

PROCEDURE COVER SHEET

PENNSYLVANIA POWER & LIGHT CO. SUSQUEHANNA STEAM ELECTRIC STATION	
18 MONTH RHR SYSTEM AND LOGIC FUNCTIONAL TEST (DIV II)	SE-249-002 Revision 3 Page 1 of 120
EFFECTIVE DATE <u>3/04/91</u> PERIODIC REVIEW FREQUENCY AND EXPIRATION DATE (check one): <input checked="" type="checkbox"/> Procedure exempt from periodic review. Procedure will not expire. <input checked="" type="checkbox"/> Periodic Review Frequency is: <u>NA</u> Expiration Date: _____ Revised Expiration Dates: _____	
PROCEDURE TYPE (check one): <input checked="" type="checkbox"/> PORC <input type="checkbox"/> NON-PORC REVIEW TYPE (check one): <input type="checkbox"/> Expedited Review. PORC Review not required. <input checked="" type="checkbox"/> Alternate Review. PORC Review not required. <input type="checkbox"/> PORC Review. PORC Meeting No. _____	
Prepared by <u>Stephen D. Sudary</u> Date <u>1-31-91</u> Reviewed by <u>Cynthia Smith</u> Date <u>2/27/91</u> Responsible Supervisor Recommended <u>P. J. Kumpinski</u> Date <u>2-27-91</u> Section Head/Manager Approved by <u>[Signature]</u> Date <u>2/28/91</u>	



TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 PURPOSE/SCOPE	4
2.0 REFERENCES	4
3.0 SPECIAL TOOLS/EQUIPMENT	7
4.0 PRECAUTIONS/NOTES	7
5.0 PREREQUISITES AND LIMITATIONS	8
6.0 PROCEDURE	12
6.1 PLACE LPCI IN TEST	12
6.2 LPCI INITIATION ALIGNMENT	20
6.3 MANUAL LPCI INITIATION	21
6.4 LPCI INITIATION AUTOMATIC ACTUATIONS	23
6.5 LPCI INITIATION INTERLOCK CHECKS	24
6.6 LPCI INITIATION RELAY CHECKS	27
6.7 CONTAINMENT SPRAY AND HX BYPASS VALVE PERMISSIVE CHECKS	28
6.8 MANUAL INITIATION RESET	31
6.9 AUTOMATIC INITIATION TESTS	34
6.10 REACTOR VESSEL LOW PRESSURE PERMISSIVE FOR THE INJECTION VALVES TEST	47
6.11 PREPARE FOR RESPONSE TIME TESTING	51
6.12 RESPONSE TIME TESTING	54
6.13 RHR PUMPS JUMPER AND 2P202D CONTROL LOGIC TEST	62
6.14 RESTORATION OF RHR PUMP 2P202B AND D BREAKERS	87
6.15 REACTOR RECIRCULATION VALVE PERMISSIVE TEST	89

TABLE OF CONTENTS (Cont'd)

<u>SECTION</u>	<u>PAGE</u>
6.16 RESTORATION	108
6.17 LOGIC POWER AVAILABLE ANNUNCIATOR TEST	110
7.0 RECORDS	111

ATTACHMENTS

<u>ATTACHMENT</u>	<u>PAGE</u>
A ACCEPTANCE CRITERIA	112
B INTERNAL CONNECTION DIAGRAM FOR JUMPER RELAYS	116
C INTERNAL CONNECTION DIAGRAM FOR HMA RELAYS	117
D TEST SYNOPSIS	118
E 2C617 & 2C618 REAR VIEW LAYOUT SKETCHES	120

1.0 PURPOSE/SCOPE

- 1.1 To perform a system and logic system functional check of the RHR Division II including a simulated automatic actuation throughout the emergency operating sequence and verifying each valve in the flowpath actuates to its correct position at least once per 18 months.
- 1.2 To perform a Division II LPCI mode system response time test verifying that the LPCI System will respond on an actuation signal and develop rated conditions within specified limits at least once per 18 months. Conformance with 40 second requirement is verified in SE-200-001, 18 Month ECCS Response Time Calculation.
- 1.3 This test will not initiate the Diesel Generators. This test will check the related logic of the Reactor Recirculation System and trip the Reactor and Turbine Building Chilled Water Compressors.
- 1.4 This test will provide sufficient testing overlap with those systems which receive initiation or trip signals from the Division II RHR logic.

2.0 REFERENCES

- 2.1 Technical Specification 4.3.3.1, Table 4.3.3.1 - 1.2.d
- 2.2 Technical Specification 4.3.2.2, Table 4.3.2.1 - 1.1.a(3)
- 2.3 Technical Specification 4.3.3.2, Table 4.3.3.1 - 1.2.a
- 2.4 Technical Specification 4.3.3.2, Table 4.3.3.1 - 1.2.b
- 2.5 Technical Specification 4.3.3.2, Table 4.3.3.1 - 1.2.c.(1)
- 2.6 Technical Specification 4.3.3.2, Table 4.3.3.1 - 1.2.c.(2)
- 2.7 Technical Specification 4.3.3.2, Table 4.3.3.1 - 1.2.d
- 2.8 Technical Specification 4.3.3.3, Table 3.3.3 - 3.2.a
- 2.9 Technical Specification 4.3.3.3, Table 3.3.3. - 3.2.b
- 2.10 Technical Specification 4.3.3.3, Table 3.3.3. - 3.2.c.(1)
- 2.11 Technical Specification 4.3.3.3, Table 3.3.3. - 3.2.c.(2)
- 2.12 Technical Specification Section 4.5.1.c.1
- 2.13 Technical Specification Section 4.5.1.e.2

- 2.14 Technical Specification Section 4.7.1.2.b
- 2.15 Technical Specification Section 3.3.2
- 2.16 Technical Specification 3.3.3
- 2.17 Technical Specification 3.5.1
- 2.18 Technical Specification 3.5.2
- 2.19 Technical Specification 3.7.1.2
- 2.20 Technical Specification 3.8.4.2.1
- 2.21 Technical Specification 3.9.11.1
- 2.22 Technical Specification 3.9.11.2
- 2.23 FSAR Section 6.3.1.1.2.14
- 2.24 FSAR Section 6.3.1.2.3
- 2.25 FSAR Section 6.3.2.2.4
- 2.26 P&ID M-2151 Sheets 1,2,3, and 4
- 2.27 Electrical Schematic E-103 Sheets 16 and 17
- 2.28 Electrical Schematic E-146 Sheets 5 and 7
- 2.29 Electrical Schematic E-151 Sheets 10 and 14
- 2.30 Electrical Schematic E-153
- 2.31 Electrical Schematic E-184 Sheet 3
- 2.32 Electrical Schematic E-185-Sheets 17, 36, 37, 43, 48, 49
- 2.33 Electrical Schematic E-213 Sheets 12, 13, 21
- 2.34 Electrical Schematic E-216 Sheets 12, 13, 20
- 2.35 Electrical Schematic E-324 Sheets 25, 26, 28, 29, 35, 36, 38
- 2.36 Electrical Schematic E-331 Sheet 4
- 2.37 GE Elementary M1-B31-178 series (FF116510) Unit 2 Recirc
- 2.38 GE Elementary M1-E11-29 series (FF124510) Unit 2 RHR

- 2.39 GE Elementary M1-E21-20 series (FF126510) Unit 2 Core Spray
- 2.40 GE Elementary M1-E11-66 series (FF124510) Unit 1 RHR
- 2.41 GE Elementary M1-E41-59 series (FF127260) Unit 2 HPCI
- 2.42 GE Panel 2C617 Connection Diagrams M1-H12-894 (1) thru (6)
- 2.43 GE Panel 2C618 Connection Diagrams M1-H12-355 (1) thru (6)
- 2.44 2A20202 Switchgear Schematic E109-17(53) (Foreign File No 103090 Sheet 1753)
- 2.45 2A20402 Switchgear Schematic E109-18(53) (Foreign File No 103090 Sheet 1853)
- 2.46 OP-233-001 Turbine Building Chilled Water System
- 2.47 OP-234-001 Reactor Building Chilled Water System
- 2.48 OP-249-001 Residual Heat Removal System
- 2.49 OP-249-002 RHR Shutdown Cooling Mode
- 2.50 OP-054-001 Emergency Service Water System
- 2.51 OP-264-001 Reactor Recirculation System
- 2.52 AD-QA-422 Surveillance Testing Program
- 2.53 SE-200-001 18 Month ECCS Response Time Calculation
- 2.54 SE-224-107 18 Month Diesel Generator A and C Auto Start and ESS Buses 2A and 2C Energization on loss of offsite Power with a LOCA Plant Shutdown
- 2.55 SE-224-207 18 Month Diesel Generator B&D Auto Start and ESS Buses 2B and 2D Energization on Loss of Offsite Power with a LOCA Plant Shutdown
- 2.56 SE-249-001 18 Month RHR System and Logic Functional Testing (Div I)
- 2.57 SE-149-002 18 Month RHR System and Logic Functional Test
- 2.58 IEEE Standard 603 - 1980 (Definitions)
- 2.59 SI-280-301 Quarterly Calibration of Reactor Vessel Pressure Channels PS-B21-2N021A,C,E,G and PIS-B21-2N021B,D
- 2.60 SI-280-413 18 Month Time Response Test of Reactor Vessel Level Switches LIS-B21-2N031A&C

- 2.61 SI-280-423 18 Month Time Response Test of Reactor Vessel Level Switches LIS-B21-2N031B&D
- 2.62 SI-251-411 18 Month Time Response Test of Drywell Pressure High Switches PS-E11-2N011A&C
- 2.63 SI-251-421 18 Month Time Response Test of Drywell Pressure High Switches PS-E11-2N011B&D
- 2.64 SI-280-411 18 Month Time Response Test of Reactor Vessel Pressure Switches PS-B21-2N021A,C,E,G
- 2.65 SI-280-421 18 Month Time Response Test of Drywell Pressure High Switches PIS-B21-2N021B&D
- 2.66 SI-280-430 18 Month Time Response Test of Reactor Vessel Pressure Auxiliary Relays E11A-K31A&B, K32A&B, K36A&B and K44A&B
- 2.67 NSSS Surveillance (SE) Format Standard
- 2.68 AD-QA-302 System Status and Equipment Control
- 2.69 Emerg. Core Clg. Benchboard 2C-601, J-2802 Sheets 4,5,6 and 7
- 2.70 Policy Letter 89-003, Control and Verification of Operating Actions

3.0 SPECIAL TOOLS/EQUIPMENT

- 3.1 Stop watch (5)
- 3.2 ECCS test switch (3)
- 3.3 Voltmeter (2)
- 3.4 Jumper with toggle switch (8)
- 3.5 Jumpers (4)
- 3.6 Jumper with indicating light - 120 VAC (2)
- 3.7 Nut drivers (5/16 and 3/8) for isolation cans

4.0 PRECAUTIONS/NOTES

- 4.1 Do not run any RHR PUMP that does not have adequate oil in its motor upper and lower oil reservoirs.

- 4.2 Water from Suppression Pool should not be injected into the Reactor Vessel under test conditions.
- 4.3 The B Reactor Bldg and B Turbine Bldg Chillers will not be available for the duration of this test.
- 4.4 When visually confirming the status of HMA and/or JUMPER Relays the contact fingers are pulled in (making contact) when energized and when de-energized the fingers are pulled away and not making contact.
- 4.5 When installing an ECCS test switch into a jack, the test jacks' relays E11A-K99A/B & E11A-K110A/B will energize and will de-energize when the ECCS switch is removed.

5.0 PREREQUISITES AND LIMITATIONS

- 5.1 Unit 2 is in operational Condition 4 or 5.

Confirmed By

- 5.2 When testing the RHR System ensure no maintenance or other testing is being conducted on the Core Spray System, Diesel Generator or ESW which would prevent the minimum ECCS requirements from being met.

Confirmed By

- 5.3 The Emergency Service Water System is available to supply cooling water to the RHR System.

Confirmed By

- 5.4 The Reactor Recirculation System is shutdown in accordance with OP-264-001.

Confirmed By

- 5.5 ESTABLISH communication for applicable portions of this surveillance between:

- 5.5.1 The Unit 2 Control Room and Unit 2 Upper and Lower Relay Rooms.

Confirmed By

PROCEDURE COVER SHEET

PENNSYLVANIA POWER & LIGHT CO. SUSQUEHANNA STEAM ELECTRIC STATION	
18 MONTH CORE SPRAY SYSTEM AND LOGIC FUNCTION CHECK LOOP A (DIVISION I)	SE-251-001 Revision 2 Page 1 of 82
EFFECTIVE DATE <u>8/10/89</u> PERIODIC REVIEW FREQUENCY AND EXPIRATION DATE (check one): <input checked="" type="checkbox"/> Procedure exempt from periodic review. Procedure will not expire. <input type="checkbox"/> Periodic Review Frequency is: <u>NA</u> Expiration Date: <u>NA</u> Revised Expiration Dates: _____ _____	
PROCEDURE TYPE (check one): <input checked="" type="checkbox"/> PORC <input type="checkbox"/> NON-PORC REVIEW TYPE (check one): <input type="checkbox"/> Expedited Review. PORC Review not required. <input checked="" type="checkbox"/> Alternate Review. PORC Review not required. <input type="checkbox"/> PORC Review. PORC Meeting No. _____	
Prepared by <u>Robert Rossiter</u>	Date <u>8-7-89</u>
Reviewed by <u>SDS [Signature]</u> Responsible Supervisor	Date <u>8/10/89</u>
Recommended <u>[Signature]</u> Section Head/Manager	Date <u>8-8-89</u>
Approved by <u>[Signature]</u>	Date <u>8-8-89</u>

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 PURPOSE/SCOPE	4
2.0 REFERENCES	4
3.0 SPECIAL TOOLS/EQUIPMENT	7
4.0 PRECAUTIONS/NOTES	7
5.0 PREREQUISITES AND LIMITATIONS	7
6.0 PROCEDURE	10
6.1 Place Div I Of Core Spray In Test	10
6.2 Preparation for A Div I Core Spray Initiation	13
6.3 Test the RX Low Pressure Interlock From Sensor Contacts To Valve Operation	14
6.4 Test Of Injection Valve Logic With Initiation Logic Present	29
6.5 Preparation of Div I Core Spray for Response Time Testing	30
6.6 Div I Core Spray Response Time Test	33
6.7 Return Core Spray Division I To A Standby Alignment	38
6.8 Test Of The Drywell Pressure And Reactor Low Water Level Relays From Sensor Contacts To Sys. Initiation	39
6.9 Return Core Spray Division I and HPCI to Standby Line Up	54
6.10 Calculate Time For "A" Loop Of Core Spray To Reach Rated Pressure	60
6.11 Test of the Unit 1 Preferred Pump Logic	60
6.12 Test Of Logic Power Failure Monitor	72
6.13 Notification Of Shift Supervisor	73
7.0 RECORDS	73

ATTACHMENTS

ATTACHMENT

PAGE

A	Data Form, SE-251-001	74
B	HFA/HMA Relay Connection Diagram	78
C	Test Synopsis	80

1.0 PURPOSE/SCOPE

- 1.1 To ensure the Div I Core Spray System (CSS) will respond to an initiation signal and carry out the design features of delivering Core Spray from the suppression pool. Initiation logic and operating logic will be confirmed to perform all design safety features. This test is to be performed at least once per 18 months.
- 1.2 To perform a Div I Core Spray System response time test confirming that the Core Spray System will respond to an actuation signal and develop rated conditions within specified limits at least once per 18 months. Conformance with 27 second requirement is verified in SE-200-001.
- 1.3 To demonstrate the proper performance of the Unit 2 HPCI Initiation logic upon detection of a High Drywell Pressure Switch.
- 1.4 This test will not initiate the Diesel Generators, trip the Drywell Cooling Fans, or test the Plant Aux. Load Shed.

2.0 REFERENCES

- 2.1 Technical Specification 4.3.3.1, Table 4.3.3.1-1.1.d
- 2.2 Technical Specification 4.3.3.2, Table 4.3.3.1-1.1.a
- 2.3 Technical Specification 4.3.3.2, Table 4.3.3.1-1.1.b
- 2.4 Technical Specification 4.3.3.2, Table 4.3.3.1-1.1.c
- 2.5 Technical Specification 4.3.3.2, Table 4.3.3.1-1.1.d
- 2.6 Technical Specification 4.3.3.2, Table 4.3.3.1-1.3.b
- 2.7 Technical Specification 4.3.3.3, Table 3.3.3-3.1.a
- 2.8 Technical Specification 4.3.3.3, Table 3.3.3-3.1.b
- 2.9 Technical Specification 4.3.3.3, Table 3.3.3-3.1.c
- 2.10 Technical Specification 4.5.1.c.1
- 2.11 Technical Specification 4.6.3.2, Table 3.6.3-1.a
- 2.12 Technical Specification 4.7.1.2.b
- 2.13 Technical Specification 3.3.3.b
- 2.14 Technical Specification 3.5.2.a

- 2.15 Technical Specification 3.5.2.b
- 2.16 Technical Specification 3.8.1.1
- 2.17 Technical Specification 3.8.1.2
- 2.18 FSAR Section 6.3
- 2.19 P&ID M-2152
- 2.20 Electrical Schematic E-155, Sh 10,11,12,13,14,18
- 2.21 Electrical Schematic E-156, Sh 5 and 7
- 2.22 GE Elementary 8856-M1-E21-20, Sh (1)(2)(3)(4)(5)(6)(7)(8)
- 2.23 GE Functional Control Diagram 8856-M1-E21-3
- 2.24 AD-QA-422 Surveillance Test Program
- 2.25 OP-251-001 Core Spray System
- 2.26 SE-200-001 18 Month ECCS Response Time Calculation
- 2.27 IEEE STD 603-1980, (Definitions)
- 2.28 Electrical Schematic E-146, Sht 1
- 2.29 SE-224-107 DG A and C Auto Start upon LOOP with a LOCA (Division I)
- 2.30 SE-224-207 DG B and D Auto Start upon LOOP with a LOCA (Division II)
- 2.31 SE-252-001, 18 Month HPCI System and Logic Function Check
- 2.32 Electrical Schematic E-185, Sh 16,18,40,41
- 2.33 Electrical Schematic E-102, Sh 32
- 2.34 Electrical Schematic E-184, Sh 10,11
- 2.35 GE Elementary 8856-M1-E41-59(2)(4)(5)(7)(8)
- 2.36 Breaker 2A20105 Connection Diagram 8856-E109-16(61)
- 2.37 Breaker 2A20305 Connection Diagram 8856-E109-19(55)
- 2.38 GE Elementary 8856-M1-E21-35(2) and (3)
- 2.39 GE Elementary 8856-M1-E11-29(3)(4)(5)(6)(8)(9)



- 2.40 Emergency Core Cooling Benchboard 2C601 Drawing J2802 Sh 3,4,6,7,8
- 2.41 GE Panel 2C626 Connection Drawing 8856-M1-H12-349(1)(2)
- 2.42 Panel 2C235A Connection Drawing E358 Sh 1 and 2
- 2.43 Electrical Schematic E-222 Sh 2
- 2.44 PLIS-17483 Policy on Control and Verification of Operating Actions
- 2.45 SE-251-002 18 Month Core Spray System and Logic Function Check Loop B (Division II)
- 2.46 SI-251-501 18 Month Core Spray System Logic System Functional Test
- 2.47 SI-280-411 18 Month Time Response Test of Reactor Vessel Pressure Switches PS-B21-2N021A,C,E,G
- 2.48 SI-280-421, 18 Month Time Response Test of Reactor Vessel Pressure Switches PIS-B21-2N021B&D
- 2.49 SI-280-413, 18 Month Time Response Test of Reactor Vessel Water Level Switches LIS-B21-2N031A&C
- 2.50 SI-280-423, 18 Month Time Response Test of Reactor Vessel Water Level Switches LIS-B21-2N031B&D
- 2.51 SI-251-411 18 Month Time Response Test of Drywell Pressure High Switches PS-E11-2N011A&C
- 2.52 SI-280-421 18 Month Time Response Test of Drywell Pressure High Switches PS-E11-2N011B&D
- 2.53 CL-251-0011 Unit 2 Core Spray System Div 1 Electrical
- 2.54 CL-251-0012 Unit 2 Core Spray System Div 1 Mechanical
- 2.55 CL-251-0013 Unit 2 Core Spray System Div 1 Containment
- 2.56 CL-251-0017 Unit 2 Core Spray System Common Electrical
- 2.57 CL-251-0018 Unit 2 Core Spray System Common Mechanical
- 2.58 OP-037-001 Demineralized and Condensate Transfer Systems
- 2.59 Technical Specification 4.5.1.e.2

3.0 SPECIAL TOOLS/EQUIPMENT

- 3.1 Stopwatch (3)
- 3.2 DC Voltmeter (1)
- 3.3 ECCS Test Switch (2)
- 3.4 Jumper with toggle switch (14)
- 3.5 Maintenance Pages, if available (3)

4.0 PRECAUTIONS/NOTES

- 4.1 When visually confirming the status of HMA and/or HFA relays the contact fingers are pulled in when energized and are pulled away when de-energized.
- 4.2 Valve stroking and pump breaker operation will be confirmed by the indication on Panel 2C601, CORE SPRAY LOOP A.
- 4.3 When attempting to open or close valves, (to confirm the valve will not open or close), hold the control switch in the position required for approx. 10 seconds to ensure valve will not move.
- 4.4 All Core Spray Logic is shown on GE drawings 8856-M1-E21-20 Sheets 1,2,3,4,6,7 except as noted throughout this test.
- 4.5 Reference Attachment B for HFA and HMA relay connection layout.

5.0 PREREQUISITES AND LIMITATIONS

- 5.1 No Core Spray initiation signals present. (This is performed by observing the green CORE SPRAY LOOP A(B) INIT SIG RESET HS-E21-2S17A(B) RESET lights are OFF.)

Confirmed By

- 5.2 No maintenance or other testing is being performed on the Unit 2 Core Spray System and none allowed to start during this test which may affect the performance of this test without test director's concurrence.

Confirmed By