________
   Signature Date

8. Clearance Issued (If applicable) Clearance No:____________

9. I&C Maintenance lineup complete.

   N/A / N/A
   Signature Date

10. Clearance removed and Valve/Breaker/ Switch lineup restored to normal.

    ______________/________
    Signature Date

11. Source Range NI-31 has been declared operable.

    ______________/________
    Signature Date

VALVE, BREAKER, SWITCH LINEUP

COMPONENT DESCRIPTION	POSITION FOR MAINTENANCE	INIT	RESTORED POSITION	INIT
SOURCE RANGE CHANNEL NI-31				
REMOVE NI-31 from ERFIS SCAN: NIN0031A	REMOVED	____	RESTORED	____
AUDIO COUNT RATE CHANNEL - CHANNEL SELECTOR Switch	Selected to SR 32	____		
START UP RATE CHANNEL SELECT Switch *	NI ____	____		
LEVEL TRIP Switch	BYPASS	____	NORMAL	____
NIS TRIP BYPASS NI-31 Status Light	ILLUM	____	EXTNG	____
HIGH FLUX AT SHUTDOWN Switch	BLOCK	____	NORMAL IF SHUTDOWN OR BLOCK	____

* Switch should be selected to an NI which is **NOT** removed from service.

Facility:	HB ROBINSON	Task No.:	01000106705
Task Title:	Respond To A Loss Of CCW To The RCP Motor Coolers	JPM No.:	2011-2 NRC JPM H

K/A Reference:	008 K1.02	3.3/3.4
	008 K3.03	4.1/4.2
	026 AK3.03	4.0/4.2

Examinee: NRC Examiner: N/A

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: Plant is at 100% RTP.

No equipment is out of service.

You are the Reactor Operator.

Task Standard: Actions taken to ensure the RCPs are NOT damaged. AOP-014, Section D actions completed with the exception of referring to Tech Specs and implementing the EALs.

Required Materials: AOP-014 Main Body and Section D

General References: APP-001-A8, CCW to CRDM LO FLOW

APP-001-B1, RCP BRG COOL WTR LO FLOW

APP-001-D1, RCP THERM BAR COOL WTR LO FLOW

AOP-014, Section D - CCW System Low Flow OR High Temperature

Handouts: AOP-014 Main Body and Section D

Initiating Cue: Respond to plant events.

Time Critical Task: NO

Validation Time: 6 Minutes

SIMULATOR SETUP

1. Reset to IC-813
2. Open SCN: 008_JPM_NRC_H
3. Place simulator in run when directed by the examiner.
4. Execute the CCW failure when directed by the examiner.

(Denote Critical Steps with an asterisk*)

START TIME: _______

Performance Step: 1 Candidate refers to APP-001-A8, B1 and/or D1.

Standard: Candidate observes RCP bearing temperatures are rising and valve CC-716B indicates closed.

Candidate takes action for loss of CCW to RCPs and enters AOP-014, CCW System Malfunction

Examiner's Note:

Comment:

AOP-014, MAIN BODY

Performance Step: 2 Implement The EALs. (Step 1)

Standard: Candidate notifies the SM of EAL implementation.

Examiner's Note: Candidate is NOT responsible for implementing the EALs

Examiner's Cue: **Respond as the SM that you will implement the EALs.**

Comment:

Performance Step: 3 Make PA Announcement for procedure entry (Step 2).

Standard: Candidate makes PA announcement for entry into AOP-014.

Examiner's Note:

Comment:

NOTE

A loss of inventory may be indicated by a report of leakage or lowering of surge tank level.

CCW Pump discharge pressure less than 78 psig will cause an alarm.

CCW low flow is defined as less than 2200 gal per pump.

CCW high temperature is defined as greater than 105°F or greater than 125°F if in Mode 3.

Performance Step: 4 Go To Appropriate Section For Indicated Malfunction (Step 3)

Standard: Candidate proceeds to AOP-014, Section D based on high temperature or low flow.

Examiner's Note:

Comment:

AOP-014, Section D

Performance Step: 5 Monitor RCP temperatures using ERFIS Group Display RCP LOG or RCP Temperature Recorder TR-448 (Step 1)

Standard: Candidate observes rising motor bearing temperatures by displaying GD RCP LOG on ERFIS or monitors TR-448.

Examiner's Note: **Candidate may notice CC-716B closure at any time and may dispatch an Operator for local valve operation.**

BOOTH OPERATOR CUE: **If dispatched to locally open valve CC-716B, report the valve is stuck on the closed seat and will not open manually.**

Comment:

Performance Step: 6 Check APP-001-B1 RCP BRG COOL WTR LO FLOW extinguished. (Step 2)

Standard: Candidate observes that APP-001-B1, RCP BRG COOL WTR LO FLOW is NOT extinguished and goes to RNO Step 2.

Examiner's Note:

Comment:

Performance Step: 7 Verify CC-716A, CC-716B, and CC-730 open: (RNO Step 2.)

Standard: Candidate verifies CC-716A and CC-730 open and attempts to open CC-716B. Determines that CCW flow CANNOT be restored and proceeds to Step 4.

Examiner's Note: The failure of CC-716B may have already been addressed.

Booth Operator Cue: **See JPM Performance Step 5 for local operator actions if directed to manually open valve CC-716B.**

Comment:

Performance Step: 8 Determine if reactor trip is required as follows:
Check Reactor – Critical. (Step 4.a)

Standard: Candidate determines that the reactor is at 100% RTP and is critical.

Examiner's Cue:

Comment:

* **Performance Step: 9** Verify Reactor - TRIPPED (Step 4.b)

Standard: Candidate trips the reactor by depressing either of the 2 reactor trip pushbuttons on the RTGB.

Examiner's Note: **Candidate will state the actions that the reactor has been tripped;**

Reactor trip and bypass breakers open,

All IRPI indicate that rods are on the bottom,

All rod bottom lights are illuminated,

Neutron flux is lowering,

Reactor is tripped.

Comment:

* **Performance Step: 10** Stop ALL affected RCPs (Step 4.c)

Standard: Candidate will stop all of the RCPs by placing the RTGB control switches in the STOP position and observing the GREEN OFF indication for the RCP breakers.

Examiner's Note:

Comment:

Performance Step: 11 Go To PATH-1 while continuing with this procedure. (Step 4.d)

Standard: Candidate informs CRS to enter PATH-1 while he continues in AOP-014.

Examiner's Cue: **Acknowledge as the CRS that you and the BOP will continue in PATH-1 and the RO will continue in AOP-014.**

Comment:

END OF TASK

Terminating Cue: **All RCPs have been secured and task is completed.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM H

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:	Plant is at 100% RTP. No equipment is out of service. You are the Reactor Operator.
INITIATING CUE:	Respond to plant events.

INITIAL CONDITIONS: Plant is at 100% RTP.

No equipment is out of service.

You are the Reactor Operator.

INITIATING CUE: Respond to plant events.

CONTINUOUS USE

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL
VOLUME 3
PART 5
ABNORMAL OPERATING PROCEDURE

AOP-014

COMPONENT COOLING WATER SYSTEM MALFUNCTION

REVISION 30

AOP-014, Revision 30
Summary of Changes (PRR 473133)

Section A

Steps 5 & 19	Changed Path-1 to Path-1 or EOP-E-0 in preparation for EOP upgrade. (PRR 473133)
Step 70 RNO 3	Changed step to GP-006-1 or 2 (PRR 473409)

Section B

Step 6d	Changed Path-1 to Path-1 or EOP-E-0 in preparation for EOP upgrade. (PRR 473133)

Section C

Step 4d	Changed Path-1 to Path-1 or EOP-E-0 in preparation for EOP upgrade. (PRR 473133)

Section D

Step 4d	Changed Path-1 to Path-1 or EOP-E-0 in preparation for EOP upgrade. (PRR 473133)

Purpose and Entry Conditions

(Page 1 of 1)

1. PURPOSE

This procedure provides the instructions necessary to mitigate abnormal conditions associated with Component Cooling Water (CCW) or any reduction in cooling to components served by the CCW System. Instructions for mitigating leakage into and out of the CCW system are also provided.

> **NOTE**
>
> This procedure assumes valid indications are present. This procedure should NOT be entered for transmitter failures.

2. ENTRY CONDITIONS

a. Any abnormal condition associated with the CCW System as indicated by:

- Improper Surge Tank Level
- Low Flow
- High CCW Temperature
- Unacceptable System Leakage

b. From AOP-005, Radiation Monitoring System, following an alarm on radiation monitor R-17 AND a confirmed rise in CCW Surge Tank level.

c. From APP-001 on a loss of CCW flow to the RCPs.

- END -

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

1. Implement The EALs

2. Make PA Announcement For Procedure Entry

NOTE

- A loss of inventory may be indicated by a report of leakage or lowering of surge tank level.
- CCW Pump discharge pressure less than 78 psig will cause an alarm.
- CCW low flow is defined as less than 2200 gal per pump
- CCW high temperature is defined as greater than 105°F or greater than 125°F if in Mode 3.

3. Go To Appropriate Section For Indicated Malfunction:

Loss Of CCW Inventory	Go To Section A
Rising CCW inventory <u>OR</u> R-17 Alarming	Go To Section B
CCW Pump Discharge Pressure Low	Go To Section C
CCW System Low Flow <u>OR</u> High Temperature	Go To Section D

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
4.	Determine If CCW Parameters Are Normal:	
	a. Check RCS temperature - LESS THAN 350°F	a. Perform one of the following: • IF CCW HX outlet temperature is greater than 105°F, THEN Go To Step 3. OR • IF CCW HX outlet temperature is less than 105°F, THEN Go To Step 4.c.
	b. Check CCW HX outlet temperature - LESS THAN 125°F	b. Go To Step 3.
	c. Check CCW HX outlet temperature - STABLE OR DECREASING	c. Go To Step 3.
	d. Check APP-001-F5, CCW PMP LO PRESS - EXTINGUISHED	d. Go To Step 3.
5.	Refer To Technical Specifications For Applicable LCOs • T.S. 3.4.17 - Chemical and Volume Control System (CVCS) • T.S. 3.5.2 - ECCS - Operating • T.S. 3.5.3 - ECCS - Shutdown • T.S. 3.6.6 - Containment Spray and Cooling Systems • T.S. 3.7.6 - Component Cooling Water (CCW) System	
6.	Return to Procedure And Step In Effect	

- END -

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION D

CCW SYSTEM LOW FLOW OR HIGH TEMPERATURE

(Page 1 of 7)

1. Monitor RCP Temperatures Using One Of The Following:

   - ERFIS group display RCP LOG

     OR

   - RCP temperature recorder, TR-448

MOTOR BEARING	RCP A		RCP B		RCP C	
UPPER THRUST	PT.2	TE-417A	PT.9	TE-427A	PT.16	TE-437A
LOWER THRUST	PT.3	TE-417B	PT.10	TE-427B	PT.17	TE-437B
UPPER GUIDE	PT.4	TE-418A	PT.11	TE-428A	PT.18	TE-438A
LOWER GUIDE	PT.5	TE-419	PT.12	TE-429	PT.19	TE-439

2. Check APP-001-B1, RCP BRG COOL WTR LO FLOW - EXTINGUISHED

   Response Not Obtained: Verify the following CCW Valves open:

   - CC-716A, CCW TO RCP ISO
   - CC-716B, CCW TO RCP ISO
   - CC-730, BRG OUTLET ISO

   IF CCW to the RCP(s) can NOT be restored, THEN Go To Step 4.

* 3. Check ANY RCP Motor Bearing Temperature - GREATER THAN 200°F

   Response Not Obtained: IF any RCP Motor Bearing temperature exceeds 200°F, THEN perform Step 4

   Go To Step 5

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION D

CCW SYSTEM LOW FLOW OR HIGH TEMPERATURE

(Page 2 of 7)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
4.	Determine If Reactor Trip Is Required As Follows:	
	a. Check Reactor - CRITICAL	a. Perform the following: 1) Verify Control Rods - TRIPPED 2) Stop ALL Affected RCPs. 3) IF Control Rods were inserted on the trip, THEN perform the following: a) IF RCS temperature is greater than OR equal to 350°F, THEN Go To Step 4.d. b) IF RCS temperature is less than 350°F, THEN Go To Step 5. 4) IF Control Rods were already inserted, THEN Go To Step 5.
	b. Verify Reactor - TRIPPED	
	c. Stop ALL Affected RCPs	
	d. Go To Path-1 OR EOP-E-0, Reactor Trip or Safety Injection, While Continuing With This Procedure	
5.	Check CCW HX OUTLET Temperature - GREATER THAN 105°F	Go To Step 17.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION D

CCW SYSTEM LOW FLOW OR HIGH TEMPERATURE

(Page 3 of 7)

****

CAUTION

If only one SW Pump is running, it is subject to runout until the following step is completed.

****

6. Check SW Header Pressure AND Transition To Steps Indicated By The Table Below:

SW PRESSURE CONDITION	STEP
LESS THAN 40 PSIG	7
GREATER THAN 50 PSIG	8
BETWEEN 40 PSIG AND 50 PSIG	11

7. Raise SW Pressure As Follows:

INSTRUCTIONS	RESPONSE NOT OBTAINED
a. Start additional SW Pumps as necessary to obtain at least 40 psig SW Header pressure	a. IF ALL available SW Pumps are running AND at least 40 psig can NOT be obtained, THEN isolate SW to the Turbine Building by closing: • V6-16C, SW TURB BLDG ISO OR • V6-16A AND V6-16B, SW TURB BLDG SUPPLY
b. Check SW Header pressure - GREATER THAN 50 PSIG	b. Go To Step 11.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION D

CCW SYSTEM LOW FLOW OR HIGH TEMPERATURE

(Page 4 of 7)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
8.	Reduce SW Pressure As Follows:	
	a. Check number of SW Pumps Running - GREATER THAN 2	a. WHEN personnel are available, THEN locally perform Attachment 10, Throttling CCW Heat Exchanger SW Valves, while continuing with this procedure. Go To Step 11.
	b. Stop 1 Pump	
	c. Check SW Header Pressure - GREATER THAN 50 PSIG	c. Go To Step 8.e.
	d. Go To Step 8.a	
	e. Check SW Header pressure - GREATER THAN 40 PSIG	e. WHEN personnel are available, THEN locally perform Attachment 10, Throttling CCW Heat Exchanger SW Valves, while continuing with this procedure.
9.	Check SW To Turbine Building Status - ISOLATED	Go To Step 11.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION D

CCW SYSTEM LOW FLOW OR HIGH TEMPERATURE

(Page 5 of 7)

10. Shutdown Secondary Systems As Follows:

    a. Close all MSIVs AND MSIV BYPASS Valves

    b. Break vacuum to the Condenser as follows:

        1) Depress AND hold the THINK Button

        2) Open VACUUM BREAKER VALVES:

            - MS-70A
            - MS-70B

        3) WHEN Vacuum Breaker Valves are Open, THEN Release the THINK Button

    c. Verify The Following Equipment - STOPPED:

        - FW PUMP A AND B
        - COND PUMP A AND B
        - HEATER DRAIN PUMP A AND B
        - GOV FLUID PUMP A AND B
        - VACUUM PUMP A AND B

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION D

CCW SYSTEM LOW FLOW OR HIGH TEMPERATURE

(Page 6 of 7)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
11.	Reduce Heat Loads On The CCW System As Necessary To Maintain Temperature	
	a. Stop Waste Gas Compressor(s)	
	b. Secure excess letdown	
	c. Check RHR - IN CORE COOLING MODE	c. Go To Step 11.e.
	d. Minimize RCS cooldown rate	
	e. Reduce number of Charging Pumps in service	
	f. Throttle CC-775, CC FROM SPENT FUEL PIT HX BUTTERFLY, to maintain SFP temperature between 115°F and 120°F (located East of Heat Exchanger 9 foot above floor)	
12.	Check CCW Temperature - • LESS THAN 105°F AND • STABLE OR LOWERING	Go To Step 14.
13.	Go To The MAIN BODY, Step 4, Of This Procedure	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

SECTION D

CCW SYSTEM LOW FLOW OR HIGH TEMPERATURE

(Page 7 of 7)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
14.	Check CCW Temperature Based On RCS Temperature - GREATER THAN LIMITS USING TABLE BELOW	Go To the MAIN BODY, Step 4, of this procedure.

RCS TEMPERATURE	CCW TEMPERATURE
GREATER THAN 350°F	105°F
LESS THAN 350°F	125°F

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
15.	Check Plant Status - AT POWER	Go To the MAIN BODY, Step 4, of this procedure.
16.	Initiate An Operability Determination For Components Cooled By CCW	
17.	Check RCP B OR C - RUNNING	Go To the MAIN BODY, Step 4, of this procedure.
18.	Check RCP B - RUNNING	Place PCV-455A, PZR SPRAY 444G, Controller to MAN AND adjust controller output to ZERO.
19.	Check RCP C - RUNNING	Perform the following: a. Place PCV-455B, PZR SPRAY 444H, Controller to MAN AND adjust controller output to ZERO. b. Maintain PZR level between 30% and 40% to provide adequate PZR spray.
20.	Go To The MAIN BODY, Step 4, Of This Procedure	

- END -

Facility:	HB ROBINSON	Task No.:	01344100205
Task Title:	Align Deepwell Pump D to supply cooling water to CCW Heat Exchangers	JPM No.:	2011-2 NRC JPM I
K/A Reference:	076 A2.01 (3.5/3.7) 076 G2.1.30 (4.4/4.0)		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance: ______

Classroom ______ Simulator ______ Plant X

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:

- Plant is in Mode 3 following a reactor trip from 100% RTP
- An attack on the RNP site has resulted in a loss of the Startup Transformer and the Intake Structure.
- EDG B tripped while starting.
- EPP-28, Loss of Ultimate Heat Sink, is in progress.
- MSIVs and MSIV Bypass valves have been closed.
- EPP-28, Attachment 6, Deepwell Cooling to one of the available EDGs, has been completed for EDG A.

Task Standard: Align Deepwell Pump D to supply cooling to Component Cooling Water Heat Exchangers.

Required Materials: EPP-28, Attachment 7

General References: EPP-28, Loss of Ultimate Heat Sink, Revision 10

Handouts:	EPP-28, Attachment 7
Initiating Cue:	The CRS has directed you to align Deepwell Pump D to supply the cooling water to the Component Cooling Water Heat Exchangers IAW EPP-28, Attachment 7.
Time Critical Task:	NO
Validation Time:	12 minutes

SIMULATOR SETUP

N/A

(Denote Critical Steps with a check mark)

START TIME: ____________

CAUTION
The calculated maximum time a CCW Heat Exchanger may operate without cooling to preclude adverse system effects is less than 60 minutes.

NOTE
A locked valve key is required for steps below.

√ **Performance Step: 1** Establish Aux Building SW Drain path as follows: (Att.7, Step 1)

a. Unlock and close SW-23, SW RETURN FROM AUXILIARY BUILDING

Standard: Candidate **simulates** unlocking and closing valve SW-23 by rotating the valve handwheel in the clockwise direction until the closed stop is reached and the position indicator is pointing to CLOSE position.

Examiner's NOTE: **SW-23 is a butterfly valve.**
SW-23 As Found Position – Locked Open

Examiner's CUE: **Valve SW-23 indicates closed.**

Comment:

√ **Performance Step: 2** Establish Aux Building SW Drain path as follows: (Att.7, Step 1)

b. Close SW-739, CCW HEAT EXCHANGER 'A' RETURN

Standard: Candidate **simulates** closing valve SW-739 by rotating the valve handwheel in the clockwise direction until the closed stop is reached and the position indicator is pointing to CLOSE position.

Examiner's NOTE: **SW-739 is a butterfly valve.**

SW-739 As Found Position – Throttled Open

Examiner's CUE: **Valve SW-739 indicates closed.**

Comment:

√ **Performance Step: 3** Establish Aux Building SW Drain path as follows: (Att.7, Step 1)

c. Close SW-740, CCW HEAT EXCHANGER 'B' RETURN

Standard: Candidate **simulates** closing valve SW-740 by rotating the valve handwheel in the clockwise direction until the closed stop is reached and the position indicator is pointing to CLOSE position.

Examiner's NOTE: **SW-740 is a butterfly valve.**

SW-740 As Found Position – Throttled Open

Examiner's CUE: **Valve SW-740 indicates closed.**

Comment:

Performance Step: 4 Establish Aux Building SW Drain path as follows: (Att.7, Step 1)

d. Close the DIESEL SW RETURN valve for the in service EDG

- SW-88, DIESEL "A" RETURN

Standard: Candidate determines that valve SW-88 is closed by attempting to rotate the valve handwheel in the clockwise direction.

Examiner's NOTE: **SW-88 As Found Position – Closed. Valve SW-88 was placed in the closed position during the performance of EPP-28, Attachment 6.**

Examiner's CUE: **Valve SW-88 is closed.**

Comment:

√ **Performance Step: 5** At the in-service EDG, throttle the EDG ALTERNATE COOLING RETURN valve 5.5 turns in the close direction (4 turns open) (Att. 7, Step 2)

- SW-968, EDG A ALTERNATE COOLING RETURN

Standard: Candidate **simulates** closing valve SW-968 5.5 turns by rotating the valve handwheel in the clockwise direction 5.5 turns.

Examiner's NOTE: **SW-968 As Found Position – Unlocked and Open. Valve SW-968 was opened fully during the performance of EPP-28, Attachment 6.**

Examiner's CUE: **Report that valve SW-968 valve has been rotated in the clockwise position for 5.5 turns.**

Comment:

√ **Performance Step: 6**

Open bypass for the normal EDG cooling valve for the in service EDG: (Att. 7, Step 3)

- "A" EDG: SW-87, TCV-1660 BYPASS

Standard:

Candidate **simulates** opening valve SW-87 by rotating the valve handwheel in the counterclockwise direction until the valve comes to a hard stop and stem is extended.

Examiner's NOTE:

SW-87 As Found Position - Closed

Examiner's CUE:

Report that valve SW-87 handwheel has come to a hard stop and the valve stem is extended.

Comment:

Performance Step: 7

Open the in-service DIESEL TEMP CONTROL VALVE outlet: (Att. 7, Step 4)

- SW-86, TCV-1660 OUTLET (A EDG)

Standard:

Candidate **simulates** opening valve SW-86 by rotating the valve handwheel in the counterclockwise direction and observing the stem rising from the operator until the valve no longer rotates in the counterclockwise direction and the stem is extended.

Examiner's NOTE:

SW-86 As Found Position – Closed. Valve SW-86 was closed during the performance of EPP-28, Attachment 6.

Examiner's CUE:

Report that valve SW-86 handwheel has come to a hard stop and the valve stem is extended.

Comment:

√ **Performance Step: 8** Establish CCW HX Cooling as follows: (Att. 7, Step 5)

a. Open SW-268, CCW HEAT EXCHANGER 'A' RETURN VENT.

b. Observe flow from the vent.

c. Close SW-268.

Standard: Candidate **simulates** opening valve SW-268 by rotating the valve handwheel in the counterclockwise direction and observing water flow from the valve. Once venting is complete, close valve SW-268 by rotating the valve handwheel in the clockwise direction until the valve comes to a hard stop and the water ceases to flow.

Examiner's NOTE:

Examiner's CUE: **Report that water is flowing when valve SW-268 is open and the water has stopped flowing when the valve is closed.**

Comment:

√ **Performance Step: 9** Establish CCW HX Cooling as follows: (Att. 7, Step 5)

d. Open SW-257, CCW HEAT EXCHANGER 'B' RETURN VENT.

e. Observe flow from the vent.

f. Close SW-257.

Standard: Candidate **simulates** opening valve SW-257 by rotating the valve handwheel in the counterclockwise direction and observing water flow from the valve. Once venting is complete, close valve SW-257 by rotating the valve handwheel in the clockwise direction until the valve comes to a hard stop and the water ceases to flow.

Examiner's NOTE:

Examiner's CUE: **Report that water is flowing when valve SW-257 is open and the water has stopped flowing when the valve is closed.**

Comment:

√ **Performance Step: 10** Establish CCW HX Cooling as follows: (Att. 7, Step 5)

g. Open EACH CCW HEAT EXCHANGER RETURN Valve 1 Turn:

- SW-739
- SW-740

Standard: Candidate **simulates** opening valves SW-739 and SW-740 by rotating the handwheel in the counterclockwise direction 1 turn each.

Examiner's NOTE: **SW-739 and SW-740 AS Found Position – CLOSED. Valves were closed earlier in this attachment performance.**

Examiner's CUE: **Valves SW-739 and SW-740 have been opened 1 turn each.**

Comment:

NOTE

- **The next two steps are intended to maintain CCW temperature less than 125°F while at the same time maintaining less than 1325 gpm total flow from Deep Well Pump "D". This flow rate can be observed by either maintaining SW pressure greater than 18 psig at the CCW Heat Exchanger OR reading the well water flow indicator located in the EDG Room (FE-11135 or FE-11136).**
- **Note that subsequent steps will cut in additional SW flow to several components (20 to 30 gpm), therefore some margin to 18 psig must be maintained.**

√ **Performance Step: 11** Throttle SW-739 AND SW-740 in equal increments to maintain CCW temperature less than 125°F. (Att. 7, Step 6)

Standard: Candidate **simulates** throttling valves SW-739 and SW-740 open by rotating the valve handwheels in the counterclockwise direction and monitoring the CCW temperature.

Examiner's NOTE: **CCW temperature is NOT available in the CCW Room and the candidate will have to communicate with the Control Room for the temperature to be monitored.**

Examiner's CUE: **Report that CCW temperature is 117°F and stable following the throttling of valves SW-739 and SW-740 open 3 turns each.**

Comment:

√ **Performance Step: 12** Control SW pressure at the CCW Heat Exchanger as follows: (Att. 7, Step 7)

a. Throttle SW-739 AND SW-740 in equal increments to maintain SW pressure greater than 18 psig.

Standard: Candidate **simulates** throttling valves SW-739 and 740 by rotating the valve handwheels in the clockwise direction and observing the pressure indication at PI-1619A and B rising.

Examiner's NOTE: **Flow element FE-11136 is located in EDG A Room on the east side of the diesel. The flow indicator is 0-150 inches water column range with a mark of 1325 GPM on the indicator for excessive flow.**

SW pressure indicators PI-1619A and B are located at the south end of the CCW HXs adjacent to valves SW-739 and 740.

Examiner's CUE: **Report that SW pressure is currently at 17 psig.**

Report SW pressure has risen to 20 psig once valves SW-739 and SW-740 have been throttled closed 1 turn each.

Comment:

Performance Step: 14 Inform the Control Room that CCW cooling has been established. (Att. 7, Step 8)

Standard: Candidate notifies the Control Room that EPP-28, Attachment 7 has been completed for establishing CCW cooling.

Examiner's NOTE:

Examiner's CUE: **Respond as the Control Room that CCW cooling has been established.**

Comment:

END OF TASK

Terminating Cue: **CCW cooling has been established IAW EPP-28, Attachment 7; Evaluation of this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM I

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

- Plant is in Mode 3 following a reactor trip from 100% RTP
- An attack on the RNP site has resulted in a loss of the Startup Transformer and the Intake Structure.
- EDG B tripped while starting.
- EPP-28, Loss of Ultimate Heat Sink, is in progress.
- MSIVs and MSIV Bypass valves have been closed.
- EPP-28, Attachment 6, Deepwell Cooling to one of the available EDGs, has been completed for EDG A.

INITIATING CUE:

The CRS has directed you to align Deepwell Pump D to supply the cooling water to the Component Cooling Water Heat Exchangers IAW EPP-28, Attachment 7.

INITIAL CONDITIONS:

- Plant is in Mode 3 following a reactor trip from 100% RTP
- An attack on the RNP site has resulted in a loss of the Startup Transformer and the Intake Structure.
- EDG B tripped while starting.
- EPP-28, Loss of Ultimate Heat Sink, is in progress.
- MSIVs and MSIV Bypass valves have been closed.
- EPP-28, Attachment 6, Deepwell Cooling to one of the available EDGs, has been completed for EDG A.

INITIATING CUE:

The CRS has directed you to align Deepwell Pump D to supply the cooling water to the Component Cooling Water Heat Exchangers IAW EPP-28, Attachment 7.

ATTACHMENT 7

ESTABLISHING CCW COOLING

(Page 1 of 3)

****

CAUTION

The calculated maximum time a CCW Heat Exchanger may operate without cooling to preclude adverse system effects is less than 60 minutes.

****

NOTE

A locked valve key is required for steps below.

1. Establish Aux Building SW Drain Pathway As Follows:

   a. Unlock and Close SW-23, SW RETURN FROM AUXILIARY BUILDING.

   b. Close SW-739, CCW HEAT EXCHANGER "A" RETURN.

   c. Close SW-740, CCW HEAT EXCHANGER "B" RETURN.

   d. Close the DIESEL SW RETURN valve for the in service EDG:

      - SW-88, DIESEL "A" RETURN

      OR

      - SW-92, DIESEL "B" RETURN

2. At the in-service EDG, throttle the EDG ALTERNATE COOLING RETURN valve 5.5 turns in the close direction (4 turns open):

   - SW-966, EDG B ALTERNATE COOLING RETURN

   OR

   - SW-968, EDG A ALTERNATE COOLING RETURN

ATTACHMENT 7

ESTABLISHING CCW COOLING

(Page 2 of 3)

3. Open Bypass For The Normal EDG cooling valve for the in service EDG:

   - "A" EDG: SW-87, TCV-1660 BYPASS

     OR

   - "B" EDG: SW-91, TCV-1661 BYPASS

4. Open the in-service DIESEL TEMP CONTROL VALVE outlet:

   - SW-90, TCV-1661 OUTLET (B EDG)

     OR

   - SW-86, TCV-1660 OUTLET (A EDG)

5. Establish CCW HX Cooling As Follows:

   a. Open SW-268, CCW HEAT EXCHANGER "A" RETURN VENT.

   b. Observe flow from the vent.

   c. Close SW-268.

   d. Open SW-257, CCW HEAT EXCHANGER "B" RETURN VENT.

   e. Observe flow from the vent.

   f. Close SW-257.

   g. Open EACH CCW HEAT EXCHANGER RETURN Valve 1 Turn:

      - SW-739

      - SW-740

ATTACHMENT 7

ESTABLISHING CCW COOLING

(Page 3 of 3)

NOTE

- The next two steps are intended to maintain CCW temperature less than 125°F while at the same time maintaining less than 1325 gpm total flow from Deep Well Pump "D". This flow rate can be observed by either maintaining SW pressure greater than 18 psig at the CCW Heat Exchanger OR reading the well water flow indicator located in the EDG Room (FE-11135 or FE-11136).
- Note that subsequent steps will cut in additonal SW flow to several components (20 to 30 gpm), therefore some margin to 18 psig must be maintained.

6. Throttle SW-739 AND SW-740 in equal increments to maintain CCW Temperature less than 125°F
7. Control SW pressure at the CCW Heat Exchanger as follows:
   a. Throttle SW-739 AND SW-740 in equal increments to maintain SW pressure greater than 18 psig.
8. Inform the Control Room that CCW cooling Has been established.

- END -

Facility:	HB ROBINSON	Task No.:	01000110805
Task Title:	Startup of Dedicated Shutdown UPS Inverter IAW OP-602	JPM No.:	2011-2 NRC JPM J
K/A Reference:	062 G2.1.20 4.6 / 4.6		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance: ______

Classroom ______ Simulator ______ Plant X

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:

- DS UPS has been removed from service for maintenance.
- Maintenance has been completed and the UPS is ready to be restored to service.
- OP-602, Section 8.1.4, Steps 1a, 1b, 1c and 1d have been completed.

Task Standard: OP-602, Section 8.1.4 has been completed with the DS UPS in service.

Required Materials: OP-602, Revision 56.

General References: OP-602, Dedicated Shutdown System, Revision 56.

Initiating Cue: The CRS has directed you to restore the DS UPS to service IAW OP-602, Section 8.1.4, beginning at Step 8.1.4.2.

Time Critical Task: NO

Validation Time: 6 minutes

(Denote Critical Steps with an asterisk*)

START TIME: ______

Performance Step: 1 Verify OPEN all breakers on DS UPS Inverter (Step 8.1.4.2.a)

- DC INPUT Breaker
- Inverter Output Breaker
- Sync Reference AC Input Breaker

Standard: Candidate simulates verifying the DC Input Breaker, Inverter Output Breaker and Sync Reference AC Input Breaker are open by ensuring that the breaker operating handles are in the down position. obtains all of the required equipment specified in the step.

Examiner's Cue: **Inform the operator that all of the breakers are in the open position.**

Comment:

Performance Step: 2 VERIFY the Manual Bypass Switch is in the Bypass to Load position (Step 8.1.4.2.b)

Standard: Candidate **simulates** verifying that the switch is in the BYPASS TO LOAD position (Operating handle positioned to the RIGHT)

Examiner's Cue: **Inform the operator that the Manual Bypass Switch is positioned to the BYPASS TO LOAD position.**

Comment:

* **Performance Step: 3** CLOSE DC Input Breaker (Step 8.1.4.2.c)

Standard: Candidate simulates closing the DC Input Breaker by placing the breaker operating handle in the up position.

Examiner's Cue: **Inform the operator that the DC Input Breaker is closed.**

Comment:

* **Performance Step: 4** CLOSE Sync Reference AC Input Breaker (Step 8.1.4.2.d)

Standard: Candidate **simulates** closing the Sync Reference AC Input Breaker by placing the breaker operating handle in the up position.

Examiner's Cue: **Inform the operator that the Sync Reference AC Input Breaker is closed.**

Comment:

* **Performance Step: 5** WHEN greater than 30 seconds have elapsed after closing the DC Input Breaker, THEN CLOSE the Inverter Output Breaker (Step 8.12.4.2.e)

Standard: Candidate **simulates** closing the Inverter Output Breaker by placing the breaker operating handle in the up position.

Examiner's Cue: **Inform the operator that the Inverter Output Breaker is closed.**

Comment:

Performance Step: 6 VERIFY In Sync light illuminated (green) (Step 8.1.4.2.f)

Standard: Candidate observes the GREEN In Sync light illuminated on the inverter.

Examiner's Cue: **Inform the candidate that the In Sync GREEN light is illuminated.**

Comment:

* **Performance Step: 7**	TRANSFER Manual Bypass Switch to Normal Operation Position (Step 8.1.4.2.g)
Standard:	Operator **simulates** placing the MANUAL BYPASS SWITCH to the NORMAL OPERATION position by rotating the switch to the LEFT position. .
Examiner's Cue:	**Inform the candidate that the MANUAL BYPASS SWITCH has been placed in the NORMAL OPERATION position.**
Comment:	

Performance Step: 8 CHECK Inverter Supplying Load light illuminated (green) (Step 8.1.4.2.h)

Standard: Candidate observes the GREEN Inverter Supplying Load light illuminated on the inverter.

Examiner's Cue: **Inform the candidate that the Inverter Supplying Load GREEN light is illuminated.**

Comment:

Performance Step: 9 CHECK Bypass Source Supplying Load light extinguished (Step 8.1.4.2.i)

Standard: Candidate observes the AMBER Bypass Source Supplying Load light extinguished on the inverter.

Examiner's Cue: **Inform the candidate that the Bypass Source Supplying Load AMBER light is extinguished.**

Comment:

Performance Step: 10 PRESS Alarm Reset Pushbutton (Step 8.1.4.2.j)

Standard: Operator simulates depressing the ALARM RESET pushbutton (S1) on the inverter.

Examiner's Cue: **Inform the operator that the ALARM RESET pushbutton has been depressed and all alarms are extinguished.**

Comment:

Performance Step: 11 CHECK Inverter AC Output Voltage 116 to 124 volts AC (Step 8.1.4.2.k)

Standard: Operator observes the INVERTER AC OUTPUT VOLT meter for the appropriate voltage.

Examiner's Cue: **Inform the operator that the INVERTER AC OUTPUT VOLT meter indicates 121 Volts AC.**

Examiner's Note:

Comment:

<u>END OF TASK</u>

Termination Cue: DS UPS Inverter has been returned to service IAW OP-602.

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM J

Examinee's Name:

Examiner's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

- DS UPS has been removed from service for maintenance.
- Maintenance has been completed and the UPS is ready to be restored to service.
- OP-602, Section 8.1.4, Steps 1a, 1b, 1c and 1d have been completed.

INITIATING CUE:

The CRS has directed you to restore the DS UPS to service IAW OP-602, Section 8.1.4, beginning at Step 8.1.4.2.

INITIAL CONDITIONS:

- DS UPS has been removed from service for maintenance.
- Maintenance has been completed and the UPS is ready to be restored to service.
- OP-602, Section 8.1.4, Steps 1a, 1b, 1c and 1d have been completed.

INITIATING CUE:

The CRS has directed you to restore the DS UPS to service IAW OP-602, Section 8.1.4, beginning at Step 8.1.4.2.

INIT

8.1.4 Startup of DS Uninterruptible Power Supply (UPS) Inverter

1. Initial Conditions

NOTE:	This section has been screened IAW PLP-037 criteria and determined to be not applicable to PLP-037.

a. This revision has been verified to be the latest revision available. Today Date

b. Power Panel 51 is energized.

c. CKT 2, 5 KVA Inverter, on DS Distribution Panel "A" CLOSED.

d. Power Supply "A" is in service.

2. Instructions

a. **VERIFY** OPEN all breakers on DS UPS Inverter.

- DC Input Breaker OPEN ____
- Inverter Output Breaker OPEN ____
- Sync Reference AC Input Breaker OPEN ____

b. **VERIFY** the Manual Bypass Switch is in the Bypass to Load position. ____

c. **CLOSE** DC Input Breaker. ____

d. **CLOSE** Sync Reference AC Input Breaker. ____

8.1.4.2 (Continued)

INIT

e. **WHEN** greater than 30 seconds have elapsed after closing the DC Input Breaker, **THEN CLOSE** the Inverter Output Breaker. ____

f. **VERIFY** In Sync light illuminated (green). ____

g. **TRANSFER** Manual Bypass Switch to Normal Operation Position. ____

h. **CHECK** Inverter Supplying Load light illuminated (green). ____

i. **CHECK** Bypass Source Supplying Load light extinguished. ____

j. **PRESS** Alarm Reset Pushbutton. ____

k. **CHECK** Inverter AC Output Voltage 116 to 124 volts AC. ____

	Initials	Name (Print)	Date
Performed By:	RO	R.O. Moore	Today

Approved By: ______________________ ____________
Shift Manager Date

Facility:	HB ROBINSON	Task No.:	01000101905
Task Title:	Respond to Control Room Inaccessibility	JPM No.:	2011-2 NRC JPM K
K/A Reference:	068 AA1.06 4.1 / 4.2		

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: X Actual Performance: ______

Classroom ______ Simulator ______ Plant X

START JPM AT THE INSIDE AUXILIARY OPERATORS OFFICE

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:

- Control Room has been evacuated due to a fire in the Control Room kitchen.
- The Shift Manager has implemented AOP-004, Control Room Inaccessibility.
- Charging Pumps B and C are operating.
- You are the Balance of Plant Operator.

Task Standard: AOP-004, Attachment 1, is complete with PZR level being controlled with the band specified.

Required Materials: AOP-004, Revision 19.

General References: AOP-004, Revision 19.

Initiating Cue: The SM directs you to perform the local actions contained in AOP-004, Attachment 1 for the Auxiliary Building Operator.

Time Critical Task: NO

Validation Time: 20 minutes

(Denote Critical Steps with an asterisk*)

START TIME: ______

Performance Step: 1 Obtain the following equipment: (Step 1)

At the Old Fire Equipment Building:

-Two-way radio

-Flashlight

-Locked valve keys

-Locked high rad area key

Standard: Candidate obtains all of the required equipment specified in the step.

Examiner's Cue: **Inform the operator that he has all of the specified equipment.**

Comment:

Performance Step: 2 Verify all of the following breakers – OPEN (Step 2)

- REACTOR TRIP BREAKER A
- REACTOR TRIP BREAKER B
- BYPASS BREAKER A
- BYPASS BREAKER B

Standard: Candidate **simulates** depressing the trip button on the REACTOR TRIP and BYPASS BREAKERS A AND B and notes that GREEN OPEN flag appears in the breaker status window.

Examiner's Cue: **Inform the operator that the GREEN OPEN flag appears in the breaker status window.**

Comment:

Performance Step: 3 Notify the SM/CRS that the reactor has been tripped. (Step 3)

Standard: Candidate notifies the SM/CRS that the reactor has been tripped.

Examiner's Cue: **Respond as the SM that you understand that the reactor has been tripped.**

Comment:

NOTE

If the Control Room was evacuated due to a fire, the ventilation system is de-energized to prevent increasing the amount of oxygen available to support combustion.

Performance Step: 4 Check Control Room Status – CONTROL ROOM EVACUATED DUE TO FIRE (Step 4)

Standard: Candidate determines that Control Room was evacuated due to a fire in the Control Room kitchen as stated in the initial conditions.

Examiner's Cue: **NONE**

Comment:

* **Performance Step: 5**	Open the following breakers at MCC-16: (Step 5) - CONTROL ROOM AIR CONDITIONER, HVA-1A (CMPT 2F) - CONTROL ROOM AIR CLEANING UNIT, HVE-19A (CMPT 4H)
Standard:	Operator locates the breakers for HVA-1A and HVE-19A on MCC-16 and **simulates** opening the breakers by positioning the breaker handle to the down position and the loss of breaker indication.
Examiner's Note:	**SAF-NGGC-2175, Attachment 2, Sheet 3 of 5 for Motor Control Centers (MCC's) (600V or less) specifies that operating breakers with the doors closed is a Hazard Category 0 and refers to Attachment 3.** **Attachment 3, Hazard Category 0 requires 100% Untreated Natural Fabric Long sleeve shirt and pants along with undergarments made from natural fabric and Safety Glasses or Goggles.** **If needed, PPE for electrical safety is located in a locker adjacent to the Inside Auxiliary Operator's office area.**
Examiner's Cue:	**Breakers have been positioned to the down position and the RED and GREEN lights are extinguished.** **If electrical safety PPE is requested, discussion of the PPE required and its location can satisfy the PPE requirements.**
Comment:	

* **Performance Step: 6** Open the following breakers at MCC-18: (Step 6)

- CONTROL ROOM AIR CONDITIONER, HVA-1B (CMPT 2F)
- CONTROL ROOM AIR CLEANING UNIT, HVE-19B (CMPT 4H)

Standard: Operator locates the breakers for HVA-1B and HVE-19B on MCC-18 and **simulates** opening the breakers by positioning the breaker handle to the down position and the loss of breaker indication.

Examiner's Cue: **Breakers have been positioned to the down position and the RED and GREEN lights are extinguished.**

Comment:

* **Performance Step: 7** Open breaker V1-8A, SDAFW PUMP STEAM ISOLATION, at MCC-5 (CMPT 16F) (Step 7)

Standard: Operator **simulates** opening the breaker for V1-8A on MCC-5 by moving the breaker handle in the down position and noting the loss of breaker indication.

Examiner's Cue: **Breaker has been positioned to the down position and the RED and GREEN lights are extinguished.**

Comment:

* **Performance Step: 8**	Open the following breakers at MCC-10: (Step 8) -V2-14A, SDAFW PUMP TO S/G A (CMPT 3C) -V2-16A, MDAFW PUMP HEADER DISCHARGE TO S/G A (NORMAL POWER) (CMPT 4C) -V2-16B, MDAFW PUMP HEADER DISCHARGE TO S/G B (CMPT 4F) -V2-14C, SDAFW PUMP DISCHARGE TO S/G C (CMPT 4M)
Standard:	Operator **simulates** opening the breakers for V2-14A, V2-16A, V2-16B and V2-14C on MCC-10 by moving the breaker handles in the down position and noting the loss of breaker indication.
Examiner's Cue:	**Breakers have been positioned to the down position and the RED and GREEN lights are extinguished.**
Comment:	
Performance Step: 9	Notify the SM/CRS that breakers for the following valves have been opened: (Step 9) V1-8A, V2-14A, V2-14C, V2-16A, V2-16B.
Standard:	Operator notifies the SM that the breakers for valves V1-8A, V2-14A, V2-14C, V2-16A, and V2-16B have been opened.
Examiner's Cue:	**Respond as the SM that you understand that the breakers have been opened.**
Comment:	

Performance Step: 10 Check with SM/CRS LCV-115C breaker – OPEN (Step 10)

Standard: Operator notifies the SM and requests the status of the breaker for valve LCV-115C.

Examiner's Cue: **Respond as the SM that the breaker for LCV-115C has been reported as open.**

Comment:

* **Performance Step: 11** Open CVC-358, RWST TO CHARGING PUMP SUCTION, in the Charging Pump Room. (Step 11)

Standard: Operator **simulates** opening valve CVC-358 by rotating the operating handle 90 degrees.

Examiner's Cue: **Inform the operator that the valve has been opened by rotating the valve operating handle 90 degrees.**

Examiner's Note: **CVC-358 is located in the Charging Pump Room approximately 7 feet from floor level on the west side of Charging Pump B. Operator will probably need a ladder to reach the valve or can describe where a ladder can be obtained (CCW Pump Room).**

Comment:

* **Performance Step: 12** Verify LCV-115C, VOLUME CONTROL TANK OUTLET in the Charging Pump Room – CLOSED (Step 12)

Standard: Operator **simulates** closing valve LCV-115C by declutching the motor and rotating the valve handwheel in the clockwise direction until the valve handwheel no longer turns.

Examiner's Cue: **Inform the operator that the declutching lever has been engaged and the valve has been closed.**

Examiner's Note: **Valve LCV-115C is located above the floor level of the Charging Pump Room on a platform between Charging Pumps B and C. Operator should be able to describe the operation of the valve from the floor level.**

Comment:

NOTE

Steps 13 through 20 are performed at the Charging Pump Room Control Panel or Local Control Panel for Charging Pumps on the South Wall of the Charging Pump Room unless otherwise noted.

* **Performance Step: 13** Place the following transfer switches – IN LOCAL. (Step 13)

- CHARGING PUMP A TRANSFER SW
- CHARGING PUMP B TRANSFER SW
- CHARGING PUMP C TRANSFER SW

Standard: Operator **simulates** placing the Charging Pump LOCAL/REMOTE switches on the Charging Pump Room Control Panel to the LOCAL position by rotating the pistol grip switches.

Examiner's Cue: **Inform the operator that the Charging Pump LOCAL/REMOTE switches has been placed in LOCAL.**

Comment:

* **Performance Step: 14** Verify only one Charging Pump – RUNNING (Step 14)

Standard: Operator **simulates** operating the START / STOP pushbutton controls to ensure that only one Charging Pump is operating by observing the RED running indication on only one pump is illuminated. Diverse indications provided are the noise in the room and observation of the pump rotating.

Examiner's Note: **The candidate will have to stop one of the running charging pumps by depressing the STOP pushbutton and observing the GREEN stop light illuminated.**

Examiner's Cue: **If asked, inform the operator that B and C Charging Pumps are operating prior to any simulated actions.**

Comment:

Performance Step: 15 Check neutron flux NI-51 SOURCE RANGE indication – LESS THAN 1E05 CPS (Step 15)

Standard: Operator observes the NI-51 indicator on the Charging Pump Room Control Panel to determine the present reading.

Examiner's Cue: **Inform the operator that NI-51 indicates 5E03 CPS.**

Comment:

Performance Step: 16 Observe the NOTE prior to Step 18 and Go To Step 18. (Step 16)

Standard: Operator observes the NOTE and proceeds to Step 18.

Examiner's Cue: **NONE**

Comment:

NOTE

Starting duty limitations allow four Charging Pump starts per hour and require a minimum of five minutes between starts.

* **Performance Step: 17** Control PZR level from the Charging Pump Room as follows: (Step 18)

a. Place the selector switch for the running Charging Pump on the CHARGING PUMP SPEED CONTROLLER to MAN

b. Turn the Speed Control Knob counter-clockwise to lower Charging Pump speed to minimum

c. Check PZR level – GREATER THAN 71%

d. Stop the running Charging Pump

Standard: Operator **simulates** placing the Charging Pump Speed Controller to MAN by rotating the switch from AUTO to MAN.

Operator **simulates** rotating the speed control knob counter-clockwise to lower the Charging Pump speed to minimum.

Operator observes PZR level indicator to obtain present reading.

Operator responds to reported PZR level by **simulating** stopping the running Charging Pump.

Examiner's Cue: **Inform the operator that the Charging Pump Speed Controller has been placed in MAN.**

Inform the operator that the speed control knob has been rotated counter-clockwise and Charging Pump speed is at minimum.

Inform the operator that PZR level is at 75%.

Comment:

END OF TASK

Termination: AOP-004, Attachment 1 actions have been performed to maintain RCS inventory within the prescribed control band.

STOP TIME: ____________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2011-2 NRC JPM K

Examinee's Name:

Examiner's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

INITIAL CONDITIONS:

- Control Room has been evacuated due to a fire in the Control Room kitchen.
- The Shift Manager has implemented AOP-004, Control Room Inaccessibility.
- You are the Balance of Plant Operator.

INITIATING CUE:

The SM directs you to perform the local actions contained in AOP-004, Attachment 1 for the Auxiliary Building Operator.

INITIAL CONDITIONS:

- Control Room has been evacuated due to a fire in the Control Room kitchen.
- The Shift Manager has implemented AOP-004, Control Room Inaccessibility.
- You are the Balance of Plant Operator.

INITIATING CUE:

The SM directs you to perform the local actions contained in AOP-004, Attachment 1 for the Auxiliary Building Operator.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

CONTINUOUS USE

ATTACHMENT 1

AUXILIARY BUILDING OPERATOR

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STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

1.	Obtain The Following Equipment:
	• At the Old Fire Equipment Building:
	  • Two-way radio
	  • Flashlight
	  • Locked valve keys
	  • Locked high rad area key	

2.	Verify All Of The Following Breakers - OPEN • REACTOR TRIP BREAKER A • REACTOR TRIP BREAKER B • BYPASS BREAKER A • BYPASS BREAKER B	Trip open the following MG Set Output Breakers: a. GENERATOR A CIRCUIT BREAKER b. GENERATOR B CIRCUIT BREAKER
3.	Notify The SM/CRS That The Reactor Has Been Tripped	

NOTE

If the Control Room was evacuated due to a fire, the ventilation system is de-energized to prevent increasing the amount of oxygen available to support combustion.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
4.	Check Control Room Status - CONTROL ROOM EVACUATED DUE TO FIRE	Go To Step 7.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

CONTINUOUS USE

ATTACHMENT 1

AUXILIARY BUILDING OPERATOR

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5. Open The Following Breakers At MCC-16:
   - CONTROL ROOM AIR CONDITIONER, HVA-1A (CMPT 2F)
   - CONTROL ROOM AIR CLEANING UNIT, HVE-19A (CMPT 4H)
6. Open The Following Breakers At MCC-18:
   - CONTROL ROOM AIR CONDITIONER, HVA-1B (CMPT 2F)
   - CONTROL ROOM AIR CLEANING UNIT, HVE-19B (CMPT 4H)
7. Open Breaker V1-8A, SDAFW PUMP STEAM ISOLATION, At MCC-5 (CMPT 16F)
8. Open The Following Breakers At MCC-10:
   - V2-14A, SDAFW PUMP TO S/G A (CMPT 3C)
   - V2-16A, MDAFW PUMP HEADER DISCHARGE TO S/G A (NORMAL POWER) (CMPT 4C)
   - V2-16B, MDAFW PUMP HEADER DISCHARGE TO S/G B (CMPT 4F)
   - V2-14C, SDAFW PUMP DISCHARGE TO S/G C (CMPT 4M)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

CONTINUOUS USE

ATTACHMENT 1

AUXILIARY BUILDING OPERATOR

(Page 3 of 9)

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
9.	Notify The SM/CRS That Breakers For The Following Valves Have Been Opened: • V1-8A • V2-14A • V2-14C • V2-16A • V2-16B	
*10.	Check with SM/CRS LCV-115C Breaker - OPEN.	Notify SM/CRS to inform you when LCV-115C breaker is open. WHEN LCV-115C breaker is open, THEN perform Steps 11 and 12. Go To Step 13.
11.	Open CVC-358, RWST TO CHARGING PUMP SUCTION, In The Charging Pump Room.	
12.	Verify LCV-115C, VOLUME CONTROL TANK OUTLET In The Charging Pump Room - CLOSED	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

CONTINUOUS USE

ATTACHMENT 1

AUXILIARY BUILDING OPERATOR

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> **NOTE**
>
> Steps 13 through 20 are performed at the Charging Pump Room Control Panel or Local Control Panel for Charging Pumps on the South wall of the Charging Pump Room unless otherwise noted.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
13.	Place The Following Transfer Switches - IN LOCAL • CHARGING PUMP A TRANSFER SW • CHARGING PUMP B TRANSFER SW • CHARGING PUMP C TRANSFER SW	
14.	Verify Only One Charging Pump - RUNNING	
15.	Check Neutron Flux NI-51 SOURCE RANGE Indication - LESS THAN 10^5 CPS	<u>IF</u> 30 minutes have elapsed since the Reactor Trip <u>AND</u> neutron flux is greater than 10^5 CPS, <u>THEN</u> Go To Step 17. Observe the <u>NOTE</u> prior to Step 22 and Go To Step 22.
16.	Observe The <u>NOTE</u> Prior To Step 18 and Go To Step 18	

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

CONTINUOUS USE

ATTACHMENT 1

AUXILIARY BUILDING OPERATOR

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17. Perform The Following To Raise The Quantity Of Borated Water In The RCS:

    a. Place the selector switch on CHARGING PUMP SPEED CONTROLLER to MAN

    b. Turn the Speed Control Knob clockwise to raise Charging Pump speed to maximum

    c. Check PZR Level On LI-607D-1 - GREATER THAN 81%

       RESPONSE NOT OBTAINED: c. WHEN PZR Level is greater than 81%, THEN Go To Step 17.d.

       Observe the NOTE prior to Step 22 and Go To Step 22.

    d. Stop the running Charging Pump

    e. Go To Step 19

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

CONTINUOUS USE

ATTACHMENT 1

AUXILIARY BUILDING OPERATOR

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> NOTE
>
> Starting duty limitations allow four Charging Pump starts per hour and require a minimum of five minutes between starts.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED
*18.	Control PZR Level From The Charging Pump Room As Follows:	
	a. Place the selector switch for the running Charging Pump on CHARGING PUMP SPEED CONTROLLER to MAN	
	b. Turn the Speed Control Knob counter-clockwise to lower Charging Pump speed to minimum	
	c. Check PZR level - GREATER THAN 71%	c. <u>WHEN</u> PZR level is greater than 71%, <u>THEN</u> stop the running Charging Pump <u>AND</u> Go To Step 19. Go To Step 21.
	d. Stop the running Charging Pump	
*19.	Check PZR level - LESS THAN 24%	<u>WHEN</u> PZR level lowers to less than 24%, <u>THEN</u> perform Step 20. Go To Step 21.

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

CONTINUOUS USE

ATTACHMENT 1

AUXILIARY BUILDING OPERATOR

(Page 7 of 9)

20. Raise PZR Level As Follows:

    a. Place a different CHARGING PUMP SPEED CONTROLLER to MAN

    b. Turn the Speed Control Knob for the Charging Pump counter-clockwise to lower speed to minimum

    c. Start the Charging Pump

21. Notify The SM/CRS That PZR Level Is Being Controlled Between 24% And 71%

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

CONTINUOUS USE

ATTACHMENT 1

AUXILIARY BUILDING OPERATOR

(Page 8 of 9)

NOTE

If an additional operator is not available, the Auxiliary Building Operator is expected to periodically monitor PZR pressure in the Charging Pump Room AND operate PZR Heaters in the Rod Control Room.

*22. Check PZR Pressure Indicated On PI-607-E1 In The Charging Pump Room - BETWEEN 2200 PSIG AND 2250 PSIG

Perform the following:

a. Contact the SM/CRS and request an additional operator with a radio.

b. Station the additional operator in the Rod Control Room to operate PZR Backup Heaters AND establish radio contact.

c. Direct the operation of the PZR Backup Heaters as follows:

1) Place the LOCAL/REMOTE switches for the PZR Backup Group Heaters at their respective EMERG-CONTR-STA in the LOCAL position.

2) Operate the PZR Heaters using the START/STOP Pushbuttons.

d. WHEN the PZR pressure is being controlled between 2200 psig and 2250 psig, THEN perform Step 23.

23. Notify The SM/CRS That PZR Pressure Is Being Controlled Between 2200 PSIG And 2250 PSIG

STEP	INSTRUCTIONS	RESPONSE NOT OBTAINED

CONTINUOUS USE

ATTACHMENT 1

AUXILIARY BUILDING OPERATOR

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24. Go To Step 15

- END -