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

April 12, 2002

Southern Nuclear Operating Company
ATTN: Mr. D. N. Morey
Vice President
P. O. Box 1295
Birmingham, AL 35201

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT - NRC INSPECTION REPORT 50-348/02-03, 50-364/02-03

Dear Mr. Morey:

On March 22, 2002, the Nuclear Regulatory Commission (NRC) completed a safety system design and performance capability inspection at your Farley Nuclear Plant. The enclosed report documents the inspection findings which were discussed on March 22, 2002, with Mr. Don Grissette 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 Nos.: 50-348, 50-364
License Nos.: NPF-2, NPF-8

Enclosure: (See page 2)

Enclosure: NRC Inspection Report 50-348/02-03,
50-364/02-03 w/Attachment

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U. S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket Nos.:	50-348, 50-364
License Nos.:	NPF-2, NPF-8
Report No.:	50-348/2002-03, 50-364/2002-03
Licensee:	Southern Nuclear Operating Company, Inc.
Facility:	Joseph M. Farley Nuclear Plant, Units 1 and 2
Location:	P. O. Box 1295 Birmingham, AL 35201
Dates:	March 4-8, 2002 and March 18-22, 2002
Inspectors:	F. Jape, Senior Project Manager, Lead N. Merriweather, Senior Reactor Inspector R. Schin, Senior Reactor Inspector K. Maxey, Reactor Inspector B. Desai, Senior Resident Inspector, H. B. Robinson
Approved by:	C. R. Ogle, Chief Engineering Branch 1 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000348-02-03, IR 05000364-02-03, on 03/4-22/2002, Southern Nuclear Operating Company, Inc., Joseph M. Farley Nuclear Plant, Units 1 & 2. Inspection of Safety System Design and Performance Capability - Auxiliary Feedwater System.

This inspection was conducted by a team of regional engineering inspectors and a senior resident inspector from a different site.

No findings of significance were identified during this inspection. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website.

A. Inspection Identified Findings

None.

B. Licensee Identified Violations

None.

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

Process Medium

The team reviewed the availability, reliability, and adequacy of the condensate storage tank (CST) and the service water (SW) system supply for the auxiliary feedwater (AFW) system to determine their capability to perform their design functions. This review included the protection of the CST against freezing weather and tornado missiles, the water volume of the CST, and the suction head pressure provided to the AFW pumps by the CST. The review also included the licensee's actions to identify and prevent degradation of the SW supply piping to the AFW system due to clams, debris, and biofouling. To accomplish this review, the team inspected design documentation, drawings, calculations, test documentation, surveillance and operating procedures, and installed equipment.

The team also reviewed plant Technical Specifications (TS), the Updated Final Safety Analysis Report (UFSAR), and system descriptions to determine the requirements for the CST and the SW systems. This review also included a system walkdown, discussions with the system engineer, and review of operating and emergency procedures to verify that the installed system and procedures were consistent with these requirements.

Energy Source

The team reviewed the reliability and availability of the steam supply to the turbine driven (TD) AFW pump. This was done to determine that the design and performance requirements of the steam supply valves and piping as specified in design documents were met. The licensee's program to prevent condensate accumulation in the steam supply lines that could cause the pump to overspeed when started was also reviewed. To accomplish this review, the team inspected design documentation, drawings, calculations, vendor manuals, test documentation, surveillance and operating procedures, and installed equipment.

Electrical Signals

The team reviewed electrical elementary and schematic drawings depicting the start logic for the motor driven (MD) and TD AFW pumps to verify that the logic design was consistent with the UFSAR and the AFW Functional System Description (FSD). The MD AFW pumps starting logic design was specifically reviewed to verify that the pumps

would automatically start on either 1) a loss of both feedwater pumps, 2) 2 out of 3 low-low level in any steam generator, 3) loss of offsite power, or 4) a safety injection signal. Also, the team reviewed the start logic for the MD AFW pump room coolers to verify that the cooler motors were interlocked to automatically start on an AFW pump motor start when the control switch was in the "Auto" position. Similar to the above, the team reviewed the TD AFW pump start logic to verify that the pump would automatically start on either 1) 2 out of 3 reactor coolant pump bus undervoltage (blackout) signal or 2) 2 out of 3 low-low level signals on 2 out of 3 steam generators.

The team also reviewed the control logic for the AFW feed regulating valves and AFW SW supply valves to verify that the controls were consistent with design documents.

In addition to the above, the team reviewed the latest surveillance and functional test records for the AFW system to verify that all start circuitry was functionally tested periodically in accordance with test procedures, design drawings, and TS. The calibration test records for selected AFW process instruments were reviewed to verify that they were being calibrated and tested in accordance with the calibration program.

Electrical Power Sources

The team reviewed electrical one-line drawings for the 4160 volt alternating current (VAC) switchgear, 600 VAC load centers and motor control centers (MCCs), the 120 VAC vital power system, and the 125 volt direct current (VDC) system to identify and ensure adequate power sources were available for the AFW system loads. The team reviewed the licensee's evaluation of minimum expected voltage conditions to verify adequate protection was provided for the cables from overloads and short circuit conditions. In addition, the team reviewed fuse and breaker coordination studies on selected loads to verify protection between breakers and fuses was in accordance with equipment specifications.

The team evaluated the AFW uninterruptible power supply (UPS) and 48 VDC batteries to verify proper loading consideration was given to selected AFW components. The team reviewed periodic testing performed to demonstrate onsite AC emergency power supplies were capable of providing adequate voltage and current for the AFW loads in accordance with design requirements.

Instrumentation and Controls

The team reviewed electrical elementary and schematic drawings depicting permissives and interlocks for valves and motor logic to verify that control logic was consistent with system functional requirements.

The team reviewed process drawings for the AFW system to ensure adequate alarms and indications were available to operators to make decisions regarding operation of the system. The team also reviewed completed surveillance test procedures to verify that valve position indications associated with selected AFW valves were being functionally tested on a periodic basis. In addition, the team reviewed calibration test records to verify that the instruments were included in a periodic calibration test program.

Operator Actions

The team reviewed pertinent operator instructions, including emergency operating procedures, performed a system walkdown with a licensed operator to determine access to components listed in operating procedures, reviewed an ongoing surveillance test of the TD AFW pump to determine procedural control, adequacy of testing, and communications. The inspectors also reviewed the list of operator work arounds to determine if there were any AFW related issues.

Heat Removal

The team reviewed availability and reliability of the subsystems required to remove heat from the AFW pumps and pump rooms during normal and accident conditions as specified in design basis documents. To accomplish this review, the team reviewed drawings, test documentation, surveillance procedures, operating procedures, and installed equipment.

b. Findings

No findings of significance were identified.

.2 System Condition And Capability

a. Inspection Scope

Installed Configuration

The team performed field walkdowns of the AFW system to assess material condition, identify degraded conditions, and verify that the installed configuration was consistent with the design drawings and design inputs to calculations. Additionally, the team inspected the flood detection devices, watertight doors, drains, and sump pumps to verify the capability to detect and limit the effects of internal flooding in or near the AFW pump rooms.

The team performed selective field inspections of the AFW pump rooms and pumps; isolation, flow control, and turbine steam supply valves; and the CST. Particular attention was focused on the installation and configuration of piping, components, and instruments; the placement of protective barriers and systems; the susceptibility to flooding, fire, tornados, cold weather, or other environmental concerns; physical separation; provisions for high energy line breaks; accessibility for operator action; and the conformance of the installed configurations with the design and licensing bases.

The team performed a walkdown inspection of 600 VAC MCCs (i.e. MCC 1U and 2V) to verify that the installed configuration was consistent with design drawings. The team performed visual inspections inside of selected MCC compartments to verify that the types and sizes of installed fuses, overloads, reversing starters, and molded case breakers, were consistent with design documents. The material condition of the internal electrical wiring was also visually inspected for any signs of apparent physical degradation from conditions such as overheating. The team also observed, during walk-

downs, the material condition of other AFW related equipment such as motor operated valves, (MOVs), temperature recorders, TD AFW and MD AFW pumps, AFW hot shutdown panels, AFW process instrumentation, and AFW UPS and 48 VDC battery banks.

Design

Design and test documents were reviewed to determine if the design basis assumptions of system capability were verified. This included pump discharge pressures, net positive suction head (NPSH), and valve stroke times. To accomplish this review, the team inspected design documentation, drawings, calculations, vendor manuals, test documentation, and surveillance and maintenance procedures.

The team reviewed the design calculations that sized the feeder cables for the AFW pump motors to verify that the cables were sized to provide adequate voltage and current to the motors. The team reviewed calculations that determined voltage drop on the 4160 VAC buses when starting an AFW pump from the diesel generator. The team reviewed the environmental qualification for selected AFW system components to verify compliance with 10 CFR 50.49.

The team reviewed design calculations, vendor manuals, and motor data sheets to verify that the ground and phase overcurrent relays for the AFW pump motors were set at appropriate thresholds to allow adequate protection without causing spurious trips.

The team reviewed design calculations that determined the required opening and closing stem thrust for MOVs to verify that during a design basis event, the AFW MOVs would be able to perform their desired function.

Testing

The team reviewed the programs and procedures using TS and design basis requirements for inservice testing and inspection of the safety-related valves and pumps in the AFW system. The team also reviewed the testing of pump vibration and lubricating oil. These reviews included testing results for selected pumps and valves, pump manufacturer pump curves, pump and valve inservice test trend records, and oil and vibration testing. On March 19, the team observed actual surveillance testing of the Unit 2 TD AFW pump.

The team reviewed calibration test records and functional test procedures to verify that critical AFW system level, flow, and pressure instrumentation were being monitored and calibrated in accordance with calibration procedures. The team reviewed the “as-found” and “as-left” instrument calibration records to verify that the instrument settings met procedural requirements. The team assessed whether identified test deficiencies or out of tolerance conditions were properly evaluated and corrected by reviewing the last two completed calibrations performed to determine if instruments were continuously drifting outside the allowable response band between calibrations. The team also reviewed functional test procedures to verify that the AFW pump start/stop switch, local/remote switch, flow control valve reset, and AFW valve position indication were functionally tested.

The team reviewed the latest calibration records for the AFW pump motors and bus supply breaker protective relays to verify that relay setpoints (i.e., "as-found" and "as-left") were in accordance with approved plant procedures and TS.

Operation

The team reviewed periodic testing procedures and results to determine if the system performance satisfied design analysis and TS requirements. The team also reviewed the AFW system's operation by conducting system walkdowns; reviews of normal, abnormal, and emergency operating procedures; review of the UFSAR, TS, design calculations, drawings, system engineer notebooks and procedures; and discussions with operators and system engineers. Inspection emphasis was placed on modifications of the design and changes to the normal and emergency operating procedures to ensure system availability, reliability, and functional capability had been maintained. The team also reviewed the TS required surveillance to determine that each requirement was in the test program.

The team performed a system walkdown of the AFW system to assess system material condition, verify configuration, and identify potentially degraded conditions. During this walkdown, the team reviewed the cold weather preparations in effect, required Appendix R lighting in some of the AFW pump rooms, administrative controls of combustion material, and temporary system alterations. The team also performed a control board walkdown and discussed system performance history with several licensed operators.

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. Specifically, the team reviewed at least 2 years of both preventive and corrective maintenance history, for a selection of 4160 VAC and 600 VAC breakers, AFW pump motors, AFW pump room sump pump motors, and AFW motor operated valves. Additionally, potential common cause failure mechanisms due to flooding, maintenance, and parts replacement were reviewed. The selected equipment included pumps, tanks, and a risk-based selection of critical valves.

The team reviewed completed work orders for the replacement of environmentally qualified limit switches that had reached the end of life qualification.

Design Changes

The team reviewed design changes of equipment performed through the licensee's design change process and component level design changes accomplished through the procurement process to verify that system and equipment function were appropriately evaluated and maintained.

Operating Experience

The team reviewed the licensee's evaluations and, if applicable, corrective actions on a selected sample of NRC Information Notices which could be applicable to equipment normally utilized in AFW systems. The review was performed to verify that the issue or issues had been properly assessed for impact on the plant and that, if applicable, appropriate corrective actions had been taken or planned to resolve the items.

b. Findings

No findings of significance were identified.

.4 Identification And Resolution Of Problems

a. Inspection Scope

The team reviewed a sample of AFW system problems identified by the licensee in the corrective action program to evaluate the effectiveness of corrective actions related to design issues. The specific corrective action documents that were sampled and reviewed by the team are listed in the attachment to this report. Inspection Procedure 71152, "Identification and Resolution of Problems," was used as guidance to perform this part of the inspection. The team reviewed condition reports (CRs) and corrective actions related to the AFW system for the past two years to assess the adequacy of corrective actions.

The team reviewed occurrence reports and work orders on risk significant equipment related to the AFW system to evaluate failure trends and 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 that corrective actions were being taken for the identified deficiencies.

b. Findings

No findings of significance were identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee
M. Ajluni, Licensing Services Manager
C. Collins, Assistant General Manager, Plant Support
M. Conner, AFW System Engineer
E. Cormack, Senior Project Engineer-Farley Project-Engineering Support
D. Grissette, Plant General Manager
R. Johnson, Assistant General Manager, Operations
J. Kale, Senior Engineer, Engineering Support
R. Martin, Engineering Support Manager
D. McCoy, Project Engineer-Technical Support-Engineering Services
G. Wilson, Senior Project Engineer-Farley Project-Mechanical

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

NRC
R. Caldwell, Resident Inspector
T. Johnson, Senior Resident

ITEMS OPENED, CLOSED, OR DISCUSSED

None

LIST OF DOCUMENTS REVIEWED

Procedures

FNP-0-ACP-18.0, Predictive Maintenance Guideline, Version 1.0, dated 4/11/01
FNP-0-ETP-4412, Instrument Air Sampling Program, Rev. 3, dated 12/15/98
FNP-0-GMP-5.3, Vibration Analysis Program, Version 3.0, dated 3/28/01
FNP-0-GMP-30.1, Tribology Program, Version 1.0, dated 5/30/01
FNP-0-MP-84.0, Vibration Measurements for Safety Related Pumps, Version 21.0, dated 8/6/01
FNP-1-SOP-22.0, Auxiliary Feedwater System, Version 46.0, dated 12/13/01
FNP-1-STP-22.1, 1A Auxiliary Feedwater Pump Quarterly Inservice Test, Version 27.0, dated 2/8/02
FNP-1-STP-22.12, Motor Driven Auxiliary Feedwater Check Valves Flow Verification, Version 13.0, dated 8/15/01
FNP-1-STP-22.16, Turbine Driven Auxiliary Feedwater Pump Quarterly Inservice Test, Rev. 34, dated 7/6/00
FNP-1-STP-22.26, 1A Auxiliary Feedwater Pump Cold Shutdown Inservice Test, Version 9.0, dated 2/28/02
FNP-0-EMP-1512.02, Molded Case Circuit Breakers Inspection and Test, Version 18
FNP-0-EMP-1513.01, ITE Magnetic Starters and Overload Relays, Ver. 19
FNP-0-EMP-1313.02, Maintenance of General Electric 4.16 KV Metal-Clad Switchgear Type M-26, Version 6
FNP-0-EMP-1313.04, Maintenance of Siemens-Allis 4.16 KV Metal-Clad Switchgear, Version 11
FNP-0-EMP-1320.01, General Inspection of Switchgear, Motor Control Centers, and Electrical Enclosures, Version 9.0
FNP-0-EMP-1323.01, Inspection of Environmentally Qualified and Other Motor Control Centers, Rev. 6
FNP-0-EMP-1313.09, Maintenance of General Electric 4.16 KV Cubicles During Circuit Breaker Maintenance, Version 1.0
FNP-0-EMP-1313.08, Guidance For Preventive Maintenance of General Electric 4.16 KV Circuit Breakers Type AM 4.16 - 350 MAGNE-BLAST, Version 1.0
FNP-0-EMP-1313.07, Guidance For Overhaul of General Electric 4.16 KV Circuit Breakers Type AM - 4.16 - 350 MAGNE-BLAST, Version 1.0
FNP-0-EMP-1313.10, Maintenance of Siemens-Allis 4.16 KV Circuit Breakers Type FA-350, Version 1.0
FNP-0-EMP-1313.03, Maintenance of Siemens-Allis 4.16 KV Circuit Breakers Type MA-350, Version 19
FNP-0-EMP-1322.01, Westinghouse DS-206 and DS-416 Circuit Breakers, Version 16
FNP-0-IMP-418.1, Calibration Procedure For Aux. Feedwater Check Valve Temperature N1N23TRSH2293, N2N23TRSH2293, Rev. 4
FNP-0-SOP-36.6, Circuit Breaker Racking Procedure, Ver. 24.0
FNP-1-STP-21.3, TD AFW Pump Steam Supply Valves Valve Inservice Test, Ver. 11.0
FNP-1-STP-22.6, Auxiliary Feedwater Pump Train B Functional Test, Ver. 18.0
FNP-1-STP-22.7, Auxiliary Feedwater Pump Train A Functional Test, Ver. 22.0
FNP-1-STP-22.8, Auxiliary Feedwater Inservice Valve Exercise Test, Rev. 15
FNP-1-STP-22.9, Auxiliary Feedwater Pumps 1A and 1B Auto Start Test, Version 11.0

FNP-1-STP-22.10, Turbine Driven Auxiliary Feedwater Pump Blackout Start Test, Version 21.0
FNP-1-STP-22.11, Auxiliary Feedwater Pump 1A (1B) LOSP Test, Rev. 13
FNP-1-STP-40.0, Safety Injection With Loss Of Off-Site Power Test, Version 40.0
FNP-1-STP-45.0, Refueling Valve Inservice Test, Rev. 16
FNP-2-STP-931.0, Motor Operated Valves Thermal Overload Protection Devices Test Verification, Rev. 4

Drawings

B-207556, Sheet 10A, Unit 2 MCC Schedules - 600V, MCC - 2V, Rev. 14
B-207556, Sheet 10C, Unit 2 MCC Schedules - 600V, MCC - 2V, Rev. 11
B-177556, Sheet 19A, Unit 1 MCC Schedules - 600V, MCC - 1U, Rev. 15
B-177556, Sheet 19C, Unit 1 MCC Schedules - 600V, MCC - 1U, Rev. 11
B-177556, Sheet 19D, Unit 1 MCC Schedules - 600V, MCC - 1U, Rev. 12
B-177556, Sheet 20A, Unit 1 MCC Schedules - 600V, MCC - 1V, Rev. 16
B-177556, Sheet 20C, Unit 1 MCC Schedules - 600V, MCC - 1V, Rev. 15
D-207591, Sheet 2, Elementary Diagram Solenoid Valves Train “B”, Rev. 3
D-207591, Sheet 1, Elementary Diagram Solenoid Valves, Rev. 10
D-207590, Sheet 1, Elementary Diagram Solenoid Valves, Rev. 7
D-177590, Sheet 1, Elementary Diagram Solenoid Valves SH 22, Rev. 9
D-177591, Sheet 1, Elementary Diagram Solenoid Valves SH 23, Rev. 12
D-177591, Sheet 2, Elementary Diagram Solenoid Valves, Rev. 3
D-207294, Elementary Diagram MISC Auxiliary Building Sump Pump Motors, Rev. 8
D-177294, Sheet 1, Elementary Diagram MISC Auxiliary Building Sump Pump Motors, Rev.0
D-207188, Sheet 1, Elementary Diagram TD AFW Pump Train “C”, Rev. 14
D-207189, Sheet 1, Elementary Diagram TD AFW Pump Train “C” SH. 2, Rev. 8
D-177188, Sheet 1, Elementary Diagram TD AFW Pump Train “C”, Rev. 22
D-177189, Sheet 1, Elementary Diagram TDAFWP Train “C”, Rev. 12
D-177186, Sheet 1, Elementary Diagram AFW Pump 4160V No. 1A, Rev. 20
D-177186, Sheet 2, Elementary Diagram AFW Pump 4160V No. 1B, Rev. 10
D-207186, Sheet 1, Elementary Diagram AFW Pump 4160V No.2A & 2B, Rev. 14
D-207186, Sheet 2, Elementary Diagram AFW Pump 4160V No.2A & 2B, Rev. 9
D-177229, Sheet 1, Elementary Diagram AFW Pump Room Cooler Fan Motors, Rev. 0
D-207229, Sheet 1, Elementary Diagram HHSI & AFW Pump Room Cooler Fan Motors, Rev. 8
D-207626, Elementary Diagram Motor Operated Valves, Rev. 6
D-177626, Elementary Diagram Motor Operated Valves - Sheet 23, Rev. 9
D-177620, Sheet 1, Elementary Diagram 575V Motor Operated Valves Sheet 17, Rev. 0
D-207620, Sheet 1, Elementary Diagram 575V Motor Operated Valves, Rev. 12
D-207629, Sheet 1, Elementary Diagram CTMT Cooler Service Water Discharge MOV’s Motor Driven AFW Pump Intake MOV & Turbine Driven AFW Pump Intake MOV, Rev. 7
D-177629, Sheet 1, Elementary Diagram CTMT Cooler SVCE WTR DISCH MOV’s MD AFW PMP Intake MOV & TD AFW PMP Intake MOV, Rev. 0
D-177944, Sheet 1, Single Line Diagram Turbine Driven Aux. Feedwater Pump UPS, Rev. 3
D-205007, Sheet 1, P & I Diagram Aux. Feedwater System, Rev. 16
D-175007, Sheet 1, P & ID - Aux. Feedwater System, Rev. 24
U210126D, BOP Cabinet J Card Frame 2 Schematic Diagram Aux. FW Pump (TD) Intake & Discharge Pressure; (MD) Intake & (TD) Intake Flow, Rev. A1

7408D17, BOP Cabinet J Card Frame 05 Schematic Diagram Steam Gen. Feedwater Intake Flow, Rev. A1
7408D37, BOP Cabinet K Card Frame 05 Schematic Diagram CST Level; Steam Gen. Feedwater Intake Flow, Rev. A3
D-175005, P&ID Aux. Bldg. Drains Non-Rad., RCP Oil Collect Sys., Rev. 24
D-177654, Unit 1 Elementary Diagram Sequencer B 1G Load Shedding Circuit, Rev. 15

Work Orders / Work Authorizations

WA W00600492, Perform FNP-0-EMP-1501.5 (MOVATS) on Q1N23MOV 3210B, completed 10/30/98
WA W00644155, Test the 1A AFW Pump Room Cooler Per FNP-0-ETP-4447, completed 12/5/00
WA W00644156, Test the 1B AFW Pump Room Cooler Per FNP-0-ETP-4447, completed 11/30/00
WA W00668875, Inspect the 1A AFW Pump Room Cooler Per FNP-0-EMP-1213.01, completed 10/18/01
WA W00668876, Inspect the 1B AFW Pump Room Cooler Per FNP-0-EMP-1213.01, completed 10/20/01
WA W00670702, Perform a Design Basis Diagnostic (Full) Test per FNP-0-EMP-1501.17 on Q1N23MOV 3210A, completed on 10/19/01
WA W00444583, Perform FNP-0-EMP-1501.05 (MOVATS) on Q1N23MOV 3550C, completed 10/13/95
WA W00629905, Perform FNP-0-EMP-1501.05 (MOVATS) on Q1N23MOV 3764A, completed 3/9/00
WA W00604690, Perform FNP-0-EMP-1501.05 (MOVATS) on Q1N23MOV 3764B, completed 10/21/98
WA W00604691, Perform FNP-0-EMP-1501.05 (MOVATS) on Q1N23MOV 3764D, completed 10/22/98
WO 98008603, Unit 2 TDAFWP Drain Pot Level Transmitter Gives Drain Valve Signal to Open but Valve Does Not Open Immediately and Recloses Without Blowing Down Drain Pot, dated 1/28/99
WO M98007705, Remove the Actuator, Replace the Valve Bonnet, and Perform MOVATS Testing on Q1N23MOV 3350H, completed 12/8/98
WO 1000584, TDAFW Pump Outboard Bearing Failed due to Lubrication Problem, dated 1/23/01
WO 20006621, Q1N23P002 Pump Vibration in Alert Range, dated 8/10/00
WO 20006835, Verify that the Unit One EGM and its Related Components are Checked for the Oxidation Concerns Noted on Unit Two, dated 8/22/00
WO 1001638, Oil Analysis Reveals an Upward Step Change in Ferrous Materials on the TDAFWP outboard Bearing. Disassemble and Inspect Thrust Bearings, dated 3/25/01
WO 554065, 1B MDAFWP Outboard Bearing Oil Sample Indicated Elevated Ferrous Materials - Replace Bearings With New Ones, dated 3/23/01
WO 554066, 1B MDAFWP Bearing Smoked During Bump - Inspect the Bearing, dated 10/19/01
WO 20003744, TDAFWP Steam Admission Valve Q1N12HV3226 Stroke Time Out of Acceptable Range, dated 5/6/00

WO 1007974, TDAFWP Steam Admission Valve Q1N12HV3226 Stroke Time Outside Acceptable Range, dated 10/29/01
WO 20004237, Unit 1 AFW AOV HV3228C Will Not Stroke From MCB HIC 3227CA, dated 5/19/00
WO 98008636, Unit 1 AFW AOV Q1N23HV3228C Leaks By Seat, dated 12/26/98
WO 1002912, Unit 2 AFW AOV HV3227A Had a Slow Stroke Time, dated 4/7/01
W00655476, Replace limit switches, 10/14/01
W00655477, Replace old limits with new limits, 10/14/01
W00655478, Replace open and close limit switches, 10/13/01
W00655479, Set up new limit switches, 10/15/01
W00655480, Replace limit switches, 10/14/01
W00655481, Perform FNP-0-EMP-1551.01, 10/15/01
98006671, Corrective Maintenance on 1A Emergency Air Compressor, 7/22/00
W00482472, 5 YR PM on 1B Emergency Air Compressor, 9/10/97
W00494059, 5 YR PM on 2A Emergency Air Compressor, 3/12/98
W00670155, 5 YR PM on 2B Emergency Air Compressor, 1/15/02
WO0682317, TDAFW UPS Battery Weekly Pilot Cells Check, 03/05/02
WO0673480, TDAFW UPS Battery Quarterly Inspection, 01/18/02
WO0655455, TDAFW UPS Battery Service Test, 10/22/01
WO0626349, TDAFW UPS Battery Performance Test, 03/28/00
WO0655473, TDAFW Pump Uninterruptable Power Supply Cleaning and Inspection, 10/21/01
WO0655454, TDAFW UPS Battery General Battery Cleaning, 10/19/01

Calculations

Bechtel Calc. 11.13, Available NPSH for Auxiliary Feedwater Pumps, Rev. 1, dated 8/11/00
Bechtel Calc. 38.04, Verification of AFW Flow Bases Unit 2, Rev. 4, dated 3/25/97
Bechtel Calc. 40.02, Verification of AFW Flow Bases Unit 1, REv. 4, dated 3/25/99
Bechtel Calc. #571-46-07597, Auxiliary Feedwater Pumps Minimum Flow Evaluation, Rev. 1, dated 2/16/89
BOP Engineering Report, Farley Power Uprate, Section 12.0, Auxiliary Feedwater System, dated 11/27/96
BOP Engineering Report, Farley Replacement Steam Generators, Section 8.0, Auxiliary Feedwater System, Rev. 1
Farley Mech. Calc. #571-46-07597, Auxiliary Feedwater Pumps Minimum Flow Evaluation, Rev. 1, dated 2/16/89
Southern Company Services Calc. #CN-98-0040, Auxiliary Feedwater Pumps Minimum Flow Evaluation, Rev. A, dated 10/7/98
E-22, Cable Ampacity Tables, Rev. 1
E-23.5, FNP AFW MOVs, Rev. 1
E-35.0, Setting of Protective Relays for FNP Unit 1 & 2 Auxiliary Power Systems, Rev. 11
E-35.1.A, Setting of Protective Relays for FNP Unit 1 4.16 kV Auxiliary Power System, Rev. 3
E-35.2.A, Setting of Protective Relays for FNP Unit 2 4.16 kV Auxiliary Power System, Rev. 3
E-82, Plant Electrical Distribution System Coordination Study, Rev. 7
E-95, Battery Capacity Calculation for LOSP and LOSP+LOCA Situations and Limiting Battery Load Profile, Rev. 8
E-106, Battery Capacity Calculation for TD AFW UPS, Rev. 1A

SE-90-1714-2, Voltage Drop to Motors on 600V and 208V MCCs, Rev. 1
SE-90-1714-12, Overload Heater Resistance, Rev. 2
SE-90-1653-002, Non-LOCA MOV Starting Part 2, Rev. 2
SE-94-0-0378-001, MOV Combination Starter Component Sizes and Setting Calc, Rev. 2
SE-94-0-0378-002, MOV Combination Starter Component Sizes and Settings Calc, Rev. 2
SE-94-0470-004, Unit 1 As-built Load Study Summary Calculation, Rev. 2
SE-94-0470-005, Unit 2 As-built Load Study Summary Calculation, Rev. 2
SM-90-1653-001, MOV thrust Requirements for Gate and Globe Valves, Rev. 8
SM-90-1653-002, Reduced Voltage Torque/Thrust Capability for Gate and Globe Valves in the FNP MOV Program, Rev. 9
SM-90-1653-021, FNP MOV Margin Tracking Document, Rev. 8

Functional System Descriptions

A-181010, Auxiliary Feedwater Functional System Description, Rev. 11

UFSAR

Section 6.5, Auxiliary Feedwater System
Section 8.3, Onsite Power System

Engineering Support Documents

B-172350, Cable Specification Guide, Rev. 7

Technical Specifications (TS)

3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instruments
3.7.5, Auxiliary Feedwater System

Technical Manuals/Vendor Information

A-506321, Instruction Manual for the Turbine Driven Auxiliary Feedwater Pump Data Acquisition System, Rev. 2
U-263212, UPS Instruction Manual, Rev. 9
U-265656, Station Battery Installation and Operating Instructions, 3/8/88

FNP's Evaluations of the following NRC Information Notices

NRC IN 89-64, Electrical Bus Bar Failures
NRC IN 88-75, Supplement 1, Disabling of Diesel Generator Output Circuit Breakers by Anti-Pump Circuitry
NRC IN 91-20, Electrical Wire Insulation Degradation Caused Failure in a Safety-Related Motor Control Center
NRC IN 92-51, Supplement 1, Misapplication and Inadequate Testing of Molded Case Circuit Breakers

NRC IN 99-13, Insights from NRC Inspections of Low and Medium Voltage Circuit Breaker Maintenance Programs
NRC IN 02-04, Wire Degradation at Breaker Cubicle Door Hinges
NRC IN 98-19, Shaft Binding in General Electric Type SBM Control Switches
NRC IN 98-21, Potential Deficiency of Electrical Cable/Connection Systems

Miscellaneous Documents

Predictive Maintenance Monthly Report, February 2002
Farley Nuclear Plant Nuclear Generation Department Memorandum WJ-1077; Regarding NRC Information Notice 2001-06, Centrifugal Charging Pump Thrust Bearing Damage not Detected Due to Inadequate Assessment of Oil Analysis Results and Selection of Pump Surveillance Points; dated July 5, 2001
Vendor Technical Manual for Turbine Driven AFW Pump Turbine and Governor
AFW Success Criteria from Farley PRA Model, Rev. 5
Quarterly System Health Report for Auxiliary Feedwater System, Year 2001, Quarters 1, 2, 3, & 4
U416797, Master List of Environmental Qualified (EQ) Equipment Unit 1, Rev. AM
U416798, Master List of EQ Equipment Unit 2, Rev. AW
EQ Packages: A-506152-0002, Rev. 22; A-506152-0009A, Rev. 9; A-506152-0025A, Rev. 21; and A-506152-0025D, Rev. 17
Pages 74, 76, 106, 107, and 109 of the Unit 2 Field MOV Setpoint Data Sheets, Rev. 23
Pages 88 thru 92 and 124 thru 129 of the Unit 1 Field MOV Setpoint Data Sheets, Rev. 17
NEMA MG1-1969, Standards for Motors and Generators
FR-101254, Aluminum Electrolytic Capacitors Failure Analysis, 10/26/2001
OD 02-01, Operability Determination of Turbine Driven Aux. Feedwater Pump, 3/7/02

Design Changes

DCR 98-1-9430, Unit 1 Auxiliary Feedwater Flow Indication, Rev. 0, dated 9/30/98
DCR 98-2-9431, Unit 2 Auxiliary Feedwater Flow Indication, Rev. 0, dated 9/309/98
ABN 01-2-2083, Document Component Information Resulting from Walkdown of 600 Volt MCC, Rev. 0
DCR 92-2-8408, Increase the Range of Pressure Indicators, Rev. A
DCR 97-1-9193, Replace Flow Transmitter FT3403, Rev. 0
DCR 01-1-9704, TDAFWP Monitoring and Testing System, Rev. 0

Corrective Action Documents Reviewed (Condition Reports, Occurrence Reports)

CR 2000005249, Temporary scaffolding discovered above the Unit 1 TDAFW pump UPS with no scaffolding permit, dated 8/18/00
CR 2000005443, During surveillance testing, Unit 1 TDAFW pump failed to achieve the minimum speed of 3900 rpm, dated 9/19/00
CR 2000005803, Clams were discovered inside the valve body of the Unit 2 SW to 2B MDAFWP header drain valve and the valve stem was broken from overtorque, dated 11/28/00

CR 2000005865, The Unit 1 TDAFW pump trip mechanism had excess paint accumulation, dated 12/14/00
CR 2001000488, Oil analysis on the Unit 2 TDAFW pump bearings revealed an upward step change in ferrous index, dated 3/4/01
CR 2001000915, During review of the root cause report on the bearing failure on 1B MDAFW pump an assessment of the lubrication sampling and oil analysis program was suggested, dated 4/13/01
CR 2001001316, Vibration PM on 2A MDAFW pump was not performed, dated 5/29/01
CR 2001000742, During the flush of the Unit 2 TDAFW pump turbine, significant amounts of foreign particles were found in the drained oil, dated 3/27/01
CR 2001002098, Safety systems such as the EDGs and AFW have experienced numerous equipment performance problems, dated 8/14/01
CR 2001002278, While performing a walkdown of AFW, a large paint chip was observed in the outboard bearing housing of the Unit 2 TDAFW pump, dated 9/11/01
CR 2001002665, The outboard pump bearing on the 1B MDAFWP smoked when it was bumped for STP-40.0, dated 10/19/01
CR 2002000407; WA's 674343 & 6775350 for 1A AFW pump motor were not completed prior to their late finish dates - these are lube schedules, dated 2/25/02
CR 2000005518, Two pieces of station service blackout equipment were simultaneously removed from service on Unit 1, 10/4/2000
CR 2000005806, Wrong instrument channel taken out of service for calibration, 11/29/2000
CR 2001000709, Various delays to the 1B MDAFW Pump outage, 3/23/2001
CR 2001002069, Failure of electrolytic capacitors, 8/16/2001
CR 2001002056, Failure of TDAFW UPS system, 8/16/2001
CR 2001002700, Fire occurred in UPS cabinet due to failed capacitors, 10/20/2001
CR 2001002975, TDAFW speed control circuit PM, 11/29/2001
CR 2000005097, Unit 2 AFW Performance Indicator for Q200 changed from green to white, 7/18/00
CR2001002033, Turbine Driven Aux. Feedwater Pump UPS Failure, 8/16/2001
CR2001002056, Evaluation of OE1257 and UPS Failure, 8/16/2001
OR 2-2000-079, 2A MDAFW pump room cooler failed to start, 2/9/2000
OR 2-2000-230, Failure of 2A MDAFW Pump Room Cooler, 3/15/00

CRs Issued as a Result of this Inspection

2002000511	Catchbag over 2B MDAFW Pump not in the tracking program
2002000516	CST bladder not in the PM program
2002000648	Breaker and starters associated with Unit 1 & 2 MCCs V&V not in PM program
2002000633	Freeze protection circuits appeared to be unresponsive to environmental conditions during walkdown
2002000621	Test equipment hookup error made during surveillance test
2002000639	WO which addressed deficiencies on heat tracing system appeared to be not implemented in a timely manner
2002000644	No CR was written for oil samples from AFW motors and pumps with particulate counts higher than the acceptance criteria

2002000649	Present design location of freeze protection thermostats do not provide adequate protection
2002000656	A small section of steam supply line to the SDAFW turbine pump did not have an adequate means of draining condensate
2002000659	Lack of documentated flow testing of SW supply to AFW supply to assure that flow was sufficient to mitigate a design basis tornado.

Completed Surveillance Tests, and Calibrations

FNP-1-STP-27.1, Unit 1 A.C. Source Verification Surveillance Test Procedure, completed 02/25/02, 03/04/02
FNP-1-STP-27.2, Unit 1 On-site AC Distribution Surveillance Test Procedure, completed 02/25/02, 03/04/02
FNP-2-STP-27.1, Unit 2 A.C. Source Verification Surveillance Test Procedure, completed 02/25/02, 03/04/02
FNP-2-STP-27.2, Unit 2 On-site AC Distribution Surveillance Test Procedure, completed 02/25/02, 03/04/02
FNP-1-STP-22.9, AFW Pumps 1A and 1B Auto Start Test, Rev. 10, Completed 10/22/01
FNP-2-STP-22.9, AFW Pumps 2A and 2B Auto Start Test, Ver. 7, Completed 4/28/01
FNP-2-STP-73.1, Hot Shutdown Panel Operability Verification, Rev. 6, Completed 3/7/02
FNP-1-STP-73.1, Hot Shutdown Panel Operability Verification, Rev. 6, Completed 1/26/02
W00663985, 18 Month PM on N1G21LSHH3298, 8/13/01
W00655456, 18 Month PM on Q1N23FT3403, 9/18/01
W00655780, 18 Month PM on Q1N23FT3229B, 10/25/01
W00655781, 18 Month PM on Q1N23FT3229C, 10/25/01
W00667982, 18 Month PM on Q1N23FT3402, 11/5/01
W00633620, 18 Month PM on Q1N23FT3229A, 3/1/00
W00655779, 18 Month PM on Q1N23FT3229A, 9/26/01
W00633621, 18 Month PM on Q1N23FT3229B, 5/1/00
W00633622, 18 Month PM on Q1N23FT3229C, 5/1/00
W00622343, 18 Month PM on Q2N23FT3229A, 10/19/99
W00651085, 18 Month PM on Q2N23FT3229A, 3/4/01
W00622344, 18 Month PM on Q2N23FT3229B, 10/20/99
W00651086, 18 Month PM on Q2N23FT3229B, 3/4/01
W00622345, 18 Month PM on Q2N23FT3229C, 10/19/99
W00651087, 18 Month PM on Q2N23FT3229C, 3/4/01
W00608053, 2Year PM on Q1N23FISL3212A, 1/4/99
W00649334, 2Year PM on Q1N23FISL3212A, 12/12/00
W00610522, 2Year PM on Q1N23FISL3212B, 1/18/99
W00650715, 2Year PM on Q1N23FISL3212B, 1/26/01
W00619347, 2Year PM on Q2N23FISL3212A, 6/1/99
W00661575, 2Year PM on Q2N23FISL3212A, 6/1/01
W00615474, 2Year PM on Q2N23FISL3212B, 5/6/99
W00661038, 2Year PM on Q2N23FISL3212B, 5/18/01
W00497245, 2Year PM on Q1N23FISL3218, 6/26/98
W00635362, 2Year PM on Q1N23FISL3218, 6/23/00
W00611770, 2Year PM on Q2N23FISL3218, 3/15/99

W00656921, 2Year PM on Q2N23FISL3218, 1/25/01
W00635363, 18 Month PM on Q1N23FT3402, 6/9/00
W00626352, 18 Month PM on Q1N23FT3403, 3/6/00
W00635393, 18 Month PM on Q2N23FT3402, 6/1/00
W00668004, 18 Month PM on Q2N23FT3402, 12/11/01
W00621459, 18 Month PM on Q2N23FT3403, 8/31/99
W00651998, 18 Month PM on Q2N23FT3403, 2/19/01
W00634469, 18 Month PM on N1G21LSHH3292, 2/22/00
W00663981, 18 Month PM on N1G21LSHH3292, 8/13/01
W00634472, 18 Month PM on N2G21LSHH3292, 2/22/00
W00664149, 18 Month PM on N2G21LSHH3292, 8/13/01
W00634470, 18 Month PM on N1G21LSHH3297, 2/22/00
W00663984, 18 Month PM on N1G21LSHH3297, 8/13/01
W00633829, 18 Month PM on N2G21LSHH3297, 2/22/00
W00664154, 18 Month PM on N2G21LSHH3297, 8/13/01
W00633760, 18 Month PM on N1G21LSHH3298, 2/22/00
W00634474, 18 Month PM on N2G21LSHH3298, 2/22/00
W00664155, 18 Month PM on N2G21LSHH3298, 8/13/01
W00666022, 18 Month PM on N1P11LT0501, 9/27/01
W00667983, 18 Month PM on Q1P11LT0515, 12/7/01
W00671867, 18 Month PM on Q1P11LT0516, 2/15/02
W00642962, 18 Month PM on N2P11LT0501, 9/8/00
W00668005, 18 Month PM on Q2P11LT0515, 12/6/01
W00671908, 18 Month PM on Q2P11LT0516, 2/18/02
W00671763, 18 Month PM on N2N23TRSH2293, 1/8/02
W00649114, 18 Month PM on N1N23TRSH2293, 11/29/00
WO 0623350, DG01Overcurrent Relay Phase 1, 06/15/99
WO 0420481, DG01Overcurrent Relay Phase 1, 12/7/94
WO 0623351, DG01Overcurrent Relay Phase 2, 06/16/99
WO 0420482, DG01Overcurrent Relay Phase 2, 12/8/94
WO 0623352, DG01Overcurrent Relay Phase 3, 06/16/99
WO 0420483, DG01Overcurrent Relay Phase 3, 12/12/94
WO 0623353, DG01Ground Overcurrent Relay, 06/15/99
WO 0420480, DG01Ground Overcurrent Relay, 12/7/94
WO 0623354, DG15 Overcurrent Relay Phase 1, 06/15/99
WO 0420485, DG15 Overcurrent Relay Phase 1, 12/7/94
WO 0623355, DG15 Overcurrent Relay Phase 2, 6/16/99
WO 0420486, DG15 Overcurrent Relay Phase 2, 12/8/94
WO 0623356, DG15 Overcurrent Relay Phase 3, 06/16/99
WO 0420487, DG15 Overcurrent Relay Phase 3, 12/12/94
WO 0623357, DG15 Ground Overcurrent Relay, 06/15/99
WO 0420484, DG15 Ground Overcurrent Relay, 12/7/94
WO 0623111, DF01 Overcurrent Relay Phase 1, 6/28/99
WO 0420473, DF01 Overcurrent Relay Phase 1, 11/14/94
WO 0623112, DF01 Overcurrent Relay Phase 2, 6/29/99
WO 0420474, DF01 Overcurrent Relay Phase 2, 11/17/94
WO 0623113, DF01 Overcurrent Relay Phase 3, 6/30/99

WO 0420475, DF01 Overcurrent Relay Phase 3, 11/17/94
WO 0623114, DF01 Ground Overcurrent Relay, 6/25/99
WO 0420472, DF01 Ground Overcurrent Relay, 11/17/94
WO 0623115, DF15 Overcurrent Relay Phase 1, 6/28/99
WO 0420476, DF15 Overcurrent Relay Phase 1, 11/17/94
WO 0623116, DF15 Overcurrent Relay Phase 2, 6/29/99
WO 0420477, DF15 Overcurrent Relay Phase 2, 11/17/94
WO 0623349, DF15 Overcurrent Relay Phase 3, 6/30/99
WO 0420478, DF15 Overcurrent Relay Phase 3, 12/12/94
WO 0623117, DF15 Ground Overcurrent Relay, 6/25/99
WO 0420479, DF15 Ground Overcurrent Relay, 11/17/94
WO 0643534, DF01 Overcurrent Relay Phase 1, 9/17/00
WO 0643535, DF01 Overcurrent Relay Phase 2, 9/19/00
WO 0643536, DF01 Overcurrent Relay Phase 3, 9/19/00
WO 0623324, DF01 Ground Overcurrent Relay, 6/25/99
WO 0620843, DF15 Overcurrent Relay Phase 1, 5/26/99
WO 0620844, DF15 Overcurrent Relay Phase 2, 5/26/99
WO 0620845, DF15 Overcurrent Relay Phase 3, 5/26/99
WO 0643537, DF15 Ground Overcurrent Relay, 9/19/00
WO 0642163, DG01 Overcurrent Relay Phase 1, 8/25/00
WO 0642164, DG01 Overcurrent Relay Phase 2, 8/25/00
WO 0643078, DG01 Overcurrent Relay Phase 3, 9/7/00
WO 0643079, DG01 Ground Overcurrent Relay, 9/6/00
WO 0642165, DG15 Overcurrent Relay Phase 1, 9/1/00
WO 0642166, DG15 Overcurrent Relay Phase 2 9/1/00
WO 0643080, DG15 Overcurrent Relay Phase 3, 9/8/00
WO 0643081, DG15 Ground Overcurrent Relay, 9/6/00