UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931
April 9, 2001

Tennessee Valley Authority
ATTN: Mr. J. A. Scalice
Chief Nuclear Officer and
Executive Vice President
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT - NRC INSPECTION REPORT 50-259/2001-06, 50-260/2001-06, AND 50-296/2001-06

Dear Mr. Scalice:

On March 9, 2001, the NRC completed a safety system design inspection at your Browns Ferry Nuclear facility. The enclosed report documents the inspection findings which were discussed on March 9, 2001, with Mr A. Bhatnagar and other members of your staff.

The inspection examined 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 licenses. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

No findings of significance were identified.

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 *Publically Available Records* (PARS) *component* of the NRC's document system (ADAMS). ADAMS *is accessible from* the NRC web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

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

Docket Nos. 50-259, 50-260, 50-296
License Nos. DPR-33, DPR-52, DPR-68

Enclosure: (See page 2)

Enclosure: NRC Inspection Report
Nos. 50-259/2001-06, 50-260/2001-06, 50-296/2001-06

Attachment: List of Documents Reviewed

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-259, 50-260, 50-296
License Nos:	DPR-33, DPR-52, DPR-68
Report Nos:	50-259/2001-06, 50-260/2001-06, 50-296/2001-06
Licensee:	Tennessee Valley Authority (TVA)
Facility:	Browns Ferry Nuclear Plant, Units 1, 2, & 3
Location:	Corner of Shaw and Browns Ferry Roads Athens, AL 35611
Dates:	February 26 - March 9, 2001
Inspectors:	J. Lenahan, Senior Reactor Inspector (Team Leader) N. Merriweather, Senior Reactor Inspector R. Moore, Reactor Inspector C. Smith, Senior Reactor Inspector M. Thomas, Senior Reactor Inspector
Approved By:	Charles R. Ogle, Chief Engineering Branch Division of Reactor Safety

ENCLOSURE

SUMMARY OF FINDINGS

IR 05000259-01-06, 05000260-01-06, 05000296-01-06, on 02/28-3/9/01, Tennessee Valley Authority, Browns Ferry Nuclear Plant, Units 1, 2, & 3, safety system design.

This safety system design and performance capability inspection was conducted by regional inspectors.

No findings of significance were identified.

REPORT DETAILS

1. REACTOR SAFETY

CORNERSTONES: Initiating Events and Mitigating Systems

1R21 Safety System Design and Performance Capability (71111.21)

.1 System Needs

a. Inspection Scope

Standby Diesel Generator (SDG) Diesel Fuel Oil

The team reviewed design documentation, drawings, calculations, technical manuals, test documentation, and installed equipment to verify that the sizing of storage tanks and design of the fuel oil transfer pumps were adequate to provide the fuel requirements to operate the SDGs for the period of time assumed in the accident analysis. This included diesel testing to determine the fuel consumption rate and calculations determining the fuel oil volume required for seven days operation. Additionally, the team reviewed the station acceptance criteria for fuel oil quality to verify these were consistent with the SDG vendor recommendations and applicable industry standards.

SDG Starting Air

The team reviewed design documentation and equipment specifications to verify that the air start system capability and storage capacity were consistent with design bases assumptions. This included calculations for air receiver sizing and test documentation to verify multiple start capability.

Controls

The team reviewed logic diagrams and electrical wiring diagrams which depicted the permissives and interlocks for the SDG starting, load shedding, and load sequencing during degraded and loss of voltage conditions on the safety-related 4160 volt alternating current (VAC) shutdown boards. The objective of the review was to verify that risk significant systems and components required to ensure successful mitigation of a loss of offsite power (LOOP) event would be capable of performing their design functions consistent with the licensing and design basis for the plant. The team reviewed the degraded voltage and loss of voltage relay logic channels to verify that upon sensing a valid degraded or loss of voltage condition on the 4160 VAC shutdown boards; the SDGs would start and restore power to the boards with LOOP loads being automatically sequenced onto the boards. The team also verified that the design of the degraded voltage relays with the 2 out of 3 logic was consistent with the Updated Final Safety Analysis Report (UFSAR).

Operator Actions

The team reviewed pertinent operating instructions for mitigating the consequences of a LOOP and station blackout (SBO) events to verify that the instructions specified appropriate operator actions and that those actions could be performed in a timely manner commensurate with the significance of the action. The operator actions were also reviewed for consistency with the accidents described in the UFSAR, TVA design criteria, and licensing basis documents. This review included operating instructions (OIs), abnormal operating instructions (AOIs), emergency operating instructions (EOIs), and alarm response procedures (ARPs). The team performed a walkdown of selected contingency operator actions delineated in the AOIs and EOIs for placing the high pressure coolant injection (HPCI) system in pressure control; placing the common heating, ventilation, and air conditioning equipment in service; and transfer of breaker control power to ensure availability of adequate voltage to operate switchyard breakers. The team also performed a walkdown of the main control room instrumentation and alarms to verify that appropriate indications and controls were available and adequate for operators to make the necessary decisions during performance of the specific AOIs and EOIs.

Heat Removal - SDG Internal Cooling System

The team reviewed calculations and equipment specifications to verify that the internal cooling systems for the engine cooling and lubricating oil were adequate to maintain SDG operation within vendor specifications. This included heat transfer testing data sheets which verified the capacity of the SDG heat exchangers.

Heat Removal - Ventilation of SDG Spaces

The team reviewed design documentation, drawings, and calculations for the ventilation design of the SDG spaces to verify that the systems were capable of maintaining ambient conditions within the ranges specified in vendor documents for equipment operation. This included the battery area exhaust hood ventilation and the SDG intake and exhaust ventilation systems.

Heat Removal - Emergency Equipment Cooling Water System (EECW)

The team reviewed the design and capability of the EECW system to provide the required cooling for the SDGs specified in design bases documents. The review included calculations, drawings, equipment specifications, flow balance test documentation, and equipment performance trending.

SBO Water Sources

The team reviewed the sources and volume of water available to provide the secondary side cooling capacity specified in design bases documents during an SBO event. These sources included the condensate storage tanks which provided a minimum reserve volume for the HPCI and reactor core isolation cooling (RCIC) systems. The review included calculations which determined the volume of water necessary to remove decay

heat during an SBO event, tank and piping drawings, and calculations determining the volume of the available water sources.

b. Findings

No findings of significance were identified.

.2 System Condition and Capability

a. Inspection Scope

Installed Configuration

The team performed a field review of accessible equipment related to the SDGs and their support systems and the 4160 VAC switchgear for Unit 1 and 2. This review was performed to assess material condition, identify degraded equipment, and verify the installed configuration was consistent with design drawings and calculation design inputs.

Design

4160 VAC and 480 VAC Shutdown Electrical Distribution System

The team performed an electrical design review for probable common cause failure of risk significant equipment to operate because of inadequate equipment utilization voltage. The team reviewed design basis documents, calculations of record, vendor information and approved design output drawings for Unit 2 4160 VAC and 480 VAC shutdown electric distribution system. Field inspection of the as built plant configuration was also performed to verify conformance with approved drawings and design bases documents. The team evaluated the adequacy of the the licensee's analysis of the electrical distribution system and its compliance with the guidance of Branch Technical Position PSB-1, Adequacy of Station Electric Distribution System Voltages. The capability of risk significant motors to perform their design function was evaluated for compliance with vendor recommendations and the requirements of industry codes and standards. Additionally, the capability of risk significant Generic Letter 89-10 motor operated valves to perform their design function was evaluated against the licensee's design requirements and industry codes and standards.

125 Volt Direct Current (VDC) Diesel Generator Control Power

The team reviewed design basis documents, Calculations ED-Q2000-870046 and ED-Q2000-870047, and Institute of Electrical and Electronics Engineers (IEEE) 485, "IEEE Recommended Practice for Sizing Large Lead Storage Batteries for Generating Stations and Substations," used for sizing the diesel generator 125 VDC batteries and battery chargers. This review was conducted to verify that the calculations were consistent with the design basis and the IEEE Standard. Calculation ED-Q2000-870046, Diesel Generator Battery Capacity, evaluated the capacity of the SDG batteries and battery chargers based on a duty cycle of 30 minutes. Calculation ED-Q2000-87047, 125 VDC System Voltage, evaluated the adequacy of minimum and maximum

available voltage at 125 VDC. A field walk down of the battery rooms was performed to verify that the as-built plant configuration was consistent with approved drawings and design bases documents.

Degraded Voltage/Undervoltage Calculations

The team reviewed design bases documents and approved design output drawings of the 4160 VAC shutdown electrical distribution system in order to verify that the degraded voltage relay set point values of voltage magnitude and time delays were consistent with values incorporated in the Technical Specifications. The analytical limits upon which the degraded voltage dropout set points were based were also reviewed to ensure that steady state voltage criteria for risk significant equipment were not violated when fed from the preferred power supply during degraded voltage conditions. The loss of voltage relay reset values of voltage magnitude and time delay were also evaluated to demonstrate agreement with values delineated in the Technical Specification. Instrument loop inaccuracies associated with the degraded voltage relays and the loss of voltage relays were reviewed for agreement with values listed in the instrument calibration procedures. The team also reviewed instrument uncertainty calculations for the undervoltage relays, time delay relays, and the diesel generator day tank level switch in order to verify that the instrument setpoint values were suitable for the application and were consistent with values incorporated in the Technical Specifications. The team also reviewed design basis calculations of record for degraded voltage conditions, and analyses performed by the licensee at the time of the inspection, in order to verify the capability of the 4160 VAC electrical distribution system to support operation of risk significant motors. Diesel generator room supply fan motors performance curves were reviewed by the team in order to verify that the motors were adequately sized for performing their design function. The capability of the fan motors to perform their design function under degraded voltage conditions was evaluated.

Testing

The team reviewed completed calibration and functional test procedures for the degraded, undervoltage, and time delay relays associated with the load shedding and sequencing control logic for the 4160 VAC Shutdown Boards A, B, C, and D for Units 1 and 2. The completed procedures were reviewed to verify that the subject relays had been calibrated and tested in accordance with design output documents and technical specifications. The team assessed whether identified test deficiencies or out of tolerance conditions were properly evaluated and corrected by the licensee. The team also reviewed the last three calibrations performed on the undervoltage and time delay relays on 4160 VAC Shutdown Board A to determine if instruments were continuously drifting outside the allowable response band between calibrations. In addition, the team reviewed the last two calibrations performed on the SDG day tank level switches 0-LS-018-0055A and 57A. These switches provide the start and stop signals for the SDG A fuel oil tranfer pumps. The team assessed calibration procedure test methods to verify that functional testing performed demonstrated that all appropriate relay contacts were operable. The team reviewed test records for Unit Battery Banks 1, 2, and 3; Units 1 and 2 Shutdown Batteries A, B, C, D; and Unit 3 Shutdown Battery 3EB. The team verified that the batteries were adequate to supply the required emergency loads for the design duty cycle.

b. Findings

No findings of significance were identified.

.3 Selected Components

a. Inspection Scope

Component Inspection

The team reviewed maintenance and testing documentation to assess the licensee's actions to verify and maintain the safety function, reliability, and availability of selected components. The components included the SDG, fuel oil storage tanks, air start system boundary check valves, and relief valves. The SBO equipment reviewed included the RCIC and HPCI pumps which provide reactor vessel pressure and level control during an SBO event. The team also reviewed maintenance and testing records for the following components: Switchgear Breakers 1818, 1824, 1612, 1614, 1716, 1632, 1732, 1642, and 1742; Relays 27/DA, 27/SA, 2-211-1A, 2-211-2A, 2-211-3A, 2-211-4A, and RLY-82-A/FSR2; Speed Switch SS-82-A/SSC; Flow Control Valves FCV -73-35 and FCV-73-36; Condenser Pump PMP-073-GS; and Exhaust Blower Pump PMP-073-GS. The documentation covered periods from 1993 to present. These records were reviewed to verify that these components were being maintained within the parameters specified in design documents and the Technical Specifications. The team reviewed pump performance curves and motor/pump speed torque curves for the residual heat removal service water pump motors in order to verify that the motors were adequately sized based on mechanical load demand.

Design Changes

The team reviewed design changes of equipment accomplished through the licensee's design change process and component level design changes accomplished through the procurement process to verify that system and equipment function was appropriately evaluated and maintained. The team reviewed design basis documents, calculations of record, and a 10 CFR 50.59 safety evaluation prepared in support of plant modification DCN Number W17274 which replaced Unit Batteries 2 and 3 (C&D type LCUN 29) with new class 1E (C&D type LCUN-33) batteries. The team reviewed calculation ND-N0999-890021, Station Blackout List, which was prepared to determine the equipment necessary to cope with a station blackout at Browns Ferry nuclear plant. Calculation ED-Q0999-890059, Station Blackout- Unit Battery Capacity, was also reviewed by the team to demonstrate the adequacy of each unit battery to supply the loads required to cope with a station blackout for a period of 4 hours. The capability for restoration of alternating current power using switchyard controls fed from Unit Battery 2 was also evaluated by the team.

Equipment Protection

The team reviewed calculations for the design of the SDG buildings which demonstrated that safety related equipment in the buildings is adequately protected from tornado generated missiles. The team also reviewed provisions for protection of the SDG and

related equipment from internal and external flooding. These included flood evaluation studies, procedures for maintaining flood barriers, abnormal operating instructions for responding to site flooding, operator instructions for identifying and responding to internal flooding of the SDG buildings, and design changes implemented to maintain adequate flood protection for the SDG buildings. This review was performed to verify that the SDGs and supporting equipment were adequately protected from internal and external flooding.

Operating Experience

The team reviewed the licensee's evaluation for Information Notice (IN) IN 88-75 and 88-75, Supplement 1, "Disabling of Diesel Generator Output Circuit Breakers by Anti-Pump Circuitry." The review was performed to verify that the issue had been properly assessed for impact on the plant and that, if applicable, appropriate corrective actions had been taken to resolve the issue.

b. Findings

No findings of significance were identified.

.4 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed selected problem evaluation reports (PERs) and corrective maintenance documentation related to the SDGs and support systems, and the RCIC and HPCI pumps to assess the adequacy of corrective actions for identified problems. The team also verified that the licensee was identifying procedural deficiencies at an appropriate threshold, was entering the deficiencies into the corrective action program, and corrective actions were being taken for the identified deficiencies.

The team reviewed PERs (BFPER980524, BFPER951423, BFPER940644, BFPER940121, BFPER940260, BFPER971862, and BFPER970766) describing electrical instrumentation and control problems that had occurred on equipment relied on for a LOOP and/or SBO to verify that appropriate corrective actions were either planned or implemented to resolve the concerns and prevent recurrence.

The team also reviewed the Nuclear Assurance Assessment Report NA-BF-01-001 which documented the results of the licensee's self-assessment which the licensee performed prior to the NRC safety system design inspection on the SDGs and related system required to mitigate the LOOP/SBO events. The team reviewed the twelve PERs that had been initiated by the licensee resulting from their self-assessment to verify that appropriate corrective actions were either planned or implemented to resolve the concerns identified during the licensee's self assessment.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA6 Management Meeting

The lead inspector presented the inspection results to Mr. A. Bhatnagar, Plant Manager, and other members of the licensee's staff at an exit meeting on March 9, 2001. The licensee acknowledged the findings presented. Proprietary information is not included in the inspection report.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

T. Abney, Licensing and Industry Affairs Manager
T. Achorn, Licensing Manager
A. Bhatnagar, Plant Manager
P. Chadwell, Operations Support Supervisor
W. Crouch, Mechanical/Nuclear Engineering Supervisor
J. Davenport, Licensing Engineer
G. Denney, SDG System Engineer
R. Jones, Site Support Manager
G. Little, Operations Manager
R. Wiggall, Design Engineering Manager
R. Wright, Electrical Engineering Supervisor

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

NRC

R. Emch, Acting Deputy Director, Division of Reactor Safety, Region II
W. Smith, Senior Resident Inspector
J. Starefos, Resident Inspector
E. DiPaolo, Resident Inspector

ITEMS OPENED, CLOSED, OR DISCUSSED

None

LIST OF DOCUMENTS REVIEWED

Procedures

Abnormal Operating Instruction 0-AOI-100-3, Flood Above Elevation 558', Rev. 23

Abnormal Operating Instruction 0-AOI-100-4, Breach of Wheeler Dam, Rev. 8

Abnormal Operating Instruction 0-AOI-57-1A, Loss of Offsite Power (161 and 500 KV)/Station Blackout, Rev. 47

Abnormal Operating Instruction 0-AOI-57-1B, Loss of 500KV, Rev. 10

Abnormal Operating Instruction 0-AOI-57-1C, Loss of 161KV, Rev. 7

0-GOI-300-1, Operator Round Logs, Rev. 86

0-ARP-9-26, Alarm Response Procedure, Rev. 24

0-ARP-25-41, Alarm Response Procedure, Rev. 16

1,2-ARP-9-23A, Alarm Response Procedure, Rev. 2

Emergency Operating Instruction 2-EOI-1, RPV Control, Rev. 8

Emergency Operating Instruction 2-EOI-2, Primary Containment Control, Rev. 7

Emergency Operating Instruction 2-EOI Appendix-5C, Injection System Lineup RCIC, Rev. 3

Emergency Operating Instruction 2-EOI Appendix-11A, Alternative RPV Pressure Control Systems MSRVs, Rev. 3

Emergency Operating Instruction 2-EOI Appendix-11C, Alternative RPV Pressure Control Systems HPCI Test Mode, Rev. 3

Emergency Operating Instruction 2-EOI Appendix-16A, Bypassing RCIC Low RPV Pressure Isolation Interlocks, Rev. 2

Emergency Operating Instruction 2-EOI Appendix 16D, Bypassing HPCI Test Mode Isolation Interlocks, Rev. 3

Emergency Operating Instruction 2-EOI Appendix-16K, Bypassing RCIC High Temperature Isolation, Rev. 1

Emergency Operating Instruction 3-EOI-1, RPV Control, Rev. 5

Emergency Operating Instruction 3-EOI-2, Primary Containment Control, Rev. 5

EPI-0-260-SEC008, Security Diesel Generator Inspection and Manual Operability Test, Rev. 13

Surveillance Instruction, 1, 2-SI-4.9.A.1.d(A), Diesel Generator A, Two Year Inspection, Rev.27

Mechanical Preventive Instruction MPI-0-086-DRY001, Diesel Starting Air Maintenance, Rev.4

Mechanical Preventive Instruction MPI-0-260-DRS001, Inspection and Maintenance of Doors, Rev. 23

Calculations

ED-N0018-970005, Set Point and Scaling Calculation for 0-CS-18-45 and 3-LS-18-61, 62, 63, and 64, Rev. 0

ED-N0057-970002, Browns Ferry Nuclear Plant (BFN) -Transmission System Study (TSS)-Grid Voltage Study of Browns Ferry Offsite Power System, Rev. 1.

ED-Q0018-880526, Demonstrated Accuracy Calculation Diesel Generator Day Tank Level Switch, Rev. 1

ED-Q0057-920034, 4.16 KV and 480 V Busload and Voltage Drop Calculation, Rev. 16.

ED-Q0082-900012, Technical Justification For Diesel Generator Components MB1, MB3 & 4-12/14-82-A2, Rev. 1

ED-Q0211-890136, Setpoint And Scaling Calculation - BBTDA, BBTDB, Rev. 1

ED-Q0211-890258, Demonstrated Accuracy Calculations for DG Start Logic TDPU Relays 2-211-2A, 2B, 2C, 2D, 2A3, 2B3, 2C3, 2D3, Rev. 1.

ED-Q0211-890279, Demonstrated Accuracy Calculation For Degraded Voltage Time Delay Relays 2-211-1A, 1B, 1C, 1D, 1A3, 1B3, 1C3, 1D3, Rev. 1

ED-Q0211-890280, Demonstrated Accuracy Calculation For Load Shedding Time Delay Relays 2-211-3A, 3B, 3C, 3D, 3A3, 3B3, 3C3, 3D3, Rev. 1

ED-Q0211-890281, Demonstrated Accuracy Calculation For D/G Breaker Closure Time Delay Relays 2-211-4A, 4B, 4C, 4D, 4A3, 4B3, 4C3, 4D3, Rev. 1

ED-Q0211-900011, Setpoint and Scaling Calculation Undervoltage Time Relays on 4kV Shutdown Boards, Rev. 0

ED-Q0211-990004, BFN-0-02-211-1818A Setpoint and Scaling Calculation, Rev. 1

ED-Q0248-870043, 250 VDC Voltage Drop Calculations- Battery Boards, Rev. 19.

ED-Q0999-890059, Station Blackout- Unit Battery Capacity, Rev. 18.

ED-Q2000-870046, Diesel Generator Batteries Capacity Calculation, Rev. 8.

ED-Q2000-870047, 125 VDC System Voltage Calculations, Rev. 2.

ED-Q2057-88416, Process Limits For Breaker Blocking Time Delay Relays in 4 kV Bus Transfer Scheme, Rev. 1

ED-Q2211-890144, Set Point and Scaling Calculations 4 KV Bus Degraded Voltage Relays (ITE 27N), Rev. 5.

MD-N0002-890009, Condensate Inventory for Decay Heat Removal During a Station Blackout, Rev. 5

MD-N0067-930039, SDG Temperature Rise Evaluation at Full Load, Rev. 1

MD-Q0002-870243, Condensate Storage Tank Reserve Volume, Rev.4

MD-Q0018-870164, Diesel Fuel Oil consumption/Delivery Rate and 7 Day Tank Sizing, Rev.5

MD-Q0067-870107, EECW System Modes of Operation, Rev. 8

MD-Q0067-880201, SDG Heat Exchanger in Series Analysis, Rev. 3

MD-Q0067-910008, Flow Requirements of EECW Fed Components, Rev. 8

MD-Q0067-930028, EECW System Pressure Drop - EZFLOW, Rev. 4

MD-Q0067-940058, EECW Flow Balance, Rev. 1

MD-Q0073-870194, HPCI Orifice Sizing, Rev. 4

MD-Q0082-000016, SDG Jacket Water Cooler Capacity and Tube Plugging, Rev. 0

MD-Q0082-900091, SDG Temperature Rise Evaluation, (Diesel Unloaded), Rev. 2

MD-Q0082-900102, SDG Temperature Rise Evaluation, (Diesel Partially Loaded), Rev. 1

MD-Q0082-900104, Diesel Generator Exhaust Ductwork, Rev. 1

MD-Q0082-900117, Diesel Generator Exhaust Ductwork, Rev. 1

MD-Q0082-920130, System Requirements Calculation - SDG, Rev. 2

MD-Q2082-870122, SDG Modes of Operation, Rev. 2

MD-Q3018-920236, Analytical Limits for 3-L-18-61, 62, 63, & 64, (7 Day Tank Fuel Level Instrumentation), Rev. 2

ND-Q0082-880171, SDG Intake Air Degradation Due to Exhaust From Stacks, Rev. 0

ND-Q0999-910033, Safe Shutdown Analysis, Rev.19

ND-N0999-890021, Station Blackout Equipment List, Rev. 5.

XD-Q0000-890002, Frequency of Occurrence of Tornado-Generated Missile Strike on Vulnerable Diesel Generator Building Areas, Rev. 1

NRC Generic Letter 89-10 MOV Operator Requirements and Capabilities Calculations

. Calculation No. MD-Q2071-910082, Tag Location: 2-FCV-71-03, Rev. 3.

. Calculation No. MD-Q2071-910083, Tag Location: 2-FCV-73-36, Rev. 6.

. Calculation No. MD-Q2071-910089, Tag Location: 2-FCV71-34, Rev. 6.

. Calculation No. MD-Q2071-910092, Tag Location: 2-FCV-71-39, Rev. 6.

. Calculation No. MD-Q2073-970042, Tag Location: 2-FCV-71-38, Rev. 1.

. Calculation No. MD-Q2073-910094, Tag Location: 2-FCV-73-03, Rev. 4

. Calculation No. MD-Q2073-910095, Tag Location: 2-FCV-73-16, Rev. 6.

. Calculation No. MD-Q2073-910101, Tag Location: 2-FCV-73-36, Rev. 4.

. Calculation No. MD-Q2073-910102, Tag Location: 2-FCV-73-40, Rev. 3.

Drawings

CCD 0-17E300-8, Mechanical Isometric RHR Service Water Piping, Rev. 0

CCD 0-17E405-1, Mechanical Building Drainage, Rev. 2

CCD 0-731E761-1, Elementary Diagram Emergency Equipment, Rev. 10

CCD 0-45E724-1, Wiring Diagram 4160V Shutdown BD A Single Line, Rev. 17

CCD 0-45E765-3, Wiring Diagram 4160V Shutdown AUX Power Schematic Diagram, Rev. 23

CCD 0-45E765-8, Wiring Diagram 4160V Shutdown AUX Power Schematic Diagram, SH 8, Rev. 13

CCD 0-45E765-9, Wiring Diagram 4160V Shutdown Auxiliary Power Schematic Diagram, Rev. 4

CCD 0-45E765-10, Wiring Diagram 4160V Shutdown Auxiliary Power Schematic Diagram, Rev. 8

CCD 0-45E765-11, Wiring Diagram 4160V Shutdown Auxiliary Power Schematic Diagrams, Rev. 32

CCD 0-45E767-1, Wiring Diagram Diesel Generators Schematic Diagram, Rev. 16

CCD 0-45E767-2, Wiring Diagram Diesel Generators Schematic Diagram, Rev. 11

CCD 0-45E765-9, Wiring Diagram 4160V Shutdown Auxiliary Power Schematic Diagram, Rev. 4

CCD 0-731E761-2, Elementary Diagram Emergency Equipment, Rev. 7

CCD 0-731E761-10, Elementary Diagram Emergency Equipment, Rev. 15

CCD 0-731E761-11, Elementary Diagram Emergency Equipment, Rev. 17

CCD 0-731E761, SH 18, Elementary Diagram Emergency Equipment, Rev. 4

CCD 0-731E781, SH 24, Emergency Equipment, Rev. 12

CCD 0-761E597-5, Schematic Diagram Physical Schematic, Rev. 4

CCD 0-17W300-5, Raw, Potable, Demineralized, Residual Heat Removal, Emer Equip Cooling Water & Comp Air, Rev. 3

CCD 0-17W300-6, Raw, Potable, Demineralized, Residual Heat Removal, Emer Equip Cooling Water & Comp Air, Rev. 2

CCD 0-17W300-8, Raw, Potable, Demineralized, Residual Heat Removal, Emer Equip Cooling Water & Comp Air, Rev. 0

CCD 0-17W405-2, Mechanical Building Drainage, Rev. 3

CCD 0-47W585-1, Standby Diesel Generator (SDG) Building, Mechanical Drains and Embedded Piping, Rev. 1

CCD 0-47W585-2, Standby Diesel Generator (SDG) Building, Mechanical Drains and Embedded Piping, Rev. 5

CCD 0-J8073C1, Diesel Fuel Oil Storage Tank (TVA Drawing 0-47W310-5), Rev. 1

CCD 1-47E858-1, Flow Diagram RHR Service Cooling Water System, Rev. 36

CCD 2-47E455-5, Mechanical HPCI system, Rev. 2

CCD 2-47E812-1, Flow Diagram, HPCI system, Rev. 45

CCD 2-47E813-1, Flow Diagram, Reactor Core Isolation Cooling (RCIC) System, Rev. 41

CCD 2-47E858-1, Flow Diagram RHR Service Water System, Rev. 17

CCD 2-47W455-7, Mechanical High Pressure Coolant Injection (HPCI) system, Rev. 3

CCD 2-47W456-3, Mechanical, RCIC System, Rev 41

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BFPER970740, Rev. 0, Unit 3 Diesel Building Emergency Drain Check Valve Stuck Open

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98-008873, Diesel Fuel Oil Particulate High, dated 8/13/98

98-013403, High Particulate in SDG Fuel Oil, dated 11/12/98

99-003670, 3A SDG Room Fire Protection Damper Found Closed, dated 11/5/2000

99-010448, SDG 3B Air System Pressure Low, dated 9/26/99

99-011997, SDG 3B Air System Pressure Low, dated 10/28/99

00-000702, Quality Level of Unit 3 7-Day Tank Level Transmitter Non-safety, dated 1/24/00

00-000926, SDG Relay Installed not Consistent with Vendor Manual Part Number, dated 1/31/00

00-002176, 3C SDG Low Frequency, dated 3/10/00

00-003266, EECW Check Valve Surveillance Failure, dated 4/2/00

00-011605, 3A, 3B SDG Room Exhaust Fan Failed to Start, dated 11/5/00

01-000222-000, Loading Preferences of SDG in Backfeed for Heatsink, dated 1/18/01

PERs and Work Orders Written During This Inspection

01-002101, Administrative Error in Completion of Safety Assessment dated 3/7/01

01-002114, CST Reserve Inventory Calculation Not Updated After Power Uprate dated 3/7/01

01-002155, Assumptions for Calculation ED-Q0999-890059 Require Clarification dated 3/8/01

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Work Order 01-002145-00, Clean SDG Building Drains, dated 3/8/01

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DCN W-5436A, Modification of Dresser Couplings on RHR Service Water Piping, dated 11/27/89

DCN W-16945A, RHR Discharge Piping Repair, dated 7/11/91

DCN W-17046A, Install On-Line Corrosion Monitoring Devices, dated 8/16/0\91

DCN W17726B, Remove Non-1E Loads from Unit Battery

DCN W-18093A, RHRSW Pump Impeller Replacement, dated 5/4/94

DCN W-19250A, Install Goosenecks on EECW Vent Relief Piping in Yard Outside EDG Buildingdate8/18/92

DCN W-20321A, Leaking Pipe, dated 10/26/92

DCN T39684A, Determine Anchorage Acceptability for Panels, dated 4/24/96

DCN T37522A, Revise EECW Low Flow Alarm Setpoint, dated 8/14/95

DCN T40220C, Replace A1, A2, C1, and C2 RHRSW Pump Impeller with New Type, dated 1/29/99

EEC 50327, Revise Set Point to Assure Technical Specification Limit not Exceeded, dated 2/11/00

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1-SI-4.9.A.2.C(II)(A), Shutdown Board A Battery Discharge Test, Revision 2 (completed on 3/24/97)

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2-SI-4.9.A.2.C(II)(C), Shutdown Board C Battery Discharge Test, Revision 2 (completed on 4/7/97)

2-SI-4.9.A.2.C(II)(D), Shutdown Board D Battery Discharge Test, Revision 2 (completed on 1/16/97)

3-SI-4.9.A.2.C(II)(3EB), Shutdown Board 3EB Battery Discharge Test, Revision 10 (completed 4/1/97)

1-SR-3.8.4.2.(1), Main Bank 1 Battery Service Test, Revision 6 (completed 6/21/00)

2-SR-3.8.4.2(2), Main Bank 2 Battery Service Test, Revision 5 (completed 6/13/00)

3-SR-3.8.4.2(3), Main Bank 3 Battery Service Test, Revision 7 (completed 10/4/00)

0-SR-3.3.8.1.2(A), 4 kV Shutdown Board A Undervoltage And Time Delay Relay Calibration And Functional Test, Revision 1 (completed on 9/7/2000)

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Design Criteria, BFN-50-7082, Standby Diesel Generator System, Units 1 and 2, Rev. 10.

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Section 8.0, Electrical Power Systems

Sections 8.4, “Normal Auxiliary Power System,” and 8.5, “ Standby AC Power Supply and Distribution

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