



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

April 22, 2002

Carolina Power & Light Company
ATTN: Mr. James Scarola
Vice President - Harris Plant
Shearon Harris Nuclear Power Plant
P. O. Box 165, Mail Code: Zone 1
New Hill, NC 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC INSPECTION REPORT
50-400/02-03

Dear Mr. Scarola:

On March 15, 2002, the Nuclear Regulatory Commission (NRC) completed a safety system design and performance capability inspection at your Shearon Harris Nuclear Power Plant. The enclosed report documents the inspection findings which were discussed on March 15, 2002, with Mr. R. Duncan and other members of your staff.

The inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations, and with the conditions of your operating license. Within these areas, the inspection involved selected examination of procedures and representative records, observations of activities, and interviews with personnel.

No findings of significance were identified during the inspection.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Charles R. Ogle, Chief
Engineering Branch 1
Division of Reactor Safety

Docket No.: 50-400
License No.: NPF-63

Enclosure: (See page 2)

Enclosure: Inspection Report No. 50-400/02-03
w/Attachment

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E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-400

License No.: NPF-63

Report No.: 50-400/2002-03

Licensee: Carolina Power & Light (CP&L)

Facility: Shearon Harris Nuclear Power Plant, Unit 1

Location: 5413 Shearon Harris Road
New Hill, NC 27562

Dates: February 25 - March 1, 2002 (Week1)
March 11 - 15, 2002 (Week 2)

Inspectors: J. Lenahan, Senior Reactor Inspector (Team Leader)
C. Smith, Senior Reactor Inspector
W. Bearden, Reactor Inspector (Week 2 only)
R. Moore, Reactor Inspector (Week 1 only)
M. Maymi, Reactor Inspector
S. Walker, Reactor Inspector

Approved by: Charles R. Ogle, Chief
Engineering Branch 1
Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000400-02-03 on 2/25/02-3/15 /02, Carolina Power and Light Company, Shearon Harris Nuclear Plant, Unit 1, safety system design and performance capability-loss of offsite power station blackout.

This inspection was conducted by a team of regional inspectors. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609 "Significance Determination Process" (SDP). Findings for which the SDP does not apply are indicated by "No Color" or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website.

No findings of significance were identified.

REPORT DETAILS

1. **REACTOR SAFETY** **Cornerstones: Initiating Events, Mitigating Systems**

1R21 Safety System Design and Performance Capability (71111.21)

.1 System Needs

a. Inspection Scope

Energy Source

Emergency Diesel Generator (EDG) Fuel Oil

The team reviewed design documentation, drawings, calculations, technical manuals, and test documentation to verify that the capacity of the fuel oil storage tanks and the design of the fuel oil transfer pumps were adequate to provide the fuel required to operate the EDGs for the seven-day period of operation assumed in the accident analysis. Included in the review were fuel consumption rate tests performed on the EDGs, and calculations determining day tank high/low level alarm set points. The team also reviewed the fuel oil transfer pump surveillance test records which tested the transfer function, discharge check valve operability, and the on/off switch calibrations for the fuel oil transfer system. In addition, the team reviewed the station acceptance criteria tests results and trending for fuel oil quality, to verify these were consistent with the EDG vendor recommendations and applicable industry standards.

EDG Starting Air

The team reviewed design documentation and drawings to verify that the air start system capabilities were consistent with design basis assumptions. This included test documentation to verify the 5-start capability of the air start system receivers and dew point trending to verify air quality. Additionally, design and test documentation for the check valves between the air dryers and the receivers was reviewed to verify the valves were seismically qualified and periodically leak tested.

Controls

Electrical Control Logic

The team reviewed electrical control schematics depicting control logic for the 6900 volt alternating current (VAC) emergency bus 1A-SA bus tie circuit breakers, the diesel generator output circuit breaker, and all feeder circuit breakers fed from this emergency bus. The team also reviewed Operations Surveillance Test procedure OST-1823 which implements the requirements of Technical Specification (TS) surveillance requirements 4.8.1.1.2.f.4.a and 4.8.1.1.2.f.4.b on a simulated loss of offsite power (LOOP).

Loop Initiation Logic

The team reviewed the instrument loop uncertainty calculation for 6900 VAC emergency bus 1A-SA loss of voltage relays 27-1/SA, 27-2/SA, 27-3/SA, loss of voltage time delay relay 2/SA, degraded voltage relays 27A-1/SA, 27A-2/SA, 27A-3/SA, and degraded voltage time delay relays 2-1/SA and 2-2/SA to verify that the 6900 VAC electrical distribution system had two levels of under voltage protection. The team also reviewed plant procedures MST-0075 and MST-00045 which are used for calibrating the under voltage relays.

Operator Actions

The team reviewed selected normal (OPs), abnormal (AOPs), and emergency operating procedures (EOPs) associated with a LOOP and station blackout (SBO) to verify that the procedures specified operator actions that were consistent with design and licensing requirements during accident conditions. The team discussed selected tasks (e.g., job performance measures) with operations personnel to understand operator actions and important equipment functions. Operator actions were also evaluated for consistency with events described in the Updated Final Safety Analysis Report (UFSAR). The team also performed walkdowns of instrumentation and controls in the main control room and remote locations to verify that appropriate indications and controls were available and adequate for operators to make the necessary decisions during performance of the specific AOPs and EOPs.

Heat Removal

EDG Internal Lubrication and Cooling System

The team reviewed design documentation, drawings, calculations and equipment specifications to verify that the internal cooling systems for the engine cooling (jacket water system) and lubricating oil were adequate to maintain operation of the EDG within vendor specifications.

The jacket water system review included heat exchanger performance trending and monitoring actions for heat exchanger plugged tubes. Jacket water temperature and pressure trending, as well as alarm/trip set point values were also reviewed to verify these were consistent with vendor specifications.

Review of the lube oil system capability included review of lube oil temperature, pressure and cooler performance parameter trending and the lube oil chemistry testing to verify these were consistent with the EDG vendor recommendations and design requirements.

Ventilation - Intake and Exhaust System and Equipment Space

The team reviewed design documentation, drawings, and calculations for the design of the heating, ventilation, and air conditioning (HVAC) systems for the EDG building spaces to verify that the systems were capable of maintaining ambient conditions within

the ranges specified for equipment operation. This included the electrical equipment space ventilation and the EDG intake and exhaust ventilation systems. This review included the heat load calculation for the EDG, electrical equipment rooms, and the exhaust silencer rooms. In addition, surveillance records for room fans, static pressure calculations, and the combustion air intake filter inspection records were reviewed.

EDG Service Water Supply

The team reviewed the availability and reliability of the emergency service water (ESW) system to supply cooling water to the EDGs. This included the licensee's actions to identify and prevent degradation of ESW supply piping due to clams, debris, and biofouling. This review included design documentation, drawings, calculations, vendor manuals, test documentation, surveillance and operating procedures, and installed equipment.

Station Blackout (SBO) Water Source

The team reviewed the availability, reliability, and adequacy of the condensate storage tank as a water source for SBO. This review included design documentation, drawings, and calculations of tank capacity and water makeup requirements for decay heat removal during an SBO. The team reviewed the reliability and availability of the steam supply to the turbine driven auxiliary feedwater (TDAFW) pump. This included the design and performance of the steam supply valves and supply line steam traps.

b. Findings

No findings of significance were identified.

.2 System Conditions and Capability

a. Inspection Scope

Installed Configuration

The team performed a field walkdown of equipment related to the operation of the EDG, the ESW supply to the EDGs, the auxiliary feedwater system, and their support systems during LOOP and SBO conditions. Equipment examined included the TDAFW pump, system piping and valves, and main control room controls and instrumentation, and the accessibility of equipment required to be manually operated during an SBO. In addition, a walkdown was also performed to examine the 6900 VAC emergency buses 1A-SA and 1B-SB, the 480 VAC emergency buses 1A3-SA and 1B3-SB, the 125 volt direct current (VDC) Class 1E system, and non-nuclear safety related 125 and 250 VDC systems. The walkdowns were performed to assess material condition, identify degraded equipment and verify installed configuration were consistent with design drawings and calculation design inputs.

Operation

The team reviewed the performance history and surveillance records for the TDAFW pump and system flow and vibration trending data to evaluate the performance of the TDAFW pump and to identify any trends indicating degrading equipment. The team also reviewed parameter trending and corrective maintenance history for the EDGs. Parameter trending included lube oil pressure, temperature, cooler performance, and strainer delta P; fuel oil pressure; left and right bank exhaust temperatures; jacket water temperature, pressure, and heat exchanger performance; stator temperatures; governor rack position; fast start times; and crankcase pressure. Additionally, the team reviewed the vendor manuals and the preventive maintenance procedures for the EDGs, TDAFW pump, turbine, and trip and throttle valve to verify maintenance practices were consistent with the manufacturer's recommendations.

Design

EDG Support Systems

The team performed a design review of the EDG support systems such as the fuel oil system and the ESW system to determine if the design bases assumptions of system capability were verified. This included flow verification for EDG ESW supply lines and equipment required to respond to an SBO. The review included design documentation, drawings, calculations, vendor manuals, test documentation, surveillance and maintenance procedures for installed equipment. Additionally, the implementation of the Harris SBO coping strategy for a four-hour coping period was reviewed.

Essential Alternating Current Power System

The team reviewed selected portions of calculation E-6000 to verify that the degraded voltage relay dropout setting ensured that steady state voltage criteria were not violated on downstream emergency power system buses during switchyard degraded voltage conditions. The team reviewed the calculation to determine the maximum expected diesel generator loading during each sequencer load block, including the diesel generator terminal voltage response, during sequencing. The team also reviewed selected portions of calculation E-6003 to determine the adequacy of the class 1E bus voltages. In addition, the team reviewed coordination studies for 6900 VAC emergency bus 1A-SA, 480 VAC power centers 1A2-SA and 1A3-SA and selected 480 VAC motor control center power supplies. The review was performed to determine that selective circuit breaker coordination had been established for the Class 1E electrical distribution system.

Station Blackout DC (SBO- 10 CFR 50.63)

The team evaluated the battery sizing calculations to ensure proper considerations were taken in sizing the battery and to verify that the 125 VDC Class 1E and the Non-Class 1E Batteries have adequate capacity to support the decay heat removal for the required four-hour coping duration. The team reviewed vendor data, maintenance procedures and maintenance history for each battery system to determine whether adequate

monitoring had been established. The team also reviewed plant procedure, EOP-EPP - Loss of AC Power to 1A-SA and 1B-SB, to verify that the procedure instructions were consistent with the SBO calculations in identifying the direct current (DC) loads that are required to be shed during an SBO event.

Testing

EDG and EDG Support Systems

The team reviewed surveillance testing and inspection documentation for the EDGs to verify performance monitoring was adequate to assure that design capability was maintained and equipment degradation would be identified. The team also reviewed the surveillance test procedures which control testing of the TDAFW pump to verify testing requirements specified in the procedures were adequate. Additionally, completed test and inspection results were reviewed to assess the licensee's actions to verify and maintain the safety function, reliability, and availability of the TDAFW pump. Response time testing of critical valves was included in the review. Test and inspection results were reviewed to verify that the results were consistent with design specifications, that test acceptance criteria and test results appropriately considered differences between testing conditions and design requirements during accident conditions, and that test and inspection results met established acceptance criteria.

DC Battery Systems

The inspectors reviewed results of tests performed on the station batteries to verify all surveillance requirements as established by TS 4.8.2.1.d were properly being met. The team also reviewed test results performed to determine if LOOP mitigation loads could be adequately supplied by the batteries and without overloading the batteries during load sequencing. Time-current coordination studies were reviewed to verify that adequate selective coordination had been established for selected 125 VDC and 118 VAC loads (e.g. 125 VDC emergency bus panels, 118 VAC instrument panels). The EDG field flashing circuit (circuit No. 13) was also evaluated to ensure it could perform its function of fast-starting the EDG during an emergency. The inspectors reviewed EDG fast-start testing procedures, maintenance history, and circuit wiring diagrams to assess the performance of the field flashing circuit.

b. Findings

No findings of significance were identified.

.3 Selected Components

a. Inspection Scope

Component Inspection

The team reviewed maintenance and testing documentation, performance trending information, corrective maintenance histories, and work orders to assess the licensee's actions to verify and maintain the safety function, reliability, and availability of selected

components. The selected equipment included the steam generator power operated relief valves, TDAFW steam supply valves, the TDAFW pump, a risk-based selection of critical valves, the EDG jacket water system thermostatic control valves, and the EDG output circuit breakers 106-SA and 126-SB.

Design Changes

The team reviewed modifications/design changes performed on the EDGs and support systems accomplished through the licensee's design change process to verify that system and equipment function were appropriately evaluated and maintained. Modifications reviewed for the EDGs and support system included a slow start addition, and a fuel oil drain header return valve modification, which were reviewed for potential impact on EDG capability and adequacy of post-modification testing. The team also reviewed the modification to the circuit configuration of the secondary under voltage time delay relays 2-1/SA and 2-2/SA which deleted Target Relays T1/1711 and T1/1712.

Equipment Protection

The team reviewed the cathodic protection system for protection of buried EDG fuel oil piping from galvanic corrosion. This review included design documentation, drawings, calculations, vendor manuals, test documentation, periodic maintenance documentation, surveillance and operating procedures and installed equipment.

b. Findings

No findings of significance were identified.

.4 Identification and Resolution of Problems

a. Inspection Scope

Condition Reports

The team reviewed condition reports/action requests (CRs/ARs) related to the EDG and their support systems, to verify that the licensee was identifying deficiencies at an appropriate threshold, that the deficiencies were entered into the corrective action program, and corrective actions were being taken for the identified deficiencies. The team reviewed the respective corrective actions to assess the adequacy of corrective actions and the trending for the identified problems .

The team also reviewed selected self-assessment reports which documented the results of the licensee's periodic self-assessments performed on the EDG, and related systems required to mitigate the LOOP/SBO events. The team reviewed the CRs/ARs that had been initiated by the licensee resulting from self-assessment findings.

Industry Experience

The team reviewed industry operating experience reviews and evaluations related to the SBO equipment and the EDGs to verify applicability and implementation of appropriate

corrective actions in equipment and system design. The team evaluated the licensee's review of selected NRC information notices (INs) for applicability to their facility. Corrective actions taken by the licensee in response to their review of the operating experience evaluations and INs were evaluated by the team in order to determine their adequacy for preventing similar problems.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA6 Management Meetings

The lead inspector presented the inspection results to Mr. R. Duncan, and other members of the licensee's staff at an exit meeting on March 15, 2002. The licensee acknowledged the findings presented. Proprietary information is not included in the inspection report.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

G. Attarian, Harris Engineering Support Services (HESS) Manager
J. Caves, Supervisor, Licensing
J. Dietrick, Electrical Design Engineer
R. Duncan, Director of Site Operations
R. Field, Regulatory Affairs Manager
C. Georgeson, SBO Program Manager
T. Hobbs, Operations Manager
C. Kamilaris, Corrective Action Program Unit Supervisor
A. Khanpour, Superintendent of Design, HESS
S. Mabe, Harris PSA Engineer
J. Scarola, Harris Plant Vice President
R. Varner, Supervisor, Electrical/I&C Design
M. Wallace, Senior Analyst, Licensing

Other licensee employees contacted included engineers, operations personnel, and administrative personnel.

NRC

J. Brady, Senior Resident Inspector

ITEMS OPENED, CLOSED AND DISCUSSED

None

LIST OF DOCUMENTS REVIEWED

Procedures

AOP-025, Loss of One Emergency AC Bus (6.9KV) or One Emergency DC Bus (125V), Rev. 21
AP-300, Severe Weather Response, Rev. 1
AP-301, Seasonal Weather Preparations and Monitoring, Rev. 32
CM-E0024, Safety / Non-Safety Spare Battery Cell Connection and Jumpered Cell Float Charge, Rev. 4
CM-M0063, Terry Steam Turbine Disassembly and Maintenance, Rev 18
CM-M0071, Ingersoll-Rand Turbine Driven Auxiliary Feedwater Pump Size 4 X 9 NH-7 Disassembly and Maintenance, Rev 14
CM-M0213, Terry Turbine Stop Valve, Rev 3
CRC-001, SHNPP Environmental and Chemistry Sampling and Analysis Program, Rev. 29
EOP-EPP-001, Loss of AC Power to A-SA and 1B-SB Buses, Rev. 24
EOP-EPP-002, Loss of All AC Power Recovery Without SI Required, Rev. 15
EOP-EPP-003, Loss of All AC Power Recovery With SI Required, Rev. 15
EPT-163, GL 89-13 Inspections, Rev. 9
EPT-282, Engineering Periodic Test Procedure - ESW Piping Erosion/corrosion Monitoring Program, Rev. 0
EPT-826T, Temporary Procedure for Acceptance Testing of Breaker 105 and 106 Trip Logic Modification, Rev. 0
EPT- 829, Train A LOOP Logic Integrated Test, Rev. 3
EPT- 830, Train B LOOP Logic Integrated Test, Rev. 2
MST-E0011, 1E Battery Quarterly Test , Rev. 9
MST-E0013, 1E Battery Performance Test, Rev. 9
MST-E0014, 1E Battery Charger Capacity Test, Rev. 10
MST-E0045, 6.9 KV Emergency Bus 1A-SA and 1B-SB Under Voltage Relay Channel Calibration, Rev. 10
MST-E0075, 6.9 KV Emergency Bus 1A-SA and 1B-SB Under Voltage (Loss of Voltage) Channel Calibration, Rev. 3
MTE- 0008, Battery Capacity Test System Calibration, Rev.10
OP-126, Main Steam, Extraction Steam, and Steam Dump Systems Operating Procedure, Rev. 12
OP-137, Auxiliary Feedwater System, Rev 18
OP-155, Diesel Generator Emergency Power System, Rev. 24
OP-137, Auxiliary Feedwater (AFW) System Operating Procedure, Rev. 19
OST-1411, Auxiliary Feedwater Pump 1X-SAB Operability Test Quarterly Interval, Rev. 19
OST-1823, 1A-SA Emergency Diesel Generator Operability Test 18 Month Interval Modes 5 and 6, Rev. 16.
PLP-620, Service Water Program (GL 89-13), Rev. 8
PM-M0094, Lubrication Oil Testing, Rev. 8
PM-E0005, 6.9 KV 1200/2000 Amp Air Circuit Breaker PM, Rev. 13.
PM-E0024, Non Class 1E Battery Maintenance, Rev. 14
PM-E0028, Non Class 1E Battery Performance Test, Rev. 9

Calculations

8S44-M-01, SBO Coping Study - Condensate Storage Inventory for Decay Heat Removal, Rev. 5
 8S44-M-02, SBO - Loss of HVAC, Rev. 3
 8S44-P-101, Station Blackout Coping Analysis Report, Rev. 4
 9-DGB, Diesel Generator Room, Electrical Equip. Room, Day Tank & Silencer Ventilation, Rev. 3
 9FP-BE-08, Static Pressure Calculation for Air Handling Units, Rev. 1
 9FP-BE-13, Equivalent Static Pressure Calculation and Fan Capacity Verification, Rev. 1
 9FP-BE-17A, Equivalent Static Pressure Calculation and Fan Capacity Verification, Rev. 0
 9-RAB-6A, Switchgear Room A ventilation System Served by AH-12, Rev. 3
 DG-1, Jacket Water Cooler - Emergency Diesel Generator, Rev. 2
 E1-005.01, Attachment B, Coordination Study for 480 VAC Power Center 1A2-SA, dated 4/22/98
 E1-0005.02, Attachment C, Coordination Study for 480 VAC Power Center 1A3-SA, dated 11/19/93
 E1-0002.01, Attachment D, Coordination Study for 480 VAC MCCs 1A21, 1A23, 1A31, and 1A35, dated 11/19/93
 E1-0002.02, Attachment E, Coordination Study for 480 VAC MCC 1A22, dated 11/17/93
 E2-0003.01, Attachment A, Coordination Study for 6900 VAC Emergency Bus 1A-SA, dated 1/23/86
 E4-0006, Safety Batteries 1A-SA & 1B-SB Load Profile Determination LOCA/SBO , Rev.1
 E4-0008, 125 VDC 1E Battery Sizing and Battery / Panel Voltages for Station Blackout, Rev.4
 E4-0010, 125 VDC Non 1E Battery Sizing and Battery / Panel Voltages for SBO , Rev. 3
 E4-0011, Station Battery Cell Sizing and Voltage, 250 VDC -Non Class 1E, Rev. 2
 E-5506 ,Appendix R Coordination Study , Rev. 6
 E-6000, Auxiliary System Load Study, Rev. 8.
 E6003, Minimum and Maximum Operating Voltages Required for Class 1E Buses, Rev. 4
 EQS-23, Diesel Fuel Oil Storage Tank Level Set Points, Rev. 3
 EQS-28, Diesel Generator Day Tank Level Set Points, Rev. 1
 FO-5, Fuel Oil Storage Tank Sizing, Rev. 0
 SBO-CALC-001, Analysis for Station Blackout Coping Duration Requirements, Rev. 0
 SW-49, EDG JW Cooler Performance with Reduced SW Flows, Rev. 2
 SW-0080, ESW Flow Requirement Based on Reservoir Level, Rev. 8
 0020-WRE, Minimum Control Voltage at Switchgear Busses, Rev.3
 0044-SKD, DC Control Power Voltage Criteria for AC Switchgear, Rev. 8
 0054-JRG, PSB-1 Loss of Offsite Power Relay Settings, Rev. 2.
 0055-JRG, PSB-1 Degraded Voltage Condition Relay Settings, Rev. 7.

Drawings

1364-16463, Emergency Diesel Generator Engine Pneumatic Schematic, Rev. 5
 1364-16462, Emergency Diesel Generator Engine Control Panel Schematic, Rev. 16
 1364-34979, Emergency Diesel Generator Heat Exchanger Specification Sheet, Sh. 1-4, Rev. A
 1364-34980 S01, S02, S03, S04, Emergency Diesel Generator Heat Exchanger Specification Sheet, Rev. 0

1364-44330, Diesel Oil Transfer Pump 1A-SA Performance Test Curve/Log, Rev. 1
 1364-44331, Diesel Oil Transfer Pump 1B-SB Performance Test Curve/Log, Rev. 1
 922301055, Control Components Inc., Drag Valve (SG PORV), OXG9-X8-X8BW-10BW, Rev. J
 CAR-2165-G-044, Flow Diagram- Feedwater and AFW Systems, Rev. 42
 CAR-2165-G-214, Yard Piping Diesel Fuel Oil Storage Tank Area Plan & Sections Unit 1,
 Rev. 12
 CAR 2166-B-041, U1 Power Distribution & Motor Data, Symbols, Abbreviations, & Notes, Sh.6,
 Rev. 13
 CAR 2166-B-041, U1 Power Distribution & Motor Data 6900 V Emergency Bus 1A-SA, Sh. 45,
 Rev. 11
 CAR 2166-B-041, U1 Power Distribution & Motor Data 480 V Emergency Bus 1A3-SA, Sh. 127,
 Rev. 11
 CAR 2166-B-041, U1 Power Distribution & Motor Data 120 VDC Power Panel DP-1A-SA,
 Sh. 674, Rev. 11
 CAR 2166-B-041, U1 Power Distribution & Motor Data 125 VDC Power Panel DP-1A1-SA,
 Sh. 675, Rev. 8
 CAR 2166-B-401, Sh. 221, Charging / Safety Injection Pump 1A-SA, Rev. 17
 CAR 2166-B-401, Sh. 0941, Component Cooling Pump 1A-SA, Rev.14
 CAR 2166-B-401, Sh. 0943, Component Cooling Pump 1C-SA-B, Sh. 1, Rev.12
 CAR 2166-B-401, Sh. 1102, Emergency Load Sequencer ESS Cabinet 1A-SA, Sh. 2 ,Rev.13
 CAR 2166-B-401, Sh. 1572, Gen. Lockout Relays 86/G1A, Sh.3, Rev. 11
 CAR 2166-B-401, Sh. 1607, Start Up Transformer 1A (Y-Wdg) Instruments- Potential, Sh.2,
 Rev.13
 CAR 2166-B-401, Sh. 1614, "A" Start Up Transformers Protection Lockout Relay 86/ STU A,
 Sh.1, Rev.8
 CAR 2166-B-401, Sh. 1615, "A" Start Up Transformers Protection Lockout Relay 86/ STU A,
 Sh.2, Rev.9
 CAR 2166-B-401, Sh. 1615A, "A" Start Up Transformers Lockout Relay 86/ STU A & Test
 Shutdown Development, Rev. 7
 CAR 2166-B-401, Sh. 1622, Unit Auxiliary Transformer 1A "Y" Winding Breaker 102, Rev. 16
 CAR 2166-B-401, Sh. 1626, Start Up Transformer 1A "Y" Winding Breaker 101, Sh.7, Rev. 20
 CAR 2166-B-401, Sh. 1633, 6.9 kV Auxiliary Bus 1D to Emergency Bus 1A-SA Tie Breaker
 104, Rev. 9
 CAR 2166-B-401, Sh. 1658, 6.9 kV Auxiliary Bus1E Switchgear
 CAR 2166-B-401, Sh. 1659, Start Up Transformer 1A "Y" Winding Breaker 101, Sh.2, Rev.10
 CAR 2166-B-401, Sh. 1665, 6.9 kV Auxiliary Bus 1D Differential Relay (87D), Sh.1, Rev.5
 CAR 2166-B-401, Sh. 1701, Emergency Diesel Generator 1A-SA Breaker 106, Sh.1, Rev. 12
 CAR 2166-B-401, Sh. 1702, Emergency Diesel Generator 1A-SA Breaker 106, Sh.2, Rev. 12
 CAR 2166-B-401, Sh. 1711, 6.9 kV Emergency Bus 1A-SA Secondary Undervoltage Relays,
 Rev.10
 CAR 2166-B-401, Sh. 1724, 6.9 kV Emergency Bus 1A-SA Switchgear Annunciator, Rev. 7
 CAR 2166-B-401, Sh. 1726, 6.9 kV Emergency Bus 1A-SA to Auxiliary Bus 1D Tie Breaker
 105, Sh.1. , Rev. 11
 CAR 2166-B-401, Sh. 1726, 6.9 kV Emergency Bus 1A-SA to Auxiliary Bus 1D Tie Breaker
 105, Sh.7, Rev. 11
 CAR 2166-B-401, Sh. 1727, 6.9 kV Emergency Bus 1A-SA to Auxiliary Bus 1D Tie Breaker
 105, Sh.2, Rev. 11

CAR 2166-B-401, Sh. 1729, 6.9 kV Emergency Bus 1A-SA Relays & Instrument Potential, Rev.14

CAR 2166-B-401, Sh. 1731, 6.9 kV Emergency Bus 1A-SA Undervoltage Trip, Rev.21

CAR 2166-B-401, Sh. 1733, 6.9 kV Emergency Bus 1A-SA Differential Relay (87 SA), Sh. 1, Rev.3

CAR 2166-B-401, Sh. 1734, 6.9 kV Emergency Bus 1A-SA Differential Relay (87 SA), Sh. 2, Rev.7

CAR 2166-B-401, Sh. 1737, 6.9 KV Emer. Bus 1A-SA Under Voltage Lockout Relay Developments (86UV/SA & 86T/SA), Rev. 8

CAR 2166-B-401, Sh. 1741, 6.9 kV Emergency Bus 1A-SA to Transformer 1A1 Breaker 1A1A-SA, Rev.10

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 AR 1281, FSAR Discrepancy, 12/04/97
 AR 1670 - DC Voltage Study Error, 01/17/99
 AR 1732, Breaker Failure, 01/19/99
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 AR 2163, Transient Combustible Permit, 02/28/99
 AR 2910, Surveillance Test OST-1827 Improvement, 05/05/99
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 AR 29951, B EDG Shutdown Cylinder Shaft was Found Extended, 03/23/01
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 0056623, Minor Roundoff Error in Calculation E2-0005.09 and MST-E0045
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 0057290, EDG-A Starting Air Dew Point Above Test Acceptance Criteria
 0057475, Rolling Toolbox not Secured in ESW Structure
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 SD-139, Service Water System, Rev. 13
 SD-155.01, Emergency Diesel Generator System, Rev. 7
 SD-156 , Plant Electrical Distribution System, Rev. 8
 SD-162, Cathodic Protection, Rev. 4

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 DBD-201, Emergency Diesel Generator System, Rev. 5
 DBD-202, Plant Electrical Distribution System, Revision 8
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Updated Final Safety Analysis Report (UFSAR)

Section 8.0, Electrical Power Systems
 Section 8.3.1.1.2.4, Manual and Automatic Interconnections Between Buses, Between Buses and Loads, and Between Buses and Supplies
 Section 8.3.1.1.2.5, Interconnections Between Safety and Non-safety Related Buses
 Section 8.3.1.1.2.8, Automatic Tripping and Loading of Buses
 Section 8.3.1.1.2.11 Electric Circuit Protection Systems
 Section 8.3.1.1.2.14, Design Aspects of the Emergency Diesel Generators
 Section 9.2.1, Service Water System
 Section 9.4.5, Engineered Safety Feature Ventilation System
 Section 9.5.4, Diesel Generator Fuel Oil Storage and Transfer System
 Section 9.5.5, Diesel Generator Cooling Water System
 Section 9.5.6, Diesel Generator Air Starting System
 Section 9.5.7, Diesel Generator Lubrication System
 Section 9.5.8, Diesel Generator Combustion Air Intake & Exhaust System
 Section 10.4.9, Auxiliary Feedwater System

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TS Section 3/4.8.1, A.C. Sources
 TS Section 3/4.8.2, D.C .Sources
 TS Table 3.3-4, Engineered Safety Features Actuation System Instrumentation Trip Set points
 TS Section 3/4.3.2, Engineered Safety Features Actuation System Instrumentation

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 VM-MDY, Terry AFW Pump Turbine
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