

PROCEDURE COVER SHEET

PENNSYLVANIA POWER & LIGHT CO. SUSQUEHANNA STEAM ELECTRIC STATION	
18 MONTH DIESEL GENERATORS A AND C (OR E) AUTO START AND ESS BUSES 2A AND 2C ENERGIZATION ON LOSS OF OFFSITE POWER WITH A LOCA - PLANT SHUTDOWN	SE-224-107 Revision 2 Page 1 of 87
EFFECTIVE DATE <u>10/16/89</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: _____	
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Prepared by <u>Bruce J. Darrach</u>	Date <u>10/3/89</u>
Reviewed by <u>B. R. Ruffin</u> Responsible Supervisor	Date <u>10/3/89</u>
Recommended <u>George J. Kucykowski</u> Section Head/Manager	Date <u>10-7-89</u>
Approved by <u>[Signature]</u>	Date <u>10.12.89</u>

FORM AD-QA-101-1, Rev. 5, Page 1 of 1

SE-224-107

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TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 PURPOSE/SCOPE	4
2.0 REFERENCES	5
3.0 SPECIAL TOOLS/EQUIPMENT	10
4.0 PRECAUTIONS	10
5.0 PREREQUISITES AND LIMITATIONS	12
6.0 PROCEDURE	16
6.1 Electrical Maintenance Setup to Perform Test	16
6.2 Pre-test Plant Equipment Lineup	19
6.3 Station Personnel to Support Test	30
6.4 Division 1 LOCA/LOOP Initiation	31
6.5 Division 1 LOCA/LOOP Reset	46
6.6 Diesel Generators A and C (or E if substituted for A or C) Demonstration that Auto Connected Loads do not exceed 4700KW	51
6.7 Diesel Generator A (or E) Synchronization with Offsite Power and Transfer of Emergency Loads to Offsite Power Source	53
6.8 Diesel Generator C (or E) Synchronization with Offsite Power and Transfer of Emergency Loads to Offsite Power Source	54
6.9 Restoration of Systems	55
6.10 Electrical Maintenance Removal of Test Equipment	67
6.11 Shift Supervision Notification of Test Completion	69
7.0 RECORDS	69

ATTACHMENTS

<u>ATTACHMENT</u>		<u>PAGE</u>
A	Data Form SE-224-107-1	70
B	Division 1 Permanently Connected Loads	76
C	Division 1 Auto Connected and Load Shed Loads	79
D	Division 1 Logic Functional Checks	81
E	ESS Bus 2A Deenergization and Load Shedding Table	82
F	ESS Bus 2C Deenergization and Load Shedding Table	83
G	ESS Bus 2A Load Substitution Table	84
H	ESS Bus 2C Load Substitution Table	85
I	Sample Visicorder Analysis	86

1.0 PURPOSE/SCOPE

- 1.1 To demonstrate at least once per 18 months during shutdown of Unit 2
 - 1.1.1 That on a simulated loss of offsite power and ECCS actuation signal, ESS buses 2A and 2C deenergize and shed loads. (Acceptance Criteria #13)
 - 1.1.2 That deenergization of ESS buses 2A and 2C initiates load shedding. (Acceptance Criteria #15)
 - 1.1.3 That on a simulated loss of offsite power concurrent with a Unit 2 Division 1 ECCS actuation test signal, Diesel Generators A and C (or E if substituted for A or C) auto-start, energize Unit 2 ESS buses 2A and 2C with permanently connected loads within 10 seconds, energize the auto-connected loads through the load timers, and operate for greater than or equal to 5 minutes loaded with the emergency loads. Voltage and frequency are maintained at 4160 ± 400 volts and 60 ± 3.0 hz during the test. (Acceptance Criteria #9)
 - 1.1.4 That the non-emergency trip circuits do not trip the A and C engines while running in the emergency mode. (Acceptance Criteria #8)
 - 1.1.5 That the auto-connected Unit 2 loads to Diesel Generators A and C do not exceed 3700kw. This limit is combined with the shutdown load limits of 1000 kw from SE-124-A02 and SE-124-C02 to verify the total auto connected loads to diesel generators A and C do not exceed 4700 kw. (Acceptance Criteria #14)
 - 1.1.6 The capability of Diesel Generators A and C (or E if substituted for A or C) to synchronize with offsite power while loaded with the emergency loads, transfer the loads to the offsite power source, and be restored to standby status upon a simulated restoration of offsite power. (Acceptance Criteria #10)
 - 1.1.7 That the diesel generator loading sequence timers associated with ESS buses 2A and 2C are operable with setpoints within $\pm 10\%$ (+20, -10% for RHR Timers) of their design setpoints. (Acceptance Criteria #11)
- 1.2 To perform a portion of the Unit 2 Division 1 Core Spray logic system functional test by demonstrating that Diesel Generator A (or E) starts upon Division 1 Core Spray initiation. (Acceptance Criteria #1)

- 1.3 To perform a portion of the Unit 2 Division 1 RHR logic system functional test by demonstrating that Diesel Generator C (or E) starts upon Division 1 RHR initiation. (Acceptance Criteria #2)
- 1.4 To perform a portion of the ESS Bus 2A and 2C Loss of Power logic system functional test by demonstrating load shedding upon bus deenergization. (Acceptance Criteria #3)
- 1.5 To perform a portion of the Unit 2 Division 1 Core Spray ECCS response time test by timing from Division 1 Core Spray initiation to Diesel Generator A(E) - Bus 2A breaker closure. (Acceptance Criteria #5)
- 1.6 To perform a portion of the Unit 2 Division 1 RHR ECCS response time test by timing from Division 1 RHR initiation to Diesel Generator C(E) - Bus 2C breaker closure. (Acceptance Criteria #6)
- 1.7 To perform a portion of the Unit 1 and Unit 2 Division 1 ESW logic system functional test by demonstrating that relay K11A energizes on a Division 1 Core Spray initiation. (Acceptance Criteria #12)
- 1.8 To perform a portion of the logic functional test for the Unit 2 4KV degraded grid circuit by testing that relays K11AX4 and K11AX6 operate on a Division 1 Core Spray initiation. (Acceptance Criteria #4)
- 1.9 To perform a portion of the Unit 2 Division 1 Core Spray system functional test by demonstrating that relays K3A and K4A deenergize on a loss of power to the ESS buses. (Acceptance Criteria #7)

NOTE: Refer to Attachment A for the Technical Specifications satisfied by this Surveillance.

2.0 REFERENCES

- 2.1 Unit 2 Technical Specification 3.5.1
- 2.2 Unit 2 Technical Specification 3.5.2
- 2.3 Unit 1 and Unit 2 Technical Specification 3.8.1.1
- 2.4 Unit 1 and Unit 2 Technical Specification 3.8.1.2
- 2.5 Unit 2 Technical Specification 3.9.11.1
- 2.6 Unit 2 Technical Specification 4.3.3.2 Functions 1b,1c,1d
- 2.7 Unit 2 Technical Specification 4.3.3.2 Functions 2a,2b,2c1,2d
- 2.8 Unit 2 Technical Specification 4.3.3.2 Function 5

- 2.9 Unit 2 Technical Specification 4.3.3.3 Functions 1a,1b,1c
- 2.10 Unit 2 Technical Specification 4.3.3.3 Functions 2a,2b,2d
- 2.11 Unit 1 and 2 Technical Specification 4.7.1.2.b
- 2.12 Unit 2 Technical Specification 4.8.1.1.2.d.4a
- 2.13 Unit 2 Technical Specification 4.8.1.1.2.d.6a,6b
- 2.14 Unit 1 and Unit 2 Technical Specification 4.8.1.1.2.d.6.c
- 2.15 Unit 1 and Unit 2 Technical Specification 4.8.1.1.2.d.9
- 2.16 Unit 2 Technical Specification 4.8.1.1.2.d.10a,10b,10c
- 2.17 Unit 1 and Unit 2 Technical Specification 4.8.1.1.2d.12
- 2.18 Unit 2 Technical Specification 4.8.1.1.3.d.6(a)(i)(a)
- 2.19 Unit 2 Technical Specification 4.8.1.1.3.d.6(a)(iii)(a),(b)
- 2.20 Unit 1 and Unit 2 Technical Specification 4.8.1.1.3.d.6(a)(iii)(c)
- 2.21 Unit 2 Technical Specification 4.8.1.1.3.d.6(a)(iv)
- 2.22 FSAR Section 8.3.1.4, Standby Power Supply
- 2.23 FSAR Table 8.3-1, Assignment of ESF and Selected Non-ESF Loads to Diesel Generators and Diesel Ratings
- 2.24 FSAR Table 8.3-1a, Diesel Generator Loading
- 2.25 Regulatory Guide 1.108, Periodic Testing of Diesel Generator Units used as Onsite Electric Power System at Nuclear Power Plants
- 2.26 IEEE Standard 603-1980 (Definitions)
- 2.27 SSES Policy Letter 6-84, Control and Verification of Operating Actions
- 2.28 AD-QA-101, Procedure Program
- 2.29 AD-QA-302-8, RHR Full Flow Test Hours Log
- 2.30 AD-QA-302-9, Core Spray Full Flow Test Hours Log
- 2.31 AD-QA-422, Surveillance Testing Program

- 2.32 MT-GE-024, Setup and Calibration of Model 1858 Visicorder for Diesel Generator Surveillances
- 2.33 SE-200-001, ECCS Response Time Calculation Procedure
- 2.34 E-009 Sh 36, 480V MCC 2B217
- 2.35 E-009 Sh 56, 480V MCC 2B116
- 2.36 E-009 Sh 66, 480V MCC 2B216
- 2.37 E-009 Sh 70, 480V MCC 2B236
- 2.38 E-023 Sh 03, 4KV System Meter and Relay Diagram
- 2.39 E-023 Sh 06, 4KV System DG Meter and Relay Diagram
- 2.40 E-026 Sh 01, 125V and 250V DC Systems
- 2.41 E-103 Sh 13, 4KV System
- 2.42 E-103 Sh 14, 4KV System
- 2.43 E-103 Sh 15, 4KV System
- 2.44 E-103 Sh 19, 4KV System
- 2.45 E-103 Sh 20, 4KV System
- 2.46 E-103 Sh 21, 4KV System
- 2.47 E-105 Sh 09, DG A 4KV Circuit Breaker Control
- 2.48 E-105 Sh 11, DG C 4KV Circuit Breaker Control
- 2.49 E-115 Sh 18, Turbine Generator Turning Gear Oil Pump
- 2.50 E-120 Sh 32, Plant Aux Load Shedding
- 2.51 E-135 Sh 39, Mechanical Vacuum Pump
- 2.52 E-146 Sh 01, ESW Pump A
- 2.53 E-147 Sh 07, TBCCW
- 2.54 E-153 Sh 105, Isolation Swing Bus MG Sets
- 2.55 E-166 Sh 07, Standby Liquid Control

- 2.56 E-184 Sh 02, Diesel Generator Auto Start Signals
- 2.57 E-184 Sh 10, LOCA Isolation Signals
- 2.58 E-213 Sh 12, Turbine Building Chiller
- 2.59 E-214 Sh 9A, Control Structure Chilled Water
- 2.60 E-216 Sh 12, Reactor Building Chiller
- 2.61 E-216 Sh 25, Emergency Switchgear Room Cooler Compressor
- 2.62 E-126 Sh 26, Emergency Switchgear Room Cooling Comp.
- 2.63 E-220 Sh 02, RCIC Room Coolers
- 2.64 E-222 Sh 02, Core Spray Room Coolers
- 2.65 E-223 Sh 02, RHR Room Coolers
- 2.66 E-258 Sh 05, Containment Instrument Gas
- 2.67 E-258 Sh 10, Instrument Air
- 2.68 FF105801 Sh 2401, Diesel Generator Controls (A-D)
- 2.69 FF105801 Sh 2402, Diesel Generator Controls (A-D)
- 2.70 FF61604 Sh 28, Diesel Generator Controls (E)
- 2.71 FF61604 Sh 29, Diesel Generator Controls (E)
- 2.72 M1-E11-29(4), RHR System
- 2.73 M1-E11-29(6), RHR System
- 2.74 M1-E21-20(3), Core Spray System
- 2.75 M1-E21-20(4), Core Spray System
- 2.76 OI-AD-036, Breaker Racking
- 2.77 ON-004-001, 4KV Bus Transfer, Load Shed and Sequencing
- 2.78 ON-259-002, Containment Isolation
- 2.79 OP-024-001, Diesel Generators
- 2.80 OP-030-001, Control Structure Chilled Water System

- 2.81 OP-030-002, Control Structure HVAC
- 2.82 OP-054-001, ESW
- 2.83 OP-070-001, Standby Gas Treatment System
- 2.84 OP-214-001, RBCCW
- 2.85 OP-215-001, TBCCW
- 2.86 OP-216-001, RHR Service Water
- 2.87 OP-217-001, 120V Instrument AC Distribution System
- 2.88 OP-218-001, Instrument Air System
- 2.89 OP-233-001, Turbine Building Chilled Water System
- 2.90 OP-234-001, Reactor Building Chilled Water System
- 2.91 OP-234-002, Reactor Building HVAC Zone 2 & 3
- 2.92 OP-243-001, SJAE and Mechanical Vacuum Pump
- 2.93 OP-249-001, RHR System
- 2.94 OP-249-002, RHR Shutdown Cooling
- 2.95 OP-251-001, Core Spray System
- 2.96 OP-253-001, Standby Liquid Control System
- 2.97 OP-255-001, CRD Hydraulic System
- 2.98 OP-258-001, RPS Distribution System
- 2.99 OP-259-002, Suppression Pool Temperature Monitoring
- 2.100 OP-260-001, Drywell Ventilation System
- 2.101 OP-275-001, 24V DC System
- 2.102 OP-288-001, 250V DC System
- 2.103 OP-293-001, Main Turbine Operation

3.0 SPECIAL TOOLS/EQUIPMENT

NOTE: RECORD M&TE identification and calibration information on Data Form SE-224-107-1 as applicable.

- 3.1 Model 1858 Visicorder - Diesel A
- 3.2 Model 1858 Visicorder - Diesel C
- 3.3 Stopwatch - 2C681 (2)
- 3.4 Stopwatch - 0C653 (CS)
- 3.5 Stopwatch - 0C653 (RHR)
- 3.6 Diesel Surveillance Boards (2 req'd)
- 3.7 Indicating Lights (4 req'd)
- 3.8 ECCS Test Switch
- 3.9 Jumpers (10 req'd)
- 3.10 Ohmmeters (4 req'd)

4.0 PRECAUTIONS

- 4.1 The following test mode shutdown signals are bypassed during this test because the diesel generator is operating in the emergency mode:
- Turbocharger lube oil low pressure
 - Main and connecting rod bearing high temperature
 - Engine vibration
 - Turbocharger thrust bearing failure
 - High jacket water temperature
 - Generator reverse power
 - Generator high bearing temperature
 - Generator loss of field
 - Generator overexcitation

- Generator underfrequency
- Generator overvoltage
- Incomplete sequence
- Turbocharger Overspeed (E D/G only)

If any of the shutdown signals above are received, the associated alarm will sound, but the engine will continue to run. Monitor the abnormal condition in accordance with the applicable alarm response procedure and initiate shutdown of the diesel generator if deemed necessary.

- 4.2 Ensure circulation pumps and heaters have been running long enough for the engine to be up to keep-warm temperature of $\geq 100^{\circ}\text{F}$ before starting.
- 4.3 Refer to ON-004-001 for effects of deenergization of 4KV busses 2A and 2C.
- 4.4 Test switches to be operated in this procedure are energized even when open. Care should be taken not to contact metal portion of switches.
- 4.5 Minimize the time during which the CRD pump 2P132A is removed from service to minimize crud accumulation in the CRDMs and depleting HCU accumulator pressure. CRD pump 2P132B should be running throughout the test.
- 4.6 Reactor Water Cleanup System may be in service, but will isolate during this test.
- 4.7 Both instrument air compressors will trip during this test. Service air may be cross-tied in accordance with OP-218-001.
- 4.8 Visicorder data may be used to verify settings of load sequencing timers in the event of a malfunction during the test. The start of the load must be clearly visible.
- 4.9 Steps 6.4.4 and 6.4.6 prevent Diesel Generators A and C from auto starting on loss of power to ESS buses 2A and 2C. The A and C Diesel Generators are inoperable until steps 6.5.5 and 6.5.6 are performed.
- 4.10 All circuit breaker racking will be performed in accordance with OI-AD-036.
- 4.11 Attachment I can be used as an aid for using visicorder traces in measuring the performance of the diesel generators and load sequence timers.