NOTE

A FULL CORE ROD POSITION SCAN IS AVAILABLE ON DEMAND FROM THE CONTROL ROOM WORKSTATIONS ONLY.

THE SCAN DETERMINES THE CURRENT ROD POSITIONS - REFRESHES THIS DISPLAY AND PROVIDES A PRINTOUT.

TO SCAN FROM ANY DISPLAY PRESS SOFTKEY CHANGE THEN SOFTKEY 10 .

MESSAGES

RPIS SCAN AS OF
06-27-2007 10:53:55

CONTROL ROD WITHDRAW

LEGEND

00	ROD FULL IN
	INTERM. ROD POSITION
++	ROD FULL OUT
S	MANUALLY SUBSTITUTED
FF	BAD ROD POSITION

	02	06	10	14	18	22	26	30	34	38	42	46	50	
51					++	++	++	++	++					51
47			++	++	++	++	++	++	++	++	++			47
43		++	++	++	26	++	22	++	26	++	++	++		43
39		++	++	++	++	++	++	++	++	++	++	++		39
35	++	++	26	++	08	++	18	++	08	++	26	++	++	35
31	++	++	++	++	++	++	++	++	++	++	++	++	++	31
27	++	++	22	++	18	++	22	++	18	++	22	++	++	27
23	++	++	++	++	++	++	++	++	++	++	++	++	++	23
19	++	++	26	++	08	++	18	++	08	++	26	++	++	19
15		++	++	++	++	++	++	++	++	++	++	++		15
11		++	++	++	26	++	22	++	26	++	++	++		11
07			++	++	++	++	++	++	++	++	++			07
03					++	++	++	++	++					03
	02	06	10	14	18	22	26	30	34	38	42	46	50	

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

NRC SIM JPM S-2

TITLE: RCIC SYSTEM OPERATION

SAFETY CONSIDERATIONS:

None.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee.
2. This is an ALTERNATE PATH JPM
3. Validation time is 20 minutes.

TASK CONDITIONS:

1. Unit Two (2) is in Mode 1.
2. 0PT-10.1.1, RCIC System Operability Test, is in progress.
3. Personnel are in the field in support of the RCIC surveillance.
4. All pre-job and ALARA briefs have been completed.
5. The HP Window has been notified of the anticipated rad level changes when steam is admitted to the RCIC turbine.
6. Brunswick Security personnel have been notified of restricted access to the Unit Two (2) -17 foot elevation during the RCIC operation.
7. Standby Gas has been started per OP-10 to support testing.
8. 0PT-10.1.1 has been completed up to, and including, Step 7.9.4.
9. A second operator is available to monitor Suppression Pool level and temperature.
10. Drywell to Torus Vacuum Breaker monitoring equipment is installed.

INITIATING CUE:

You are directed by the Unit Two (2) SCO to continue with the performance of 0PT-10.1.1 beginning with Step 7.10.1.

Step 1 – Obtain and Review 0PT-10.1.1.

Obtains and reviews 0PT-10.1.1, begins at step 7.10.1

SAT/UNSAT

Step 2 – OPEN COND PUMP DISCH INBD DRAIN VALVE, E51-F004.

2-E51-F004 is Opened. SAT/UNSAT

Step 3 – CONFIRM RCIC SYSTEM PRESS LOW (A-02, 2-6) annunciator is clear.

SYSTEM PRESS LOW (A-02, 2-6) annunciator is clear. SAT/UNSAT

PROMPT: When oil level is requested, report that it is normal

Step 4 – ENSURE the RCIC lubricant oil level is normal.

RCIC lubricant oil level is normal. SAT/UNSAT

PROMPT: When local suction pressure indication is requested, inform the candidate that suction pressure is 52 psig.

Step 5 – RECORD RCIC pump suction pressure (stopped) indicated on E51-PI-R002 (local) on Attachment 2.

RCIC pump suction pressure (52 psig) recorded on Attachment 2, page 34 of 43..

SAT/UNSAT

Step 6 – IF RCIC pump suction pressure is greater than or equal to 29 psig, THEN RECORD RCIC CONDENSATE CHECK VALVE TO PUMP, E51-F011 and RCIC CONDENSATE PUMP DISCHARGE LINE CHECK VALVE, E51-F047 are closed on Attachment 3.

E51-F011 recorded on Attachment 3, page 37 of 43. SAT/UNSAT

E51-F047 recorded on Attachment 3. SAT/UNSAT

Step 7 – Step 7.10.5 determined to be not applicable.

Step 7.10.5 determined to be not applicable. SAT/UNSAT

PROMPT: WHEN requested, inform the candidate that suppression chamber to drywell vacuum breaker monitoring has been established and that all of the vacuum breakers indicate CLOSED.

Step 8 – IF desired, THEN ESTABLISH MONITORING of the suppression chamber to drywell vacuum breakers.

Suppression chamber to drywell vacuum breaker monitoring established. SAT/UNSAT

Step 9 – CLOSE COND PUMP DISCH INBD DRAIN VLV, E51-F004.

E51-F004 CLOSED. SAT/UNSAT

Step 10 – OPEN REDUNDANT ISOL TO CST VLV, E41-F011.

E41-F011 OPENED.

****CRITICAL STEP**** SAT/UNSAT

Step 11 – START BAROMETRIC CNDSR VACUUM PUMP.

Barometric Condsr Vacuum Pump started. SAT/UNSAT

Step 12 – OPEN COOLING WATER SUPPLY VLV, E51-F046.

E51-F046 Opened.

****CRITICAL STEP**** SAT/UNSAT

Step 13 – THROTTLE OPEN BYPASS TO CST VLV, E51-F022, 2 to 4 seconds, unless otherwise directed by the Unit SCO.

E51-F022 throttled open approximately 3 seconds.

****CRITICAL STEP**** SAT/UNSAT

Step 14 – DISPATCH an auxiliary operator to observe the system discharge piping for excessive motion and water hammer during startup of the RCIC System.

Auxiliary operator dispatched. SAT/UNSAT

Step 15 – EVACUATE all personnel below the Reactor Building 20' Elevation east half.

Announces that personnel evacuate from Reactor Building below the 20' Elevation east half.

SAT/UNSAT

PROMPT: WHEN requested, inform the candidate that suppression pool monitoring has been established.

Step 16 – MONITOR suppression pool temperature at intervals less than or equal to 5 minutes to ensure the average suppression pool temperature is less than 104°F.

Suppression Pool temperature monitoring is established.

SAT/UNSAT

NOTE: Twenty seconds after the 2-E51-F045 is opened, indications of an Exhaust Diaphragm Failure will be present. This should result in an Automatic RCIC Steam Line isolation and RCIC Turbine trip. However, these functions will fail to automatically occur.

Step 17 – Open the RCIC Turbine Steam Supply Valve, 2-E51-F045.

2-E51-F045 is opened.

****CRITICAL STEP**** SAT/UNSAT

NOTE: The recognition of a failure of the E51-F007 and E51-F008 to close and the candidate's actions to close them may be performed in either order.

Step 18 - Recognize RCIC Isolation Signal "A" light is lit and the 2-E51-F007 not closing.

2-E51-F007 failure to isolate is recognized.

SAT/UNSAT

Step 19 – 2-E51-F007 CLOSED by taking the control switch to the CLOSE position.

2-E51-F007 closed using the control switch. ****CRITICAL STEP****

SAT/UNSAT

Step 20 - Recognize RCIC Isolation Signal "B" light is lit and the 2-E51-F008 not closing.

2-E51-F008 failure to isolate is recognized.

SAT/UNSAT

Step 21 – 2-E51-F008 CLOSED by taking the control switch to the CLOSE position.

2-E51-F008 closed using the control switch. ****CRITICAL STEP****

SAT/UNSAT

Step 22 – Recognize RCIC TURBINE TRIP failed to actuate.

RCIC TURBINE TRIP failure recognized. SAT/UNSAT

NOTE: Tripping the RCIC Turbine is not critical because closure of either the E51-F007 or E51-F008 will isolate steam to the RCIC turbine.

Step 23 – RCIC Turbine tripped using the trip pushbutton on the RTGB.

RCIC turbine tripped using the manual pushbutton. SAT/UNSAT

Step 24 – Notify the SCO that RCIC had failed to isolate automatically on a valid signal and that RCIC has been isolated and tripped by operator action.

SCO notified of RCIC status. SAT/UNSAT

TERMINATING CUE: When the 2-E51-F007 and 2-E51-F008 are CLOSED and the SCO is informed of the status, this JPM is complete.

RCIC EXHAUST DIAPHRAGM FAILURE WITH A RCIC FAILURE TO ISOLATE

RELATED TASKS:

217000 K1.07 3.1/3.2 Knowledge of the physical connections and /or cause-effect relationships between REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) and Leak Detection.

217000 A2.14 3.3/3.4 Ability to (a) predict the impact of a rupture disc failure: Exhaust-Diaphragm on the Reactor Core Isolation System (RCIC); and (b) based on those predictions, mitigate the consequences of the abnormal condition.

REFERENCES:
0PT-10.1.1, Rev. 89
TOOLS AND EQUIPMENT:
None.
SAFETY FUNCTION (from NUREG 1123, Rev 2.):
5 – Containment Integrity

Time Required for Completion: 20 Minutes (approximate).

APPLICABLE METHOD OF TESTING
Performance: Simulate___ Actual _X_ Unit: 2
Setting: Control Room ___ Simulator _X_
Time Critical: Yes ___ No _X_ Time Limit N/A
Alternate Path: Yes _X_ No ___

EVALUATION
Trainee: _____
JPM: Pass ___ Fail ___

Comments:

TASK CONDITIONS:

1. Unit Two (2) is in Mode 1.
2. 0PT-10.1.1, RCIC System Operability Test, is in progress.
3. Personnel are in the field in support of the RCIC surveillance.
4. All pre-job and ALARA briefs have been completed.
5. The HP Window has been notified of the anticipated rad level changes when steam is admitted to the RCIC turbine.
6. Brunswick Security personnel have been notified of restricted access to the Unit Two (2) -17 foot elevation during the RCIC operation.
7. Standby Gas has been started per OP-10 to support testing.
8. 0PT-10.1.1 has been completed up to, and including, Step 7.9.4.
9. A second operator is available to monitor Suppression Pool level and temperature.
10. Drywell to Torus Vacuum Breaker monitoring equipment is installed.

INITIATING CUE:

You are directed by the Unit Two (2) SCO to continue with the performance of 0PT-10.1.1 beginning with Step 7.10.1.

KEY

Progress Energy

BRUNSWICK NUCLEAR PLANT

C
Continuous Use

DATE COMPLETED _____
UNIT _____ % PWR_____GMWE_____
SUPERVISOR_____
REASON FOR TEST (check one or more):
____ Routine surveillance
___ WO # _____
____ Other (explain)_____
_____
_____
_____

FREQUENCY:

A. Once every 92 days in Modes 1, 2, and 3.
B. Leakage Walkdown – at least once per 24 months.

PLANT OPERATING MANUAL

VOLUME X

PERIODIC TEST

UNIT
0

0PT-10.1.1

RCIC SYSTEM OPERABILITY TEST

REVISION 89

7.0 PROCEDURAL STEPS

Initials

7.1 **OBTAIN** permission from the Unit SCO to perform this test. J

R1 7.2 **CONFIRM** reactor pressure is between 945 psig and 1045 psig. J

7.2.1 **IF** reactor pressure is less than 945 psig, **THEN SLOWLY INCREASE** the setpoint of the pressure regulator to attain at least 945 psig. N/A

NOTE: Fire watch inspections in the 20' ECCS room should be coordinated with Security to ensure they are completed as required while performing this test. 0FPP-005 requires a fire watch inspection in the 20' ECCS Room once every clock hour. Additionally, 30 minutes should elapse between fire watch inspections in an area. Fire watch inspections established for impairments in areas that could be affected by this test should be coordinated also.

7.3 **CONTACT** Security **AND COORDINATE** fire watch inspections. J

7.4 **PERFORM** the following notifications:

7.4.1 **NOTIFY** E&RC of the estimated time of RCIC turbine operation. J

7.4.2 **WHEN** available, **THEN NOTIFY** I&C and Maintenance Supervisors of RCIC turbine and pump run so they can observe operation, if desired. J

7.5 **ENSURE** prerequisites listed in Section 4.0 are met. J

7.6 **ENSURE** the required data has been recorded in Section 5.0. J

7.7 **ENSURE** RHR is in the suppression pool cooling mode, in accordance with 1(2)OP-17. J

7.8 **PERFORM** the following to place the SBGT in service:

7.8.1 **IF** HPCI is **NOT** in standby, **THEN ENSURE** HPCI *VACUUM PUMP DISCHARGE TO SBGT SYSTEM VALVE, E41-V30*, is open. N/A

7.0 PROCEDURAL STEPS

Initials

7.8.2 **START** SBGT in accordance with 1(2)OP-10. Y

7.8.3 **ENSURE** the following valves are open:

1. *POST LOCA VENT, SGT-V8.* Y
2. *POST LOCA VENT, SGT-V9.* Y

7.9 Verification of Filled Discharge Piping

CAUTION

During system venting, air is **NOT** expected in the system. **IF** air is found, then a W/R should be initiated and the system engineer notified of the condition. The presence of air in the system does **NOT** mean the system is inoperable but can imply component degradation that must be addressed at some point. The test may be continued provided the air in the system is removed by the normal venting process.

7.9.1 **IF** required, **THEN CONNECT** a vent and drain rig to *RCIC PUMP DISCHARGE HEADER VENT VALVE, E51-V33.* N/A

7.9.2 **THROTTLE OPEN** *RCIC PUMP DISCHARGE HEADER VENT VALVE, E51-V33.* Y

7.9.3 **WHEN** a solid stream of water issues from the vent, **THEN CLOSE** *RCIC PUMP DISCHARGE HEADER VENT VALVE, E51-V33.* Y

7.9.4 **IF** desired, **THEN REMOVE** the vent and drain rig. N/A

7.0 PROCEDURAL STEPS

Initials

R29

CAUTION

Performance of this section has the potential to significantly increase area dose rates. During RCIC turbine operation using reactor steam, caution should be used when personnel are entering the south RHR area and the mini-steam tunnel. A portable radiation monitor should be carried to check for high radiation levels and to prevent inadvertent exposure to any personnel entering the area.

7.10 Pump Operability Testing

7.10.1 **OPEN** *COND PUMP DISCH INBD DRAIN VLV, E51-F004.* _____

1. **CONFIRM** *RCIC SYSTEM PRESS LOW* (A-02 2-6) annunciator is clear. _____

7.10.2 **ENSURE** the RCIC lubricant oil level is normal. _____

7.10.3 **RECORD** RCIC pump suction pressure (stopped) indicated on *E51-PI-R002* (local) on Attachment 2. _____

NOTE: A suction pressure of greater than or equal to 29 psig confirms RCIC *CONDENSATE CHECK VALVE TO PUMP, E51-F011,* and *RCIC CONDENSATE PUMP DISCHARGE LINE CHECK VALVE, E51-F047*, are closed.

7.10.4 **IF** RCIC pump suction pressure is greater than or equal to 29 psig, **THEN RECORD** RCIC *CONDENSATE CHECK VALVE TO PUMP, E51-F011* and *RCIC CONDENSATE PUMP DISCHARGE LINE CHECK VALVE, E51-F047* are closed on Attachment 3. _____

7.10.5 **IF** RCIC suction pressure is **NOT** greater than or equal to 29 psig, **THEN PERFORM** the following:

1. **RECORD** RCIC suction pressure and CST level in the Comments Section of Attachment 1. _____

2. **SLOWLY THROTTLE OPEN** *RCIC KEEPFILL STATION BYPASS VALVE, E51-V70*, while monitoring RCIC suction pressure. _____

7.0 PROCEDURAL STEPS Initials

3. **IF** RCIC suction pressure increases to greater than or equal to 29 psig **THEN PERFORM** the following:

   a. **IMMEDIATELY CLOSE** *RCIC KEEPFILL STATION BYPASS VALVE, E51-V70.* _____

   b. **RECORD** RCIC *CONDENSATE CHECK VALVE TO PUMP, E51-F011* and *RCIC CONDENSATE PUMP DISCHARGE LINE CHECK VALVE, E51-F047* are closed on Attachment 3. _____

4. **IF** RCIC suction pressure does **NOT** increase to greater than or equal to 29 psig **AND** flow is evident through the keepfill bypass line, **THEN PERFORM** the following:

   a. **CLOSE** *RCIC KEEPFILL STATION BYPASS VALVE, E51-V70.* _____

   b. **NOTIFY** the Unit SCO that the *E51-F011* and *E51-F047* valve positions could **NOT** be confirmed closed. _____

   c. **NOTIFY** Engineering for determination. _____

NOTE: Technical Specifications 3.6.1.6.2 (Modes 1, 2, or 3) requires completion of 0PT-02.3.1, Suppression Chamber To Drywell Vacuum Breakers Operability Test, within 12 hours following an operation that causes any of the vacuum breakers to open. The test is **NOT** required if vacuum breakers are monitored and determined to remain closed.

7.10.6 **IF** desired, **THEN ESTABLISH MONITORING** of the suppression chamber to drywell vacuum breakers. _____

7.10.7 **CLOSE** *COND PUMP DISCH INBD DRAIN VLV, E51-F004.* _____

7.10.8 **OPEN** *REDUNDANT ISOL TO CST VLV, E41-F011.* _____

7.10.9 **START** *BAROMETRIC CNDSR VACUUM PUMP.* _____

7.10.10 **OPEN** *COOLING WATER SUPPLY VLV, E51-F046.* _____

7.0 PROCEDURAL STEPS

Initials

NOTE: The System Engineer may have trend data that will assist in positioning *BYPASS TO CST VLV, E51-F022*, as needed (ESR 99-00507).

7.10.11 **THROTTLE OPEN** *BYPASS TO CST VLV, E51-F022*, 2 to 4 seconds, unless otherwise directed by the Unit SCO. ____

7.10.12 **DISPATCH** an auxiliary operator to observe the system discharge piping for excessive motion and water hammer during startup of the RCIC System. ____

CAUTION

During the initial startup transient, it is possible for the turbine exhaust rupture discs to release steam. Personnel access below the Reactor Building 20' elevation east half during RCIC initial roll is prohibited. Exceptions require Unit SCO permission.

7.10.13 **EVACUATE** all personnel below the Reactor Building 20' elevation east half. ____

7.10.14 **MONITOR** suppression pool temperature at intervals less than or equal to 5 minute to ensure the average suppression pool temperature is less than 104°F. ____

NOTE: **WHEN** evolutions are in progress with the potential to change suppression pool level, **THEN** a second operator is necessary to monitor suppression pool level.

CAUTION

IF the average suppression pool temperature reaches 104°F, **THEN** testing which adds heat should be terminated.

CAUTION

IF the average suppression pool temperature reaches 110°F, **THEN** the reactor must be manually scrammed to comply with Technical Specifications.

7.10.15 **OPEN** *TURBINE STEAM SUPPLY VLV, E51-F045.* ____

Isolation signal will occur following valve opening

7.0 PROCEDURAL STEPS

Initials

7.10.16 **CONFIRM** RCIC turbine starts and develops a flow of greater than or equal to 400 gpm **AND RECORD** the start time below: _____

_____

NOTE: Depending upon the number of valve motor starts required in the following step, consideration may be given to manually throttling the valve.

NOTE: The required test flow/pressure condition can usually be obtained by increasing the flow controller setpoint to between 480 and 500 gpm, and then throttling *E51-F022* in 0.5 to 1.0 second increments.

CAUTION

1(2) E51-F022 is allowed nine actuations with an average duration of 3 seconds (or less) with at least 15 seconds between actuations in accordance with guidelines established by ESR 94-00802. Any valve actuation, whether in the form of a throttle action, a continuous stroke, or any auto-actuated movement, is considered a motor start. Adherence to the duty cycle requirements will minimize DC valve motor failures.

7.10.17 **ADJUST** RCIC *FLOW CONTROL, E51-FIC-R600*, and *BYPASS TO CST VLV, E51-F022*, as necessary, to obtain a pump discharge pressure of greater than or equal to 1130 psig with a pump flow rate of greater than or equal to 400 gpm. _____

7.10.18 **RECORD** the following **AND CIRCLE** the indicator used when appropriate:

1. Pump discharge pressure on *E51-PI-R601*. _____

   _____psig

2. Pump flow rate on *E51-FIC-R600*. _____

   _____gpm

3. Reactor pressure on *C32-R609* **OR** *C32-R608*. _____

   _____psig

TASK CONDITIONS:

1. Unit Two (2) is in Mode 1.
2. 0PT-10.1.1, RCIC System Operability Test, is in progress.
3. Personnel are in the field in support of the RCIC surveillance.
4. All pre-job and ALARA briefs have been completed.
5. The HP Window has been notified of the anticipated rad level changes when steam is admitted to the RCIC turbine.
6. Brunswick Security personnel have been notified of restricted access to the Unit Two (2) -17 foot elevation during the RCIC operation.
7. Standby Gas has been started per OP-10 to support testing.
8. 0PT-10.1.1 has been completed up to, and including, Step 7.9.4.
9. A second operator is available to monitor Suppression Pool level and temperature.
10. Drywell to Torus Vacuum Breaker monitoring equipment is installed.

INITIATING CUE:

You are directed by the Unit Two (2) SCO to continue with the performance of 0PT-10.1.1 beginning with Step 7.10.1.

Progress Energy | BRUNSWICK NUCLEAR PLANT | C Continuous Use

DATE COMPLETED _____
UNIT _____ % PWR_____GMWE_____
SUPERVISOR_____
REASON FOR TEST (check one or more):
____ Routine surveillance
___ WO # _____
____ Other (explain)_____
_____
_____
_____

FREQUENCY:

A. Once every 92 days in Modes 1, 2, and 3.
B. Leakage Walkdown – at least once per 24 months.

PLANT OPERATING MANUAL

VOLUME X

PERIODIC TEST

UNIT
0

0PT-10.1.1

RCIC SYSTEM OPERABILITY TEST

REVISION 89

1.0 PURPOSE

1.1 This test is performed to determine the operability of the RCIC System in conformance with the requirements specified in the ASME Boiler and Pressure Vessel Code, Section XI, ASME/ANSI-OM-CODE, and Technical Specifications 5.5.6, TRM 3.14 and SR 3.5.3.3, SR 3.6.1.6.1, and SR 3.6.1.6.2. It also satisfies Technical Specification SR 3.6.2.1.1 to monitor suppression pool temperature at least every five minutes while adding heat and Technical Specification 5.5.2 for leak tightness inspection every 24 months.

1.2 The following test quantities shall be measured, observed, or calculated as applicable:

1.2.1 Valve stem travel or disk movement

1.2.2 Pump discharge pressure

1.2.3 Pump flow rate

1.2.4 Reactor pressure

1.2.5 Turbine speed (rpm)

1.2.6 Pump suction pressure (stopped and running)

1.2.7 Pump vibration velocity

1.2.8 Pump lubricant level/pressure

1.2.9 Pump differential pressure (calculated)

2.0 REFERENCES

R1 2.1 Technical Specifications 3.5.3.3, 3.6.1.6.1, 3.6.1.6.2, 3.6.2.1.1, 5.5.2a & b, 5.5.6, TRM 3.14

2.2 FSAR, Section 7.4.1

2.3 1(2)OP-10, Standby Gas Treatment System Operating Procedure

2.4 1(2)OP-16, Reactor Core Isolation Cooling System Operating Procedure

2.0 REFERENCES

2.5 1(2)OP-17, Residual Heat Removal System Operating Procedure

2.6 1(2)OP-51, DC Electrical System Operating Procedure

2.7 1(2)OP-59, Hydrogen Water Chemistry System Operating Procedure

2.8 0OI-65, Operation of IRD Model 890 Data Collector

2.9 SD-16, Reactor Core Isolation Cooling System Description

2.10 ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition

2.11 ANSI/ASME, OM-1987, "Operation and Maintenance of Nuclear Power Plants," w/OMa-1988 Addenda

2.12 0PT-02.3.1, Suppression Chamber To Drywell Vacuum Breakers Operability Test

2.13 0PT-02.3.1b, Suppression Pool to Drywell Vacuum Breaker Position Indication Check

2.14 0ENP-16.1, IST Pump and Valve Data

2.15 0ENP-17, Pump and Valve Inservice Testing (IST)

2.16 NUREG-0737, Item III.D.1.1, Integrity of Systems Outside Containment Likely to Contain Radioactive Material for Pressurized Water Reactors and Boiling Water Reactors

R17 2.17 CP&L Response to NRC Bulletin 88-04, Potential Safety-Related Pump Loss

R18 2.18 GE SIL No. 106 Rev. 2, Suppression Pool Temperature Monitoring and Control

R19 2.19 SOER 89-1, Testing of Steam Turbine/Pump Overspeed Trip Devices

2.20 GE SIL 623, RCIC Pump Discharge Pressure

2.21 EGR-NGGC-0010, System & Component Trending Program and System Libraries

2.22 0ENP-23, Predictive Maintenance Program

2.0 REFERENCES

2.23 Piping Diagram, D-02529, SH.1, Reactor Core Isolation Cooling System, Unit 2

2.24 Piping Diagram, D-02529, SH.2, Reactor Core Isolation Cooling System, Unit 2

2.25 Piping Diagram, D-25029, SH.1, Reactor Core Isolation Cooling System, Unit 1

2.26 Piping Diagram, D-25029, SH.2, Reactor Core Isolation Cooling System, Unit 1

2.27 NUREG 1482, Guidelines For Inservice Testing at Nuclear Power Plants

2.28 0FPP-005, Fire Watch Program

R29 2.29 SOER 01-01, Unplanned Radiation Exposure, Recommendation 6d

3.0 PRECAUTIONS AND LIMITATIONS

3.1 The following annunciators may alarm during the performance of this test:

3.1.1 *RCIC TURBINE TRIPPED* (A-03 5-3)

3.1.2 *RCIC VACUUM TANK PRESS HI* (A-03 6-4)

3.1.3 *RCIC TURB OIL PRESS LO* (A-03 5-4)

3.1.4 *RCIC PUMP DISCH FLOW LO* (A-03 3-4)

3.2 Test Information Attachments 2 and 3 shall be reviewed by the IST group.

3.3 Suppression pool water shall not be injected into the reactor vessel during the performance of this test.

3.0 PRECAUTIONS AND LIMITATIONS

R1 3.4 Confirm suppression pool average temperature less than 105°F every 5 minutes when adding heat to the suppression pool as required by SR 3.6.2.1.1.

3.4.1 When suppression pool average water temperature is greater than 95°F, then suppression pool temperature shall be logged at 30 minute intervals.

R18 3.5 When the RCIC System is discharging steam into the suppression pool, then suppression pool cooling should be in service to insure proper mixing for the best possible indication of average water temperature.

3.6 Suppression pool cooling should be placed in service prior to starting RCIC turbine operation. Both RHR Loops may be required for suppression pool cooling if average cooling water inlet temperature is greater than 80°F.

3.7 Suppression pool average water temperature may be monitored using Process Computer points G050 and G051 for operator convenience. However, Technical Specifications function must be verified using the SPTMS temperature recorders *CAC-TR-4426-1A(2A)* and *CAC-TR-4426-1B(2B)*.

R1 3.8 If average suppression pool temperature reaches 104°F, then RCIC System should be shut down. The maximum allowable suppression pool temperature during testing which adds heat to the suppression pool is 105°F (LCO 3.6.2.1 Action C).

R1 3.9 If average suppression pool temperature exceeds 110°F, then the reactor must be scrammed in accordance with Tech Spec 3.6.2.1.

3.10 When evolutions are in progress that have the potential to change suppression pool level, then a second operator is necessary to monitor suppression pool level.

R17 3.11 Operation of the RCIC System under minimum flow conditions with *MIN FLOW BYPASS TO TORUS VLV, E51-F019*, open should be minimized to reduce suppression pool level increases.

3.12 The steam line to the turbine must be completely drained prior to any turbine operation.

3.13 To ensure adequate oil pressure and to prevent exhaust valve chattering, operation of the RCIC turbine below 2000 rpm should be kept to a minimum.

3.0 PRECAUTIONS AND LIMITATIONS

3.14 DC Limitorque valves are limited to a duty cycle of 3 starts in 5 minutes followed by a 50-minute cooldown period except:

3.14.1 Valves *1(2)E51-F013, 1(2)E51-F019, 1(2)E51-F045,* and *1(2)E51-V8* have a duty cycle of 6 starts and,

3.14.2 *1(2)E51-F022* is allowed 9 actuations with an average duration of 3 seconds (or less) with at least 15 seconds between actuations in accordance with guidelines established by ESR 94-00802.

Any valve actuation, whether in the form of a throttle action, a continuous stroke, or any auto-actuated movement, is considered a motor start. Adherence to the duty cycle requirements will minimize DC valve motor failures.

3.15 The RCIC turbine has the potential for failures that could cause personnel injuries. The potential is most significant when the system is initially started after control system maintenance or after an extended period of being idle. Announcing turbine starts and clearing of all personnel below the Reactor Building 20' elevation east half are required during this period of risk. Permission to access this area during initial RCIC turbine roll requires the approval of the Unit SCO.

R1 3.16 Failure to ensure each suppression chamber to drywell vacuum breaker is closed (0PT-02.3.1b for SR 3.6.1.6.1) and functional (0PT-02.3.1 or observing valve position for SR 3.6.1.6.2) will violate Technical Specifications.

3.17 The vibration velocity readings shall be taken at the test positions specified on the Data Sheet. Ensure the probe is located on the correct bearing in accordance with Attachment 6 and in the correct direction as specified on Attachment 2.

3.18 When taking vibration readings, then the accelerometer probe shall be used with the magnetic holder for each test position and the probe must be in firm contact with the bearing housing.

3.19 When taking pressure readings to be recorded on Attachment 2, the indicator/pointer fluctuation should be reduced to a minimum. A valve upstream of the gauge may be throttled to reduce fluctuation. Care should be taken to ensure proper communication between gauge and main flow path.

3.0 PRECAUTIONS AND LIMITATIONS

3.20 The HPCI System should be operable prior to and during the performance of this test, for Mode 1, 2, and 3 testing.

R29 3.21 During RCIC turbine operation using reactor steam, caution should be used when entering the south RHR area and the mini-steam tunnel. A portable radiation monitor should be carried to check for high radiation levels and to prevent inadvertent exposure to personnel.

3.22 Hydrogen injection rate should be minimized, in accordance with 1(2)OP-59 and Chemistry concurrence, during performance of this test to reduce personnel radiation exposure.

3.23 If RCIC System automatic initiation should occur while the RCIC *FLOW CONTROL, E51-FIC-R600*, is in manual (*M*), then the controller shall be immediately returned to automatic (*A*) to allow proper operation of the system. Depressing the *PF* pushbutton on the controller will immediately place the controller in automatic (*A*) at 400 gpm.

3.24 The RCIC System will be inoperable while the mechanical overspeed device is in the tripped position. Therefore, all efforts to quickly reset the device should be made.

3.25 When using temporary test gauges, then the full scale range of each instrument shall be three times the reference value or less, with adequate low range to prevent damage during use.

3.26 If an overspeed event occurs and pump discharge pressure of greater than 1500 psig is noted, then a routine walk down of the SRHR room for leakage should be performed. Engineering should be contacted for estimation of maximum discharge pressure above 1500 psig, in accordance with ESR 99-00507. If no significant joint leakage is noted and the estimated pressure is less than 2000 psig, an Operations Log entry should be made documenting the overpressure event and walkdown. For discharge pressures estimated greater than 2000 psig, Engineering will provide analysis of the piping equipment prior to declaring the system operable following the event.

3.27 During system venting, air is not expected in the system. If air is found, then a W/O should be initiated and the system engineer notified of the condition. The presence of air in the system does not mean the system is inoperable but can imply component degradation that must be addressed at some point. The test may be continued provided the air in the system is removed by the normal venting process.

3.0 PRECAUTIONS AND LIMITATIONS

3.28 The local lube oil sight glass has a scale that indicates a normal level range. The oil level should be in the normal range when the turbine lube oil system has been shutdown for a while (up to 24 hours may be needed for the level to stabilize after a turbine run). When the turbine lube oil system is in operation, oil level will normally drop and take time to return to the "standstill" normal level in the sight glass, this is not a problem as long as there is visible oil in the sight glass.

4.0 PREREQUISITES

4.1 No other testing or maintenance is in progress that will adversely affect the performance of this test.

4.2 The SBGT System is in standby in accordance with 1(2)OP-10.

4.3 RCIC System is in standby in accordance with 1(2)OP-16.

4.4 The station battery chargers are in operation in accordance with 1(2)OP-51.

R1 4.5 The suppression pool level is between -27 inches and -31 inches.

4.6 Ensure maintenance is available to take oil samples when the run is complete.

5.0 SPECIAL TOOLS AND EQUIPMENT

5.1 Confirm no active corrective maintenance WO exists on the following installed instruments. **IF** any active WO exists, **THEN** operability of the instrument must be resolved and recorded in the General Comments and Recommendations section before the instrument may be used.

	Instrument	WO	WO #
5.1.1	*E51-FT-N003*	yes/no	_____
5.1.2	*E51-FIC-R600*	yes/no	_____
5.1.3	*E51-PT-N004*	yes/no	_____
5.1.4	*E51-PI-R601*	yes/no	_____
5.1.5	*E51-PI-R001*	yes/no	_____
5.1.6	*E51-PI-R004*	yes/no	_____
5.1.7	*E51-PT-N007*	yes/no	_____
5.1.8	*E51-PI-R602*	yes/no	_____
5.1.9	*E51-PT-N008*	yes/no	_____
5.1.10	*E51-PI-R603*	yes/no	_____
5.1.11	*E51-PI-3005*	yes/no	_____
5.1.12	*C32-PT-N008*	yes/no	_____
5.1.13	*C32-PR-R609*	yes/no	_____
5.1.14	*E51-PI-R002*	yes/no	_____
5.1.15	*E51-PI-R003*	yes/no	_____
5.1.16	*C32-PT-N005A*	yes/no	_____
5.1.17	*C32-PT-N005B*	yes/no	_____
5.1.18	*C32-LPR-R608*	yes/no	_____
5.1.19	*E51-C002-2*	yes/no	_____
5.1.20	*E51-C002-EGM*	yes/no	_____
5.1.21	*E51-C002-MAG-PU*	yes/no	_____

5.0 SPECIAL TOOLS AND EQUIPMENT

5.2 Suitable test gauges may be used to obtain data in place of any installed instrument. If used, then record the following information:

ID No. N/A
Range of instrument
Cal date
Cal due date
Parameter being measured N/A

ID No. N/A
Range of instrument
Cal date
Cal due date
Parameter being measured N/A

5.3 Tubing, valves, and fittings to install test gauges (as required).

5.4 Predictive Maintenance personnel will provide the vibration monitoring equipment they will use to collect vibration data. Record the required data below:

Data Collector ID No. DCD-137
Transducer ID No. DCT-947
Data Collector/transducer cal date 1-1-07
Data Collector/transducer cal due date 1-1-08

5.5 Portable speed indicator. If used, then record the following information:

ID No. N/A
Cal date
Cal due date N/A

5.6 Vent and drain rig.

6.0 ACCEPTANCE CRITERIA

This procedure may be considered satisfactory when the following criteria are met:

6.1 Pump Tests

R1

6.1.1 The RCIC System develops a flow rate of greater than or equal to 400 gpm with a pump discharge pressure of greater than or equal to 1125 psig when the steam supply pressure is between 945 psig and 1045 psig.

6.1.2 The pump test data shall be compared to the allowable ranges identified on Test Information Attachment 2.

6.1.3 If deviations fall within the ALERT RANGE of Attachment 2, then the frequency of testing shall be doubled until the cause of the deviation is determined and corrected and either the existing reference values reverified or a new set of reference values established per OMa-1988, Paragraph 6.1.

6.1.4 If the deviations fall within the REQUIRED ACTION RANGE of Attachment 2, the pump shall be declared inoperable and not returned to service until the condition has been corrected.

6.1.5 If completed test results show deviations outside the allowable ACCEPTANCE VALUE, the instrument(s) involved may be re-calibrated and the test rerun. This shall not preclude declaring the pump inoperable.

6.1.6 Deviations from the standard methods of testing will be specified in the procedure.

6.2 Check Valve Exercising

6.2.1 Valve exercising to the full open position shall be satisfied by demonstrating the ability to pass maximum accident condition flow. Flow rates less than maximum accident flow are considered partial exercise tests.

6.2.2 Valve exercising to the closed position shall be considered satisfactory by demonstrating the ability to establish a differential pressure across the valve seat or by opening an upstream drain connection and confirming the absence of pressurized flow with pressure on the downstream side.

6.0 ACCEPTANCE CRITERIA

6.3 Leak Tightness Examination

6.3.1 Identified leakage is recorded on Attachment 4, Leak Identification Data Sheet, and a Work Request (WR) is initiated for any leakage with the exception of packing and gasket leakage less than 5 drops per minute (dpm). The WR shall state that identified leakage is required to be corrected or minimized as required by TS 5.5.2.

6.3.2 For 'through-wall' or 'through-weld' leakage, a Nuclear Condition Report (NCR) is initiated to assess structural integrity of the affected component.

7.0 PROCEDURAL STEPS

Initials

7.1 **OBTAIN** permission from the Unit SCO to perform this test. Y

R1 7.2 **CONFIRM** reactor pressure is between 945 psig and 1045 psig. Y

7.2.1 **IF** reactor pressure is less than 945 psig, **THEN SLOWLY INCREASE** the setpoint of the pressure regulator to attain at least 945 psig. N/A

NOTE: Fire watch inspections in the 20' ECCS room should be coordinated with Security to ensure they are completed as required while performing this test. 0FPP-005 requires a fire watch inspection in the 20' ECCS Room once every clock hour. Additionally, 30 minutes should elapse between fire watch inspections in an area. Fire watch inspections established for impairments in areas that could be affected by this test should be coordinated also.

7.3 **CONTACT** Security **AND COORDINATE** fire watch inspections. Y

7.4 **PERFORM** the following notifications:

7.4.1 **NOTIFY** E&RC of the estimated time of RCIC turbine operation. Y

7.4.2 **WHEN** available, **THEN NOTIFY** I&C and Maintenance Supervisors of RCIC turbine and pump run so they can observe operation, if desired. Y

7.5 **ENSURE** prerequisites listed in Section 4.0 are met. Y

7.6 **ENSURE** the required data has been recorded in Section 5.0. Y

7.7 **ENSURE** RHR is in the suppression pool cooling mode, in accordance with 1(2)OP-17. Y

7.8 **PERFORM** the following to place the SBGT in service:

7.8.1 **IF** HPCI is **NOT** in standby, **THEN ENSURE** HPCI *VACUUM PUMP DISCHARGE TO SBGT SYSTEM VALVE, E41-V30*, is open. N/A

7.0 PROCEDURAL STEPS Initials

7.8.2 **START** SBGT in accordance with 1(2)OP-10. Y

7.8.3 **ENSURE** the following valves are open:

1. *POST LOCA VENT, SGT-V8.* Y
2. *POST LOCA VENT, SGT-V9.* Y

7.9 Verification of Filled Discharge Piping

CAUTION

During system venting, air is **NOT** expected in the system. **IF** air is found, then a W/R should be initiated and the system engineer notified of the condition. The presence of air in the system does **NOT** mean the system is inoperable but can imply component degradation that must be addressed at some point. The test may be continued provided the air in the system is removed by the normal venting process.

7.9.1 **IF** required, **THEN CONNECT** a vent and drain rig to *RCIC PUMP DISCHARGE HEADER VENT VALVE, E51-V33.* N/A

7.9.2 **THROTTLE OPEN** *RCIC PUMP DISCHARGE HEADER VENT VALVE, E51-V33.* Y

7.9.3 **WHEN** a solid stream of water issues from the vent, **THEN CLOSE** *RCIC PUMP DISCHARGE HEADER VENT VALVE, E51-V33.* Y

7.9.4 **IF** desired, **THEN REMOVE** the vent and drain rig. N/A

7.0 PROCEDURAL STEPS

Initials

R29

CAUTION

Performance of this section has the potential to significantly increase area dose rates. During RCIC turbine operation using reactor steam, caution should be used when personnel are entering the south RHR area and the mini-steam tunnel. A portable radiation monitor should be carried to check for high radiation levels and to prevent inadvertent exposure to any personnel entering the area.

7.10 Pump Operability Testing

7.10.1 **OPEN** *COND PUMP DISCH INBD DRAIN VLV, E51-F004*. _____

1. **CONFIRM** *RCIC SYSTEM PRESS LOW* (A-02 2-6) annunciator is clear. _____

7.10.2 **ENSURE** the RCIC lubricant oil level is normal. _____

7.10.3 **RECORD** RCIC pump suction pressure (stopped) indicated on *E51-PI-R002* (local) on Attachment 2. _____

NOTE: A suction pressure of greater than or equal to 29 psig confirms RCIC *CONDENSATE CHECK VALVE TO PUMP, E51-F011,* and *RCIC CONDENSATE PUMP DISCHARGE LINE CHECK VALVE, E51-F047*, are closed.

7.10.4 **IF** RCIC pump suction pressure is greater than or equal to 29 psig, **THEN RECORD** RCIC *CONDENSATE CHECK VALVE TO PUMP, E51-F011* and *RCIC CONDENSATE PUMP DISCHARGE LINE CHECK VALVE, E51-F047* are closed on Attachment 3. _____

7.10.5 **IF** RCIC suction pressure is **NOT** greater than or equal to 29 psig, **THEN PERFORM** the following:

1. **RECORD** RCIC suction pressure and CST level in the Comments Section of Attachment 1. _____

2. **SLOWLY THROTTLE OPEN** *RCIC KEEPFILL STATION BYPASS VALVE, E51-V70*, while monitoring RCIC suction pressure. _____

7.0 PROCEDURAL STEPS

Initials

3. **IF** RCIC suction pressure increases to greater than or equal to 29 psig **THEN PERFORM** the following:

   a. **IMMEDIATELY CLOSE** *RCIC KEEPFILL STATION BYPASS VALVE, E51-V70.* _____

   b. **RECORD** RCIC *CONDENSATE CHECK VALVE TO PUMP, E51-F011* and *RCIC CONDENSATE PUMP DISCHARGE LINE CHECK VALVE, E51-F047* are closed on Attachment 3. _____

4. **IF** RCIC suction pressure does **NOT** increase to greater than or equal to 29 psig **AND** flow is evident through the keepfill bypass line, **THEN PERFORM** the following:

   a. **CLOSE** *RCIC KEEPFILL STATION BYPASS VALVE, E51-V70.* _____

   b. **NOTIFY** the Unit SCO that the *E51-F011* and *E51-F047* valve positions could **NOT** be confirmed closed. _____

   c. **NOTIFY** Engineering for determination. _____

NOTE: Technical Specifications 3.6.1.6.2 (Modes 1, 2, or 3) requires completion of 0PT-02.3.1, Suppression Chamber To Drywell Vacuum Breakers Operability Test, within 12 hours following an operation that causes any of the vacuum breakers to open. The test is **NOT** required if vacuum breakers are monitored and determined to remain closed.

7.10.6 **IF** desired, **THEN ESTABLISH MONITORING** of the suppression chamber to drywell vacuum breakers. _____

7.10.7 **CLOSE** *COND PUMP DISCH INBD DRAIN VLV, E51-F004.* _____

7.10.8 **OPEN** *REDUNDANT ISOL TO CST VLV, E41-F011.* _____

7.10.9 **START** *BAROMETRIC CNDSR VACUUM PUMP.* _____

7.10.10 **OPEN** *COOLING WATER SUPPLY VLV, E51-F046.* _____

7.0 PROCEDURAL STEPS

Initials

NOTE: The System Engineer may have trend data that will assist in positioning *BYPASS TO CST VLV, E51-F022*, as needed (ESR 99-00507).

7.10.11 **THROTTLE OPEN** *BYPASS TO CST VLV, E51-F022*, 2 to 4 seconds, unless otherwise directed by the Unit SCO. _____

7.10.12 **DISPATCH** an auxiliary operator to observe the system discharge piping for excessive motion and water hammer during startup of the RCIC System. _____

CAUTION

During the initial startup transient, it is possible for the turbine exhaust rupture discs to release steam. Personnel access below the Reactor Building 20' elevation east half during RCIC initial roll is prohibited. Exceptions require Unit SCO permission.

7.10.13 **EVACUATE** all personnel below the Reactor Building 20' elevation east half. _____

7.10.14 **MONITOR** suppression pool temperature at intervals less than or equal to 5 minute to ensure the average suppression pool temperature is less than 104°F. _____

NOTE: **WHEN** evolutions are in progress with the potential to change suppression pool level, **THEN** a second operator is necessary to monitor suppression pool level.

CAUTION

IF the average suppression pool temperature reaches 104°F, **THEN** testing which adds heat should be terminated.

CAUTION

IF the average suppression pool temperature reaches 110°F, **THEN** the reactor must be manually scrammed to comply with Technical Specifications.

7.10.15 **OPEN** *TURBINE STEAM SUPPLY VLV, E51-F045.* _____

7.0 PROCEDURAL STEPS Initials

7.10.16 **CONFIRM** RCIC turbine starts and develops a flow of greater than or equal to 400 gpm **AND RECORD** the start time below: _____

_____

NOTE: Depending upon the number of valve motor starts required in the following step, consideration may be given to manually throttling the valve.

NOTE: The required test flow/pressure condition can usually be obtained by increasing the flow controller setpoint to between 480 and 500 gpm, and then throttling *E51-F022* in 0.5 to 1.0 second increments.

CAUTION

1(2) E51-F022 is allowed nine actuations with an average duration of 3 seconds (or less) with at least 15 seconds between actuations in accordance with guidelines established by ESR 94-00802. Any valve actuation, whether in the form of a throttle action, a continuous stroke, or any auto-actuated movement, is considered a motor start. Adherence to the duty cycle requirements will minimize DC valve motor failures.

7.10.17 **ADJUST** RCIC *FLOW CONTROL, E51-FIC-R600*, and *BYPASS TO CST VLV, E51-F022*, as necessary, to obtain a pump discharge pressure of greater than or equal to 1130 psig with a pump flow rate of greater than or equal to 400 gpm. _____

7.10.18 **RECORD** the following **AND CIRCLE** the indicator used when appropriate:

1. Pump discharge pressure on *E51-PI-R601*. _____

   _____psig

2. Pump flow rate on *E51-FIC-R600*. _____

   _____gpm

3. Reactor pressure on *C32-R609* **OR** *C32-R608*. _____

   _____psig

7.0 PROCEDURAL STEPS

Initials

4. Steam inlet pressure on *E51-PI-R602* **OR** *E51-PI-R003* (local). _____

_____psig

5. Steam exhaust pressure on *E51-PI-R603* **OR** *E51-PI-R004* (local). _____

_____psig

NOTE: A turbine steam exhaust pressure of less than or equal to 30 psig on *E51-PI-R603* or *E51-PI-R004* (local), confirms *TURBINE EXHAUST CHECK VALVE, E51-F040*, and *TURBINE EXHAUST STOP CHECK VALVE, E51-F001*, are open.

7.10.19 **CONFIRM** turbine steam exhaust pressure is less than or equal to 30 psig **AND RECORD** *TURBINE EXHAUST CHECK VALVE, E51-F040* and *TURBINE EXHAUST STOP CHECK VALVE, E51-F001* are open on Attachment 3. _____

NOTE: Pump operation should remain as stable as possible during the examination.

NOTE: A leakage walkdown is required to be performed every 24 months in accordance with TS 5.5.2.

7.10.20 **IF** required, **THEN PERFORM** a leak tightness examination of components identified on Attachment 7, **AND RECORD** any leakage observed on Attachment 4. _____

7.10.21 **WHEN** leak tightness examination is complete **OR** determined **NOT** needed, **THEN PERFORM** the following:

1. **PLACE** RCIC *FLOW CONTROL, E51-FIC-R600,* in manual (*M*). _____

NOTE: Local speed verification using the portable speed indicator is preferred.

2. **ADJUST** RCIC *FLOW CONTROL, E51-FIC-R600,* as necessary, to obtain approximately 2500 rpm. _____

7.0 PROCEDURAL STEPS

Initials

3. **OPEN** *BYPASS TO CST VLV, E51-F022.* _____

4. **SLOWLY OPEN** *E51-PI-R001 INSTRUMENT ISOLATION VALVE, E51-PI-R001-3.* _____

5. **ADJUST** RCIC *FLOW CONTROL, E51-FIC-R600* **OR** *BYPASS TO CST VLV, E51-F022,* as necessary, to attain the reference values given on Attachment 2 in accordance with the following:

   a. Turbine speed of 2500 rpm on *E51-C002-2* **OR** 2485 to 2515 rpm on portable speed indicator. _____

   b. System flow of 465 gpm for Unit 1 (480 gpm for Unit 2). _____

NOTE: To minimize the potential for delays, it is allowable to check that the pump dP is in the acceptable range shown on Attachment 2 prior to the 2-minute hold period.

NOTE: The RCIC System shall operate for at least 2 minutes under conditions as stable as the system permits prior to recording test data.

7.10.22 **RECORD** the following information on Attachment 2 **AND CIRCLE** the indicator used:

1. RCIC suction pressure (running) on *E51-PI-R002* (local). _____

2. RCIC discharge pressure on *E51-PI-R001* (local). _____

3. RCIC turbine speed on *E51-C002-2* **OR** strobe tach (local). _____

4. RCIC system flow on *E51-FIC-R600.* _____

5. RCIC pump vibration velocity (in/sec peak) at the test positions designated on Attachment 2. _____

7.10.23 **CLOSE** *E51-PI-R001 INSTRUMENT ISOLATION VALVE, E51-PI-R001-3.* _____ / Ind.Ver.

7.0 PROCEDURAL STEPS

Initials

NOTE: Steps 7.10.24 through 7.10.28 may be performed at any time after RCIC is running and may be performed in any sequence, as appropriate, with concurrence from the Unit SCO.

7.10.24 **ENSURE** the RCIC lubricant oil level is normal **AND RECORD** on Attachment 2. _____

NOTE: Operability of the keep-fill check valves are performed as a pair.

NOTE: A pressure indication on *E51-PI-R601* greater than *E51-PI-3005* confirms *RCIC KEEPFILL STATION OUTLET CHECK, E51-V72* and *RCIC KEEPFILL STATION OUTLET CHECK VALVE, E51-V73*, are closed.

7.10.25 **IF** pressure indication on *E51-PI-R601* is greater than *E51-PI-3005*, **THEN RECORD** *RCIC KEEPFILL STATION OUTLET CHECK, E51-V72 and RCIC KEEPFILL STATION OUTLET CHECK VALVE, E51-V73,* are closed on Attachment 3. _____

7.10.26 **IF** pressure indication on *E51-PI-3005* is greater than *E51-PI-R601* or *E51-PI-3005* is off-scale high, **THEN PERFORM** the following:

1. **CONNECT** a drain hose at *E51-PI-3005 INSTRUMENT DRAIN VALVE, E51-PI-3005-6,* **AND ROUTE** to floor drain. _____

2. **CLOSE** *RCIC KEEPFILL STATION INLET ISOLATION VALVE, E51-V66.* _____

3. **OPEN** *E51-PI-3005 INSTRUMENT DRAIN VALVE, E51-PI-3005-6,* and drain for at least 3 minutes. _____

7.0 PROCEDURAL STEPS

Initials

NOTE: The absence of flow under pressure during the following venting sequence confirms one or both of the keep fill check valve(s) (*RCIC KEEPFILL STATION OUTLET CHECK, E51-V72, RCIC KEEPFILL STATION OUTLET CHECK VALVE, E51-V73*) go to the closed position and satisfies reverse exercise requirements. It is acceptable that some drainage will be present.

NOTE: **IF** the check valve can **NOT** be determined to be closed, **THEN** a W/R shall be written.

4. **CONFIRM** *KEEPFILL STATION OUTLET CHECK, E51-V72*, and *RCIC KEEPFILL STATION OUTLET CHECK VALVE, E51-V73* are closed, **AND RECORD** on Attachment 3. _____

5. **CLOSE** *E51-PI-3005 INSTRUMENT DRAIN VALVE, E51-PI-3005-6.* ___/___ Ind.Ver.

6. **OPEN** *RCIC KEEPFILL STATION INLET ISOLATION VALVE, E51-V66.* ___/___ Ind.Ver.

NOTE: RCIC System flow of greater than or equal to 400 gpm confirms *CONDENSATE STORAGE TANK SUCTION CHECK VALVE, E51-F011*, and *PUMP DISCHARGE CHECK VALVE, E51-F014*, are open.

7.10.27 **CONFIRM** RCIC System flow is greater than or equal to 400 gpm **AND RECORD** *CONDENSATE STORAGE TANK SUCTION CHECK VALVE, E51-F011* and *PUMP DISCHARGE CHECK VALVE, E51-F014* are open on Attachment 3. _____

7.10.28 **IF** the Unit SCO deems it appropriate for current plant conditions, **THEN CONTINUE** RCIC system operation **AND ADJUST** parameters, as needed to obtain additional data or confirm proper system operation as required within the following: _____

1. Within vendors rated speed range of approximately 2000 rpm to 4600 rpm.

2. Within the flow and pressure limits of the control room flow and discharge pressure indicators, unless specifically authorized by the Unit SCO.

3. Stable system operation if flow is below 120 gpm.

4. Minimize time with *MIN FLOW BYPASS TO TORUS VLV, E51-F019*, open on low flow.

7.10.29 **WHEN** RCIC run is complete, **THEN PERFORM** the following to trip the RCIC turbine:

1. **ENSURE** RCIC *FLOW CONTROL, E51-FIC-R600* in Manual (*M*). _____

2. **IF** RCIC turbine speed is above 2600 rpm, **THEN ADJUST** RCIC *FLOW CONTROL, E51-FIC-R600*, as necessary, to obtain 2400 to 2600 rpm. _____

3. **DEPRESS** *TURBINE TRIP, E51-S17*, push button to trip the RCIC turbine. _____

7.10.30 **CLOSE** *TURBINE STEAM SUPPLY VLV, E51-F045.* _____

7.10.31 **CLOSE** *TURBINE TRIP & THROTTLE VLV, E51-V8*, motor operator **AND HOLD** the control switch in *CLOSE* for approximately 5 seconds after full closed indication to ensure latch mechanism engagement. _____

7.10.32 **OPEN** *TURBINE TRIP & THROTTLE VLV, E51-V8.* _____

7.10.33 **OPEN** *TORUS SUCTION VLV, E51-F031.* _____

7.10.34 **OPEN** *TORUS SUCTION VLV, E51-F029.* _____

7.10.35 **CONFIRM** *CST SUCTION VLV, E51-F010*, closes. _____

7.10.36 **CONFIRM** *BYPASS TO CST VLV, E51-F022*, closes. _____

7.10.37 **OPEN** *TURBINE STEAM SUPPLY VLV, E51-F045.* _____

7.10.38 **CONFIRM** RCIC turbine starts and accelerates. _____

7.10.39 **ADJUST** RCIC *FLOW CONTROL, E51-FIC-R600*, as necessary, to obtain 2400 to 2600 rpm. _____

7.10.40 **CONFIRM** *MIN FLOW BYPASS TO TORUS VLV, E51-F019*, opens. _____

7.0 PROCEDURAL STEPS

Initials

NOTE: *PUMP SUCTION CHECK VALVE, E51-F030*, and *MINIMUM FLOW CHECK VALVE, E51-F021*, are confirmed to go to the partially open position when RCIC flow changes are heard when stroking *MIN FLOW BYPASS TO TORUS VLV, E51-F019.*

CAUTION

Operation of the RCIC turbine with no flow path should be minimized to prevent pump damage.

7.10.41 **CLOSE** *MIN FLOW BYPASS TO TORUS VLV, E51-F019.* ____

7.10.42 **ENSURE** *MIN FLOW BYPASS TO TORUS VLV, E51-F019*, re-opens. ____

7.10.43 **CONFIRM** *PUMP SUCTION CHECK VALVE, E51-F030* and *MINIMUM FLOW CHECK VALVE, E51-F021* partially open **AND RECORD** on Attachment 3. ____

NOTE: For purposes of this procedure, the tripping of the RCIC turbine will denote "completion of steam discharge to the Suppression Chamber" for purposes of Tech Spec surveillances SR 3.6.1.6.1 (0PT-02.3.1b) and SR 3.6.1.6.2 (0PT-02.3.1).

R19 7.10.44 **DEPRESS** the local mechanical overspeed device trip lever to trip the RCIC turbine **AND RECORD** the time below. ____

_____

7.10.45 **CLOSE** *TURBINE STEAM SUPPLY VLV, E51-F045.* ____

7.10.46 **CLOSE** *TURBINE TRIP & THROTTLE VLV, E51-V8*, motor operator **AND HOLD** the control switch in *CLOSE* for approximately 5 seconds after full closed indication to ensure latch mechanism engagement. ____

7.10.47 **RESET** the mechanical trip overspeed device in accordance with 1(2)OP-16. ____

7.0 PROCEDURAL STEPS Initials

7.10.48 **OPEN** *TURBINE TRIP & THROTTLE VLV, E51-V8.* _____

7.10.49 **IF NOT** needed for HPCI operation, **THEN CLOSE** *REDUNDANT ISOL TO CST VLV, E41-F011.* _____

7.10.50 **PLACE** RCIC *FLOW CONTROL, E51-FIC-R600*, in automatic (*A*). _____

NOTE: Technical Specification 3.6.1.6.1 (Modes 1, 2, or 3) requires completion of 0PT-02.3.1b, Suppression Pool to Drywell Vacuum Breaker Position Check, within 6 hours after any discharge of steam to the suppression chamber from any source.

NOTE: Step 7.10.51 documents compliance with Technical Specifications and may be completed as required during the performance of the procedure.

R1 7.10.51 **IF** in Modes 1, 2, or 3, **THEN ENSURE** 0PT-02.3.1b, Suppression Pool to Drywell Vacuum Breaker Position Check, is completed within 6 hours after any discharge of steam to the suppression chamber from any source. _____

NOTE: Technical Specification 3.6.1.6.2 (Modes 1, 2, or 3) requires the suppression chamber to drywell vacuum breakers to remain closed **OR** completion of 0PT-02.3.1, Suppression Chamber to Drywell Vacuum Breakers Operability Test, within 12 hours following an operation that caused any of the vacuum breakers to open.

NOTE: Step 7.10.52 documents compliance with Technical Specifications and may be completed as required during the performance of the procedure.

R1 7.10.52 **IF** in Modes 1, 2, or 3, **THEN PERFORM** one of the following:

1. **CONFIRM** suppression chamber to drywell vacuum breakers remained closed. _____

OR

2. 0PT-02.3.1, Suppression Chamber to Drywell Vacuum Breakers Operability Test, is completed within 12 hours following an operation that causes any of the vacuum breakers to open. _____

7.0 PROCEDURAL STEPS Initials

7.10.53 **NOTIFY** Maintenance to sample RCIC turbine oil, as follows, within 2 hours: _____

1. **UNCAP AND OPEN** *RCIC TURBINE OIL SAMPLE VALVE, E51-TOSV-1*, to collect approximately 1 cup of oil to purge the sample line. _____

2. **OBTAIN** oil sample. _____

3. **CLOSE AND CAP** *RCIC TURBINE OIL SAMPLE VALVE, E51-TOSV-1.* ___/___ Ind.Ver.

7.10.54 **CLOSE** *COOLING WATER SUPPLY VLV, E51-F046.* _____

7.10.55 **CLOSE** *TORUS SUCTION VLV, E51-F031.* _____

7.10.56 **CLOSE** *TORUS SUCTION VLV, E51-F029.* _____

7.10.57 **OPEN** *CST SUCTION VLV, E51-F010.* _____

7.10.58 **IF** desired, **THEN SECURE** RHR from the Suppression Pool Cooling mode in accordance with 1(2)OP-17. _____

7.10.59 **WHEN** 15 minutes have elapsed after securing the RCIC Turbine, **THEN PERFORM** the following:

1. **STOP** *BAROMETRIC CNDSR VACUUM PUMP.* _____

2. **PLACE** *BAROMETRIC CNDSR VACUUM PUMP* control switch in *AUTO.* _____

7.10.60 **IF** desired, **THEN RETURN** SBGT to standby in accordance with 1(2)OP-10. _____

7.0 PROCEDURAL STEPS

Initials

NOTE: ERFIS computer points EHCPA002 and EHCPA003, in Group Point Display # 38, may be accessed to more precisely adjust the pressure regulator setpoint.

7.10.61 **IF** the pressure regulator setpoint was increased to support RCIC testing **AND** surveillance testing requiring a reactor pressure of 945 psig is complete, **THEN SLOWLY DECREASE** the pressure regulator setpoint to 928 psig. _____

7.11 RCIC System Restoration

NOTE: Completion of this section will return the RCIC System to standby in accordance with 1(2)OP-16.

7.11.1 **STOP** suppression pool temperature monitoring **AND RECORD** the maximum average temperature achieved during this test. _____

_____ °F

7.11.2 **ENSURE** proper oil level is maintained at the RCIC turbine (visible in sight glass per Precaution and Limitation 3.29). _____

7.0 PROCEDURAL STEPS

Initials

7.11.3 **ENSURE** the valves listed below are in the position as indicated:

Valve No.	Valve Description	Position	Checked	Verified
E51-V9	Turbine Governor Valve	OPEN		
E51-F019	Min Flow Bypass To Torus Vlv	CLOSED		
E51-F022	Bypass To CST Vlv	CLOSED		
E51-F066	Turbine Exh Vac Bkr Vlv	OPEN		
E51-F062	Turbine Exh Vac Bkr Vlv	OPEN		
E51-F010	CST Suction Vlv	OPEN		
E51-F031	Torus Suction Vlv	CLOSED		
E51-F029	Torus Suction Vlv	CLOSED		
E51-F012	Pump Discharge Vlv	OPEN		
E51-F008	Steam Supply Outboard Isol Vlv	OPEN		
E51-F007	Steam Supply Inboard Isol Vlv	OPEN		
E51-F045	Turbine Steam Supply Vlv	CLOSED		
E51-F013	RCIC Injection Vlv	CLOSED		
E51-F025	Supply Drain Pot Inbd Drain Vlv	OPEN		
E51-F026	Supply Drain Pot Otbd Drain Vlv	OPEN		
E51-F054	Supply Drain Pot Drain Byp Vlv	CLOSED		
E51-F046	Cooling Water Supply Vlv	CLOSED		
E51-F004	Cond Pump Disch Inbd Drain Vlv	CLOSED		
E51-F005	Cond Pump Disch Otbd Drain Vlv	OPEN		
E41-F011	Redundant Isol To CST Vlv	CLOSED		
E51-V33	RCIC Pump Discharge Header Vent Valve	CLOSED		
E51-V70	RCIC Keepfill Station Bypass Valve	CLOSED		

7.0 PROCEDURAL STEPS

Initials

7.11.4 **ENSURE** *TURBINE TRIP AND THROTTLE VLV* (Actuator Position), *E51-V8*, is open. ___/___ Ind.Ver.

7.11.5 **ENSURE** *TURBINE TRIP AND THROTTLE VLV* (Valve Position), *E51-V8*, is open. ___/___ Ind.Ver.

7.11.6 **IF** installed, **THEN REMOVE** the drain hose at *E51-PI-3005 INSTRUMENT DRAIN VALVE, E51-PI-3005-6.* _____

7.11.7 **ENSURE** the following for RCIC *FLOW CONTROL, E51-FIC-R600*:

1. In automatic (*A*) position. ___/___ Ind.Ver.
2. Setpoint set at 400 gpm. ___/___ Ind.Ver.
3. Yellow *ALM* light off. ___/___ Ind.Ver.
4. Red *FAIL* light off. ___/___ Ind.Ver.

7.11.8 **ENSURE** *TURBINE SPEED TEST SELECTOR* switch in *NORMAL*. ___/___ Ind.Ver.

7.11.9 **ENSURE** *TURBINE TEST POWER* switch is *OFF*. ___/___ Ind.Ver.

7.11.10 **ENSURE** *BAROMETRIC CNDSR VACUUM PUMP* is **NOT** running. ___/___ Ind.Ver.

7.11.11 **ENSURE** *BAROMETRIC CNDSR VACUUM PUMP* control switch in *AUTO*. ___/___ Ind.Ver.

7.11.12 **ENSURE** *BAROMETRIC CNDSR CONDENSATE PUMP* is **NOT** running. ___/___ Ind.Ver.

7.11.13 **ENSURE** *BAROMETRIC CNDSR CONDENSATE PUMP* control switch in *AUTO*. ___/___ Ind.Ver.

7.11.14 **IF** ERFIS is available, **THEN REQUEST** STA or other knowledgeable individual to obtain ERFIS data in accordance with Attachment 5. _____

7.0 PROCEDURAL STEPS Initials

7.11.15 **ENSURE** the required information has been recorded on the cover page. _____

7.11.16 **NOTIFY** IST group when data has been recorded on Test Information Attachments 2 and 3 **AND DOCUMENT** the following information: _____

IST _____Date_____Time _____
Name

7.11.17 **NOTIFY** Unit SCO when this test is complete or found to be unsatisfactory. _____

ATTACHMENT 1
Page 1 of 1
Certification and Review Form

General Comments and Recommendations _____

_____

_____

_____

_____

_____

	Initials	Name (Print)
Test procedure performed by:	Y	L. McGeesey

Exceptions to satisfactory performance _____

_____

Corrective action required _____

_____

NOTE: Pump test data shall be analyzed within 96 hours after completion of this PT. Unit SCO review/approval of the PT satisfies this ASME Code requirement.

Test procedure has been satisfactorily completed
Unit SCO: _____ _____
Signature Date

Test procedure has **NOT** been satisfactorily completed
Unit SCO: _____ _____
Signature Date

Test procedure has been reviewed by:
Shift Superintendent: _____ _____
Signature Date

ATTACHMENT 2
Page 1 of 4
RCIC Pump Data Sheet

UNIT 1

Discharge pressure – suction pressure (running) = delta P (dP)

_____ - _____ = _____

Lubricant level normal_____

NOTES: 1. Pump vibration is measured at the test point marked on the pump for the correct bearing number and direction as indicated by the Test Position number as follows:
- the number indicates the bearing number from Attachment 6
- for direction, A = Axial, H = Horizontal, V = Vertical

2. The magnetic holder is to be used with the accelerometer probe for all vibration readings.

TEST PARAMETER	ACTUAL VALUE	REFERENCE VALUE	ACCEPTANCE VALUE	ALERT RANGE		REQUIRED ACTION RANGE	
				LOW	HIGH	LOW	HIGH
Suction Press. (Stopped) psig		N/A	≥ 8	N/A	N/A	< 8	N/A
Suction Press. (Running) psig		N/A	N/A	N/A	N/A	N/A	N/A
Discharge Press. psig		N/A	N/A	N/A	N/A	N/A	N/A
Pump DP psid		275	247.5 to 302.5	N/A	N/A	< 247.5	> 302.5
Flow Rate gpm		465	N/A	N/A	N/A	N/A	N/A
Pump Speed rpm		2500	2485-2515*	N/A	N/A	N/A	N/A
Vibration-vel (in/sec peak) Position 3 H		0.114	0 to 0.285	N/A	> 0.285 to 0.684	N/A	> 0.684
Vibration-vel (in/sec peak) Position 3 V		0.074	0 to 0.185	N/A	> 0.185 to 0.444	N/A	> 0.444
Vibration-vel (in/sec peak) Position 4 A		0.105	0 to 0.262	N/A	> 0.262 to 0.630	N/A	> 0.630
Vibration-vel (in/sec peak) Position 4 H		0.138	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700
Vibration-vel (in/sec peak) Position 4 V		0.089	0 to 0.222	N/A	> 0.222 to 0.534	N/A	> 0.534

*Range given in Acceptance Value only applicable when using a portable speed indicator.

RCIC Pump Data Sheet

UNIT 1

Performed by: _____ _____ _____
(Signature) Date Time

IST Group: _____ _____ _____
(Signature) Date Time

CORRECTIVE ACTION

1. Any required corrective action shall be performed in accordance with Section 6.0, Acceptance Criteria.

RCIC Pump Data Sheet

UNIT 2

Discharge pressure – suction pressure (running) = delta P (dP)

_____ - _____ = _____

Lubricant level normal_____

NOTES:1. Pump vibration is measured at the test point marked on the pump for the correct bearing number and direction as indicated by the Test Position number as follows:
- the number indicates the bearing number from Attachment 6
- or direction, A = Axial, H = Horizontal, V = Vertical

2. The magnetic holder is to be used with the accelerometer probe for all vibration readings.

TEST PARAMETER	ACTUAL VALUE	REFERENCE VALUE	ACCEPTANCE VALUE	ALERT RANGE		REQUIRED ACTION RANGE	
				LOW	HIGH	LOW	HIGH
Suction Press. (Stopped) psig		N/A	≥ 8	N/A	N/A	< 8	N/A
Suction Press. (Running) psig		N/A	N/A	N/A	N/A	N/A	N/A
Discharge Press. psig		N/A	N/A	N/A	N/A	N/A	N/A
Pump DP psid		283	254.7 to 311.3	N/A	N/A	< 254.7	> 311.3
Flow Rate gpm		480	N/A	N/A	N/A	N/A	N/A
Pump Speed rpm		2500	2485-2515*	N/A	N/A	N/A	N/A
Vibration-vel (in/sec peak) Position 3 H		0.083	0 to 0.207	N/A	> 0.207 to 0.498	N/A	> 0.498
Vibration-vel (in/sec peak) Position 3 V		0.070	0 to 0.175	N/A	> 0.175 to 0.420	N/A	> 0.420
Vibration-vel (in/sec peak) Position 4 A		0.063	0 to 0.157	N/A	> 0.157 to 0.378	N/A	> 0.378
Vibration-vel (in/sec peak) Position 4 H		0.091	0 to 0.227	N/A	> 0.227 to 0.546	N/A	> 0.546
Vibration-vel (in/sec peak) Position 4 V		0.104	0 to 0.260	N/A	> 0.260 to 0.624	N/A	> 0.624

*Range given in Acceptance Value only applicable when using a portable speed indicator.

RCIC Pump Data Sheet

UNIT 2

Performed by: _____ _____ _____
(Signature) Date Time

IST Group: _____ _____ _____
(Signature) Date Time

CORRECTIVE ACTION

1. Any required corrective action shall be performed in accordance with Section 6.0, Acceptance Criteria.

ATTACHMENT 3
Page 1 of 2
Unit 1 RCIC Valve Test Information Sheet

VALVE NUMBER	STROKE DIRECTION	REMOTE POSITION INDICATION (INITIALS)		STROKE TIME TEST (SEC)	STROKE TIME ACCEPTANCE CRITERIA (SECONDS) ACCEPTABLE RANGE			REF. STROKE TIME	FAIL-SAFE TEST (INITIALS)	FULL-STROKE EXERCISE (INITIALS)	CHECK VALVE EXERCISE (INITIALS)	VALVE SAT/ UNSAT
		STEM	IND. LIGHTS		MINIMUM (≥)	MAXIMUM (≤)	LIMITING (≤)					
1-E51-F040	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
1-E51-F001	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
1-E51-V72/ V73	CLOSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
1-E51-F011	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
1-E51-F014	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
1-E51-F030	PART OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
1-E51-F021	PART OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
1-E51-F011	CLOSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
1-E51-F047	CLOSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

NOTES: Spaces next to valve number shall be filled in with an appropriate entry, initials, or N/A.

Performed by (Signature) _____ Date _____

Performed by (Signature) _____ Date _____

Reviewed, IST group (Signature) _____ Date _____

Unit 2 RCIC Valve Test Information Sheet

VALVE NUMBER	STROKE DIRECTION	REMOTE POSITION INDICATION (INITIALS)		STROKE TIME TEST (SEC)	STROKE TIME ACCEPTANCE CRITERIA (SECONDS) ACCEPTABLE RANGE			REF. STROKE TIME	FAIL-SAFE TEST (INITIALS)	FULL-STROKE EXERCISE (INITIALS)	CHECK VALVE EXERCISE (INITIALS)	VALVE SAT/ UNSAT
		STEM	IND. LIGHTS		MINIMUM (≥)	MAXIMUM (≤)	LIMITING (≤)					
2-E51-F040	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E51-F001	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E51-V72/ V73	CLOSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E51-F011	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E51-F014	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E51-F030	PART OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E51-F021	PART OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E51-F011	CLOSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E51-F047	CLOSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

NOTE: Spaces next to valve number shall be filled in with an appropriate entry, initials, or N/A.

Performed by (Signature) _____ Date_____

Performed by (Signature) _____ Date _____

Reviewed, IST group (Signature) _____ Date_____

ATTACHMENT 4
Page 1 of 1
Leak Identification Data Sheet

NOTE:	For packing and gaskets, a WR is required to be initiated and documented if leakage exceeds 5 dpm.
NOTE:	Each WR/WO listed is required to state that identified leakage is to be corrected or minimized as required by TS 5.5.2.

Component	Nature of Leak	Leakage Rate[1]	WR/WO#

[1] Leakage identified from components shown in Attachment 7.

Examination Performed by: _____/_____ Date _____
(Signature) (Print Name)

ATTACHMENT 5
Page 1 of 1
ERFIS Trace Setup and Notes

NOTE: The parameters shown below in the example display are normally saved as SIIT10. **IF** the setup has been lost, **THEN** the parameters should be entered again and saved as SIIT10.

NOTE: The RCIC System Engineer should be contacted if any unexpected trips or other significant problems are noted. Otherwise, the RCIC data should be forwarded to the RCIC System Engineer for trending purposes.

EXAMPLE DISPLAY:

NO.	POINT ID	ORIGIN NUMBER	FILTER 1 (HZ)	FILTER 2 (HZ)	SCALING (A OR M)	UNITS/ Y GRID	OFFSET
1.	E51SA014	1			M	500.000	0.000
2.	E51DD042	2			M	4.000	-1.000
3.	E51PA006	3			M	200.000	0.000
4.	E51FA004	7			M	100.000	0.000
5.	B21LA001	5			M	20.000	140.000
6.	B21PA104	6			M	100.000	600.000
7.							

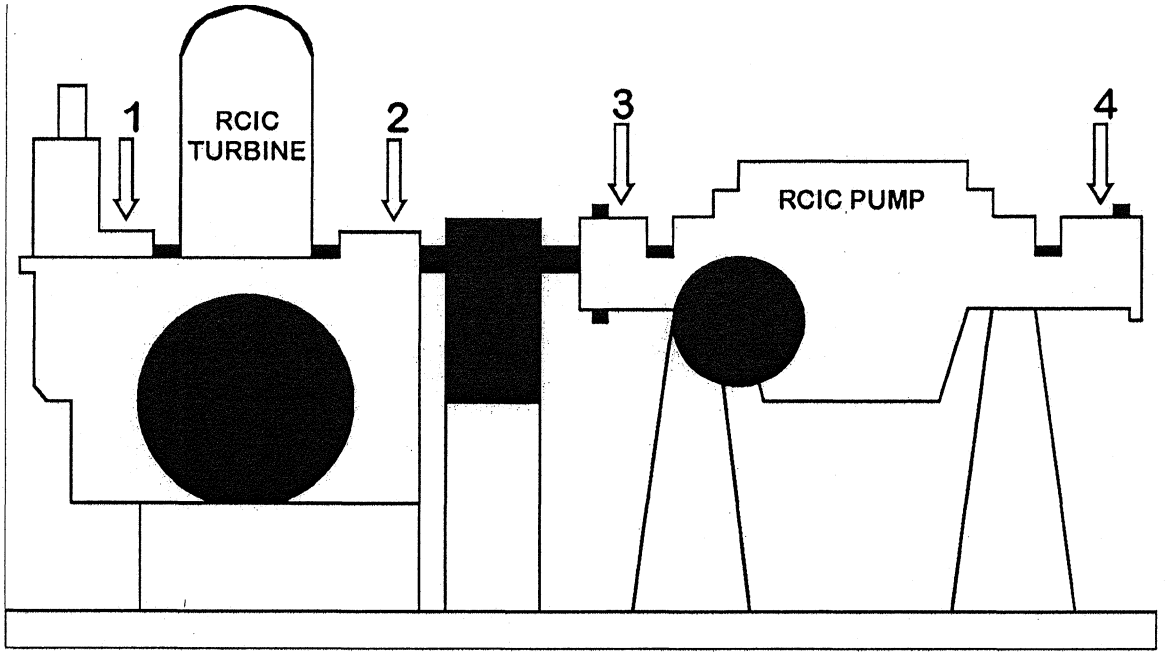
Total number of Y grids: 12

Initials

1. Make a trace of the entire run at 120 seconds per grid and 1.0" grids. _____

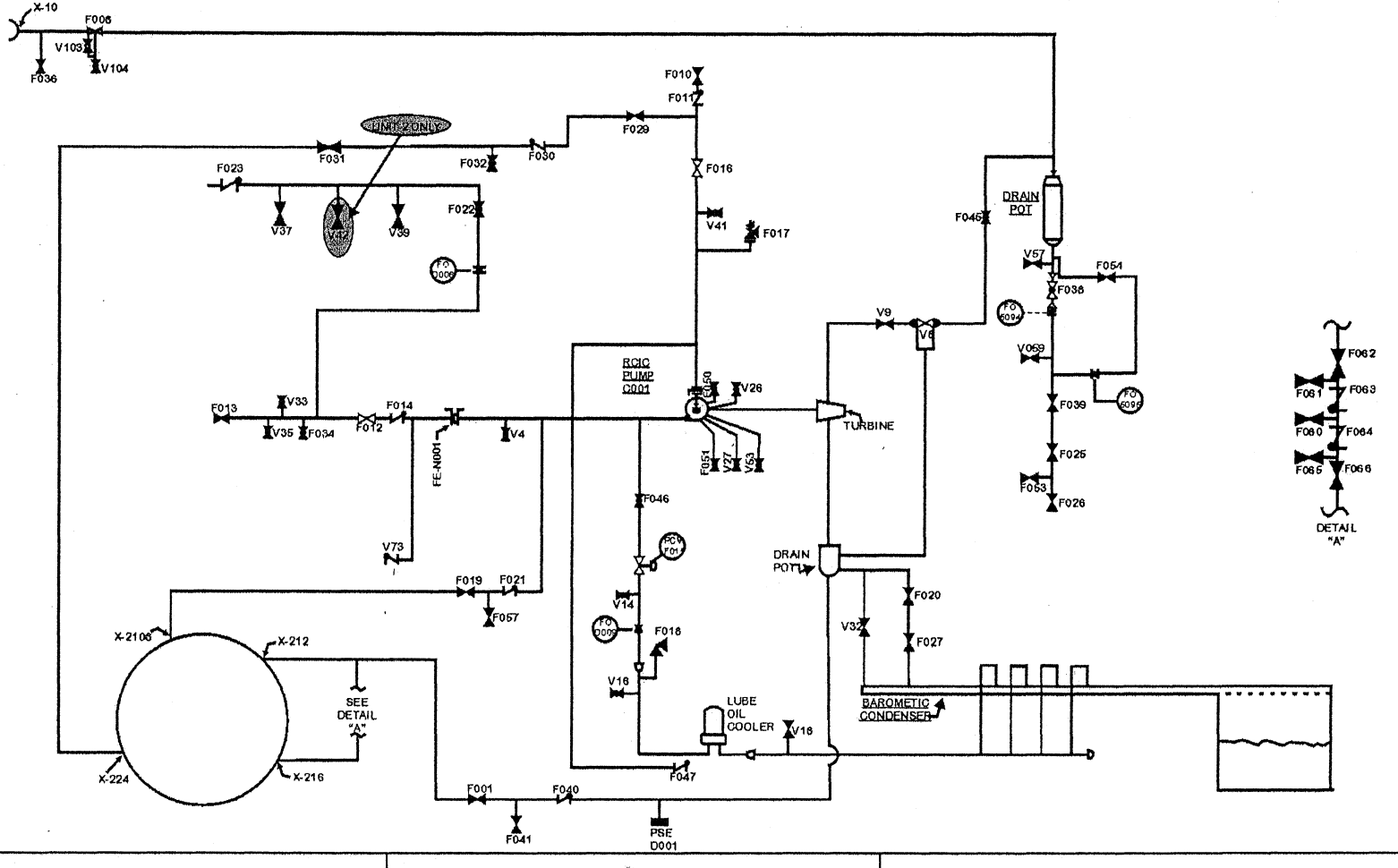
2. Make additional traces at 10 seconds per grid and 1.0" grids to show the first 1 to 2 minutes of each RCIC run. Tab trends at 0.5 second intervals may also be used. _____

ATTACHMENT 6
Page 1 of 1
Pump Vibration Test Position Numbers (Bearing Numbers)



ATTACHMENT 7
Page 1 of 2
Leakage Inspection Boundary

NOTE:	Because of drawing limitations, instrumentation lines and turbine casing piping are not shown. The leakage inspection boundary for instrumentation lines extend to and include the last instrument root valve before the instrument. Turbine casing piping to the drain pot is included the leakage inspection boundary.
NOTE:	The Suppression Chamber and Barometric Condenser are **NOT** required to be examined. They are shown for clarification only.



ATTACHMENT 7
Page 1 of 2
Leakage Inspection Guideline

When performing leakage inspections for TS 5.5.2, the following guidance should be followed to the extent practical.

1. The leakage inspection should be conducted by examining the accessible exposed surfaces for evidence of leakage.

2. For insulated components or components whose external surfaces are inaccessible for direct inspection, the leakage inspection should be performed on surrounding areas (i.e. floors or equipment surfaces located under the component) for evidence of leakage or other areas to which leakage may be channeled.

3. For vertical surfaces, the inspection of the lowest elevation where leakage may be detected should be performed.

4. For ALARA, a leakage inspection using remote visual equipment or the use of an installed leakage detection system to identify leakage is acceptable.

REVISION SUMMARY

Revision 89 incorporates program changes to perform a Leakage Walkdown in accordance with TS 5.5.2 (NCR 207575). Acceptance criteria added for pump values in the Alert Range to perform increased testing to conform to other PT s for the same type of testing. Editorial change to remove Desdemona font from place keeping aids.

Revision 88 incorporates Tech Spec Change TSC-2004-04 for suppression chamber to drywell vacuum breakers, Sections 3.16, 7.10, and 7.11.

Revision 87 incorporates EC 50554 which returns Unit 2 pressure set to 928 following testing.

Revision 86 adds step to confirm reactor pressure greater than 945 psig and adjust the pressure regulator as needed to attain 945 psig. Likewise, steps are added to return the pressure regulator setpoint to 928 psig for Unit 1 when testing is complete.

Revision 85 incorporated EC 46907, AST Implementation for Unit 2 Operation, which changed the normal valve position for 2-SGT-V8 & V9 from closed to open.

Revision 84 is an editorial correction, which updated the title page, added SOER 01-01 to the references, and annotated the associated P/L Step 3.29 and Caution prior to Step 7.10 to reflect response to recommendation 6d of the SOER. (AR 49693-26-04)

Revision 83 deleted two precaution and limitation steps stating the RCIC bearing oil temperature limits. These steps were deleted to eliminate confusion since the local temperature indicating switches were previously replaced with just temperature switches (DRs 86-0177 & 86-0124), which actuate high temperature alarms in the main control room.

Revision 82 incorporated TSC-2001-08, which changed Step 7.10.50 to perform 0PT-02.3.1b, Suppression Pool to Drywell Vacuum Breaker Position Indication Check within 6 hours after discharging steam to the suppression, and converted the procedure to Word 2000 software/format.

Revision 81 incorporated EC 47810, AST Implementation for Unit 1 Operation, which changed the normal valve position for 1-SGT-V8 & V9 from closed to open.

Revision 80 added Precaution/Limitations Step 3.30 and 3.31 concerning RCIC pre/post run oil levels venting of air from system, deleted specific references to vibration data collectors and transducers, and updated PassPort Work Management references as well as T/S 5.5.2 reference. (AR 00021660; PAR 00-537).

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

NRC SIM JPM S-3

TITLE: CORE SPRAY SURVEILLANCE

SIMULATOR OPERATOR NOTES:

Copy Batch File NRC JPM S-3.bat from memory stick E Drive to F Drive on bsimpc00

Provide calibrated stopwatch and calculator

Provide set of vibration data when requested

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee.
2. Validation Time 20 minutes
3. This is an Alternate Path JPM

TASK CONDITIONS:

1. No other testing or maintenance is in progress that will adversely affect the performance of this test.
2. The station battery chargers are in operation per 2OP-51.
3. 0PT-07.2.4a, Core Spray Operability Test – Loop "A" is in progress.
4. All pre-job briefs have been completed
5. 0PT-07.2.4a has been completed up to, and including, Step 7.7.4.
6. All required personnel are in the field to support performance of the surveillance.
7. Unit Two (2) is at 75% power.

INITIATING CUE:

You are directed by the unit SCO to continue with the performance of 0PT-07.2.4a beginning with Step 7.8.1 and notify him when the surveillance is completed.

Step 1 – Obtain 0PT-07.2.4a and reviews precautions and limitations. Begins at with Step 7.8.1

Procedure obtained and reviewed. Begins at step 7.8.1

SAT/UNSAT

PROMPT: WHEN contacted as the Reactor Building AO, report that suction pressure is 5 psig

Step 2 **OBSERVE** *CORE SPRAY PUMP A* suction pressure (stopped) as indicated on *E21-PI-R001A* **AND RECORD** on Attachment 2.

Suction pressure recorded on Attachment 2 (page 26 of 33)

SAT/UNSAT

Step 3 **ENSURE** one of the following valves is open:

NUC SW TO VITAL HEADER VLV, SW-V117 or
CONV SW TO VITAL HEADER VLV, SW-V111

Opened either the *SW-V117 or SW-V111.*

****CRITICAL STEP****
SAT/UNSAT

Step 4 **ENSURE** VITAL HEADER XTIE VLV, SW-V118, IS OPEN

SW-V118 verified open.

SAT/UNSAT

Step 5 **ENSURE** WELL WATER TO VITAL HEADER VALVE, SW-V141 IS CLOSED.

SW-V141 verified closed. SAT/UNSAT

Step 6 **STATION** an operator to monitor system piping for excessive motion and water hammer when a Core Spray Pump is started.

Operator stationed to monitor for vibration. SAT/UNSAT

PROMPT: WHEN contacted as the Reactor Building AO, report that Core Spray Pump "A" oil level is SAT.

Step 7 **ENSURE** proper CORE SPRAY PUMP A lubricant level.

Proper lubricant level verified. SAT/UNSAT

Step 8 **START** CORE SPRAY PUMP A while monitoring Pump discharge pressure on E21-PI-R600A AND CONFIRM pressure increases to greater than or Equal to 300 psig in less than or equal to 5.0 seconds.

Core Spray Pump started and pressure increase verified.

****CRITICAL STEP****
SAT/UNSAT

Step 9 **RECORD** the time that CORE SPRAY PUMP A was started.

Core Spray Pump A start time recorded. SAT/UNSAT

Step 10.a **ENSURE** the following:
CORE SPRAY DIVISION 1 ROOM COOLER FAN has Started.

CORE SPRAY DIVISION 1 ROOM COOLER FAN verified Started.

SAT/UNSAT

PROMPT: WHEN contacted as the Reactor Builidng AO, report that SW-V128 is open.

Step 10.b. SERVICE WATER OUTLET VALVE, SW-V128, is open.

SW-V128 verified open by contacting the building Auxiliary operator.

SAT/UNSAT

Step 11 **THROTTLE** OPEN Core Spray FULL FLOW TEST BYP VLV, E21-F015A, to obtain greater than or Equal to 4700 gpm as indicated on E21-FI-R601A.

E21-F015A Throttled Open and flow achieved.

****CRITICAL STEP****
SAT/UNSAT

Step 12 WHEN flow is greater than 603 gpm, CONFIRM that the Core Spray MIN FLOW BYPASS VLV, E21-F031A, closes.

E21-F031A verified closed.

SAT/UNSAT

Step 13 CONFIRM CORE SPRAY PUMP A discharge pressure is greater than or equal to 260 psig, as indicated on E21-PI-R600A.

Core Spray Pump A discharge pressure confirmed to be > 260 psig

SAT/UNSAT

PROMPT: **WHEN** contacted as the Reactor Building AO, report that E21-PI-2651 is reading 65 psig.

Step 14 CONFIRM KEEPFILL STATION CHECK VALVES, E21-F030A and/or E21-F029A, go to the closed Position, and record on Att.3

E21-F030A and/or E21-F029A confirmed to have gone to the closed position and recorded on Attachment 3.

SAT/UNSAT

Step 15 If test conditions in Step 7.8.13 cannot be met, then perform Step 7.8.14.

Candidate determines Step 7.8.14 is not required.

SAT/UNSAT

Step 16 **SLOWLY OPEN** E21-PI-7119A INSTRUMENT ISOLATION VALVE, E21-V5000.

Contacts AO to open E21-V5000

PROMPT: When contacted by the candidate, acknowledge direction to open the E21-V5000 and report that the valve is open.

****CRITICAL STEP****
SAT/UNSAT

Step 17 THROTTLE Core Spray FULL FLOW TEST BYP VLV, E21-F015A, to obtain 4700 gpm as indicated on E21-FI-R601A.

Flow established at 4700 gpm.

****CRITICAL STEP****
SAT/UNSAT

Step 18 OBSERVE CORE SPRAY PUMP A suction pressure (running) as indicated on E21-PI-R001A AND RECORD on Attachment 2.

Suction pressure obtained and recorded on Att.2

PROMPT: WHEN contacted as the Reactor Building AO, report that suction pressure is 4.5 psig

SAT/UNSAT

PROMPT: WHEN contacted as the Reactor Building AO, report that discharge pressure is 290 psig.

NOTE: IF the instrument root valve, E21-V5000, was not opened, report "0" psig discharge pressure.

Step 19 OBSERVE CORE SPRAY PUMP A discharge pressure as indicated on E21-PI-7119A AND RECORD on Att.2

Core Spray Pump A discharge pressure obtained and recorded on Attachment 2.

SAT/UNSAT

Step 20 OBSERVE CORE SPRAY PUMP A system flow as Indicated on FLOW INDICATOR E21-FI-R601A and record on Att.2

Pump flow obtained and recorded on Attachment 2.

SAT/UNSAT

PROMPT: WHEN requested as the Reactor Building AO, report lubricant level SAT

Step 21 ENSURE proper lubricant level AND RECORD on Att.2

Lubricant level verified by contacting auxiliary operator

In the reactor building.

SAT/UNSAT

PROMPT: WHEN contacted as vibration analyses personnel, provide vibration data as follows:

Vibration Vel Position 1S H = 0.215
Vibration Vel Position 1W A = 0.204
Vibration Vel Position 1W H = 0.145

Step 22 **OBTAIN** vibration data and record on Attachment 2

Vibration Data recorded

SAT/UNSAT.

Step 23 THROTTLE Core Spray *FULL FLOW TEST BYP VLV*

E21-F015A, to obtain 5000 gpm as indicated on

E21-FI-R601A.

E21-F015A throttled open and 5000 gpm

Flow obtained.

****CRITICAL STEP****
SAT/UNSAT

Step 24 **CONFIRM** *CORE SPRAY PUMP A DISCHARGE*

CHECK VALVE, E21-F003A, fully opens **AND**

RECORD on Attachment 3.

E21-F003A confirmed to be fully open and recorded

On Attachment 3.

SAT/UNSAT

PROMPT: Inform the candidate that a leakage walkdown is not required For this performance of the surveillance.

Step 25 **CLOSE** *E21-PI-7119A INSTRUMENT ISOLATION VALVE, E21-V5000.*

PROMPT: When contacted by the candidate, acknowledge direction to Close the E21-V5000 and report that the valve is closed.

SAT/UNSAT

Step 26 **CLOSE** Core Spray FULL FLOW TEST BYP VLV, E21-F015A.

E21-F015A closed.

****CRITICAL STEP****
SAT/UNSAT

EXAMINER NOTE: The next critical step will be a failure of E21-F031A to open automatically, requiring candidate action to open the valve.

Step 27 **WHEN** *CORE SPRAY LOOP A* flow is less than 603 gpm, **ENSURE** that Core Spray *MIN FLOW BYPASS VLV, E21-F031A,* opens.

Operator recognizes E21-F031A does not open Automatically and opens the valve by manipulating The E21-F031A to the Open position. ****CRITICAL STEP****

SAT/UNSAT

EXAMINER NOTE: If applicant fails to identify valve does not open and trips the pump use followup questions to determine why the pump was secured at the time it was secured.

Step 28 **STOP** *CORE SPRAY PUMP A* **AND RECORD** the time.

Core Spray Pump 2A secured and time recorded.

SAT/UNSAT

Termination Note: When the Core Spray Pump 2A has been secured and The candidate has informed the SCO of the failure of The E21-F031A, the JPM is complete.

RELATED TASKS:

209001 A4.04 2.9/2.9 Ability to manually operate and/or monitor in the control room: minimum flow valve

REFERENCES:
0PT-07.2.4a Rev. 57

TOOLS AND EQUIPMENT:
None

SAFETY FUNCTION (from NUREG 1123, Rev 2.):
2 – Reactor Water Inventory Control

Time Required for Completion: 20 Minutes (approximate).

APPLICABLE METHOD OF TESTING
Performance: Simulate ___ Actual X Unit: 2
Setting: Control Room ___ Simulator X
Time Critical: Yes___ No X Time Limit N/A
Alternate Path: Yes X No ___

EVALUATION

JPM: Pass ____ Fail ____

Comments:

TASK CONDITIONS:

1. No other testing or maintenance is in progress that will adversely affect the performance of this test.
2. The station battery chargers are in operation per 2OP-51.
3. 0PT-07.2.4a, Core Spray Operability Test – Loop "A" is in progress.
4. All pre-job briefs have been completed
5. 0PT-07.2.4a has been completed up to, and including, Step 7.7.4.
6. All required personnel are in the field to support performance of the surveillance.
7. Unit Two (2) is at 75% power.

INITIATING CUE:

You are directed by the unit SCO to continue with the performance of 0PT-07.2.4a beginning with Step 7.8.1 and notify him when the surveillance is completed.

Progress Energy

BRUNSWICK NUCLEAR PLANT

C
Continuous Use

DATE COMPLETED _____
UNIT _____ % PWR_____GMWE_____
SUPERVISOR_____
REASON FOR TEST (check one or more):
____ Routine surveillance
____ W/O # _____
____ Other (explain)_____
_____
_____
_____

FREQUENCY:
A. Once every 92 days
B. Stem verification - each refueling NOT to exceed two years
C. Leakage walkdown – at least once per 24 months
D. Stroking/timing E21-F015A- each refueling outage

PLANT OPERATING MANUAL

VOLUME X

PERIODIC TEST

UNIT
0

0PT-07.2.4a

CORE SPRAY SYSTEM OPERABILITY TEST - LOOP A

REVISION 57

7.0 PROCEDURAL STEPS

Initials

7. **SLOWLY OPEN** *KEEPFILL STATION E21-PCV-F026A DOWNSTREAM ISOLATION VALVE, E21-F027A.* — N/A / N/A Ind.Ver.

7.7.3 **IF** required, **REMOVE** the vent and drain rig from the *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23.* — N/A

7.7.4 **CONFIRM** *CORE SPRAY LOOP A SYS PRESS LOW* (A-01 2-10) is cleared. — Y

7.8 Pump Testing

7.8.1 **OBSERVE** *CORE SPRAY PUMP A* suction pressure (stopped) as indicated on *E21-PI-R001A* **AND RECORD** on Attachment 2. — ____

CAUTION

Do **NOT** cross-connect the Nuclear and Conventional Service Water headers by simultaneously opening *NUC SW TO VITAL HEADER VLV, SW-V117*, and *CONV SW TO VITAL HEADER VLV, SW-V111.*

7.8.2 **ENSURE** one of the following valves is open:

1. *NUC SW TO VITAL HEADER VLV, SW-V117* — ____

OR

2. *CONV SW TO VITAL HEADER VLV, SW-V111.* — ____

7.8.3 **ENSURE** *VITAL HEADER XTIE VLV, SW-V118*, is open. — ____

7.8.4 **ENSURE** *WELL WATER TO VITAL HEADER VALVE, SW-V141,* is closed. — ____

7.8.5 **STATION** an operator to monitor system piping for excessive motion and water hammer when a Core Spray pump is started. — ____

7.0 PROCEDURAL STEPS

Initials

7.8.6 **ENSURE** proper *CORE SPRAY PUMP A* lubricant level. _____

NOTE: The following step requires that the time interval from pump start to discharge pressure at 300 psig be measured with a stopwatch. It may be advisable to place a temporary non-destructive mark on the pressure indicator at 300 psig to assist in timing.

R15

CAUTION

Operation of the core spray pump in the minimum flow mode should be minimized.

7.8.7 **START** *CORE SPRAY PUMP A* while monitoring pump discharge pressure on *E21-PI-R600A*, **AND CONFIRM** pressure increases to greater than or equal to 300 psig in less than or equal to 5.0 seconds. _____

Response Time _____ sec.

7.8.8 **RECORD** the time that *CORE SPRAY PUMP A* was started. _____

Time _____

7.8.9 **ENSURE** the following:

1. *CORE SPRAY DIVISION I ROOM COOLER FAN* has started. _____

2. *SERVICE WATER OUTLET VALVE, SW-V128*, is open. _____

7.8.10 **THROTTLE OPEN** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A,* to obtain greater than or equal to 4700 gpm as indicated on *E21-FI-R601A.* _____

7.0 PROCEDURAL STEPS

Initials

7.8.11 **WHEN** flow is greater than 603 gpm, **CONFIRM** that the Core Spray *MIN FLOW BYPASS VLV, E21-F031A,* closes. _____

R13 7.8.12 **CONFIRM** *CORE SPRAY PUMP A* discharge pressure is greater than or equal to 260 psig, as indicated on *E21-PI-R600A*. _____

NOTE: A higher pressure indication on *E21-PI-R600A* than on *E21-PI-2651* verifies *KEEPFILL STATION CHECK VALVES, E21-F030A* and/or *E21-F029A*, go to the closed position. If indication on *E21-PI-2651* is "pegged", then proceed to Step 7.8.14. If test is satisfactory, then N/A Step 7.8.14.

NOTE: Operability of the keep-fill check valves is performed as a pair. If the check valves cannot be determined to be closed, then a W/R shall be written to repair or replace both *E21-F030A* and *E21-F029A*.

7.8.13 **CONFIRM** *KEEPFILL STATION CHECK VALVES, E21-F030A* and/or *E21-F029A*, go to the closed position, **AND RECORD** on Attachment 3. _____

NOTE: Verifying the absence of flow under pressure while venting at *E21-PI-2651 INSTRUMENT DRAIN VALVE, E21-IV-786*, satisfies reverse exercising requirements for *KEEPFILL STATION CHECK VALVES, E21-F030A* and/or *E21-F029A*. This does **NOT** imply that drainage will not be present.

R15 7.8.14 **IF** test conditions in Step 7.8.13 cannot be met, **THEN PERFORM** the following steps to satisfy exercising *KEEPFILL STATION CHECK VALVES, E21-F030A* and/or *E21-F029A*, to the closed position:

1. **CONNECT** hose at *E21-PI-2651 INSTRUMENT DRAIN VALVE, E21-IV-786*, **AND ROUTE** to floor drain. _____

2. **CLOSE** *KEEPFILL STATION E21-PCV-F026A UPSTREAM ISOLATION VALVE, E21-F025A.* _____

7.0 PROCEDURAL STEPS

Initials

3. **ENSURE** *CORE SPRAY LOOP A KEEPFILL ISOLATION VALVE, TD-V13,* is closed. _____

4. **OPEN** *E21-PI-2651 INSTRUMENT DRAIN VALVE, E21-IV-786,* **AND ALLOW** piping to drain for a minimum of three minutes. _____

5. **CONFIRM** the absence of pressurized flow from drain hose **AND RECORD** *KEEPFILL STATION CHECK VALVES, E21-F030A* and/or *E21-F029A* go to the closed position on Attachment 3. _____

6. **CLOSE** *E21-PI-2651 INSTRUMENT DRAIN VALVE, E21-IV-786.* ___/___ Ind.Ver.

CAUTION

Damage to the *KEEPFILL STATION PRESSURE CONTROL VALVE, E21-PCV-F026A*, may occur if it is placed in service too rapidly.

7. **SLOWLY OPEN** *KEEPFILL STATION E21-PCV-F026A UPSTREAM ISOLATION VALVE, E21-F025A.* ___/___ Ind.Ver.

7.8.15 **SLOWLY OPEN** *E21-PI-7119A INSTRUMENT ISOLATION VALVE, E21-V5000.* _____

NOTE: The Core Spray Pump shall be operated for at least 2 minutes under conditions as stable as the system permits prior to recording test data.

7.8.16 **THROTTLE** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A,* to obtain 4700 gpm as indicated on *E21-FI-R601A.* _____

7.8.17 **OBSERVE** *CORE SPRAY PUMP A* suction pressure (running) as indicated on *E21-PI-R001A* **AND RECORD** on Attachment 2. _____

7.0 PROCEDURAL STEPS

Initials

7.8.18 **OBSERVE** *CORE SPRAY PUMP A* discharge pressure as indicated on *E21-PI-7119A* **AND RECORD** on Attachment 2. _____

7.8.19 **OBSERVE** *CORE SPRAY PUMP A* System flow as indicated on *FLOW INDICATOR E21-FI-R601A* **AND RECORD** on Attachment 2. _____

7.8.20 **ENSURE** proper lubricant level **AND RECORD** on Attachment 2. _____

7.8.21 **MEASURE** *CORE SPRAY PUMP A* vibration velocity (in/sec peak) at the test positions indicated on Attachment 2. _____

7.8.22 **RECORD** the measured vibration velocities in the ACTUAL VALUE column on Attachment 2. _____

NOTE: Flow indication of at least 5000 gpm on *FLOW INDICATOR E21-FI-R601A* confirms *CORE SPRAY PUMP A DISCHARGE CHECK VALVE, E21-F003A,* goes to the full open position.

7.8.23 **THROTTLE** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A,* to obtain 5000 gpm as indicated on *E21-FI-R601A.* _____

7.8.24 **CONFIRM** *CORE SPRAY PUMP A DISCHARGE CHECK VALVE, E21-F003A,* fully opens **AND RECORD** on Attachment 3. _____

NOTE: A leakage walkdown is required to be performed at least once per 24 months per TS 5.5.2.

7.8.25 **IF** required, **PERFORM** a leakage walkdown of the components identified on Attachment 6, **AND RECORD** leakage on Attachment 4, Leak Identification Data Sheet. _____

7.8.26 **CLOSE** *E21-PI-7119A INSTRUMENT ISOLATION VALVE, E21-V5000.* ___/___ Ind.Ver.

7.8.27 **CLOSE** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A.* _____

7.0 PROCEDURAL STEPS

Initials

7.8.28 **WHEN** *CORE SPRAY LOOP A* flow is less than 603 gpm, **ENSURE** that Core Spray *MIN FLOW BYPASS VLV, E21-F031A,* opens. _____

7.8.29 **STOP** *CORE SPRAY PUMP A* **AND RECORD** the time. _____

Time _____

7.8.30 **CONFIRM** the following:

1. *CORE SPRAY DIVISION I ROOM COOLER FAN* is off. _____

2. *SERVICE WATER OUTLET VALVE, SW-V128,* is closed. _____

7.8.31 **IF** required, **ENSURE** the following valves are closed:

1. *NUC SW TO VITAL HEADER VLV, SW-V117* ___/___ Ind.Ver.

2. *CONV SW TO VITAL HEADER VLV, SW-V111* ___/___ Ind.Ver.

7.8.32 **CALCULATE** *CORE SPRAY PUMP A* run time. _____

_____ - _____ = _____
7.8.29 7.8.8

7.8.33 **IF** required to relieve high system pressure condition or ensure the system is filled and vented, **THEN PERFORM** the following

1. **ENSURE** a vent and drain rig is attached to *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23.* _____

2. **THROTTLE OPEN** *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23,* until a solid stream of water issues from the vent line, **THEN CLOSE** *E21-V23.* _____

3. **IF** required, **REMOVE** the vent and drain rig from *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23.* _____

ATTACHMENT 2
Page 2 of 2

Unit 2 Core Spray Pump A Test Information Data Sheet

1. The lubricant level (pump running) is normal. _____

2. Calculate pump dP as follows:

   Pump discharge pressure - suction pressure (run) = pump dP

   _____ - _____ = _____

NOTE: Pump vibration is measured at the test point marked on the pump for the correct bearing number and direction as indicated by the Test Position number as follows:

- the number indicates the bearing number from Attachment 5
- for position, N=North, S=South, E=East, W=West
- for direction, A=Axial, H=Horizontal, V=Vertical

NOTE: Reference values for pump suction and discharge pressures are provided for determining the suitability of alternate test gauges, if used.

UNIT 2 CORE SPRAY PUMP A TEST DATA							
TEST PARAMETER	ACTUAL VALUE	REFERENCE VALUE	ACCEPTANCE VALUE RANGE	ALERT RANGE		REQUIRED ACTION RANGE	
				LOW	HIGH	LOW	HIGH
Suction Press. (Stopped) psig		6.0	4 to 8	N/A	N/A	< 4	> 8
Suction Press. (Running) psig		4.0	N/A	N/A	N/A	N/A	N/A
Discharge Press. Psig		290.0	N/A	N/A	N/A	N/A	N/A
Pump DP psid		283.1	260.0 to 311.4	N/A	N/A	< 260.0	> 311.4
Flow Rate gpm		4,700	N/A	N/A	N/A	N/A	N/A
Vibration-vel (in/s peak) Position 1S H		0.230	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700
Vibration-vel (in/s peak) Position 1W A		0.212	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700
Vibration-vel (in/s peak) Position 1W H		0.156	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700

Performed By (Signature) _____ Date _____ Time _____

Reviewed, IST Group (Signature) _____ Date _____

ATTACHMENT 3
Page 2 of 2

Unit 2 Core Spray System (Loop A) Valve Test Information Sheet

Valve Number	Stroke Direction	Remote Position Indication (Initials)		Stroke Time Test (sec)	Stroke Time Acceptance Criteria (Seconds)				Fail-Safe Test (Initials)	Full-Stroke Exercise (Initials)	Check Valve Exercise (Initials)	Valve SAT/ UNSAT
		Stem	Ind. Lights		Acceptable Range		Limiting (≤)	Ref. Stroke Time				
					Minimum (≥)	Maximum (≤)						
2-E21-F015A	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-E21-F015A	CLOSED			N/A	36.30	49.10	53.30	42.70	N/A	N/A	N/A	N/A
2-E21-F004A	CLOSED			11.0	9.38	12.70	13.80	11.04	N/A	N/A	N/A	SAT
2-E21-F005A	OPEN			11.6	10.20	13.80	15.00	12.00	N/A	N/A	N/A	SAT
2-E21-F005A	CLOSED			11.7	10.30	13.94	15.15	12.12	N/A	Y	N/A	SAT
2-E21-F004A	OPEN			11.2	9.61	13.01	14.14	11.31	N/A	Y	N/A	SAT
2-E21-F001A	CLOSED			80.6	70.00	94.60	102.90	82.34	N/A	N/A	N/A	SAT
2-E21-F001A	OPEN			78.6	67.20	90.80	98.70	79.03	N/A	Y	N/A	SAT
2-E21-F031A	CLOSED			13.7	12.20	16.40	17.90	14.33	N/A	N/A	N/A	SAT
2-E21-F031A	OPEN	N/A	N/A	15.2	13.10	17.70	19.20	15.41	N/A	Y	N/A	SAT
2-E21-F029A	CLOSED	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E21-F030A	CLOSED	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E21-F003A	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

NOTE: Spaces next to valve numbers shall be filled in with an appropriate entry, initials, or N/A.

Performed by (signature) Pete Enderby Date _____

Performed by (signature) _____ Date _____

Reviewed, IST Group (signature) _____ Date _____

TASK CONDITIONS:

1. No other testing or maintenance is in progress that will adversely affect the performance of this test.
2. The station battery chargers are in operation per 2OP-51.
3. 0PT-07.2.4a, Core Spray Operability Test – Loop "A" is in progress.
4. All pre-job briefs have been completed
5. 0PT-07.2.4a has been completed up to, and including, Step 7.7.4.
6. All required personnel are in the field to support performance of the surveillance.
7. Unit Two (2) is at 75% power.

INITIATING CUE:

You are directed by the unit SCO to continue with the performance of 0PT-07.2.4a beginning with Step 7.8.1 and notify him when the surveillance is completed.

Progress Energy | BRUNSWICK NUCLEAR PLANT | **C Continuous Use**

DATE COMPLETED _____
UNIT _____ % PWR_____GMWE_____
SUPERVISOR_____
REASON FOR TEST (check one or more):
____ Routine surveillance
____ W/O # _____
____ Other (explain)_____
_____
_____
_____

FREQUENCY:
A. Once every 92 days
B. Stem verification - each refueling NOT to exceed two years
C. Leakage walkdown – at least once per 24 months
D. Stroking/timing E21-F015A- each refueling outage

PLANT OPERATING MANUAL

VOLUME X

PERIODIC TEST

UNIT
0

0PT-07.2.4a

CORE SPRAY SYSTEM OPERABILITY TEST - LOOP A

REVISION 57

1.0 PURPOSE

1.1 This test is performed to determine the operability of the Core Spray System A Loop. The test conforms to the requirements specified in Technical Specifications 5.5.6 to perform testing in accordance with ASME Boiler and Pressure Code, Section XI ASME/ANSI OM-Code. This test satisfies Technical Specification surveillance's SR 3.5.1.6 and 3.5.2.5 (for the Core Spray Pump). Performance of Valve Remote Position indicator Verification satisfies the requirements of SR 3.3.3.1.3. This test satisfies a portion of SRs 3.5.1.12 and 3.5.2.7 related to response time testing for Core Spray Pump A and E21-F005A.

1.2 This test also satisfies Technical Specification 5.5.2 for leak tightness inspection every 24 months.

1.3 The following test quantities shall be measured, calculated, or observed and recorded as applicable:

1.3.1 Valve stem travel or disk movement

1.3.2 Proper operation of the valve remote position indicator (RPI)

1.3.3 Time required for valve stroke

1.3.4 Pump inlet pressure

1.3.5 Pump discharge pressure

1.3.6 Pump vibration velocity

1.3.7 Pump flow rate

1.3.8 Pump lubricant level

1.3.9 Pump differential pressure (calculated)

2.0 REFERENCES

2.1 Technical Specifications

2.2 FSAR, Section 6.3

2.3 1(2)OP-18, Core Spray System Operating Procedure

2.4 1(2)OP-51, DC Electrical System Operating Procedure

2.5 0OI-01.08, Control of Equipment and System Status

2.6 Technical Requirements Manual (TRM)

2.7 0SD-18, Core Spray System Description

2.8 ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition

2.9 ANSI/ASME, OM-1987, "Operation and Maintenance of Nuclear Power Plant," w/OMa-1988 Addenda, Part 6 and Part 10

2.10 NRC Generic Letter 89-04, Guidance on Developing Acceptable Inservice Testing Programs

2.11 0ENP-17, Pump and Valve Inservice Testing (IST)

2.12 0ENP-16.1, IST Pump and Valve Data

R13 2.13 EC 46949, 2-E21-F004A/B and F005A/B Motor Pinion Gear Ratio Change & Compiling Core Spray Surveillance Requirements

2.14 EER 90-0315, Vibration Program for 1A and 2A Core Spray Pumps

R15 2.15 Response to NRC Bulletin 88-04, Potential Safety Related Pump Loss

2.16 D-25024, Sheet 2, Core Spray System, Unit 1

2.17 D-02524, Sheet 2, Core Spray System, Unit 2

2.18 NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants

2.0 REFERENCES

2.19 ESR 97-00508, ECCS Response Time Testing Methods

R20 2.20 Second Request for Additional Information, Brunswick Steam Electric Plant, Units 1 and 2 Response to Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power Operated Gate Valves"

2.21 EGR-NGGC-0010, System and Component Trending Program and System Libraries

2.22 0ENP-23, Predictive Maintenance Program

2.23 RFJ-24, Refueling Justification for Stroking E21-F015A/B.

2.24 0AP-54, Plant Leak Management

R25 2.25 Brunswick Steam Electric Plant Units 1 and 2, Issuance of Amendment RE: Alternative Source Term (License Amendments 221 and 246, dated May 30, 2002)

2.26 10 CFR 50.67, Accident Source Term

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Attachments 2 and 3 must be reviewed by the IST group.

3.2 Water from the suppression pool should not be injected into the reactor vessel during the performance of this test.

3.3 The following annunciators may alarm during the performance of this test:

3.3.1 *CORE SPRAY OR RHR PUMPS RUNNING* (A-03 2-1).

3.3.2 *CORE SPRAY LOOP A SYS PRESS LOW* (A-01 2-10).

3.4 The vibration velocity readings shall be taken at the test positions specified on the data sheet. Since there are multiple test points, ensure that the probe is located on the correct bearing (see Attachment 5) and in the correct direction as specified in the test position number.

3.0 PRECAUTIONS AND LIMITATIONS

3.5 For taking vibration readings, the probe shall be securely mounted at each test position. The probe must be in firm contact with the bearing housing when taking data.

3.6 When taking readings to be recorded on Attachment 2, the indicator/pointer fluctuation should be reduced to a minimum. A valve upstream of the gauge may be throttled to reduce fluctuation. Care should be taken to ensure proper communication between the gauge and main flow path.

3.7 Suitable test gauges may be used in place of any installed instrument. If used, the full-scale range of each instrument should be three times the reference value or less, with adequate range to prevent damage during use. Use of alternate test gauges requires recording the test gauge identification number, test gauge calibration date, and test gauge calibration due date.

3.8 Some steps of this test require independent verification.

3.9 An Operator should be stationed to monitor system piping for excessive motion and/or water hammer when a core spray pump is started. The susceptible piping includes core spray discharge piping located in the overhead of the 50' elevation of the Reactor Building.

3.10 When opening system drain/vent valves, proper radiological control procedures shall be observed.

3.11 Core Spray Loop A shall be declared inoperable from the beginning of Valve Testing, Section 7.6, to when valve stroking is complete **AND** the *CORE SPRAY LOOP A SYS PRESS LOW* (A-01 2-10) is cleared.

3.12 During system venting, air is not expected in the system. Should air be found, initiate a W/O and notify the System Engineer. Presence of air in the system does not make the system inoperable but does imply component degradation at some point that must be addressed. The test may continue provided air can be removed from the system via the normal venting process.

4.0 PREREQUISITES

4.1 No other testing or maintenance is in progress that will adversely affect the performance of this test.

4.2 The Core Spray System (Loop A) is in standby per 1(2)OP-18.

4.3 The station battery chargers are in operation per 1(2)OP-51.

4.4 **IF** a leakage walkdown is required, **THEN** 0AP-054 Alternative Source Term (AST) Combined Leakage Log value has been recorded on Attachment 4.

5.0 SPECIAL TOOLS AND EQUIPMENT

5.1 Confirm that no active corrective maintenance W/O exists on the following installed instruments. If any active W/O exists, operability of the instrument must be resolved and recorded in the General Comments and Recommendations section before the instrument may be used.

	Instrument	W/R-W/O	W/R-W/O #
5.1.1	E21-PT-N001A	yes / (no)	N/A
5.1.2	E21-FT-N003A	yes / (no)	
5.1.3	E21-PI-R600A	yes / (no)	
5.1.4	E21-FI-R601A	yes / (no)	
5.1.5	E21-PI-2651	yes / (no)	
5.1.6	E21-PI-7119A	yes / (no)	
5.1.7	E21-PI-R001A	yes / (no)	N/A

5.0 SPECIAL TOOLS AND EQUIPMENT

5.2 Suitable test gauges may be used to obtain data in place of any installed instrument. If used, note:

5.2.1	ID number	N/A
5.2.2	Range of instrument	
5.2.3	Calibration date	
5.2.4	Calibration due date	
5.2.5	Parameter measured	N/A

5.3 A stopwatch with the following data recorded below:

5.3.1	Stopwatch identification number.	7 KLOK 43
5.3.2	Stopwatch calibration date.	1-1-07
5.3.3	Stopwatch calibration due date.	12-31-07

5.4 Predictive Maintenance personnel will provide the vibration monitoring instrument used for data collection. Record the required data below:

5.4.1	Vibration monitor identification number.	3 CELU 7
5.4.2	Transducer identification number.	BR 438
5.4.3	Vibration monitor/transducer calibration date.	2-28-07
5.4.4	Vibration monitor/transducer calibration due date.	2-29-08

5.5 Vent and drain rig

5.6 Tubing, valves, and fittings to install test gauges (as required).

5.7 Ladder for vibration readings

6.0 ACCEPTANCE CRITERIA

This test may be considered satisfactory when the following criteria are met:

6.1 Pump Tests

NOTE:	Acceptance Criteria 6.1.1 includes allowances for a number of items (such as flow diversion through the minimum flow valve, cracks, and the vent hole). Meeting the values shown assure that CS can provide 4100 gpm to the vessel with 113 psid between the Suppression Pool and the vessel as required by Technical Specifications.

R13

6.1.1 *CORE SPRAY PUMP A* operation develops a recirculation flow rate of 4700 gpm or greater against a system head of greater than or equal to 260 psig. (SR 3.5.1.6, SR 3.5.2.5)

6.1.2 *CORE SPRAY PUMP A* discharge pressure increases to greater than or equal to 300 psig within 5 seconds of control switch operation. (SR 3.5.1.12, SR 3.5.2.7)

6.1.3 The pump test data shall be compared to the allowable ranges identified in Test Information Attachment 2.

6.1.4 If deviations fall within the ALERT RANGE of Attachment 2, the frequency of testing shall be doubled until the cause of the deviation is determined and corrected and either the existing reference values reverified or a new set of reference values established per OMa-1988, Paragraph 6.1.

6.1.5 If the deviations fall within the REQUIRED ACTION RANGE of Attachment 2, the pump shall be declared inoperable and not returned to service until the condition has been corrected.

6.1.6 When completed test results show deviations greater than the allowable ACCEPTANCE VALUE RANGE, the instruments involved may be recalibrated and the test rerun. However, this shall not preclude declaring the pump inoperable as required.

6.0 ACCEPTANCE CRITERIA

6.2 Valve Tests

NOTE:	Stroke time shall be measured from the time the control switch is repositioned to the time the valve is fully stroked by light indication. Deviations from this standard method of testing will be specified in the procedure.

6.2.1 Valve Stroke Time

1. Measured stroke times shall be within the ACCEPTABLE RANGE as specified by the minimum and maximum stroke times shown on Attachment 3.

2. For tests where the measured stroke time of a valve exceeds the maximum ACCEPTABLE stroke time but **does not** exceed the LIMITING stroke time, the valve shall be immediately retested or declared INOPERABLE.

   a. If a valve is retested, and the measured stroke time is within the ACCEPTABLE RANGE, the valve may be declared OPERABLE. A Condition Report (CR) shall be generated to ensure the OM Code requirement associated with the evaluation is completed by Engineering.

   b. If a valve is retested and the measured stroke time falls outside the ACCEPTABLE RANGE, a Tracking LCO shall be generated to track the time agreed upon by the Shift Superintendent and BESS in accordance with 0OI-01.08. Otherwise, declare the valve INOPERABLE and meet the requirements of all applicable Technical Specifications.

3. For tests where the measured stroke time of the valve is less than the minimum ACCEPTABLE stroke time, exceeds the LIMITING stroke time or the valve disc or stem fail to exhibit the required change of position, the valve shall immediately be declared INOPERABLE.

4. For Core Spray Injection Valves, E21-F004A and E21-F005A, the measured opening stroke time shall be less than or equal to 23.8 seconds to satisfy Core Spray Loop A response time requirements. (SR 3.5.1.12, SR 3.5.2.7).

6.0 ACCEPTANCE CRITERIA

6.2.2 Valve Full-Stroke Exercise

Full-stroke exercise requirements shall be satisfied by completely cycling a valve from the closed position to the open position and back to the closed position or from the open position to the closed position and back to the open position.

6.2.3 Valve Remote Position Indicator (RPI) Verification

At a refueling frequency (not to exceed 2 years), each RPI Verification identified on Attachment 3 shall be observed to verify that the valve position is accurately indicated in both the open and closed positions by the indicating lights on the RTGB when the valve stem or mechanical position indicator has stopped moving. RPI verification satisfies the requirements of SR 3.3.3.1.3.

6.2.4 Check Valve Exercising

1. Check valve exercising to the full open position shall be satisfied by demonstrating the ability to pass maximum accident condition flow.

2. Check valve exercising to the closed position shall be considered satisfactory by demonstrating the ability to establish a differential pressure across the valve seat, or by verifying the absence of flow under pressure while venting the upstream side of the valve seat with pressure on the downstream side.

6.3 Leak Tightness Examination

6.3.1 Identified leakage is recorded on Attachment 4, Leak Identification Data Sheet, and a Work Request (WR) is initiated for any leakage with the exception of packing and gasket leakage less than 5 drops per minute (dpm). The WR shall state that identified leakage is required to be corrected or minimized as required by TS 5.5.2.

6.3.2 For 'through-wall' or 'through-weld' leakage, a Nuclear Condition Report (NCR) is initiated to assess structural integrity of the affected component.

6.0 ACCEPTANCE CRITERIA

R25

6.3.3 The following applicable actions are taken when the combined leakage total (AST Combined Leakage Log value plus leakage from components shown on Attachment 6) is greater than 0 gpm:

1. If the combined leakage is determined to be less than or equal to 1 gallon per minute (gpm), the normal work management process (PRI 3) for correcting leakage is implemented.

2. If the combined leakage is determined to be greater than 1 gpm and less than or equal to 20 gpm, the initiated WR should be identified as PRI 2 to expedite corrective actions to eliminate or reduce identified leakage as soon as plant conditions allow.

3. If the combined leakage is greater than 20 gpm, the initiated WR should be identified as PRI 2 to expedite corrective actions to eliminate or reduce identified leakage as soon as plant conditions allow. A Nuclear Condition Report (NCR) is initiated to have Engineering assess the impact to the AST (10CFR50.67) analysis.

7.0 PROCEDURAL STEPS

Initials

7.1 **OBTAIN** permission from the Unit SCO to perform this test, **AND ENSURE** LCO requirements have been reviewed in accordance with 0OI-01.08. — S (Unit SCO)

7.2 **ENSURE** all prerequisites listed in Section 4.0 are met. — Y

7.3 **CONFIRM** required data has been recorded in Section 5.0. — Y

7.4 **NOTIFY** Maintenance the pumps are being tested so they can observe the pump run, if desired. — Y

NOTE: A leakage walkdown is required to be performed each 24 months per TS 5.5.2.b.

7.5 **IF** a leakage walkdown is required of *CORE SPRAY LOOP A* during the performance of this procedure, **THEN PREPARE** to perform a system walkdown to identify system leaks. — N/A

7.6 Valve Testing

NOTE: Those steps associated with valve remote position indicator (RPI) verification are performed each refueling, not to exceed 2 years, or after maintenance which affects RPI performance. **IF** RPI verification is **NOT** required for this test, **THEN** N/A may be entered in the Initials.

NOTE: Steps 7.6.1 through 7.6.3.2 are required to be performed only during refueling outages in an effort to prevent voiding Core Spray piping during power operations. **IF** these steps are **NOT** required for this test, **THEN** NA may be entered where appropriate.

R20

CAUTION

Core Spray Loop A shall be declared inoperable from the beginning of Valve Testing to when valve stroking is complete **AND** the *CORE SPRAY LOOP A SYS PRESS LOW* (A-01 2-10) is cleared.

7.6.1 **IF** performing during a refueling outage, **THEN ENSURE** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A,* is closed. — N/A

7.0 PROCEDURAL STEPS

Initials

7.6.2 **IF** performing during a refueling outage, **THEN OPEN** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A.* N/A

1. **CONFIRM** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A,* valve stem travels to the open position when indicating lights indicate open, **AND RECORD** remote position indicator results on Attachment 3. N/A

7.6.3 **IF** performing during a refueling outage, **THEN CLOSE** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A,* **AND RECORD** valve stroke time and full-stroke exercise on Attachment 3. N/A

1. **CONFIRM** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A*, valve stem travels to the closed position when indicating lights indicate closed, **AND RECORD** remote position indicator results on Attachment 3. N/A

2. **IF** entrance into this procedure was necessary only to perform stroking and timing of *E21-F015A*, **THEN GO TO AND PERFORM** Section 7.7 **AND** applicable steps of Section 7.9. N/A

7.6.4 **ENSURE** Core Spray *OUTBOARD INJECTION VLV, E21-F004A,* is open. Y

7.6.5 **CLOSE** Core Spray *OUTBOARD INJECTION VLV, E21-F004A,* **AND RECORD** valve stroke time on Attachment 3. Y

1. **CONFIRM** Core Spray *OUTBOARD INJECTION VLV, E21-F004A*, valve stem travels to the closed position when indicating lights indicate closed, **AND RECORD** remote position indicator results on Attachment 3. N/A

7.6.6 **ENSURE** Core Spray *INBOARD INJECTION VLV, E21-F005A,* is closed. Y

7.6.7 **OPEN** Core Spray *INBOARD INJECTION VLV, E21-F005A,* **AND RECORD** valve stroke time on Attachment 3. Y

1. **CONFIRM** Core Spray *INBOARD INJECTION VLV, E21-F005A,* valve stem travels to the open position when indicating lights indicate open, **AND RECORD** remote position indicator results on Attachment 3. N/A

7.0 PROCEDURAL STEPS

Initials

7.6.8 **CLOSE** Core Spray *INBOARD INJECTION VLV, E21-F005A,* **AND RECORD** valve stroke time and full-stroke exercise on Attachment 3. Y

1. **CONFIRM** Core Spray *INBOARD INJECTION VLV, E21-F005A,* valve stem travels to the closed position when indicating lights indicate closed, **AND RECORD** remote position indicator results on Attachment 3. N/A

7.6.9 **OPEN** Core Spray *OUTBOARD INJECTION VLV, E21-F004A,* **AND RECORD** valve stroke time and full-stroke exercise on Attachment 3. Y

1. **CONFIRM** Core Spray *OUTBOARD INJECTION VLV, E21-F004A,* valve stem travels to the open position when indicating lights indicate open, **AND RECORD** remote position indicator results on Attachment 3. N/A

7.6.10 **ENSURE** Core Spray *TORUS SUCTION VLV, E21-F001A,* is open. Y

7.6.11 **CLOSE** Core Spray *TORUS SUCTION VLV, E21-F001A,* **AND RECORD** valve stroke time on Attachment 3. Y

1. **CONFIRM** Core Spray *TORUS SUCTION VLV, E21-F001A,* valve stem travels to the closed position when indicating lights indicate closed, **AND RECORD** remote position indicator results on Attachment 3. N/A

7.0 PROCEDURAL STEPS

Initials

7.6.12 **OPEN** Core Spray *TORUS SUCTION VLV, E21-F001A,* **AND RECORD** the valve stroke time and full-stroke exercise on Attachment 3. Y

1. **CONFIRM** Core Spray *TORUS SUCTION VLV, E21-F001A,* valve stem travels to the open position when indicating lights indicate open, **AND RECORD** remote position indicator results on Attachment 3. N/A

7.6.13 **ENSURE** Core Spray *MIN FLOW BYPASS VLV, E21-F031A,* is open. Y

7.6.14 **CLOSE** Core Spray *MIN FLOW BYPASS VLV, E21-F031A,* **AND RECORD** valve stroke time on Attachment 3. Y

1. **CONFIRM** Core Spray *MIN FLOW BYPASS VLV, E21-F031A,* valve stem travels to the closed position when indicating lights indicate closed, **AND RECORD** remote position indicator results on Attachment 3. N/A

7.6.15 **OPEN** Core Spray *MIN FLOW BYPASS VLV, E21-F031A,* **AND RECORD** valve stroke time and full-stroke exercise on Attachment 3. Y

1. **CONFIRM** Core Spray *MIN FLOW BYPASS VLV, E21-F031A,* valve stem travels to the open position when indicating lights indicate open, **AND RECORD** remote position indicator results on Attachment 3. N/A

7.7 Filling and Venting Core Spray Loop A

NOTE:	**IF** air is observed in the discharge piping, a W/R should be prepared to correct any problems.

7.7.1 **IF** the keepfill station for *CORE SPRAY LOOP A* is available, **THEN PERFORM** the following:

1. **ENSURE** that a vent and drain rig is attached to *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23.* Y

7.0 PROCEDURAL STEPS

Initials

2. **THROTTLE OPEN** *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23,* until a solid stream of water issues from the vent line, **THEN CLOSE** *E21-V23.* — ✓

CAUTION

Failure to follow Steps 7.7.2.1 through 7.7.2.7 in the order specified may cause the *KEEPFILL RELIEF VALVE, E21-F024A*, to lift and damage the seat of *KEEPFILL STATION PRESSURE CONTROL VALVE, E21-PCV-F026A.*

7.7.2 **IF** it is desired to use the *KEEPFILL STATION E21-PCV-F026A BYPASS VALVE, E21-F028A*, **OR** the valve is already open, **THEN PERFORM** the following:

1. **ENSURE** that a vent and drain rig is attached to *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23.* — N/A

2. **ENSURE** *KEEPFILL STATION E21-PCV-F026A DOWNSTREAM ISOLATION VALVE, E21-F027A,* is closed. — N/A

3. **IF** necessary, **THROTTLE OPEN** *KEEPFILL STATION E21-PCV-F026A BYPASS VALVE, E21-F028A.* — N/A

4. **THROTTLE OPEN** *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23*, until a solid stream of water issues from the vent line, **THEN CLOSE** *E21-V23.* — N/A

5. **CLOSE** *KEEPFILL STATION E21-PCV-F026A BYPASS VALVE, E21-F028A.* — N/A / N/A (Ind.Ver.)

6. **THROTTLE OPEN** *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23,* until *CORE SPRAY PUMP A DISCHARGE PRESSURE INDICATOR, E21-PI-R600A* (Panel H12-P601), indicates 40 to 70 psig, **THEN CLOSE** *E21-V23.* — N/A

7.0 PROCEDURAL STEPS

Initials

7. **SLOWLY OPEN** *KEEPFILL STATION E21-PCV-F026A DOWNSTREAM ISOLATION VALVE, E21-F027A.* N/A / N/A Ind.Ver.

7.7.3 **IF** required, **REMOVE** the vent and drain rig from the *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23.* N/A

7.7.4 **CONFIRM** *CORE SPRAY LOOP A SYS PRESS LOW* (A-01 2-10) is cleared. Y

7.8 Pump Testing

7.8.1 **OBSERVE** *CORE SPRAY PUMP A* suction pressure (stopped) as indicated on *E21-PI-R001A* **AND RECORD** on Attachment 2. ____

CAUTION

Do **NOT** cross-connect the Nuclear and Conventional Service Water headers by simultaneously opening *NUC SW TO VITAL HEADER VLV, SW-V117*, and *CONV SW TO VITAL HEADER VLV, SW-V111.*

7.8.2 **ENSURE** one of the following valves is open:

1. *NUC SW TO VITAL HEADER VLV, SW-V117* ____

OR

2. *CONV SW TO VITAL HEADER VLV, SW-V111.* ____

7.8.3 **ENSURE** *VITAL HEADER XTIE VLV, SW-V118*, is open. ____

7.8.4 **ENSURE** *WELL WATER TO VITAL HEADER VALVE, SW-V141,* is closed. ____

7.8.5 **STATION** an operator to monitor system piping for excessive motion and water hammer when a Core Spray pump is started. ____

7.0 PROCEDURAL STEPS

Initials

7.8.6 **ENSURE** proper *CORE SPRAY PUMP A* lubricant level. _____

NOTE: The following step requires that the time interval from pump start to discharge pressure at 300 psig be measured with a stopwatch. It may be advisable to place a temporary non-destructive mark on the pressure indicator at 300 psig to assist in timing.

R15

CAUTION

Operation of the core spray pump in the minimum flow mode should be minimized.

7.8.7 **START** *CORE SPRAY PUMP A* while monitoring pump discharge pressure on *E21-PI-R600A*, **AND CONFIRM** pressure increases to greater than or equal to 300 psig in less than or equal to 5.0 seconds. _____

Response Time _____ sec.

7.8.8 **RECORD** the time that *CORE SPRAY PUMP A* was started. _____

Time _____

7.8.9 **ENSURE** the following:

1. *CORE SPRAY DIVISION I ROOM COOLER FAN* has started. _____

2. *SERVICE WATER OUTLET VALVE, SW-V128*, is open. _____

7.8.10 **THROTTLE OPEN** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A,* to obtain greater than or equal to 4700 gpm as indicated on *E21-FI-R601A.* _____

7.0 PROCEDURAL STEPS

Initials

7.8.11 **WHEN** flow is greater than 603 gpm, **CONFIRM** that the Core Spray *MIN FLOW BYPASS VLV, E21-F031A,* closes. _____

R13 7.8.12 **CONFIRM** *CORE SPRAY PUMP A* discharge pressure is greater than or equal to 260 psig, as indicated on *E21-PI-R600A*. _____

NOTE: A higher pressure indication on *E21-PI-R600A* than on *E21-PI-2651* verifies *KEEPFILL STATION CHECK VALVES, E21-F030A* and/or *E21-F029A*, go to the closed position. If indication on *E21-PI-2651* is "pegged", then proceed to Step 7.8.14. If test is satisfactory, then N/A Step 7.8.14.

NOTE: Operability of the keep-fill check valves is performed as a pair. If the check valves cannot be determined to be closed, then a W/R shall be written to repair or replace both *E21-F030A* and *E21-F029A*.

7.8.13 **CONFIRM** *KEEPFILL STATION CHECK VALVES, E21-F030A* and/or *E21-F029A*, go to the closed position, **AND RECORD** on Attachment 3. _____

NOTE: Verifying the absence of flow under pressure while venting at *E21-PI-2651 INSTRUMENT DRAIN VALVE, E21-IV-786*, satisfies reverse exercising requirements for *KEEPFILL STATION CHECK VALVES, E21-F030A* and/or *E21-F029A*. This does **NOT** imply that drainage will not be present.

R15 7.8.14 **IF** test conditions in Step 7.8.13 cannot be met, **THEN PERFORM** the following steps to satisfy exercising *KEEPFILL STATION CHECK VALVES, E21-F030A* and/or *E21-F029A*, to the closed position:

1. **CONNECT** hose at *E21-PI-2651 INSTRUMENT DRAIN VALVE, E21-IV-786*, **AND ROUTE** to floor drain. _____

2. **CLOSE** *KEEPFILL STATION E21-PCV-F026A UPSTREAM ISOLATION VALVE, E21-F025A.* _____

7.0 PROCEDURAL STEPS

Initials

3. **ENSURE** *CORE SPRAY LOOP A KEEPFILL ISOLATION VALVE, TD-V13,* is closed. _____

4. **OPEN** *E21-PI-2651 INSTRUMENT DRAIN VALVE, E21-IV-786,* **AND ALLOW** piping to drain for a minimum of three minutes. _____

5. **CONFIRM** the absence of pressurized flow from drain hose **AND RECORD** *KEEPFILL STATION CHECK VALVES, E21-F030A* and/or *E21-F029A* go to the closed position on Attachment 3. _____

6. **CLOSE** *E21-PI-2651 INSTRUMENT DRAIN VALVE, E21-IV-786.* ___/___ Ind.Ver.

CAUTION

Damage to the *KEEPFILL STATION PRESSURE CONTROL VALVE, E21-PCV-F026A,* may occur if it is placed in service too rapidly.

7. **SLOWLY OPEN** *KEEPFILL STATION E21-PCV-F026A UPSTREAM ISOLATION VALVE, E21-F025A.* ___/___ Ind.Ver.

7.8.15 **SLOWLY OPEN** *E21-PI-7119A INSTRUMENT ISOLATION VALVE, E21-V5000.* _____

NOTE: The Core Spray Pump shall be operated for at least 2 minutes under conditions as stable as the system permits prior to recording test data.

7.8.16 **THROTTLE** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A,* to obtain 4700 gpm as indicated on *E21-FI-R601A.* _____

7.8.17 **OBSERVE** *CORE SPRAY PUMP A* suction pressure (running) as indicated on *E21-PI-R001A* **AND RECORD** on Attachment 2. _____

7.0 PROCEDURAL STEPS

Initials

7.8.18 **OBSERVE** *CORE SPRAY PUMP A* discharge pressure as indicated on *E21-PI-7119A* **AND RECORD** on Attachment 2. _____

7.8.19 **OBSERVE** *CORE SPRAY PUMP A* System flow as indicated on *FLOW INDICATOR E21-FI-R601A* **AND RECORD** on Attachment 2. _____

7.8.20 **ENSURE** proper lubricant level **AND RECORD** on Attachment 2. _____

7.8.21 **MEASURE** *CORE SPRAY PUMP A* vibration velocity (in/sec peak) at the test positions indicated on Attachment 2. _____

7.8.22 **RECORD** the measured vibration velocities in the ACTUAL VALUE column on Attachment 2. _____

NOTE: Flow indication of at least 5000 gpm on *FLOW INDICATOR E21-FI-R601A* confirms *CORE SPRAY PUMP A DISCHARGE CHECK VALVE, E21-F003A,* goes to the full open position.

7.8.23 **THROTTLE** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A,* to obtain 5000 gpm as indicated on *E21-FI-R601A.* _____

7.8.24 **CONFIRM** *CORE SPRAY PUMP A DISCHARGE CHECK VALVE, E21-F003A,* fully opens **AND RECORD** on Attachment 3. _____

NOTE: A leakage walkdown is required to be performed at least once per 24 months per TS 5.5.2.

7.8.25 **IF** required, **PERFORM** a leakage walkdown of the components identified on Attachment 6, **AND RECORD** leakage on Attachment 4, Leak Identification Data Sheet. _____

7.8.26 **CLOSE** *E21-PI-7119A INSTRUMENT ISOLATION VALVE, E21-V5000.* _____ / _____ Ind.Ver.

7.8.27 **CLOSE** Core Spray *FULL FLOW TEST BYP VLV, E21-F015A.* _____

7.0 PROCEDURAL STEPS Initials

7.8.28 **WHEN** *CORE SPRAY LOOP A* flow is less than 603 gpm, **ENSURE** that Core Spray *MIN FLOW BYPASS VLV, E21-F031A,* opens. _____

7.8.29 **STOP** *CORE SPRAY PUMP A* **AND RECORD** the time. _____

Time _____

7.8.30 **CONFIRM** the following:

1. *CORE SPRAY DIVISION I ROOM COOLER FAN* is off. _____

2. *SERVICE WATER OUTLET VALVE, SW-V128,* is closed. _____

7.8.31 **IF** required, **ENSURE** the following valves are closed:

1. *NUC SW TO VITAL HEADER VLV, SW-V117* __/__ Ind.Ver.

2. *CONV SW TO VITAL HEADER VLV, SW-V111* __/__ Ind.Ver.

7.8.32 **CALCULATE** *CORE SPRAY PUMP A* run time. _____

_____ - _____ = _____
7.8.29 7.8.8

7.8.33 **IF** required to relieve high system pressure condition or ensure the system is filled and vented, **THEN PERFORM** the following

1. **ENSURE** a vent and drain rig is attached to *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23.* _____

2. **THROTTLE OPEN** *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23,* until a solid stream of water issues from the vent line, **THEN CLOSE** *E21-V23.* _____

3. **IF** required, **REMOVE** the vent and drain rig from *CORE SPRAY DIVISION I LINE VENT VALVE, E21-V23.* _____

7.0 PROCEDURAL STEPS

Initials

7.9 System Restoration

7.9.1 **ALIGN** valves as specified in Table 1. _____

NOTE:	Independent verification is required for valve lineup.

TABLE 1
SYSTEM VERIFICATION LINEUP SHEET

VALVE NO.	DESCRIPTION	REQUIRED POSITION	INITIALS IND. VER.
E21-F001A	Core Spray Pump A Suppression Pool Suction Valve	OPEN	/
E21-F004A	Core Spray Outboard Injection Valve	OPEN	/
E21-F005A	Core Spray Inboard Injection Valve	CLOSED	/
E21-F031A	Core Spray Minimum Flow Bypass Valve	OPEN	/
E21-F015A	Core Spray Test Bypass Valve	CLOSED	/
E21-V23	Core Spray Division I Line Vent Valve	CLOSED	/

7.9.2 **IF** installed, **REMOVE** drain hose installed at *E21-PI-2651, INSTRUMENT DRAIN VALVE, E21-IV-786.* _____

7.9.3 **IF** necessary, **REMOVE** the temporary mark on pressure indicator *E21-PI-R600A*. _____

7.9.4 **ENSURE** the required information has been recorded on the cover page. _____

7.9.5 **NOTIFY** the IST Engineer when data has been recorded on Attachments 2 and 3 **AND RECORD** the following information. _____

IST Engineer _____ _____ _____
Name Date Time

7.9.6 **NOTIFY** the Unit SCO when this test is complete or found to be unsatisfactory. _____

ATTACHMENT 1
Page 1 of 1
Certification and Review Form

General Comments and Recommendations _____

_____

	Initials	Name (Print)
Performed by:	S	Sam Bangor
	Y	Pete Endecott

Exceptions to satisfactory performance _____

_____

Corrective action required _____

_____

NOTE:	Pump test data shall be analyzed within 96 hours after completion of this PT. SCO review/approval of the PT satisfies this ASME Code requirement.

Test procedure has been satisfactorily completed:

Unit SCO: _____ _____
Signature Date

Test procedure has **NOT** been satisfactorily completed:

Unit SCO: _____ _____
Signature Date

Test has been reviewed by:

Shift Superintendent _____ _____
Signature Date

ATTACHMENT 2
Page 1 of 2

Unit 1 Core Spray Pump A Test Information Data Sheet

1. The lubricant level (pump running) is normal. _____

2. Calculate pump dP as follows:

   Pump discharge pressure - suction pressure (run) = pump dP

   _____ - _____ = _____

NOTE: Pump vibration is measured at the test point marked on the pump for the correct bearing number and direction as indicated by the Test Position number as follows:

- the number indicates the bearing number from Attachment 5
- for position, N=North, S=South, E=East, W=West
- for direction, A=Axial, H=Horizontal, V=Vertical

NOTE: Reference values for pump suction and discharge pressures are provided for determining the suitability of alternate test gauges, if used.

UNIT 1 CORE SPRAY PUMP A TEST DATA							
TEST PARAMETER	ACTUAL VALUE	REFERENCE VALUE	ACCEPTANCE VALUE RANGE	ALERT RANGE		REQUIRED ACTION RANGE	
				LOW	HIGH	LOW	HIGH
Suction Press. (Stopped) psig		6.0	4 to 8	N/A	N/A	< 4	> 8
Suction Press. (Running) psig		4.0	N/A	N/A	N/A	N/A	N/A
Discharge Press. Psig		290.0	N/A	N/A	N/A	N/A	N/A
Pump DP psid		290.9	261.9 to 319.9	N/A	N/A	< 261.9	> 319.9
Flow Rate gpm		4,700	N/A	N/A	N/A	N/A	N/A
Vibration-vel (in/s peak) Position 1S H		0.133	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700
Vibration-vel (in/s peak) Position 1W A		0.195	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700
Vibration-vel (in/s peak) Position 1W H		0.144	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700

Performed By (Signature) _____ Date _____ Time _____

Reviewed, IST Group (Signature) _____ Date _____

ATTACHMENT 2
Page 2 of 2

Unit 2 Core Spray Pump A Test Information Data Sheet

1. The lubricant level (pump running) is normal. _____

2. Calculate pump dP as follows:

   Pump discharge pressure - suction pressure (run) = pump dP

   _____ - _____ = _____

NOTE: Pump vibration is measured at the test point marked on the pump for the correct bearing number and direction as indicated by the Test Position number as follows:

- the number indicates the bearing number from Attachment 5
- for position, N=North, S=South, E=East, W=West
- for direction, A=Axial, H=Horizontal, V=Vertical

NOTE: Reference values for pump suction and discharge pressures are provided for determining the suitability of alternate test gauges, if used.

UNIT 2 CORE SPRAY PUMP A TEST DATA							
TEST PARAMETER	ACTUAL VALUE	REFERENCE VALUE	ACCEPTANCE VALUE RANGE	ALERT RANGE		REQUIRED ACTION RANGE	
				LOW	HIGH	LOW	HIGH
Suction Press. (Stopped) psig		6.0	4 to 8	N/A	N/A	< 4	> 8
Suction Press. (Running) psig		4.0	N/A	N/A	N/A	N/A	N/A
Discharge Press. Psig		290.0	N/A	N/A	N/A	N/A	N/A
Pump DP psid		283.1	260.0 to 311.4	N/A	N/A	< 260.0	> 311.4
Flow Rate gpm		4,700	N/A	N/A	N/A	N/A	N/A
Vibration-vel (in/s peak) Position 1S H		0.230	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700
Vibration-vel (in/s peak) Position 1W A		0.212	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700
Vibration-vel (in/s peak) Position 1W H		0.156	0 to 0.325	N/A	> 0.325 to 0.700	N/A	> 0.700

Performed By (Signature) _____ Date _____ Time _____

Reviewed, IST Group (Signature) _____ Date _____

ATTACHMENT 3
Page 1 of 2

Unit 1 Core Spray System (Loop A) Valve Test Information Sheet

Valve Number	Stroke Direction	Remote Position Indication (Initials)		Stroke Time Test (sec)	Stroke Time Acceptance Criteria (Seconds)				Fail-Safe Test (Initials)	Full-Stroke Exercise (Initials)	Check Valve Exercise (Initials)	Valve SAT/ UNSAT
		Stem	Ind. Lights		Acceptable Range		Limiting (≤)	Ref. Stroke Time				
					Minimum (≥)	Maximum (≤)						
1-E21-F015A	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1-E21-F015A	CLOSED			N/A	35.90	48.50	52.70	42.20	N/A	N/A	N/A	
1-E21-F004A	CLOSED				9.85	13.33	14.49	11.59	N/A	N/A	N/A	
1-E21-F005A	OPEN				10.01	13.55	14.73	11.78	N/A	N/A	N/A	
1-E21-F005A	CLOSED				9.88	13.36	14.53	11.62	N/A	N/A	N/A	
1-E21-F004A	OPEN				9.99	13.51	14.69	11.75	N/A	N/A	N/A	
1-E21-F001A	CLOSED				68.51	92.69	100.75	80.60	N/A	N/A	N/A	
1-E21-F001A	OPEN				72.73	98.39	106.95	85.56	N/A	N/A	N/A	
1-E21-F031A	CLOSED				11.00	14.80	16.10	12.90	N/A	N/A	N/A	
1-E21-F031A	OPEN	N/A	N/A	N/A	12.30	16.50	18.00	14.40	N/A	N/A	N/A	
1-E21-F029A	CLOSED	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
1-E21-F030A	CLOSED	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
1-E21-F003A	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTE: Spaces next to valve numbers shall be filled in with an appropriate entry, initials, or N/A.

Performed by (signature) N/A Date N/A

Performed by (signature) N/A Date N/A

Reviewed, IST Group (signature) N/A Date N/A

Unit 2 Core Spray System (Loop A) Valve Test Information Sheet

Valve Number	Stroke Direction	Remote Position Indication (Initials)		Stroke Time Test (sec)	Stroke Time Acceptance Criteria (Seconds)				Fail-Safe Test (Initials)	Full-Stroke Exercise (Initials)	Check Valve Exercise (Initials)	Valve SAT/ UNSAT
		Stem	Ind. Lights		Acceptable Range		Limiting (≤)	Ref. Stroke Time				
					Minimum (≥)	Maximum (≤)						
2-E21-F015A	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-E21-F015A	CLOSED			N/A	36.30	49.10	53.30	42.70	N/A	N/A	N/A	N/A
2-E21-F004A	CLOSED			11.0	9.38	12.70	13.80	11.04	N/A	N/A	N/A	SAT
2-E21-F005A	OPEN			11.6	10.20	13.80	15.00	12.00	N/A	N/A	N/A	SAT
2-E21-F005A	CLOSED			11.7	10.30	13.94	15.15	12.12	N/A	Y	N/A	SAT
2-E21-F004A	OPEN			11.3	9.61	13.01	14.14	11.31	N/A	Y	N/A	SAT
2-E21-F001A	CLOSED			80.6	70.00	94.60	102.90	82.34	N/A	N/A	N/A	SAT
2-E21-F001A	OPEN			78.6	67.20	90.80	98.70	79.03	N/A	Y	N/A	SAT
2-E21-F031A	CLOSED			13.7	12.20	16.40	17.90	14.33	N/A	N/A	N/A	SAT
2-E21-F031A	OPEN	N/A	N/A	15.2	13.10	17.70	19.20	15.41	N/A	Y	N/A	SAT
2-E21-F029A	CLOSED	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E21-F030A	CLOSED	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
2-E21-F003A	OPEN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

NOTE: Spaces next to valve numbers shall be filled in with an appropriate entry, initials, or N/A.

Performed by (signature) Pete Enderny Date Today

Performed by (signature) _____ Date _____

Reviewed, IST Group (signature) _____ Date _____

R25

Leak Identification Data Sheet

NOTE: For packing and gaskets, a WR is required to be initiated and documented if leakage exceeds 5 dpm.

NOTE: Each WR/WO listed is required to state that identified leakage is to be corrected or minimized as required by TS 5.5.2.

SYSTEM: Core Spray System A Loop Unit _____

Component	Nature of Leak	Leakage Rate[1]	WR/WO#
	Sum of Identified Leakage:		
	AST Combined Leakage Log value from 0AP-054:	+	
	Total:	=	

[1] Conversion Factor: (dpm x 1.6 x 10^{-3}) ÷ 60 = gpm

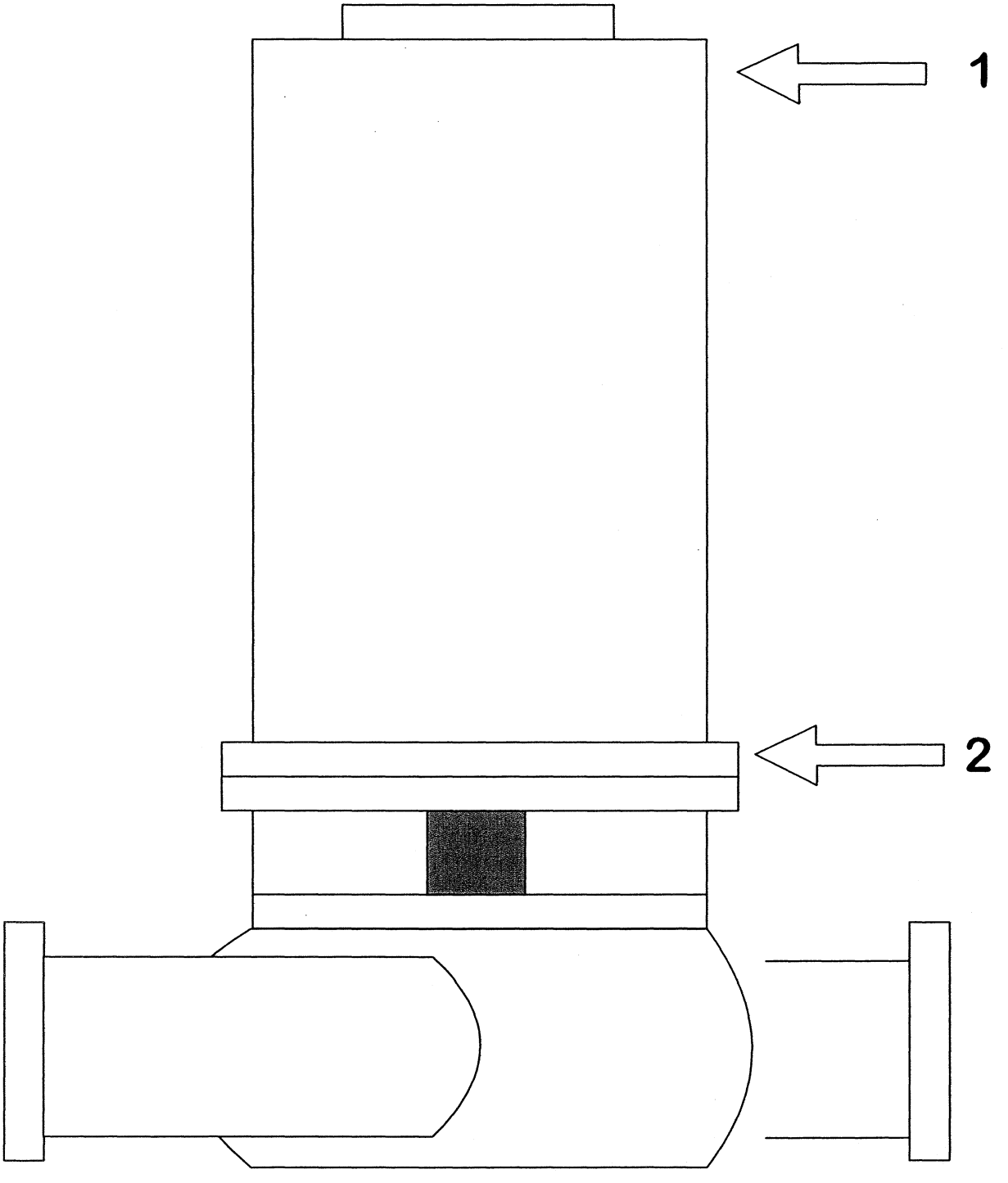
Examination Performed by: _____/_____ Date _____
(Signature) (Print Name)

Examination Performed by: _____/_____ Date _____
(Signature) (Print Name)

ATTACHMENT 5
Page 1 of 1

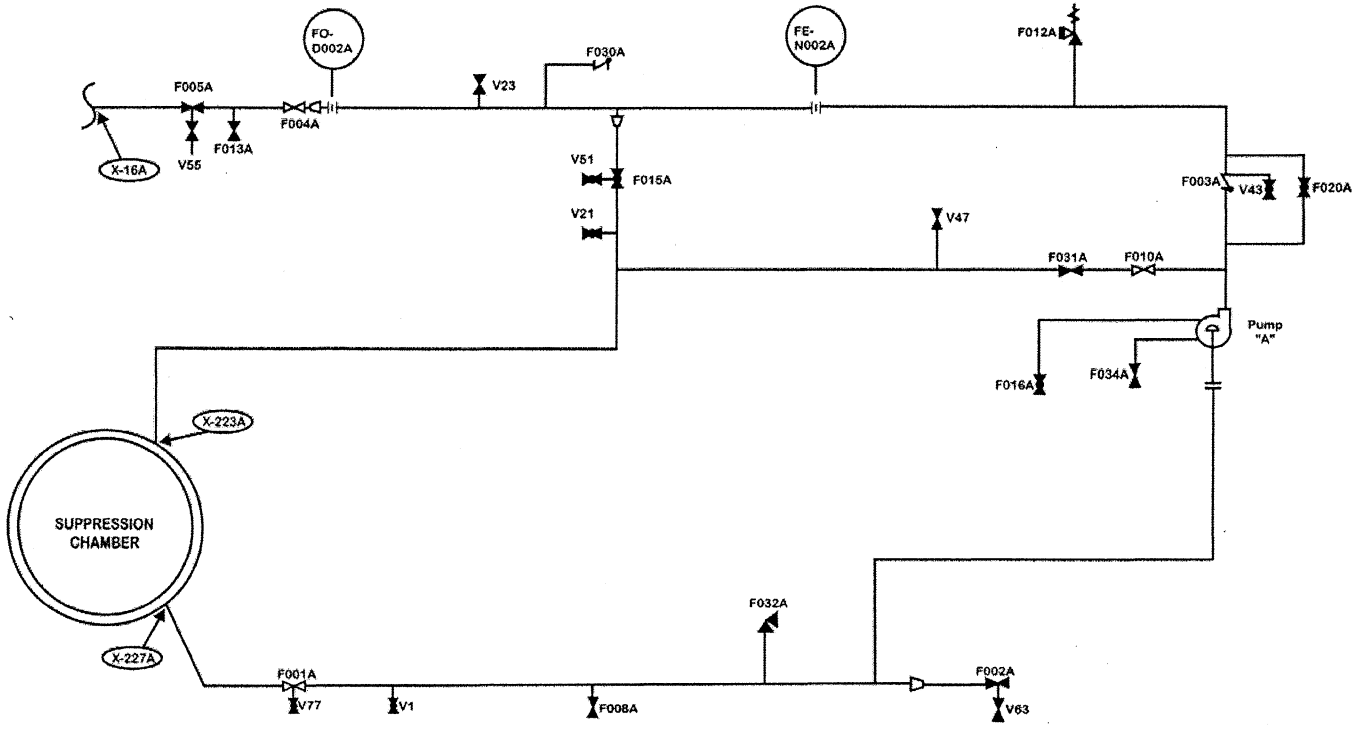
Core Spray Pump

Pump Vibration Test Position Numbers (Bearing Numbers)



ATTACHMENT 6
Page 1 of 2
Leakage Inspection Boundary

NOTE:	Because of drawing limitations, instrumentation lines connected to boundaries are not shown. The leakage inspection boundary for instrumentation lines extends to and includes the last instrument root valve before the instrument.
NOTE:	The Suppression Chamber is **NOT** required to be examined. It is shown for clarification only



Leakage Inspection Guidance

When performing leakage inspections for TS 5.5.2, the following guidance should be followed to the extent practical.

1. The leakage inspection should be conducted by examining the accessible exposed surfaces for evidence of leakage.

2. For insulated components or components whose external surfaces are inaccessible for direct inspection, the leakage inspection should be performed on surrounding areas (i.e. floors or equipment surfaces located under the component) for evidence of leakage or other areas to which leakage may be channeled.

3. For vertical surfaces, the inspection of the lowest elevation where leakage may be detected should be performed.

4. For ALARA, a leakage inspection using remote visual equipment or the use of an installed leakage detection system to identify leakage is acceptable.

REVISION SUMMARY

Revision 57 incorporates PRR214582 (CORR 207570-14) and PRR20653 (CORR 207575-16) program changes to perform a Leakage Walkdown in accordance with TS 5.5.2. Changes include documenting leakage as required for Alternate Source Term (License Amendments 221 and 246 dated May 30, 2002).

Revision 56 adds Step 7.8.33 to vent system as required.

Revision 55 incorporated EC63657 by changing pump flow rate from 4626 to 4700 gpm (steps 6.1.1 and 7.8.10), adding a new step (7.8.23) to increase flow to 5000 gpm, changing Note prior to new step (7.8.23) to 5000 gpm, remove the statement inside the "( )" in Step 2.13, and changed the IST pump psid value to 260.

Revision 54 makes an editorial correction to add the Tech Spec reference to Section 6.3 per NAS Observation 69604 (This reference is already listed in the Purpose Section).

Revision 53 revises the stroke time acceptance criteria for 1-E21-F004A and 1-E21-F005A to reflect the gear ratio change incorporated IAW EC 51210/54126.

Revision 52 makes editorial corrections to update the cover page and word processing format and makes changes to reflect EC 46949, Rev 2, re-evaluation of CS injection valve and pump performance requirements.

Revision 51 revises the stroke time acceptance criteria for 2-E21-F004A and 2-E21-F005A to reflect the gear ratio change incorporated IAW EC 46949/EC 50010.

Revision 50 adds "if performing during a refueling outage" to clarify required testing associated with stroking E21-F015A.

Revision 49 updates stroke time data for 2-E21-F005A iaw the IST program; added frequency of each refueling outage for stroking/timing E21-F015A; added NOTES/step informing operators E21-F015A is required to be stroked/timed during refuel outages only and routes procedure users to applicable sections if test is being performed only to test E21-F015A

Revision 48 removes reference to specific vibration instrument, IRD Model 890, and replaces with generic reference; Add P&L and caution identifying Core Spray Loop A is inop during valve stroking and until the Loop A low pressure alarm clears.

Revision 47 revises purpose to include Tech Spec Section 5.5.2.a and adds Precaution and Limitations regarding actions if air is found in the system during testing.

Revision 46 revises gear ratio thus stroke times for 1-E21-F004A in accordance with ESR 98-00285. This revision also incorporates new stroke times for 1-E21-F001A in accordance with ESR 98-00284.

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

NRC SIM JPM S-4

TITLE: Restore Shutdown Cooling following a spurious isolation

SAFETY CONSIDERATIONS:

None.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL** be provided to the trainee.
2. This is an **ALTERNATE PATH JPM**
3. Validation Time 20 minutes

Read the following to applicant.

TASK CONDITIONS:

Unit (2) has been shutdown for maintenance for 5 days.

A spurious Group 8 isolation(High Steam Dome Pressure) caused a loss of the B loop of shutdown cooling.

RHR flow prior to the loss was ≈5000 gpm

The cause of the isolation was found and repaired and the isolation has been reset.

RPS is energized

Reactor Water Level band is 200" to 220"

Reactor pressure is 0 psig

RHR system cooldown and draindown are not a concern

A 2nd licensed operator will be conducting 2PT-01.7 and will notify you of any unexpected trends.

INITIATING CUE:

You are directed by the Unit SCO to return the B loop of RHR to Shutdown Cooling IAW AOP-15 (Start the "B" RHR pump).

STEP 1- Enters AOP-15.0 and determines step 3.2.11 is the appropriate starting point.

Enters AOP-15 at step 3.2.11.

SAT/UNSAT

NOTE: If asked, all precautions are met

Step 2 - CLOSE Loop "B" OUTBOARD INJECTION VALVE, E11-F017B.

Closes Loop "B" OUTBOARD INJECTION VALVE, E11-F017B.

**** CRITICAL STEP****
SAT/UNSAT

EXAMINER NOTE: Applicant will hold switch to 'Close' position approximately 5 seconds after valve indicates full closed to ensure full closure.

Step 3 – ENSURE Loop "B" INBOARD INJECTION VALVE, E11-F015B is OPEN

ENSURES *Loop "B" INBOARD INJECTION VALVE, E11-F015B, is OPEN.*

SAT/UNSAT

Step 4 - Unit 2 Only: OPEN RHR SHUTDOWN COOLING INBOARD SOLATION VALVE, E11-F009.

Opens valve E11-F009

**** CRITICAL STEP****

SAT/UNSAT

EXAMINER NOTE: Per OP-17, Precaution and Limitation 3.1, Valve movement for the E11-F008 is limited to 3 duty cycles in a 5 minute period followed by a 50 minute cooldown.

Step 5 - Unit 2 Only: SLOWLY OPEN RHR SHUTDOWN COOLING OUTBOARD ISOLATION VALVE, E11-F008.

Slowly Opens valve E11-F008

****CRITICAL STEP****

SAT/UNSAT

CAUTION

Failure to minimize RHR Pump operation while deadheaded may cause pump damage.

Step 6 - START an RHR Pump in the loop being used for Shutdown Cooling.

Starts the "B" RHR pump.

****CRITICAL STEP****

SAT/UNSAT

Step 7 - SLOWLY THROTTLE OPEN Loop "B" OUTBOARD INJECTION VALVE, E11-F017B to re-establish RHR loop conditions prior to the event.

Throttles Open E11-F017B to approx. 5000 gpm

****CRITICAL STEP****

SAT/UNSAT

EXAMINER NOTE: When the E11-F017B is FULL OPEN, the running RHRSW Booster Pump will trip. The following annunciator will alarm.

2-A-3 1-8, " RHRSW Pump 2B TRIP

This is AOP-15 Symptom 1.2. The following actions must be taken to maintain a Shutdown Cooling alignment.

Step 8 - WHEN RHR loop conditions have stabilized, FULLY OPEN Loop "B" OUTBOARD INJECTION VALVE, E11-F017B.

Fully Opens E11-F017B

SAT/UNSAT

NOTE: If notified as the Unit SCO that RHRSW Pump 2B has tripped, then direct the candidate to take appropriate actions IAW plant procedures.

Step 9 – RHRSW Booster Pump 2B Trips

Determines RHRSW Booster Pump 2B trips and references AOP-15 and annunciator response for 2-A-3 1-8, " RHRSW Pump 2B TRIP.

Determines that actions per AOP -15, step 3.2.9 are applicable

****CRITICAL STEP**** SAT/UNSAT

EXAMINER NOTE:
AOP-15 Procedure step 3.2.9.1 is not applicable. The applicant will continue at step 3.2.9.2.

Step 10 - **IF** available, **THEN START** the idle RHRSW Booster Pump in the RHRSW loop being used for Shutdown Cooling.

Places RHRSW Booster Pump "D" in service.

****CRITICALSTEP**** SAT/UNSAT

Step 11 – Re-opens E11-F068B , Heat Exh 2B Discharge Valve

Recognizes that the E11-F068B auto closed when the 2B RHRSW pump tripped and re-opens valve to establish flowpath

****CRITICAL STEP**** SAT/UNSAT

TERMINATING CUE: When the candidate has informed you that the "B" Loop of RHR and RHRSW are in service in Shutdown Cooling, the JPM may be terminated.

COMMENTS:

REFERENCES:
0AOP-15.0, Rev.20 section 3.2.11

KA Reference:
205000 A4.01, A4.02, A4.03 Ability to monitor and/or manually in the control room SDC/RHR pumps and valves

TOOLS AND EQUIPMENT:
None

SAFETY FUNCTION (from NUREG 1123, Rev 2.):
4 – Heat removal From the Core

Time Required for Completion: 20 Minutes (approximate).

APPLICABLE METHOD OF TESTING
Performance: Simulate ___ Actual X Unit: 2
Setting: Control Room ___ Simulator X
Time Critical: Yes ___ No X Time Limit N/A
Alternate Path: Yes **No**

EVALUATION

JPM: Pass ___ Fail ___

TASK CONDITIONS:

Unit (2) has been shutdown for maintenance for 5 days.

A spurious Group 8 isolation(High Steam Dome Pressure) caused a loss of the B loop of shutdown cooling.

RHR flow prior to the loss was ≈5000 gpm

The cause of the isolation was found and repaired and the isolation has been reset.

RPS is energized

Reactor Water Level band is 200" to 220"

Reactor pressure is 0 psig

RHR system cooldown and draindown are not a concern

A 2nd licensed operator will be conducting 2PT-01.7 and will notify you of any unexpected trends.

INITIATING CUE:

You are directed by the Unit SCO to return the B loop of RHR to Shutdown Cooling IAW AOP-15 (Start the "B" RHR pump).

Progress Energy

BRUNSWICK NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME XXI

ABNORMAL OPERATING PROCEDURE

UNIT
0

0AOP-15.0

LOSS OF SHUTDOWN COOLING

REVISION 20

3.0 OPERATOR ACTIONS

3. **CLOSE** the following valves:

   - *INBOARD RX HEAD VENT VLV, B21-F003* ☐

   - *OUTBOARD RX HEAD VENT VLV, B21-F004.* ☐

4. **ENSURE** the following valves are closed:

   - *REACTOR INBOARD HIGH POINT MANUAL VENT VALVE, B21-F001* ☐

   - *REACTOR OUTBOARD HIGH POINT MANUAL VENT VALVE, B21-F002.* ☐

5. **NOTIFY** the WCC to evaluate ongoing work which requires the unit to be in Mode 4 for safety clearances. ☐

3.2.9 **IF** the operating RHRSW loop has been lost, **THEN PERFORM** the following:

R17

1. **IF** unexplained changes in flow or pump discharge pressure are observed in the running RHRSW loop, **AND** NSW or CSW header pressure approaches pump shutoff head (approximately 90 psig), **THEN ENSURE** *UNIT 1(2) SERVICE WATER DISCHARGE OUTLET VALVE, SW-V442*, is open. ☐

2. **IF** available, **THEN START** the idle RHRSW Booster Pump in the RHRSW loop being used for Shutdown Cooling. ☐

3. **IF** the NSW or CSW Service Water Header has been lost, **THEN PLACE** the RHRSW loop in operation using the other Service Water header in accordance with 1(2)OP-43. ☐

4. **IF NO** RHRSW Booster Pumps can be placed in operation, **THEN PLACE** RHRSW in operation with **NO** RHRSW Booster Pumps available in accordance with 1(2)OP-43. ☐

5. **IF** Service Water is unavailable, **THEN PLACE** Fire Protection Water in operation to the Service Water Header in accordance with 0AOP-18.0. ☐

3.0 OPERATOR ACTIONS

R21

CAUTION

If reactor coolant temperature is greater than 212°F, and reactor water level has been raised to greater than 218 inches for 10 minutes or more, a false RPV low level signal could result when the reference leg condensing pot *N12A(B)* nozzle is uncovered as level is subsequently lowered below 218 inches.

3.2.10 **IF** the RHR loop operating in Shutdown Cooling has been lost **AND** the following conditions exist, **THEN SHIFT** Shutdown Cooling loops in accordance with 1(2)OP-17: ☐

- **NO** Group 8 Isolation Signal
- **NEITHER** RHR Pump in the RHR loop being used for Shutdown Cooling can be started.

3.2.11 **IF** the RHR loop operating in Shutdown Cooling has been lost **AND** a Group 8 Isolation Signal is present, **THEN PERFORM** the following:

1. **RESTORE AND MAINTAIN** reactor water level in the previously established band in accordance with direction of the Shift Superintendent. ☐
2. **REDUCE** reactor pressure below 125 psig in accordance with 0GP-05. ☐
3. **ENSURE** RPS is energized. ☐
4. **WHEN** Group 8 Isolation signals have cleared, **THEN RESET** the Group 8 Isolation. ☐
5. **IF** RHR System piping cool down or drain down are **NOT** a concern, **THEN PERFORM** the following to restore the RHR loop that was operating in Shutdown Cooling:

   a. **CLOSE** Loop A(B) *OUTBOARD INJECTION VALVE, E11-F017A(B).* ☐

   b. **OPEN** Loop A (B) *INBOARD INJECTION VALVE, E11-F015A(B).* ☐

3.0 OPERATOR ACTIONS

c. Unit 1 Only: **OPEN** *RHR SHUTDOWN COOLING OUTBOARD ISOLATION VALVE, E11-F008.* ☐

d. Unit 1 Only: **SLOWLY OPEN** *RHR SHUTDOWN COOLING INBOARD ISOLATION VALVE, E11-F009.* ☐

e. Unit 2 Only: **OPEN** *RHR SHUTDOWN COOLING INBOARD ISOLATION VALVE, E11-F009.* ☐

f. Unit 2 Only: **SLOWLY OPEN** *RHR SHUTDOWN COOLING OUTBOARD ISOLATION VALVE, E11-F008.* ☐

CAUTION

Failure to minimize RHR Pump operation while deadheaded may cause pump damage.

g. **START** an RHR Pump in the loop being used for Shutdown Cooling. ☐

h. **SLOWLY THROTTLE OPEN** Loop A(B) *OUTBOARD INJECTION VALVE, E11-F017A(B)* to re-establish RHR loop conditions prior to the event. ☐

i. **WHEN** RHR loop conditions have stabilized, **FULLY OPEN** Loop A(B) *OUTBOARD INJECTION VALVE, E11-F017A(B).* ☐

j. **IF** the reactor coolant temperature is less than 212°F, **THEN ENSURE** the following valves are open:

- *INBOARD RX HEAD VENT VLV, B21-F003* ☐
- *OUTBOARD RX HEAD VENT VLV, B21-F004.* ☐

k. **MAINTAIN** RHR in Shutdown Cooling in accordance with 1(2)OP-17. ☐

RHR SW PUMP 2B TRIP

AUTO ACTIONS

1. If RHR SW Pump 2D is not operating, RHR Heat Exchanger 2B Service Water Discharge Valve, E11-F068B, will close.

CAUSE

1. RHR SW booster pump suction header pressure low (15.5 psig with five-second time delay).
2. Instantaneous overcurrent on Phase A, B, or C.
3. Time overcurrent on Phase A or C.
4. Circuit malfunction.

OBSERVATIONS

1. RHR SW Booster Pump 2B is off.
2. RHR SW Booster Pump 2B discharge pressure decreasing (SW-PI-1155-1).
3. RHR SW Booster Pump 2B motor breaker, Compartment AK4 on 4160V Emergency Bus E4, is in the OPEN position.
4. RHR SW PMP II SUCT HDR PRESS LOW (A-02 2-9) alarm if both RHR SW Pumps 2B and 2D have tripped on low suction pressure.
5. RHR SW PUMP 2B OVERLOAD (A-03 2-8) alarm.

ACTIONS

1. If the RHR service water header is being supplied from the service water nuclear header, check that the service water nuclear header pressure, as indicated on SW-PI-143-1 on RTGB Panel XU2, is reading a normal pressure of 55 to 65 psig and, if necessary, start the standby pump to the service water nuclear header.
2. If the RHR service water header is being supplied from the service water conventional header, check that the service water conventional header pressure, as indicated on SW-PI-131-1 on RTGB Panel XU2, is reading a normal pressure of 55 to 65 psig and, if necessary, start the standby conventional service water pump.
3. Verify that the proper bus voltage is on Emergency Bus E3.
4. Perform a visual inspection of Compartment AK4 on 4160V Emergency Bus E4 to determine the cause.
5. Perform a visual inspection of RHR SW Booster Pump 2B to verify that the pump is free of mechanical trouble.
6. If a circuit malfunction is suspected, ensure that a WR/JO is prepared.

DEVICE/SETPOINTS

Alarm Relay 74:	Energized
Pressure Switch SW-PS-1176B	15.5 psig with a five-second time delay
Instantaneous/Time Overcurrent Relay 50/51 on ØA	
Instantaneous Overcurrent Relay 50 on ØB	
Instantaneous/Time Overcurrent Relay 50/51 on ØC	

POSSIBLE PLANT EFFECTS

1. Reduced cooling capability of the RHR System.
2. If RHR SW Booster Pump 2B is inoperable, a Technical Specification LCO may result.

REFERENCES

1. LL-9364 - 54
2. Technical Specification 3.6.2.1, 3.7.1
3. PM 89-051

TASK CONDITIONS:

Unit (2) has been shutdown for maintenance for 5 days.

A spurious Group 8 isolation(High Steam Dome Pressure) caused a loss of the B loop of shutdown cooling.

RHR flow prior to the loss was ≈5000 gpm

The cause of the isolation was found and repaired and the isolation has been reset.

RPS is energized

Reactor Water Level band is 200" to 220"

Reactor pressure is 0 psig

RHR system cooldown and draindown are not a concern

A 2nd licensed operator will be conducting 2PT-01.7 and will notify you of any unexpected trends.

INITIATING CUE:

You are directed by the Unit SCO to return the B loop of RHR to Shutdown Cooling IAW AOP-15 (Start the "B" RHR pump).

PLANT OPERATING MANUAL

VOLUME XXI

ABNORMAL OPERATING PROCEDURE

UNIT
0

0AOP-15.0

LOSS OF SHUTDOWN COOLING

REVISION 20

1.0 SYMPTOMS

1.1 *RHR SW PUMP 1A(2A) TRIP* (A-01 1-9) or *RHR SW PUMP 1C (2C) TRIP* (A-01 3-9) is in alarm.

1.2 *RHR SW PUMP 1B(2B) TRIP* (A-03 1-8) or *RHR SW PUMP 1D (2D) TRIP* (A-03 3-8) is in alarm.

1.3 *RHR PUMP 1A(2A) TRIP* (A-01 3-8) or *RHR PUMP 1C(2C) TRIP* (A-01 5-8) is in alarm.

1.4 *RHR PUMP 1B(2B) TRIP* (A-03 3-7) or *RHR PUMP 1D(2D)* TRIP (A-03 5-7) is in alarm.

1.5 *RHR HX A/B DISCH CLG WTR TEMP HI* (A-03 2-9) is in alarm.

1.6 *RHR A/B DISCH & SUCT HDR PRESS HI* (A-03 3-9) is in alarm.

1.7 *REACTOR VESS LO LEVEL TRIP* (A-05 2-6) is in alarm.

1.8 *CORE SPRAY OR RHR PUMPS RUNNING* (A-03 2-1) is flashing.

1.9 ERFIS valve monitoring alarming on RHR valve closure

1.10 Group 8 Isolation Valves close.

1.11 Increasing Reactor Coolant Temperature and/or Pressure.

R17 1.12 High NSW or CSW header pressure approaching pump shutoff head (approximately 90 psig).

R17 1.13 Unexplained changes in running RHRSW loop flow or pump discharge pressure.

2.0 AUTOMATIC ACTIONS

2.1 **IF** a Group 8 Isolation Signal exists (Low Level One or High Steam Dome Pressure), **THEN** the following will occur:

- *RHR SHUTDOWN COOLING OUTBOARD ISOLATION VALVE, E11-F008*, will close ☐
- *RHR SHUTDOWN COOLING INBOARD ISOLATION VALVE, E11-F009*, will close ☐

2.0 AUTOMATIC ACTIONS

- Loop A(B) *INBOARD INJECTION VALVE, E11-F015A(B)*, will close (Low Level One Only) ☐

- The RHR Pump in service for Shutdown Cooling will trip on a loss of suction path. ☐

3.0 OPERATOR ACTIONS

3.1 Immediate Actions

None

3.2 Supplementary Actions

R21

CAUTION

If reactor coolant temperature is greater than 212°F and reactor water level has been raised to greater than 218 inches for 10 minutes or more, a false RPV low level signal could result when the reference leg condensing pot N12A(B) nozzle is uncovered as level is subsequently lowered below 218 inches.

3.2.1 **IF** Shutdown Cooling has been lost due to a tripped RHR Pump, **THEN START** an RHR Pump in the loop being used for Shutdown Cooling. ☐

NOTE: During conditions in which there is no circulation, the reactor vessel water level, as read on *B21-LI-R605A(B),* should be maintained between 200" and 220", or as directed by the Shift Superintendent based on plant conditions, until forced circulation is restored.

3.2.2 **IF** forced circulation has been lost, **AND** natural circulation has **NOT** been established, **THEN RESTORE AND MAINTAIN** reactor vessel water level. ☐

3.0 OPERATOR ACTIONS

NOTE: A Group 10 Isolation Signal will isolate the air supply to Reactor Head Vent Valves, *B21-F003* and *B21-F004*. These valves fail closed on a loss of air supply or power.

3.2.3 **IF** vessel coolant temperature is greater than 212°F, **OR** is indeterminate, **THEN ENSURE** the following valves are closed:

- *INBOARD RX HEAD VENT VLV, B21-F003* ☐
- *OUTBOARD RX HEAD VENT VLV, B21-F004* ☐

R22

CAUTION

Natural circulation can **NOT** be depended on to provide adequate flow through the bottom head region or the recirculation loops. The recirculation loop suction temperatures and bottom head temperatures therefore can **NOT** be utilized for vessel coolant temperature monitoring for indication of boiling. Under natural circulation conditions, reactor vessel pressure must be monitored for coolant temperature determination. If coolant temperature was initially less than 212°F, pressure must be closely monitored for indications of a trend of increasing pressure. If this trend is established, it must be assumed that 212°F has been exceeded, boiling is occurring, and a mode change has taken place.

3.2.4 **MONITOR** reactor coolant heatup/cooldown in accordance with 1(2)PT-01.7 for any unexpected trends. ☐

NOTE: If the time to boiling in the reactor vessel can **NOT** be determined, it must be assumed that 212°F will be exceeded.

3.2.5 **OBTAIN** the approximate time to boiling in the reactor vessel based on current plant conditions (values should be in Daily Schedule Report). ☐

3.2.6 **REFERENCE** Technical Specifications 3.4.7, 3.4.8, 3.9.7, and 3.9.8 for actions required for loss of RHR shutdown cooling. ☐

3.0 OPERATOR ACTIONS

3.2.7 **PERFORM** the following to ensure undervoltage trip is restored to Reactor Building Temp Power Panels 1-L0X (2-L0X) and 1-1R117A (2-2R117A):

NOTE: Keys for Mode Selector Switch *1-L0X-XFER-SW (2-LOX-XFER-SW)* and *1-1R117A-XFER-SW (2-2R117A-XFER-SW)* remain in the switches in Modes 4 & 5. The keys should be removed and controlled when in Modes 1, 2, & 3.

NOTE: 480V Maintenance & Construction Power Distribution Panel 1-L0X (2-L0X), breaker *1-AC-OFFSITE-L0X-1 (2-AC-OFFSITE-L0X-1), and breaker 1-AC-OFFSITE-L0X-2 (2-AC-OFFSITE-L0X-2)* are located at Reactor Building 20' elevation SW.

NOTE: Temporary Power Panel 1-1R117A (2-2R117A) is located at Reactor Building 117' elevation SW.

1. **PRIOR TO** the plant entering Mode 3, **PERFORM** the following:

   a. **ENSURE** mode selector switch *1-L0X-XFER-SW (2-L0X-XFER-SW)* is in the *MODES 1, 2 & 3* position. ☐

   b. **ENSURE** breaker *1-AC-OFFSITE-L0X-1 (2-AC-OFFSITE-L0X-1)* is reset. ☐

   c. **ENSURE** breaker *1-AC-OFFSITE-L0X-2 (2-AC-OFFSITE-L0X-2)* is reset. ☐

   d. **ENSURE** mode selector switch *1-1R117A-XFER-SW (2-2R117A-XFER-SW)* in the *MODES 1,2 & 3* position. ☐

   e. **ENSURE** breaker *1-R117A-52 (2-R117A-52)* is reset. ☐

3.0 OPERATOR ACTIONS

2. **IF** the plant is returned to Mode 4 **AND** going to Mode 5, **THEN PERFORM** the following:

   a. **OBTAIN** keys for the following mode selector switches:

      - *1-L0X-XFER-SW (2-L0X-XFER-SW)* ☐

      - *1-1R117A-XFER-SW (2-2R117A-XFER-SW).* ☐

   b. **ENSURE** mode selector switch *1-L0X-XFER-SW (2-L0X-XFER-SW)* is in the *MODES 4 & 5* position. ☐

   c. **ENSURE** breaker *1-AC-OFFSITE-L0X-1 (2-AC-OFFSITE-L0X-1)* is reset. ☐

   d. **ENSURE** breaker *1-AC-OFFSITE-L0X-2 (2-AC-OFFSITE-L0X-2)* is reset. ☐

   e. **ENSURE** mode selector switch *1-1R117A-XFER-SW (2-2R117A-XFER-SW)* in the *MODES 4 & 5* position. ☐

   f. **ENSURE** breaker *1-R117A-52 (2-R117A-52)* is reset. ☐

NOTE:	Secondary Containment Pressure Seal Work Permits are tracked in accordance with 0ENP-54.

3.2.8 **IF** it becomes apparent that Shutdown Cooling can **NOT** be reestablished **OR** it has been determined that 212°F will be exceeded, **THEN PERFORM** the following:

1. **DIRECT** Engineering to restore Secondary Containment prior to exceeding 212°F. ☐

2. **RESTORE** Primary Containment prior to exceeding 212°F. ☐

3.0 OPERATOR ACTIONS

3. **CLOSE** the following valves:

   - *INBOARD RX HEAD VENT VLV, B21-F003* ☐

   - *OUTBOARD RX HEAD VENT VLV, B21-F004.* ☐

4. **ENSURE** the following valves are closed:

   - *REACTOR INBOARD HIGH POINT MANUAL VENT VALVE, B21-F001* ☐

   - *REACTOR OUTBOARD HIGH POINT MANUAL VENT VALVE, B21-F002.* ☐

5. **NOTIFY** the WCC to evaluate ongoing work which requires the unit to be in Mode 4 for safety clearances. ☐

3.2.9 **IF** the operating RHRSW loop has been lost, **THEN PERFORM** the following:

R17

1. **IF** unexplained changes in flow or pump discharge pressure are observed in the running RHRSW loop, **AND** NSW or CSW header pressure approaches pump shutoff head (approximately 90 psig), **THEN ENSURE** *UNIT 1(2) SERVICE WATER DISCHARGE OUTLET VALVE, SW-V442*, is open. ☐

2. **IF** available, **THEN START** the idle RHRSW Booster Pump in the RHRSW loop being used for Shutdown Cooling. ☐

3. **IF** the NSW or CSW Service Water Header has been lost, **THEN PLACE** the RHRSW loop in operation using the other Service Water header in accordance with 1(2)OP-43. ☐

4. **IF NO** RHRSW Booster Pumps can be placed in operation, **THEN PLACE** RHRSW in operation with **NO** RHRSW Booster Pumps available in accordance with 1(2)OP-43. ☐

5. **IF** Service Water is unavailable, **THEN PLACE** Fire Protection Water in operation to the Service Water Header in accordance with 0AOP-18.0. ☐

3.0 OPERATOR ACTIONS

R21

CAUTION

If reactor coolant temperature is greater than 212°F, and reactor water level has been raised to greater than 218 inches for 10 minutes or more, a false RPV low level signal could result when the reference leg condensing pot *N12A(B)* nozzle is uncovered as level is subsequently lowered below 218 inches.

3.2.10 **IF** the RHR loop operating in Shutdown Cooling has been lost **AND** the following conditions exist, **THEN SHIFT** Shutdown Cooling loops in accordance with 1(2)OP-17: ☐

- **NO** Group 8 Isolation Signal
- **NEITHER** RHR Pump in the RHR loop being used for Shutdown Cooling can be started.

3.2.11 **IF** the RHR loop operating in Shutdown Cooling has been lost **AND** a Group 8 Isolation Signal is present, **THEN PERFORM** the following:

1. **RESTORE AND MAINTAIN** reactor water level in the previously established band in accordance with direction of the Shift Superintendent. ☐
2. **REDUCE** reactor pressure below 125 psig in accordance with 0GP-05. ☐
3. **ENSURE** RPS is energized. ☐
4. **WHEN** Group 8 Isolation signals have cleared, **THEN RESET** the Group 8 Isolation. ☐
5. **IF** RHR System piping cool down or drain down are **NOT** a concern, **THEN PERFORM** the following to restore the RHR loop that was operating in Shutdown Cooling:

   a. **CLOSE** Loop A(B) *OUTBOARD INJECTION VALVE, E11-F017A(B).* ☐

   b. **OPEN** Loop A (B) *INBOARD INJECTION VALVE, E11-F015A(B).* ☐

3.0 OPERATOR ACTIONS

c. Unit 1 Only: **OPEN** *RHR SHUTDOWN COOLING OUTBOARD ISOLATION VALVE, E11-F008.* ☐

d. Unit 1 Only: **SLOWLY OPEN** *RHR SHUTDOWN COOLING INBOARD ISOLATION VALVE, E11-F009.* ☐

e. Unit 2 Only: **OPEN** *RHR SHUTDOWN COOLING INBOARD ISOLATION VALVE, E11-F009.* ☐

f. Unit 2 Only: **SLOWLY OPEN** *RHR SHUTDOWN COOLING OUTBOARD ISOLATION VALVE, E11-F008.* ☐

CAUTION

Failure to minimize RHR Pump operation while deadheaded may cause pump damage.

g. **START** an RHR Pump in the loop being used for Shutdown Cooling. ☐

h. **SLOWLY THROTTLE OPEN** Loop A(B) *OUTBOARD INJECTION VALVE, E11-F017A(B)* to re-establish RHR loop conditions prior to the event. ☐

i. **WHEN** RHR loop conditions have stabilized, **FULLY OPEN** Loop A(B) *OUTBOARD INJECTION VALVE, E11-F017A(B).* ☐

j. **IF** the reactor coolant temperature is less than 212°F, **THEN ENSURE** the following valves are open:

- *INBOARD RX HEAD VENT VLV, B21-F003* ☐
- *OUTBOARD RX HEAD VENT VLV, B21-F004.* ☐

k. **MAINTAIN** RHR in Shutdown Cooling in accordance with 1(2)OP-17. ☐

3.0 OPERATOR ACTIONS

6. **IF** RHR has **NOT** been restored in accordance with Step 3.2.11.5, **THEN PLACE** the RHR loop that was operating in Shutdown Cooling back in service in accordance with 1(2)OP-17 as soon as conditions permit. ☐

3.2.12 **IF** necessary to minimize reactor coolant temperature rise, **THEN PERFORM** one of the following feed and bleed combinations: ☐

FEED	BLEED
COND/FW in accordance with 1(2)OP-32	RWCU Reject in accordance with 1(2)OP-14
CRD in accordance with 1(2)OP-08	Reactor Water Level Control using Main Steam Lines in accordance with 1(2)OP-32
Core Spray in accordance with 1(2)OP-18	
LPCI in accordance with 1(2)OP-17	

3.2.13 **IF NEITHER** RHR loop can be placed in Shutdown Cooling, **THEN PLACE** the Condensate System in Condenser Cooling in accordance with 1(2)OP-32. ☐

3.2.14 **IF ALL** of the above methods can **NOT** maintain reactor vessel coolant temperature below 212°F, **THEN INITIATE** alternate Shutdown Cooling with the SRVs as follows:

1. **ENSURE ALL** control rods are fully inserted. ☐

2. **CONFIRM** reactor vessel head is installed and tensioned. ☐

3. **IF** the Reactor Recirculation Pumps are running, **THEN PERFORM** the following:

   a. **RAISE AND MAINTAIN** reactor water level between 200" and 220" as read on *B21-LI-R605A(B)*, or as directed by Shift Superintendent based on plant conditions. ☐

   b. **STOP** the running Reactor Recirculation Pumps in accordance with 1(2)OP-02. ☐

3.0 OPERATOR ACTIONS

4. **SHUT DOWN** the RHR loop that was operating in Shutdown Cooling in accordance with 1(2)OP-17. ☐

5. **PLACE** one RHR loop in the Suppression Pool Cooling mode in accordance with 1(2)OP-17. ☐

6. **IF** Suppression Pool temperature rises above 95°F, **THEN GO TO** 0EOP-02-PCCP, Primary Containment Control Procedure **AND PERFORM CONCURRENTLY** with this procedure. ☐

7. **ENSURE** the following valves are closed:

   a. *INBOARD MSIV A VLV, B21-F022A* ☐

   b. *INBOARD MSIV B VLV, B21-F022B* ☐

   c. *INBOARD MSIV C VLV, B21-F022C* ☐

   d. *INBOARD MSIV D VLV, B21-F022D* ☐

   e. *OUTBOARD MSIV A VLV, B21-F028A* ☐

   f. *OUTBOARD MSIV B VLV, B21-F028B* ☐

   g. *OUTBOARD MSIV C VLV, B21-F028C* ☐

   h. *OUTBOARD MSIV D VLV, B21-F028D* ☐

   i. *STEAM SUPPLY INBOARD ISOL VLV, E41-F002* ☐

   j. *STEAM SUPPLY OUTBOARD ISOL VLV, E41-F003* ☐

   k. *STEAM SUPPLY INBOARD ISOL VLV, E51-F007* ☐

   l. *STEAM SUPPLY OUTBOARD ISOL VLV, E51-F008* ☐

   m. *INBOARD RX HEAD VENT VLV, B21-F003* ☐

   n. *OUTBOARD RX HEAD VENT VLV, B21-F004* ☐

3.0 OPERATOR ACTIONS

o. *REACTOR INBOARD HIGH POINT MANUAL VENT VALVE, B21-F001* ☐

p. *REACTOR OUTBOARD HIGH POINT MANUAL VENT VALVE, B21-F002* ☐

q. *MAIN STEAM LINE DRAIN INBD ISOL VLV, B21-F016* ☐

r. *MAIN STEAM LINE DRAIN OUTBD ISOL VLV, B21-F019.* ☐

8. **SELECT** one SRV based upon the desired cool down rate using the following table:

NOTE: All SRVs within the same block on the table will produce a similar cooldown rate; therefore, to effect a change in cooldown rate, an SRV in a different box must be used.

	RHR A/C	RHR B/D	CS A	CS B
HIGHEST COOLDOWN	B21-F013F B21-F013H	B21-F013A B21-F013B	B21-F013K	B21-F013E B21-F013L
	B21-F013G B21-F013J	B21-F013C B21-F013D	B21-F013G B21-F013J	B21-F013C B21-F013D
	B21-F013A B21-F013B B21-F013K	B21-F013E B21-F013F B21-F013H B21-F013L	B21-F013E B21-F013F B21-F013H B21-F013L	B21-F013A B21-F013B B21-F013K
	B21-F013C B21-F013D	B21-F013G B21-F013J	B21-F013C B21-F013D	B21-F013G B21-F013J
LOWEST COOLDOWN	B21-F013E B21-F013L	B21-F013K	B21-F013A B21-F013B	B21-F013F B21-F013H

9. **PLACE** the control switch for the desired SRV to *OPEN.* ☐

3.0 OPERATOR ACTIONS

NOTE: Raising RPV water level slowly using CRD is preferred to reduce stresses induced in the RPV vessel and piping when injecting cold water. RHR and CS may be used if necessary, but should be considered only after determining other methods are not effective.

10. **RAISE AND MAINTAIN** reactor water level greater than 254 inches. ☐

NOTE: The RHR pumps are preferred for injection.

NOTE: Monitoring T_{SAT} in accordance with 1(2)PT-01.7 may **NOT** be valid under these special conditions due to reactor pressure **NOT** necessarily relating to T_{SAT}. Therefore, SRV tailpipe temperature recorder *B21-TR-R614* on Panel H12-P614, and/or ERFIS trending should be utilized for monitoring reactor coolant cool down rate.

11. **IF** any low pressure injection system, other than the RHR Loop operating in Suppression Pool Cooling, is available, **THEN PERFORM** the following:

    a. **IF** an RHR Pump is to be started, **THEN PERFORM** the following:

    - **CLOSE** the applicable *OUTBOARD INJECTION VLV, E11-F017A(B).* ☐
    - **START** an available RHR Pump. ☐
    - **OPEN** the applicable *INBOARD INJECTION VLV, E11-F015A(B).* ☐
    - **THROTTLE OPEN** the applicable *OUTBOARD INJECTION VLV, E11-F017A(B),* until the SRV opens. ☐

    b. **IF** a Core Spray Pump is to be started, **THEN PERFORM** the following:

    - **START** the available Core Spray Pump. ☐
    - **THROTTLE OPEN** the applicable *INBOARD INJECTION VALVE, E21-F005A(B),* until the SRV opens. ☐

3.0 OPERATOR ACTIONS

12. **IF** the only low pressure injection system available is the RHR Loop in Suppression Pool Cooling, **THEN PERFORM** the following:

    a. **CLOSE** the applicable *OUTBOARD INJECTION VLV, E11-F017A(B).* ☐

    b. **CLOSE** *TORUS COOLING ISOL VLV, E11-F024A(B.* ☐

    c. **OPEN** the applicable *INBOARD INJECTION VLV, E11-F015A(B).* ☐

    d. **THROTTLE OPEN** *OUTBOARD INJECTION VLV, E11-F017A(B),* until the selected SRV opens. ☐

13. **IF** reactor pressure can **NOT** be maintained less than 164 psig above Suppression Chamber pressure, **THEN PLACE** another SRV control switch to *OPEN.* ☐

14. **PERFORM** the following as necessary to maintain cool down rate less than 100°F per hour:

    a. **THROTTLE CLOSE** the injection valve on the affected pump until the desired SRV closes. ☐

    b. **RECORD** reactor pressure at which the SRV closes. ☐

    _____ psig

    c. **THROTTLE OPEN** the injection valve on the affected pump until the SRV reopens. ☐

    d. **THROTTLE CLOSE** the injection valve on the affected pump until reactor pressure is 10 to 20 psig greater than the pressure at which the SRV closed in Step 3.2.14.14.b. ☐

    e. **IF** it is desired to adjust the cool down rate, **THEN CLOSE** the open SRV **AND OPEN** the next SRV that will adjust the cool down rate in the desired direction. ☐

3.0 OPERATOR ACTIONS

15. **REPEAT** Step 3.2.14.14 until vessel coolant and Suppression Pool temperature are within 100°F. ☐

16. **CONTROL** Suppression Pool temperature as necessary to maintain vessel coolant temperature above 75°F. ☐

17. **WHEN** a normal method of Shutdown Cooling can be established, **THEN SHUT DOWN** alternate Shutdown Cooling as follows:

    a. **STOP** the ECCS pump(s) used for vessel injection. ☐

    b. **WHEN** the SRV(s) that were opened have closed, **THEN PLACE** the control switch for the SRV(s) to *CLOSE* **OR** *AUTO*. ☐

    c. **IF** the reactor coolant temperature is less than 212°F, **THEN OPEN** the following valves:

    - *INBOARD RX HEAD VENT VLV, B21-F003* ☐
    - *OUTBOARD RX HEAD VENT VLV, B21-F004.* ☐

R21

CAUTION

IF reactor coolant temperature is greater than 212°F, **AND** reactor water level has been raised to greater than 218 inches for 10 minutes or more, **THEN** a false RPV low level signal could result when the reference leg condensing pot N12A(B) nozzle is uncovered as level is subsequently lowered below 218 inches.

    d. **RESTORE AND MAINTAIN** reactor water level between 200" and 220", or as directed by the Shift Superintendent, based on plant conditions. ☐

    e. **WHEN** directed by the Shift Superintendent, **THEN SHUT DOWN** the RHR loop used for Suppression Pool Cooling in accordance with 1(2)OP-17. ☐

4.0 GENERAL DISCUSSION

An extended loss of the decay heat removal function can lead to elevated vessel coolant temperatures, localized or bulk coolant boiling and potentially result in a depletion of reactor coolant and eventual uncovering of the core. If no forced circulation exists during a Loss of Shutdown Cooling event, natural circulation must be established. Natural circulation however, cannot be depended on to provide adequate flow through the bottom head region or the recirculation loops. The recirculation loop suction temperatures and bottom head temperatures therefore cannot be utilized for vessel coolant temperature monitoring for heatup rate determination or indication of boiling.

In addition, if RWCU is not in service with suction from the bottom head, vessel bottom head drain temperature cannot be used for verification of Tech Spec 3.4.9 (Pressure/Temperature Curves) compliance for cooldowns.

R22 Under natural circulation conditions, reactor vessel pressure must be monitored for vessel coolant temperature determination. If vessel coolant temperature is less than 212°F, pressure must be closely monitored for indications of a trend of increasing pressure. If this trend is established, it must be assumed that 212°F has been exceeded, boiling is occurring, and a mode change has taken place.

R21 If reactor coolant temperature is greater than 212°F, and reactor water level has been raised to greater than 218 inches for 10 minutes or more, then a false RPV low level signal could result when the reference leg condensing pot *N12A(B)* nozzle is uncovered as level is subsequently lowered below 218 inches. This false signal is the result of water exiting the nozzle and condensing pots at the same time steam is re-entering the reference leg. This counter flow condition sets up the conditions conducive to steam bubble creation and collapse. This causes a momentary upward pressure spike in the reference leg, which gives a momentary indicated false signal to the transmitters involved.

While irradiated fuel remains in the reactor vessel during an outage, maintaining the decay heat removal function remains a key to shutdown safety. The risk associated with a loss of decay heat removal event is dependent on a number of factors, including the decay heat load present and the existing plant configuration. Outage risk assessment will ensure that adequate contingency plans are in place prior to reducing decay heat removal capability.

4.0 GENERAL DISCUSSION

This procedure addresses a loss of normal decay heat removal capability during shutdown conditions. The procedure provides contingencies for the following methods of decay heat removal:

- RHRSW Loop Failure
- RHR Loop Failure
- Condenser Cooling Failure
- Feed and Bleed Combinations
- Alternate Shutdown Cooling with SRVs

This procedure also provides contingencies for restoring primary and secondary containment, and initial emergency actions for a loss of Shutdown Cooling.

Industry events have occurred which demonstrate that use of the SRVs to steam to the Suppression Pool is a viable method of decay heat removal. Makeup requirements can be supplied by a single CRD Pump in this mode of cooling. Outage risk assessment should prevent the need for ever using this mode of cooling.

5.0 REFERENCES

5.1 Regulatory Guide 1.33, Quality Assurance Program Requirements (Operations) (November 1972), Appendix A, Item F.8

5.2 ANSI Standard N18.7-1976, Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants, Section 5.3.9.2, Item (3)

5.3 Technical Specifications 3.4.7, 3.4.8, 3.4.9, 3.6.1.1, 3.6.4.1, 3.9.7, and 3.9.8

5.4 FSAR Section 5.4.7, 7.4.3, 15.2.7

5.5 NUMARC 91-06, Guidelines for Industry Actions to Assess Shutdown Management

5.6 1(2)APP-A-01, Annunciator Panel Procedure For Panel A-01

5.7 1(2)APP-A-03, Annunciator Panel Procedure For Panel A-03

5.8 1(2)APP-A-05, Annunciator Panel Procedure For Panel A-05

5.9 0AOP-18.0, Nuclear Service Water System Failure

5.10 1(2)OP-02, Reactor Recirculation System Operating Procedure

5.11 1(2)OP-08, Control Rod Drive Hydraulic System Operating Procedure

5.12 1(2)OP-14, RWCU System Operating Procedure

5.13 1(2)OP-17, RHR System Operating Procedure

5.14 1(2)OP-18, Core Spray System Operating Procedure

5.15 1(2)OP-32, Condensate and Feedwater System Operating Procedure

5.16 1(2)OP-43, Service Water System Operating Procedure

R17 5.17 IER #92-21-03 (IFI); FACTS #93B9034

5.18 0EOP-02-PCCP, Primary Containment Control Procedure

5.19 0ENP-54, Building Ventilation Pressure Control Program

5.20 1(2)PT-01.7, Heatup/Cooldown Monitoring

R21 5.21 CR 95-01883, False RPV Water Level Low Level 1 Signals

R22 5.22 AI 95-02283,1995 INPO Response

6.0 ATTACHMENTS

None

REVISION SUMMARY

Revision 20: As requested by PRR 222219, added additional symptoms to Section 1.0.

Revision 19 closes the RHR outboard injection valve F017, opens F015, and then throttles F017 when in alternate shutdown cooling to utilize throttle capability of F017; directs bleed portion of feed and bleed approach in step 3.2.12 to be performed in accordance with reactor water level control using main steam lines

Revision 18 incorporates PRR209334 which adds Step 3.2.8.5 to notify the WCC.

Revision 17 – Editorial Correction to change font of place keeping check boxes.

Revision 16 - Format changes to meet the requirements of 0AP-005, changed word processing software to Microsoft Word XP, added place keeping aids, and changed wording to accommodate the difference between Unit 1 and 2 Shutdown Cooling suction valves.

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

NRC SIM JPM S-5

TITLE: Primary Containment Ventilation During Personnel Entry

SAFETY CONSIDERATIONS:

None.

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section WILL be provided to the trainee.
2. Validation time 20 minutes

TASK CONDITIONS:

1. Unit Two (2) is in Mode 4.
2. Primary Containment purging is complete IAW 2OP-24, Section 5.3.
3. Primary Containment oxygen concentration is >18%.
4. An E&RC air sample has determined radioactive gases are less than 1 DAC.
5. Five drywell volumes have been purged.
6. The Reactor Building Ventilation System is in operation per 2OP-37.1 and SBGT is in STANDBY per 2OP-10.
7. Personnel entry into primary containment is necessary.
8. The requirements for isolation of all nitrogen sources to the containment and TIP System have been met.
9. E&RC has been notified of changing ventilation in primary containment.

INITIATING CUE:

You are directed by the Unit SCO to startup Primary Containment Ventilation During Personnel Entry, per 2OP-24 using both purge exhaust fans and inform the Unit SCO when the actions are complete.

Step 1 - Obtain a current revision of 2OP-24, Section 5.4.

Current Revision of 2OP-24, Section 5.4 obtained.

SAT/UNSAT

Step 2 - WHEN the unit is in Mode 4, THEN STOP PURGE EXHAUST FAN, 2A-PS-EF-RB AND 2B-PS-EF-RB, if running.

Ensures Purge Exhaust Fans are not running

SAT/UNSAT

Step 3 – Ensure the following valves are OPEN (Procedure Steps 5.4.2.3 thru 5.4.2.10)

OPENS the following are valves: ****ALL ARE CRITICAL STEPS****

1. ENSURE D/W N2 INLET VLV, CAC-V6. SAT/ UNSAT
2. ENSURE TORUS N2 INLET VLV, CAC-V5. SAT/ UNSAT
3. ENSURE TORUS PURGE EXH VLV, CAC-V7. SAT/ UNSAT
4. ENSURE TORUS PURGE EXH VLV, CAC-V8. SAT/ UNSAT
5. ENSURE DRYWELL PURGE EXH VLV, CAC-V9. SAT/ UNSAT
6. ENSURE DRYWELL PURGE EXH VLV, CAC-V10. SAT/ UNSAT
7. ENSURE DW HEAD PURGE EXH VLV, CAC-V49. SAT/ UNSAT
8. ENSURE DW HEAD PURGE EXH VLV, CAC-V50. SAT/ UNSAT

Step 4 - IF running, THEN STOP SBGT A and B.

Ensures SBGT A & B are not running

SAT/UNSAT

Step 5 - ENSURE SBGT DW SUCT DAMPER, 2F-BFV-RB, is closed.

Ensures SBGT DW SUCT DAMPER, 2F-BFV-RB, is closed

SAT/UNSAT

Step 6 - OPEN PURGE SUCTION & INBD EXHAUST ISOL, 2I-BFV-RB AND 2N-BFV-RB.

Opens PURGE SUCTION & INBD EXHAUST ISOL, 2I-BFV-RB AND 2N-BFV-RB.

****CRITICAL STEP****

SAT/UNSAT

Step 7 - OPEN PURGE OTBD EXHAUST ISOL, 2A-BFV-RB.

OPENs PURGE OTBD EXHAUST ISOL, 2A-BFV-RB

****CRITICAL STEP****

SAT/UNSAT

Step 8 - ENSURE DW PURGE AIR INLET VLV, CAC-V15, is open.

Ensures DW PURGE AIR INLET VLV, CAC-V15, is open.

****CRITICAL STEP****
SAT/UNSAT

Step 9 - PLACE DW/TORUS PURGE DAMPER, 2C-TPD-RB, in MAX.

Places DW/TORUS PURGE DAMPER, 2C-TPD-RB, in MAX.

SAT/UNSAT

NOTE: The following caution is prior to the next step

CAUTION

Starting a second fan when one is already running causes excessive thermal stress to the motor. This is due to the reverse rotation of the non-running fan while the suction and discharge dampers are opening. Starting of fan(s) should be in the slow mode of operation until system pressure stabilizes and then shifted to the fast mode of operation as desired.

EXAMINER NOTE: A dual fan start was specified in the initiating cue. Slow speed is required by the caution noted above.

NOTE: Even if the following step is performed correctly the fan may shift to 'Fast', If so, it should be placed back to 'Slow' and is not considered incorrect.

If asked, 2-hand operation is permitted for the next step.

Step 10 - PERFORM the following to start Purge Exhaust Fan(s).

a. IF a single fan start is desired, THEN START 2A-PS-EF-RB or 2B-PS-EF-RB.

b. IF dual fan starts are desired, THEN SIMULTANEOUSLY START 2A-PS-EF-RB and 2B-PS-EF-RB.

c. IF a second fan start is desired AND one fan is already running, THEN PERFORM the following:

- STOP the running fan.
- WHEN the suction and discharge dampers indicate full closure, THEN SIMULTANEOUSLY START 2A& 2B-PS-EF-RB

Performs a dual fan start in slow speed (step b. above)

**** CRITICAL STEP****

SAT/UNSAT

Step 11 - ENSURE SBGT TRAIN 2A REACTOR BUILDING SUCTION VALVE, 2D-BFV-RB, is open.

Ensures SBGT TRAIN 2A REACTOR BUILDING SUCTION VALVE, 2D-BFV-RB, is open

SAT/UNSAT

Step 12 - ENSURE SBGT TRAIN 2B REACTOR BUILDING SUCTION VALVE,

2H-BFV-RB, is open.

Ensures SBGT TRAIN 2B REACTOR BUILDING SUCTION VALVE,

2H-BFV-RB, is open.

SAT/UNSAT

TERMINATING CUE/NOTE: The JPM is complete when the next step is addressed. Another operator will perform that step.

COMMENTS:

KA Reference

288000 A4.01 3.1/2.9: Ability to manually operate and/or monitor in the control room: Start and stop fans.

REFERENCES:
2OP-24, Rev.139

TOOLS AND EQUIPMENT:
None.

SAFETY FUNCTION (from NUREG 1123, Rev 2.):
9 – Rad Release – Plant ventilation

Time Required for Completion: 20 Minutes (approximate).

APPLICABLE METHOD OF TESTING

Performance:	Simulate ___	Actual X	Unit: 2
Setting:	Control Room ___	Simulator X	
Time Critical:	Yes ___ No ___	Time Limit	N/A
Alternate Path:	Yes ___ No X		

EVALUATION

JPM: Pass ___ Fail ___

1. Unit Two (2) is in Mode 4.

2. Primary Containment purging is complete IAW 2OP-24, Section 5.3.

3. Primary Containment oxygen concentration is >18%.

4. An E&RC air sample has determined radioactive gases are less than 1 DAC.

5. Five drywell volumes have been purged.

6. The Reactor Building Ventilation System is in operation per 2OP-37.1 and SBGT is in STANDBY per 2OP-10.

7. Personnel entry into primary containment is necessary.

8. The requirements for isolation of all nitrogen sources to the containment and TIP System have been met.

9. E&RC has been notified of changing ventilation in primary containment.

INITIATING CUE:

You are directed by the Unit SCO to startup Primary Containment Ventilation During Personnel Entry, per 2OP-24 using both purge exhaust fans and inform the Unit SCO when the actions are complete.

5.4 Primary Containment Ventilating During Personnel Entry

C
Continuous
Use

5.4.1 Initial Conditions

1. Primary containment purging is complete in accordance with Section 5.3 or 8.13. ☐

2. **IF** the unit is in Mode 1, 2, or 3, **THEN** drywell purge is in service in accordance with Section 5.3. ☐

3. Primary containment oxygen concentration is greater than 18%. ☐

4. An E&RC air sample determined radioactive gases are less than 1 DAC. ☐

5. Five drywell volumes have been purged. ☐

6. The Reactor Building Ventilation System is in operation in accordance with 2OP-37.1. ☐

7. Personnel entry into primary containment is necessary. ☐

5.4.2 Procedural Steps

NOTE: The performance of Step 5.4.2.1 completes the conditions necessary to make drywell entry in Modes 1, 2, or 3 and the remainder of this section is not applicable. This step must also be completed to satisfy personnel entry requirements for Modes 4 and 5.

R27

CAUTION

Simultaneous ventilating the drywell and suppression chamber shall **NOT** be performed in Modes 1, 2, or 3.

1. **ENSURE** the requirements for isolation of all nitrogen sources to containment **AND** TIP System have been met as specified by 0OI-01.02 for drywell entry. ☐

5.4.2 Procedural Steps

NOTE:	E&RC should be notified prior to changing ventilation through primary containment.

2. **WHEN** the unit is in Mode 4, **THEN STOP** *PURGE EXHAUST FAN, 2A-PS-EF-RB* **AND** *2B-PS-EF-RB*, if running. ☐

3. **ENSURE** *D/W N_2 INLET VLV, CAC-V6*, is open. ☐

4. **ENSURE** *TORUS N_2 INLET VLV, CAC-V5*, is open. ☐

5. **ENSURE** *TORUS PURGE EXH VLV, CAC-V7*, is open. ☐

6. **ENSURE** *TORUS PURGE EXH VLV, CAC-V8*, is open. ☐

7. **ENSURE** *DRYWELL PURGE EXH VLV, CAC-V9*, is open. ☐

8. **ENSURE** *DRYWELL PURGE EXH VLV, CAC-V10*, is open. ☐

9. **ENSURE** *DW HEAD PURGE EXH VLV, CAC-V49,* is open. ☐

10. **ENSURE** *DW HEAD PURGE EXH VLV, CAC-V50*, is open. ☐

11. **IF** running, **THEN STOP** *SBGT A* and *B*. ☐

12. **ENSURE** *SBGT DW SUCT DAMPER, 2F-BFV-RB*, is closed. ☐

13. **OPEN** *PURGE SUCTION & INBD EXHAUST ISOL, 2I-BFV-RB AND 2N-BFV-RB*. ☐

14. **OPEN** *PURGE OTBD EXHAUST ISOL, 2A-BFV-RB*. ☐

5.4.2 Procedural Steps

15. **ENSURE** *DW PURGE AIR INLET VLV, CAC-V15*, is open. ☐

16. **PLACE** *DW/TORUS PURGE DAMPER, 2C-TPD-RB*, in *MAX*. ☐

CAUTION

Starting a second fan when one is already running causes excessive thermal stress to the motor. This is due to the reverse rotation of the non-running fan while the suction and discharge dampers are opening. Starting of fan(s) should be in the slow mode of operation until system pressure stabilizes and then shifted to the fast mode of operation as desired.

17. **PERFORM** the following to start Purge Exhaust Fan(s).

    a. **IF** a single fan start is desired, **THEN START** *2A-PS-EF-RB* or *2B-PS-EF-RB*. ☐

    b. **IF** dual fan starts are desired, **THEN SIMULTANEOUSLY START** *2A-PS-EF-RB* and *2B-PS-EF-RB*. ☐

    c. **IF** a second fan start is desired **AND** one fan is already running, **THEN PERFORM** the following:

    – **STOP** the running fan. ☐

    – **WHEN** the suction and discharge dampers indicate full closure, **THEN SIMULTANEOUSLY START** *2A-PS-EF-RB* and *2B-PS-EF-RB.* ☐

18. **ENSURE** *SBGT TRAIN 2A REACTOR BUILDING SUCTION VALVE, 2D-BFV-RB*, is open. ☐

5.4.2 Procedural Steps

19. **ENSURE** *SBGT TRAIN 2B REACTOR BUILDING SUCTION VALVE, 2H-BFV-RB*, is open. ☐

20. **IF** Section 7.3 was **NOT** performed prior to this section, **THEN ENSURE** SBGT System in standby in accordance with 2OP-10. ☐

NOTE:	The Control Operator may adjust primary containment flow as specific activities in the primary containment require.

1. Unit Two (2) is in Mode 4.

2. Primary Containment purging is complete IAW 2OP-24, Section 5.3.

3. Primary Containment oxygen concentration is >18%.

4. An E&RC air sample has determined radioactive gases are less than 1 DAC.

5. Five drywell volumes have been purged.

6. The Reactor Building Ventilation System is in operation per 2OP-37.1 and SBGT is in STANDBY per 2OP-10.

7. Personnel entry into primary containment is necessary.

8. The requirements for isolation of all nitrogen sources to the containment and TIP System have been met.

9. E&RC has been notified of changing ventilation in primary containment.

INITIATING CUE:

You are directed by the Unit SCO to startup Primary Containment Ventilation During Personnel Entry, per 2OP-24 using both purge exhaust fans and inform the Unit SCO when the actions are complete.

5.4 Primary Containment Ventilating During Personnel Entry

C
Continuous
Use

5.4.1 Initial Conditions

1. Primary containment purging is complete in accordance with Section 5.3 or 8.13. ☐

2. **IF** the unit is in Mode 1, 2, or 3, **THEN** drywell purge is in service in accordance with Section 5.3. ☐

3. Primary containment oxygen concentration is greater than 18%. ☐

4. An E&RC air sample determined radioactive gases are less than 1 DAC. ☐

5. Five drywell volumes have been purged. ☐

6. The Reactor Building Ventilation System is in operation in accordance with 2OP-37.1. ☐

7. Personnel entry into primary containment is necessary. ☐

5.4.2 Procedural Steps

NOTE: The performance of Step 5.4.2.1 completes the conditions necessary to make drywell entry in Modes 1, 2, or 3 and the remainder of this section is not applicable. This step must also be completed to satisfy personnel entry requirements for Modes 4 and 5.

R27

CAUTION

Simultaneous ventilating the drywell and suppression chamber shall **NOT** be performed in Modes 1, 2, or 3.

1. **ENSURE** the requirements for isolation of all nitrogen sources to containment **AND** TIP System have been met as specified by 0OI-01.02 for drywell entry. ☐

5.4.2 Procedural Steps

NOTE:	E&RC should be notified prior to changing ventilation through primary containment.

2. **WHEN** the unit is in Mode 4, **THEN STOP** *PURGE EXHAUST FAN, 2A-PS-EF-RB* **AND** *2B-PS-EF-RB*, if running. ☐

3. **ENSURE** *D/W N_2 INLET VLV, CAC-V6*, is open. ☐

4. **ENSURE** *TORUS N_2 INLET VLV, CAC-V5*, is open. ☐

5. **ENSURE** *TORUS PURGE EXH VLV, CAC-V7*, is open. ☐

6. **ENSURE** *TORUS PURGE EXH VLV, CAC-V8*, is open. ☐

7. **ENSURE** *DRYWELL PURGE EXH VLV, CAC-V9*, is open. ☐

8. **ENSURE** *DRYWELL PURGE EXH VLV, CAC-V10*, is open. ☐

9. **ENSURE** *DW HEAD PURGE EXH VLV, CAC-V49,* is open. ☐

10. **ENSURE** *DW HEAD PURGE EXH VLV, CAC-V50*, is open. ☐

11. **IF** running, **THEN STOP** *SBGT A* and *B*. ☐

12. **ENSURE** *SBGT DW SUCT DAMPER, 2F-BFV-RB*, is closed. ☐

13. **OPEN** *PURGE SUCTION & INBD EXHAUST ISOL, 2I-BFV-RB AND 2N-BFV-RB.* ☐

14. **OPEN** *PURGE OTBD EXHAUST ISOL, 2A-BFV-RB.* ☐

5.4.2 Procedural Steps

15. **ENSURE** *DW PURGE AIR INLET VLV, CAC-V15*, is open. ☐

16. **PLACE** *DW/TORUS PURGE DAMPER, 2C-TPD-RB*, in *MAX*. ☐

CAUTION

Starting a second fan when one is already running causes excessive thermal stress to the motor. This is due to the reverse rotation of the non-running fan while the suction and discharge dampers are opening. Starting of fan(s) should be in the slow mode of operation until system pressure stabilizes and then shifted to the fast mode of operation as desired.

17. **PERFORM** the following to start Purge Exhaust Fan(s).

    a. **IF** a single fan start is desired, **THEN START** *2A-PS-EF-RB* or *2B-PS-EF-RB*. ☐

    b. **IF** dual fan starts are desired, **THEN SIMULTANEOUSLY START** *2A-PS-EF-RB* and *2B-PS-EF-RB*. ☐

    c. **IF** a second fan start is desired **AND** one fan is already running, **THEN PERFORM** the following:

    – **STOP** the running fan. ☐

    – **WHEN** the suction and discharge dampers indicate full closure, **THEN SIMULTANEOUSLY START** *2A-PS-EF-RB* and *2B-PS-EF-RB*. ☐

18. **ENSURE** *SBGT TRAIN 2A REACTOR BUILDING SUCTION VALVE, 2D-BFV-RB*, is open. ☐

5.4.2 Procedural Steps

19. **ENSURE** *SBGT TRAIN 2B REACTOR BUILDING SUCTION VALVE, 2H-BFV-RB*, is open. ☐

20. **IF** Section 7.3 was **NOT** performed prior to this section, **THEN ENSURE** SBGT System in standby in accordance with 2OP-10. ☐

NOTE:	The Control Operator may adjust primary containment flow as specific activities in the primary containment require.

PROGRESS ENERGY CAROLINAS
BRUNSWICK TRAINING SECTION

JOB PERFORMANCE MEASURE

NRC SIM JPM S-6

TITLE: Manual Transfer of 4160 Emergency Bus Supply from the DG to the Normal Feeder IAW 0OP-50.1

SAFETY CONSIDERATIONS:

None.

SIMULATOR SETUP: IC-196

EVALUATOR NOTES: (Do not read to trainee)

1. The applicable procedure section **WILL NOT** be provided to the trainee.
2. Validation time was 20 minutes

TASK CONDITIONS:

1. Unit Two (2) is operating at 100% power.
2. Emergency Bus E3 is being carried by the #3 EDG due to a relay trip of the E3 Bus feeder breaker.
3. The Unit 2 alignment (Isolations and Actuations) has been restored to normal configuration following the restoration of power to Bus E3 from DG-3.
4. Repairs have been completed to the E-3 feeder breaker relay.
5. Normal feeder bus for emergency bus is energized.
6. The Load Dispatcher has been notified that the 4160V E-3 Bus power supply is being shifted to the Normal Feeder.

INITIATING CUE:

You are directed by the Unit SCO to manually transfer the 4160 Emergency Bus Supply for Emergency Bus E-3 from the DG to the Normal Feeder IAW 0OP-50.1.

EXAMINER NOTE: The following note and caution must be noted prior to performing step 1 of JPM (End of Procedure Step 8.6.1)

NOTE:
WHEN transferring the diesel generator from Auto Mode to Control Room Manual, diesel generator frequency is expected to drop approximately 3 Hz at rated load. Since the range of frequency drop to diesel generator load is linear (e.g., transfer to Control Room Manual at half load results in a frequency drop of 1.5 Hz), adjustments to lower diesel generator load or raise diesel frequency can be made to compensate for frequency drop prior to the transfer. See Figure 1.

CAUTION:
Failure to reduce load or raise frequency on the diesel generator as necessary, prior to transferring to Control Room Manual may result in trip of the RPS EPA breakers on underfrequency (57.7 Hz decreasing).

Step 1- Obtain and Review procedure 0OP-50.1. and begin at step 8.6.1

Procedure 0OP-50.1. obtained and reviewed.

SAT/UNSAT

Step 2- PERFORM one or more of the following as necessary to prevent RPS EPA breaker trip.

- RAISE diesel generator frequency (limiter set at 61 Hz)

- REDUCE diesel generator load

Raises frequency and/or reduces load to maintain 60 hertz

SAT/UNSAT

Step 3 - PLACE the appropriate diesel generator control in control room manual mode by depressing applicable push button on Panel XU-2.

Depresses PB and places the #3 EDG control in control room manual

CRITICAL STEP*

SAT/UNSAT

Step 4 - PLACE appropriate synchroscope switch in ON for normal feed to emergency bus: E3 *BUS 2D TO BUS E3 (2AD1).*

Places E3 BUS 2D TO BUS E3 (2AD1) synchroscope switch in ON

****CRITICAL STEP****

SAT/UNSAT

NOTE: Procedure Caution Prior to next step

CAUTION
Incoming voltage is from the grid and running voltage is from the diesel generator.

Step 5 - ENSURE incoming and running voltages are matched.

Ensures incoming and running voltages are matched.

SAT/UNSAT

NOTE: Procedure Caution Prior to next step

CAUTION
WHEN the synchroscope is rotating slowly in the fast direction during this method of transfer, it will be necessary to raise DG frequency to obtain rotation in the slow
direction. Failure to follow this guidance could result in an RPS MG set trip on low frequency at 57.7 Hz decreasing.

Step 6 - ADJUST diesel generator GOVERNOR motor control switch as necessary so the synchroscope is rotating slowly in the SLOW direction (counterclockwise).

ADJUST diesel generator GOVERNOR motor control switch as necessary so the synchroscope is rotating slowly in the SLOW direction (counterclockwise).

****CRITICAL STEP****

SAT/UNSAT

Step 7 - WHEN synchroscope is at "12 o'clock", THEN PLACE AND HOLD control switch for appropriate normal feed to emergency bus in CLOSE until both MSTR and SLAVE breakers indicate closed:
BUS 2D TO BUS E3 Master - 2AD1 Slave - AI2.

Places AND Holds control switch for appropriate normal feed to emergency bus in CLOSE until both MSTR (2AD1) and SLAVE (AI2) breakers indicate closed:

****CRITICAL STEP****

SAT/UNSAT

Step 8 - CONFIRM synchroscope remains at "12 o'clock".

Confirms synch scope remains at 12 o'clock.

SAT/UNSAT

Step 9- PLACE synchroscope used in Step 8.6.2.3 in OFF.

PLACES synchroscope E3 BUS 2D TO BUS E3 (2AD1) in OFF.

SAT/UNSAT

NOTE: Procedure Caution Prior to next step

CAUTION
To prevent a diesel generator from tripping on reverse power, do NOT reduce DG load below 450KW.

Step 10 - MAINTAIN generator vars with voltage adjusting rheostat while lowering diesel generator load.

Maintains vars with voltage by adjusting rheostat while lowering load

SAT/UNSAT

Step 11 - LOWER diesel generator load to between 450 and 550 KW by momentarily placing the GOVERNOR motor control switch in LOWER.

Lowers load to between 450 and 550 KW (not <450KW)

****CRITICAL STEP****

SAT/UNSAT

EXAMINER NOTE: The critical aspect of step 11 is to not get a reverse power trip of the DG if load is <450KW

Step 12 - **OPEN** the appropriate diesel generator output breaker:
DIESEL GEN 3 TO BUS E3 (AI5)

Opens output breaker DIESEL GEN 3 TO BUS E3 (AI5)

****CRITICAL STEP****

SAT/UNSAT

Step 13 - OBSERVE the following indications:

a. Breaker open in accordance with indicating lights.
b. Emergency bus voltage remains constant.
c. Diesel generator load and amps are zero.
d. NO LOAD and AVAIL lights are illuminated on the diesel generator control module.

Observes indications noted above

SAT/UNSAT

TERMINATING CUE/PROMPT: The diesel generator will be shutdown by another operator. The JPM is complete.

COMMENTS:

K/A REFERENCE AND IMPORTANCE RATING:

264000 A4.05 3.6/3.7
Ability to manually operate and/or monitor in the control room: Transfer of the EDG with load to grid

REFERENCES:

0OP-50.1, Revision 67

TOOLS AND EQUIPMENT:

None.

SAFETY FUNCTION (from NUREG 1123, Rev 2.):

6 - Electrical

APPLICABLE METHOD OF TESTING

Performance:	Simulate	___	Actual	X	Unit: 2
Setting:	Control Room	___	Simulator	X	In-Plant:
Time Critical:	Yes	___	No	X	Time Limit
Alternate Path:	Yes	___	No	X	

EVALUATION

Performer:

JPM: Pass _____ Fail _____

TASK CONDITIONS:

1. Unit Two (2) is operating at 100% power.

2. Emergency Bus E3 is being carried by the #3 EDG due to a relay trip of the E3 Bus feeder breaker.

3. The Unit 2 alignment (Isolations and Actuations) has been restored to normal configuration following the restoration of power to Bus E3 from DG-3.

4. Repairs have been completed to the E-3 feeder breaker relay.

5. Normal feeder bus for emergency bus is energized.

6. The Load Dispatcher has been notified that the 4160V E-3 Bus power supply is being shifted to the Normal Feeder.

INITIATING CUE:

You are directed by the Unit SCO to manually transfer the 4160 Emergency Bus Supply for Emergency Bus E-3 from the DG to the Normal Feeder IAW 0OP-50.1.

R36

8.6 Control Room Manual Transfer of 4160V Emergency Bus Supply from Diesel Generator to Normal Feeder

C Continuous Use

8.6.1 Initial Conditions

R38

NOTE: **IF** this procedure is being used to recover from a loss of grid event (such as 0AOP-36.1 or 0AOP-36.2), **THEN** the Shift Superintendent and Operations Manager should be included during consultation with the Load Dispatcher to obtain assurance that Off-site power is reliable enough to support reconnection of the Emergency Buses.

1. Diesel generator is supplying the associated emergency bus. ☐

2. Normal feeder bus for emergency bus is energized. ☐

3. Notify the Load Dispatcher that the 4160V E Bus power supply is being shifted to the Normal Feeder. ☐

8.6.2 Procedural Steps

R35

NOTE: **WHEN** transferring the diesel generator from Auto Mode to Control Room Manual, diesel generator frequency is expected to drop approximately 3 Hz at rated load. Since the range of frequency drop to diesel generator load is linear (e.g., transfer to Control Room Manual at half load results in a frequency drop of 1.5 Hz), adjustments to lower diesel generator load or raise diesel frequency can be made to compensate for frequency drop prior to the transfer. See Figure 1.

R35

CAUTION

Failure to reduce load or raise frequency on the diesel generator as necessary, prior to transferring to Control Room Manual may result in trip of the RPS EPA breakers on underfrequency (57.7 Hz decreasing).

8.6.2 Procedural Steps

R35

1. **PERFORM** one or more of the following as necessary to prevent RPS EPA breaker trip. (See Figure 1.)

   – **RAISE** diesel generator frequency (limiter set at 61 Hz) ☐

   – **REDUCE** diesel generator load ☐

2. **PLACE** the appropriate diesel generator control in control room manual mode by depressing applicable push button on Panel XU-2. ☐

3. **PLACE** appropriate synchroscope switch in *ON* for normal feed to emergency bus:

	Emergency Bus	Synchroscope	
a.	E1	*BUS 1D TO BUS E1 (1AD1).*	☐
b.	E2	*BUS 1C TO BUS E2 (1AC8).*	☐
c.	E3	*BUS 2D TO BUS E3 (2AD1).*	☐
d.	E4	*BUS 2C TO BUS E4 (2AC8).*	☐

CAUTION

Incoming voltage is from the grid and running voltage is from the diesel generator.

4. **ENSURE** incoming and running voltages are matched. ☐

CAUTION

WHEN the synchroscope is rotating slowly in the fast direction during this method of transfer, it will be necessary to raise DG frequency to obtain rotation in the slow direction. Failure to follow this guidance could result in an RPS MG set trip on low frequency at 57.7 Hz decreasing.

5. **ADJUST** diesel generator *GOVERNOR* motor control switch as necessary so the synchroscope is rotating slowly in the SLOW direction (counterclockwise). ☐

8.6.2 Procedural Steps

6. **WHEN** synchroscope is at "12 o'clock", **THEN PLACE AND HOLD** control switch for appropriate normal feed to emergency bus in *CLOSE* until both *MSTR* and *SLAVE* breakers indicate closed: ☐

	Breaker Feed	Master Breaker	Slave Breaker	
a.	*BUS 1D TO BUS E1*	1AD1	AE6.	☐
b.	*BUS 1C TO BUS E2*	1AC8	AG4.	☐
c.	*BUS 2D TO BUS E3*	2AD1	AI2.	☐
d.	*BUS 2C TO BUS E4*	2AC8	AJ9.	☐

7. **CONFIRM** synchroscope remains at "12 o'clock". ☐

8. **PLACE** synchroscope used in Step 8.6.2.3 in *OFF*. ☐

CAUTION

To prevent a diesel generator from tripping on reverse power, do **NOT** reduce DG load below 450KW.

9. **MAINTAIN** generator vars with voltage adjusting rheostat while lowering diesel generator load. ☐

10. **LOWER** diesel generator load to between 450 and 550 KW by momentarily placing the *GOVERNOR* motor control switch in *LOWER*. ☐

8.6.2 Procedural Steps

11. **OPEN** the appropriate diesel generator output breaker: ☐

Diesel Generator	Breaker	
No. 1	*DIESEL GEN 1 TO BUS E1 (AE9)*	☐
No. 2	*DIESEL GEN 2 TO BUS E2 (AG7)*	☐
No. 3	*DIESEL GEN 3 TO BUS E3 (AI5)*	☐
No. 4	*DIESEL GEN 4 TO BUS E4 (AK2)*	☐

12. **OBSERVE** the following indications: ☐

    a. Breaker open in accordance with indicating lights. ☐

    b. Emergency bus voltage remains constant. ☐

    c. Diesel generator load and amps are zero. ☐

    d. *NO LOAD* and *AVAIL* lights are illuminated on the diesel generator control module. ☐

13. **SHUT DOWN** the diesel in accordance with 0OP-39. ☐

NOTE: The emergency bus is now energized from normal feeder and the diesel generator is returned to standby automatic upon completion of shutdown section.

TASK CONDITIONS:

1. Unit Two (2) is operating at 100% power.

2. Emergency Bus E3 is being carried by the #3 EDG due to a relay trip of the E3 Bus feeder breaker.

3. The Unit 2 alignment (Isolations and Actuations) has been restored to normal configuration following the restoration of power to Bus E3 from DG-3.

4. Repairs have been completed to the E-3 feeder breaker relay.

5. Normal feeder bus for emergency bus is energized.

6. The Load Dispatcher has been notified that the 4160V E-3 Bus power supply is being shifted to the Normal Feeder.

INITIATING CUE:

You are directed by the Unit SCO to manually transfer the 4160 Emergency Bus Supply for Emergency Bus E-3 from the DG to the Normal Feeder IAW 0OP-50.1.