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

May 26, 2005

Southern Nuclear Operating Company, Inc.
ATTN: Mr. L. M. Stinson
Vice President
P. O. Box 1295
Birmingham, AL 35201

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT - NRC TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000348/2005006 AND 05000364/2005006

Dear Mr. Stinson:

On April 8, 2005, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Joseph M. Farley Nuclear Plant, Units 1 and 2. The enclosed inspection report documents the inspection findings, which were discussed on that date with Mr. J. R. Johnson and other members of your staff. Following completion of additional review in the Region II office, another exit was held by telephone with Mr. J. R. Johnson on May 23, 2005, to provide an update on changes to the preliminary inspection findings. The licensee acknowledged the findings.

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 license. The team reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents an NRC-identified finding of very low safety significance (Green) which involved a violation of NRC requirements. However, because of the very low safety significance and because it was entered into the corrective action program, the NRC is treating this violation as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy.

In addition, the report describes a violation concerning fire protection circuit issues for which the NRC is exercising enforcement discretion and reactor oversight process discretion in accordance with NRC Inspection Manual Chapter 0305, Section 06.06.a.2, "Violations in Specified Areas of Interest Qualifying for Enforcement Discretion." The basis for enforcement discretion is delineated in NRC Enforcement Manual Section 8.1.7.1.c, "Fire Induced Circuit Failures." The conditions for applying discretion were met because you acknowledged the finding during the inspection and entered it into the corrective action program for timely corrective action.

If you contest the NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region 2; the Director, Office of Enforcement, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Farley Nuclear Plant.

In accordance with Title 10 of the Code of Federal Regulations (10 CFR) 2.390 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

D. Charles Payne, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-348, 50-364
License Nos. NPF-2, NPF-8

Enclosure: Inspection Report 05000348/2005006 and 05000364/2005006
w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-348 and 50-364
License Nos.:	NPF-2 and NPF-8
Report Nos.:	05000348/2005006 and 05000364/2005006
Licensee:	Southern Nuclear Operating Company, Inc.
Facility:	Joseph M. Farley Nuclear Plant
Location:	7388 North State Highway 95 Columbia, Alabama 36319
Dates:	March 21 - 25, 2005 (Week 1) April 4 - 8, 2005 (Week 2)
Inspectors:	N. Merriweather, Senior Reactor Inspector (Lead Inspector) R. Fanner, Reactor Inspector (Week 1 only) R. Schin, Senior Reactor Inspector K. Sullivan, Electrical Contractor G. Wiseman, Senior Reactor Inspector
Accompanying Personnel:	C. Payne, Chief, Engineering Branch 2 (Week 1) H. Christenson, Deputy Director, Division of Reactor Safety (Week 2)
Approved by:	D. Charles Payne, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000348/2005-006, 05000364/2005-006; 03/21 - 25/2005 and 04/4 - 8/2005; Joseph M. Farley Nuclear Plant, Units 1 & 2; Fire Protection.

This report covers an announced two-week period of inspection by four regional inspectors and one contractor. One Green non-cited violation was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Rev. 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The team identified a non-cited violation of 10 CFR 50, Appendix R, Section III.G.2, for failure to physically protect or separate cables from fire damage and instead relying on unapproved local manual operator actions. The operator actions were to be accomplished outside the main control room (MCR) and were relied on to achieve and maintain a safe shutdown from the MCR during a fire in the Unit 2 Train B 4 kV Switchgear Room and the Diesel Building Train B Switchgear Room.

  This finding is greater than minor because it degraded the defense in depth for fire protection. It is associated with the protection against external factors attribute and degraded the reactor safety mitigating systems cornerstone objective. The finding adversely affected the reliability and capability of equipment required to achieve and maintain a safe shutdown condition following a fire. Because the operator actions were feasible and could reasonably be accomplished, the finding was determined to have very low safety significance. (Section 1R05.05.b.2)

B. Licensee-Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R05 Fire Protection

The purpose of this inspection was to review the Joseph M. Farley Nuclear Plant fire protection program (FPP) for selected risk-significant fire areas. Emphasis was placed on verification that the post-fire safe shutdown (SSD) capability and the fire protection features provided for ensuring that at least one redundant train of SSD systems was maintained free of fire damage. Another inspection focus was to verify that local manual operator actions were consistent with the licensing basis.

The inspection was performed in accordance with Inspection Procedure (IP) 71111.05T, Fire Protection (Triennial), dated 02/18/05, and the U. S. Nuclear Regulatory Commission's (NRC) Reactor Oversight Process, using a risk-informed approach for selecting the fire areas and attributes to be inspected. The selection of risk-significant fire areas to be evaluated during this inspection considered the licensee's Individual Plant Examination for External Events, information contained in FPP documents, results of prior NRC triennial inspections, and observations noted during in-plant tours. The fire areas chosen for review during this inspection were:

- Fire Area 2-21A; Unit 2 Train B 4 kV Switchgear Room, located on the 121 foot (ft.) elevation of the auxiliary building. A large fire in this area would involve shutdown of the unit from the main control room (MCR).

- Fire Area 44A; Units 1 and 2 MCR, located on the 155 ft. elevation of the auxiliary building. A large fire in this area would involve evacuation of the MCR and shutdown of both units using alternative shutdown capability.

- Fire Area 56B/C; Diesel Building Train B Switchgear Room, located on the 155 ft. elevation of the diesel generator building. A large fire in this area would involve shutdown of Unit 2 from the MCR.

For each of the selected fire areas, the team evaluated the licensee's FPP against applicable requirements including Operating License Conditions 2.C.(4) (for Unit 1) and 2.C.(6) (for Unit 2); Title 10 of the Code of Federal Regulations, Part 50 (10 CFR 50), Appendix R; Part 50.48 of 10 CFR 50; commitments to Appendix A of Branch Technical Position Auxiliary and Power Conversion Systems Branch (APCSB) 9.5-1; related NRC safety evaluation reports (SERs); and plant Technical Specifications. The team also reviewed the Fire Hazard Analysis (FHA) and post-fire safe shutdown methodology described in Appendix 9B of the Updated Final Safety Analysis Report (UFSAR); the fire area specific Appendix R compliance reviews documented in Calculation A-350971, "10 CFR 50 Appendix R Fire Protection Program - Sections III.G, III.J, and III.O Fire Protection Program Re-evaluation," Revision 36; and the licensee's alternative shutdown capability analysis in Calculation A-350970, "10 CFR 50 Appendix R Fire Protection Program - Alternative Shutdown Capability," Revision 14.

The specific documents reviewed by the team are listed in the Attachment.

.01 Systems Required to Achieve and Maintain Post-fire Safe Shutdown

d. Inspection Scope

The team evaluated whether the safe shutdown analysis (SSA) properly identified and categorized components in terms of SSD systems and functions to be performed. To assure the licensee had properly identified the components and systems necessary to achieve and maintain SSD conditions for equipment in the fire areas selected for review, piping and instrumentation diagrams were reviewed and compared to the list of SSD equipment documented in the licensee's post-fire SSA and referenced supporting calculations. In addition, operating procedures, operator lesson plans, and other relevant documents were reviewed to verify the flow paths and operational characteristics of systems relied on to accomplish required SSD functions. The team also checked if instrumentation required for post-fire SSD (e.g., pressurizer level and steam generator level) was analyzed by the licensee to demonstrate that the instruments would be free from fire damage for the fire areas inspected. The specific SSD components, which were reviewed for operability during and after a fire in each of the selected fire areas, are listed in the Attachment.

To verify that SSD conditions could be achieved with or without the normal source of offsite power (in areas where a loss of off-site power could occur as a result of fire damage), on a sample basis the team reviewed elementary wiring diagrams of feeder breakers supplying power to safety-related switchgear. The results of this review were then compared to the licensee's SSA and post-fire SSD operating procedures.

On February 14, 2005, the NRC issued IN 2005-04, "Single-Failure and Fire Vulnerability of Redundant Electrical Safety Buses," to alert licensees of potential single-failure and fire vulnerabilities. To determine if redundant 4160 volt (V) safety buses at Farley had similar vulnerabilities, the team reviewed applicable design documents (e.g., elementary wiring and protective relaying circuit diagrams) as well as the licensee's evaluation of this concern, which is documented in an internal memorandum from M. J. Ajluni to: S. H. Chesnut (File No.: C050816901) dated March 11, 2005.

b. Findings

No findings of significance were identified.

.02 Fire Protection of Safe Shutdown Capability

a. Inspection Scope

For the selected fire areas, the team evaluated the potential for fires, the combustible fire load characteristics, the potential exposure fire severity, the separation of systems necessary to achieve and maintain SSD, and the separation of electrical components and circuits to ensure that at least one SSD train of equipment was free of fire damage.

The team reviewed selected portions of the FPP documents that establish and implement controls and practices to prevent fires and to control the storage of permanent and transient combustible materials and ignition sources. This review was conducted to determine if the licensee's commitments, as established in the fire protection licensing basis documents, were satisfied.

The team walked down the selected plant fire areas to observe: (1) the material condition of fire protection systems and equipment, (2) the storage of permanent and transient combustible materials, and (3) the licensee's implementation of the programmatic procedures for limiting fire hazards, combustible waste collection, housekeeping practices, and cleanliness conditions. These reviews were accomplished to ensure that the licensee was maintaining the fire protection systems, had properly evaluated in-situ combustible fire loads, controlled hot-work activities, and limited transient fire hazards consistent with the UFSAR, administrative procedures and other FPP procedures. In addition, the team reviewed plant modification records associated with plant change notice, S-90-0-6404, which installed a modular office enclosure in the Diesel Building Train B Switchgear Room to determine if plant changes were adequately evaluated for the potential impact on the FPP, SSD equipment, and plant procedures as required by the FPP.

The team reviewed operator and fire brigade staffing, fire brigade response, fire brigade initial and continuing qualification course training materials, and fire drill program procedures to verify appropriate training was being conducted for the station firefighting personnel. Additionally, the team reviewed records of fire drills and critiques to ensure that drills were being conducted in risk significant areas. The team inspected the primary and secondary fire emergency equipment storage locker locations and dress-out areas to observe fire brigade protective ensembles, self-contained breathing apparatuses (SCBA), fire fighting foam and equipment, smoke control equipment, and various fire brigade equipment to determine operational readiness for fire fighting.

The team reviewed fire zone data sheets and fire response procedures for the selected fire areas to determine if appropriate information was provided to fire brigade members to identify SSD equipment and instrumentation, and to facilitate suppression of an exposure fire that could impact SSD capability. The team walked down the selected fire areas to compare the associated fire zone data sheet drawings with as-built plant conditions and fire response procedures. This was done to verify that fire fighting fire zone data sheets and drawings were consistent with the fire protection features and potential fire conditions described in the FHA and UFSAR. The team also evaluated whether the fire response procedures and fire zone data sheets for the selected fire areas could be implemented as intended.

The team observed an unannounced fire drill held on March 23, 2005. The drill was conducted in the Diesel Generator Building Train B Switchgear Room. The fire brigade performance was reviewed in several areas including timeliness in responding to the fire drill scenario, proper donning of turnout gear, proper use of SCBAs, proper use of fire zone data sheets, proper use of fire fighting techniques, and proper use of communications equipment to determine effectiveness of fire fighting response. The team also observed and reviewed the fire drill critique following the drill. The qualification records of the drill fire brigade leader and several members were reviewed to ensure that

they had met and maintained the fire protection program requirements to be qualified fire brigade members.

b. Findings

No findings of significance were identified.

.03 Post-fire Safe Shutdown Circuit Analysis

a. Inspection Scope

The team reviewed portions of the SSA which described the methodology and systems relied on to achieve SSD conditions during and following a postulated fire in the fire areas selected for review. From this review, the team selected a sample of SSD components and plant monitoring instruments for the fire areas under evaluation. The evaluation focused on the cabling of selected components for the Chemical and Volume Control System, the Auxiliary Feedwater System (AFW), the Main Steam System and the Residual Heat Removal (RHR) system, and components whose inadvertent operation due to fire damage could significantly affect the post-fire SSD capability. For the sample of components selected, the team reviewed electrical elementary and block diagrams and identified power, control, or instrument cables necessary to support their operation. In addition, conduit and cable tray layout drawings and cable routing information were reviewed to verify that fire protection features are in place as needed to satisfy the separation and design requirements of Section III.G of Appendix R. The team also walked down the selected fire areas to compare the actual plant configuration to the layout indicated on the drawings. On a sample basis, the team also reviewed the licensee's coordination studies of electrical circuit protective devices (e.g., circuit breakers, fuses, and relays). The components which were reviewed for operability during and after a fire in each of the selected fire areas are listed in the Attachment.

b. Findings

1) Inadequate Safe Shutdown Analysis

Introduction. The team identified a violation of 10 CFR 50, Appendix R, Sections III.G.1.a and III.G.3, for an inadequate SSA for a fire in the MCR. The SSA did not properly characterize the effects from fire damage to electrical circuits in the MCR involving the RHR inlet isolation valves, reactor coolant pump motors, and instrument air to the AFW control valves. As a result, the fire response procedures did not contain appropriate contingency or back-up actions outside the control room to de-energize control circuits, trip beakers, or throttle flow control valves. The NRC applied enforcement and reactor oversight process discretion to the violation.

Description. The following issues were identified from the licensee's SSA for a fire in the MCR.

(1) Potential Loss of AFW Flow Control

The licensee's fire response procedures relied on plant operators to control turbine-driven AFW flow from the hot shutdown panel. However, a fire in the MCR could affect the instrument air compressors and result in a loss of instrument air. Consequently, the AFW flow control valves would fail full open, thus overfilling the steam generators, overcooling the reactor coolant system, and adversely affecting SSD capability. The licensee's SSA identified that the fire could cause a loss of instrument air but the need for local manual control of AFW flow had not been identified. The licensee acknowledged the finding and issued Condition Report (CR) 2005103653, dated 04/07/05. This finding was corrected by revising procedures FNP-1- AOP-28.2 , "Fire in the Control Room," and FNP-2-AOP-28.2, "Fire in the Control Room."

(2) Potential for Inadvertent Actuation of High-Low Pressure Interface Valves

Within the RHR system, reactor coolant system (RCS) pressure boundary integrity was provided by a series combination of two motor operated valves (RHR Inlet Isolation Valves) located in a line that connects the (high-pressure) RCS to the (low-pressure) RHR pump suction. There are two lines on each unit, with two redundant valves in series on each line. The series valve combinations on each unit are identified as follows:

Unit 1

Q1E11MOV8701A-A, and Q1E11MOV8701B-B
OR
Q1E11MOV8702A-A, and Q1E11MOV8702B-B

Unit 2

Q2E11MOV8701A-A, and Q2E11MOV8701B-B
OR
Q2E11MOV8702A-A, and Q2E11MOV8702B-B

The control switches for the valves were installed on a single panel on each unit's main control board in the MCR. A control room fire could damage the control cables and cause the valves to spuriously open resulting in a breach in the high-low pressure interface boundary between the RCS and RHR systems. The loss or reactor coolant from this fault would not be mitigated by available post fire SSD equipment and thus could adversely affect the ability to maintain SSD conditions. The post-fire SSD functional requirements for the valves are to remain closed to ensure RCS boundary integrity. A review of elementary wiring and cable block diagrams determined that four hot shorts (two hot shorts in the control circuitry of each valve) would cause both valves to spuriously open. The licensee made an assumption in the SSA that spurious opening of both valves was not credible. However, the team concluded that the licensee was in error in making this assumption in the SSA. The licensee acknowledged the finding and issued CR 205103659, dated 04/07/05. Subsequently, on April 29, 2005, the licensee de-energized one train of valves on both units to prevent inadvertent actuation due to a fire.

(3) Reactor Coolant Pump (RCP) Trip Capability

For an alternative shutdown the only action credited in the licensee's SSA to be initiated and verified in the MCR was a "Reactor Trip." All other actions from the MCR were to be verified locally. In Step 1.3 of procedure AOP-28.2, the operator was directed to trip the RCPs. However, fire damage to the RCP trip circuits located in the MCR (e.g., shorts to ground which causes the control power circuit breaker to trip, thereby disabling the remote trip function) could render this function inoperable from the MCR. AOP-28.2 did not include any contingency or "back-up" actions to be performed from outside the MCR should this fault occur.

A similar issue was identified by the licensee during a March 2005 self-assessment. Specifically, the evaluation determined that the cables and direct current (DC) power for the RCP trip circuits were not included in the SSA. However, the self-assessment did not specifically identify the alterative shutdown procedure issues discussed above. In response to the inspection team's concern, the licensee entered this finding (capability to trip the RCPs from the MCR) into its corrective action program under CR 2005103667, dated 04/07/05. This finding was corrected by revising procedure AOP-28.2 for Units 1 and 2, respectively.

Analysis. This finding is greater than minor because it degraded the reactor safety defense-in-depth for fire protection and also because it is associated with the protection against external factors attribute and degraded the reactor safety mitigating systems cornerstone objective. The finding adversely affected the reliability and capability of equipment required to achieve and maintain SSD conditions following a severe fire in the MCR. Pursuant to NRC Manual Chapter 0305, Section 06.06.a.2, "Violations in Selected Areas of Interest Qualifying for Enforcement Discretion," the NRC did not evaluate the significance of this finding through use of the Significance Determination Process. The finding resulted in three CRs being placed into the corrective action program (i.e, CR #2005103653, CR #205103659, and CR #2005103667).

Enforcement. Operating License Condition 2.C.(4) for Unit 1, and 2.C.(6) for Unit 2, requires the licensee to implement the fire protection requirements of 10 CFR 50.48 and 10 CFR 50, Appendix R. 10 CFR 50, Appendix R, Section III.G.1.a, requires that fire protection features shall be provided for components important to safe shutdown such that one train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control stations is free of fire damage. Specific requirements for protection of cables are contained in Section III.G.2. Section III.G.3, allows for an alternative method to achieve safe shutdown in cases where the requirements of Section III.G.2 cannot be met. The requirements for alternative shutdown capability are delineated in Section III.L of Appendix R. Section III.L.3 of Appendix R, requires that alternative shutdown capability shall be independent of the specific fire area(s) and that procedures shall be in effect to implement this capability. Inherent in this requirement is that the procedures must be technically adequate. Section III.L.7 of Appendix R, requires that safe shutdown equipment and systems for each fire area shall be known to be isolated from associated non-safety circuits in the fire area so that hot shorts, open circuits, or shorts to ground in the associated circuits will not prevent operation of the safe shutdown equipment.

Contrary to the above, on April 8, 2005, the NRC determined that the Alternative Safe Shutdown Analysis A-350970, 10 CFR 50 Appendix R Fire Protection Program -

Alternative Shutdown Capability (Rev. 14) was inadequate, in that, it did not properly characterize the effects from fire damage (i.e., hot shorts, open circuits, or shorts to ground) to electrical circuits in the main control room involving the residual heat removal inlet isolation valves, reactor coolant pump motors, and the air compressors supplying control air to the auxiliary feedwater flow control valves. Consequently, Unit 2 procedure AOP-28.2, did not contain appropriate contingency or back-up actions for use outside the MCR to de-energize control circuits, trip beakers, or throttle flow control valves. This violation is also applicable to Unit 1. Pursuant to NRC Manual Chapter 0305, Section 06.06.a.2, "Violations in Selected Areas of Interest Qualifying for Enforcement Discretion," and NRC Enforcement Manual Section 8.1.7.1.c, "Fire Induced Circuit Failures," the NRC is exercising enforcement discretion for the violation. The NRC will exercise enforcement discretion for violations involving fire protection circuits if the licensee acknowledges the violation, enters it into the corrective action program, and takes appropriate compensatory actions. The conditions for applying enforcement discretion in this case have been met. The licensee has acknowledged the violation, entered the findings into the corrective action program (i.e., CR #2005103653, CR #205103659, and CR #2005103667) and completed timely corrective action.

2) Fire Procedure Did Not Identify the Appropriate Diagnostic Instruments

Introduction. The team identified an unresolved item (URI) related to the Unit 2 abnormal operating procedure for a fire in the MCR. The diagnostic instrumentation that was needed to perform the symptomatic fire response procedure was not identified in the procedure nor was it analyzed to ensure that it would be unaffected by the fire.

Description. The licensee's SSD strategy for a MCR fire relied on having sufficient instrumentation available to enable operators to properly detect fire-induced maloperations and implement actions needed to defeat them in a timely manner. The success of this approach was dependent on the operability of instruments and indications relied on in plant procedures. Such instrumentation was referred to as "diagnostic instrumentation." From a review of the licensee's documentation (SSA and required equipment list A-350871) and discussions with the licensee's staff, the team concluded that the diagnostic instrumentation that was needed to perform the symptomatic fire response procedures (e.g., IF X occurs, THEN do Y) was not identified in procedures nor was it analyzed to ensure that it would be unaffected by fire damage. For example, procedure FNP-2-AOP-28.2, "Fire in the Control Room," Rev. 20, directed the operators to perform actions in response to various indications in the MCR. Specifically, in a Caution Statement on Page 3 and again in Step 3.0, operators were directed to trip a reactor coolant pump in the event its seal leak-off flow was less than 2.5 gallons per minute. Additionally, Step 8.1 directed the operator to determine which air compressor was running and Step 9.3 directed the operators to take manual control of normal charging flow control valve FCV-122 in response to high charging flow indications. In response to this concern, the licensee initiated CR 2005103665, dated 04/07/05. The licensee stated that an evaluation of diagnostic instruments would be performed and is expected to be completed by July 1, 2006. This review will ensure that all required equipment is identified and analyzed for safe shutdown. The licensee indicated that the diagnostic instrument review would include cable routing reviews as well as an evaluation of the required safe shutdown operator actions.

Based on the above, this issue is unresolved pending NRC review of the results of the licensee's diagnostic instrument evaluation. Since this issue affects both units it will be identified as URI 05000348, 364/2005006-001, Fire Procedure Did Not Identify the Appropriate Diagnostic Instruments.

.04 Alternative Shutdown Capabilities

a. Inspection Scope

The team reviewed the licensee's SSA and walked down the selected fire areas to evaluate the adequacy of the licensee's strategy for post-fire SSD for a severe fire in the MCR. Additionally, the team reviewed control wiring diagrams and cable routing information for the control circuits for selected SSD components.

b. Findings

No findings of significance were identified.

.05 Operational Implementation of Safe Shutdown Capability

a. Inspection Scope

The team reviewed the operational implementation of the SSD capability that would be used during a severe fire in any of the selected fire areas. This review checked that: 1) the procedures were available for immediate use; 2) the operators could reasonably be expected to perform the procedures including local manual operator actions within applicable shutdown time requirements; 3) the local manual operator actions in place for III.G.2 fire areas met the feasibility criteria listed in IP 71111.05; 4) the training program for operators included local manual operator actions relied on for SSD from the MCR or from the hot shutdown panels; 5) personnel required to achieve and maintain the plant in hot standby following a fire could be provided from normal onsite staff, exclusive of the fire brigade; and 6) the licensee conducted periodic operational tests of the alternate shutdown transfer capability and instrumentation and control functions. The team evaluated and walked down the following SSD procedures:

- FNP-0-AOP-29.0, Plant Fire, Revision (Rev.) 29
- FNP-2-AOP-28.2, Fire in the Control Room, Rev. 20
- FNP-2-AOP-29.2, Plant Stabilization in Hot Standby and Cooldown Without "B" Train AC or DC Power, Rev. 14

b. Findings

1) Fire Procedure Failed to Ensure that AC Power Would Be Available

Introduction. The team identified an unresolved item (URI) related to the Unit 2 abnormal operating procedure for a fire in the MCR. The procedure did not have instructions to ensure that alternating current (AC) power would be available for SSD during a fire in the MCR that affected both trains of AC power. This finding is unresolved pending further NRC review of the Farley Units 1 and 2 licensing basis for control room fires.

Description. Procedure AOP-28.2, was written to respond to a severe MCR fire causing a loss of offsite power. In this situation the emergency diesel generators (EDGs) would automatically start, power the emergency AC busses, and power the shutdown loads. However, the team observed that a fire in the MCR could potentially cause maloperations of 4 kilo-Volt (kV) and 600 V electrical distribution breakers whose control switches were located in the MCR (e.g., breakers for EDGs, offsite power feeds to vital 4 kV switchgear, power feeds to 600 V switchgear, and power feeds from 600 V switchgear to motor control centers). Maloperation of these breakers could result in a partial or complete loss of AC power, which would adversely affect SSD in that needed safety equipment would not have power to operate. Actions needed to locally isolate electrical distribution breakers and EDGs from the MCR had been identified in the licensee's SSA, but had not been incorporated into procedure AOP-28.2. The actions identified in the SSA included local manual operation of about 50 control power transfer switches for both units (about 25 for each unit) in about 10 different locations in the plant. The needed actions would also include local manual starting and loading of the EDGs. In response to this concern, the licensee took prompt action to revise the procedure on April 15, 2005, to include in the procedure the actions identified in the SSA.

The team observed that Farley Units 1 and 2 had a combined control room, with one electrical control board for both units. The electrical control board was divided into five vertical sections, with each section separated internally from the one next to it by a single vertical sheet of steel. Four of the vertical sections included controls for AC power distribution breakers (including offsite power and EDG feeds to the 4 kV switchgear) for one train of one unit and the fifth (center) section included controls for the swing station blackout diesel generator. The team observed that the sheets of steel that separated each of the vertical sections were not fire barriers that would satisfy the train separation requirements of 10 CFR 50, Appendix R, Section III.G.2. Further, the team noted that fire testing of control room type control boards had been documented in NUREG/CR-4527 in 1987. One conclusion from that testing was that a single sheet steel divider between vertical sections of electrical panels would not be an effective fire barrier. It would not prevent spread of a fire from one vertical section to the adjacent vertical section, even if all of the cables had qualified thermoset insulation.

Licensee personnel disputed whether this issue was a violation of the licensing basis for Farley Units 1 & 2. They contended that a fire in the control room could not affect both trains of AC power for either unit because of the particular design of the electrical control board in the Farley Units 1 & 2 control room. The design included qualified thermoset insulation on all cables in the control board and separation of each vertical section from the adjacent sections with a sheet of steel. They stated that licensee submittals dated July 1, 1982, and November 3, 1982, included Alternative Shutdown Capability Report sections AA.X.2.b and AA.X.4.B design descriptions that were referenced in the NRC SER for the Farley Units 1 and 2 alternate shutdown design acceptability, dated August 24, 1983. They further stated that, based on this SER, a MCR fire is not postulated to cause spurious actuations in a redundant train.

This issue is unresolved for further NRC review of the Farley Units 1 and 2 licensing basis for control room fires. This finding is identified as URI 05000348, 364/2005006-002, Fire Procedure Failed to Ensure that AC Power Would Be Available.

2) Unapproved Local Manual Operator Actions for Post-Fire Safe Shutdown

Introduction. The team identified a Green non-cited violation of 10 CFR 50, Appendix R, Section III.G.2, for failure to have the required physical protection or separation of cables from fire damage and instead relying on local manual operator actions for post-fire SSD, two of which were not approved by the NRC. The operator actions were to be accomplished outside the MCR and were relied on for achieving and maintaining SSD from the MCR for a severe fire in the Unit 2 Train B 4 kV Switchgear Room and the Diesel Building Train B Switchgear Room.

Description. The team noted that procedures AOP-29.0 and AOP-29.2, relied on local manual operator actions to achieve and maintain SSD. The local manual operator actions were relied upon instead of meeting the physical protection or separation requirements of 10 CFR 50, Appendix R, Section III.G.2. The licensee had not received NRC exemptions from the 10 CFR 50, Appendix R, requirements for protecting cables from fire damage for two local manual operator actions, .

One local manual operator action involved a system operator (SO) tripping the turbine-driven AFW pump to prevent overfilling of the steam generators during a fire in the Unit 2 Train B 4 kV Switchgear Room. The other local manual operator action was needed if the 2B component cooling water (CCW) pump was aligned to the B train at the start of the event. In this situation the SO would align the 2B CCW pump to the A train to establish CCW flow to the miscellaneous header. This action was required during a fire in the Unit 2 Train B 4 kV Switchgear Room or the Diesel Building Train B Switchgear room. These actions were required in the following procedure steps:

FNP-0-AOP-29.0, Step 7.3.1, Locally trip TDAFWP overspeed linkage
FNP-2-AOP-29.2, Step 8.3.6, Locally trip TDAFWP overspeed linkage
FNP-2-AOP-29.2, Step 11.0, Establish CCW to a miscellaneous header

The team walked down these manual actions, reviewed them against the feasibility criteria in NRC IP 71111.05, Enclosure 2, “Inspection Criteria for Fire Protection Manual Actions,” and concluded that the actions were feasible and could reasonably be accomplished.

Analysis. This finding is greater than minor because it degraded the defense in depth for fire protection. It is associated with the protection against external factors attribute and degraded the reactor safety mitigating systems cornerstone objective. The finding adversely affected the reliability and capability of equipment required to achieve and maintain a safe shutdown condition following a fire. Because the operator actions were feasible and could reasonably be accomplished, this finding was determined to have very low safety significance (Green).

Enforcement. 10 CR 50.48(b)(1) requires, in part, that all nuclear power plants licensed to operate prior to January 1, 1979, must satisfy the applicable requirements of Appendix R, Section III.G. Unit 2 Operating License Condition 2.C.(6) requires the licensee to implement the fire protection requirements of 10CFR50.48 and 10 CFR 50 Appendix R. Section III.G.2 of Appendix R applies to the ability to achieve and maintain hot SSD from the MCR during a fire. It states, in part, that where cables or equipment, including

associated non-safety circuits that prevent operation or cause maloperations of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of three means of protecting cables to ensure that one of the redundant trains is free of fire damage shall be provided. The three means involve physical protection or separation of cables to preclude fire damage. III.G.2 does not allow local manual operator actions in lieu of protection.

Contrary to the above, on April 8, 2005, two local manual operator actions were relied on for post-fire SSD instead of physical protection or separation of cables to preclude fire damage. Because this finding is of very low safety significance and because it has been entered into the corrective action program (CR 2005103688), this violation is being treated as a non-cited violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000364/2005006-003, Unapproved Local Manual Operator Actions for Post-Fire Safe Shutdown.

.06 Communications for Performance of SSD Capability

a. Inspection Scope

The team reviewed the adequacy of the communication systems to support plant personnel in the performance of SSD functions and fire brigade duties. This included the portable radios that were the primary means of communication for the fire brigade, sound powered phones, plant telephones, and Gaitronics phones. The team reviewed selected fire brigade drill critique reports to assess proper operation and effectiveness of the fire brigade command post portable radio communications during fire drills and to identify any history of operational or performance problems with radio communications during fire drills. During walk downs of post-fire response procedures, the team checked the availability of communication equipment at the hot shutdown panels and at locations where operators performing local manual operator actions would need to communicate with the hot shutdown panel operator. The team also reviewed CRs, work orders, and records from periodic tests of the radio repeater system and from periodic inventory of operator post-fire SSD equipment lockers to assess whether the surveillance test program for the radios was sufficient to assure proper operation during a fire.

b. Findings

No findings of significance were identified.

.07 Emergency Lights for Performance of SSD Capability

a. Inspection Scope

The team reviewed the location, design, operation, and testing of the area emergency lighting units (ELUs) to verify that they met the requirements of 10 CFR 50, Appendix R, Section III.J. The team also observed whether emergency exit lighting was provided for personnel evacuation pathways to the outside exits as identified in National Fire Protection Association (NFPA) 101, Life Safety Code, and Occupational Safety and Health Administration Part 1910, Occupational Safety and Health Standards. This review also included examination of whether backup emergency lighting was provided for the

primary and secondary fire emergency equipment storage locker locations and dress-out areas in support of fire brigade operations should power fail during a fire emergency.

During plant walk downs of selected areas where operators performed SSD local manual actions, the team observed the locations of ELUs and checked the directional aiming of lamp heads to determine if adequate illumination was available to perform the actions required by the procedures and also for access and egress pathways. The team also reviewed manufacturers' data sheets and periodic testing results for the DC, self-contained, battery-powered ELUs to check if they had at least an 8-hour capacity. In addition, the team reviewed condition reports, periodic test procedures, maintenance procedures, and records to determine if adequate surveillance testing was in place to assure proper operation of the ELUs in the event of a fire at the site.

b. Findings

No findings of significance were identified.

.08 Cold Shutdown Repairs

a. Inspection Scope

The team reviewed existing cold shutdown repair procedures for fires in the selected fire areas, materials and tools, and potentially damaged plant equipment to check that they were adequate to enable licensee personnel to complete any needed repairs within 72 hours, as required by 10 CFR 50, Appendix R, Section III.G. The team reviewed locker inventories of replacement electrical power and control cables to check if the equipment was appropriately labeled, maintained in good condition, and in sufficient quantity to successfully accomplish all required repairs. The team also evaluated the estimated manpower and the time required to perform post-fire repairs for reasonableness.

b. Findings

No findings of significance were identified.

.09 Fire Barriers and Penetration Seals

a. Inspection Scope

The team reviewed the selected fire areas to evaluate the fire resistance capability of fire area barriers including enclosure walls, ceilings, floors, fire barrier mechanical and electrical penetration seals, fire doors, and fire dampers in accordance with the requirements of 10CFR 50 Appendix R, Section III.G.2, and licensee commitments to Appendix A of APCSB 9.5-1. The review was performed to ensure that at least one train of SSD equipment was free of fire damage. This was accomplished by observing the material condition and configuration of the installed fire barrier features, as well as reviewing construction detail drawings, engineering evaluations and fire endurance tests for the installed fire barrier features, to verify that the as-built configurations met design requirements, license commitments, standard industry practices and were either properly evaluated or qualified by appropriate fire endurance tests. In addition, the team reviewed

a summary of completed surveillance and maintenance procedures for the selected passive fire barrier features to verify these were properly inspected and maintained in accordance with the licensing and design bases. The fire protection features included in the review are listed in the Attachment.

b. Findings

No findings of significance were identified.

.10 Fire Protection Systems, Features, and Equipment

a. Inspection Scope

The team reviewed vendor documentation, flow diagrams, cable routing information, system operating instructions, operational valve lineup procedures, and system availability studies associated with the fire pumps and fire protection water supply system. Using operating and valve alignment procedures, the team toured selected fire pumps and portions of the fire main piping system to evaluate material condition, consistency of as-built configurations with engineering drawings, and to verify correct system valve lineups. The team evaluated the common fire protection water delivery and supply components to assess if they could be damaged or inhibited by fire-induced failures of electrical power supplies or control circuits. In addition, the team reviewed periodic surveillance and operability flow test data for the fire pumps and fire main loop to assess whether the test program was sufficient to validate proper operation of the fire protection water supply system in accordance with those design requirements and acceptance criteria specified in UFSAR Appendix 9B, Attachment C, 9B.C.2.

For the selected fire areas, the team reviewed the adequacy of the design, installation, and operation of the automatic detection and alarm system to actuate in the early stage of a fire. This included walk downs of the systems and an examination of the types of detectors installed to assess whether the areas were protected in accordance with the Code of Record requirements (i.e., NFPA 72E, 1975 Edition). The team also reviewed the licensee's submittals and associated NRC SERs for the selected fire areas to ensure that the fire detection systems for the selected fire areas were installed in accordance with the design and licensing bases of the plant. Additionally, the team reviewed completed fire detection surveillance procedures to verify that periodic testing of the system detectors met the technical operability requirements specified in UFSAR Appendix 9B, Attachment C, Table 9B.C-5.

The team reviewed the adequacy of the design and installation of the local application low pressure carbon dioxide (CO_2) fire suppression systems for switchgear, load center cabinets, termination cabinets, and transfer switch cabinets located within the selected fire areas. The team reviewed the design and installation specifications, NFPA 12, "Carbon Dioxide Fire Extinguishing Systems," 1973 Edition, installation drawings, surveillance procedures and hydraulic calculations to verify that the required quantity of CO_2 for the cabinets was available. Additionally, the team performed walk downs and observed the material condition of the systems. These reviews were performed to ensure that the CO_2 systems met the design and licensing bases as described in the

licensee submittals, NRC SERs and the UFSAR, and that the systems could perform their intended function in the event of a fire in their respective enclosures.

The team reviewed the manual portable extinguishers and suppression standpipe and fire hose systems to verify adequate design, installation, and operation in the selected fire areas. The team examined flow measurement/pressure test data to verify that sufficient pressure and flow volume was available to produce electrically safe and effective fire hose operation within the nozzle manufacturer's specified flow range. During plant tours, the team observed placement of the fire hoses and extinguishers to verify they were not blocked and were consistent with the fire fighting fire zone data sheets and fire protection program documents. Additionally, the team checked a sample of fire hose lengths to confirm they could reach the affected fire areas in support of manual fire brigade fire fighting efforts.

For Fire Areas 2-21 and 56B/C, the team reviewed internal flooding assessments which addressed potential fire suppression-caused flooding in the areas. The review focused on the Unit 2 Auxiliary Building and Diesel Generator Building equipment and floor drain system to verify that redundant trains of SSD systems or operator actions required for a safe shutdown would not be damaged or inhibited from potential combustible liquid spills or water migration through the drain systems from the effects of a fire event, fire fighting activities, or leakage from manual fire suppression systems within the fire areas or from an adjacent plant area.

b. Findings

No findings of significance were identified.

.11 Compensatory Measures

a. Inspection Scope

The team reviewed the administrative controls for out-of-service, degraded, and/or inoperable, fire protection features. The team reviewed selected active items on the fire protection status reports and compared them with the fire areas selected for inspection. The compensatory measures that had been established in these areas were compared to those specified in UFSAR Appendix 9B, Attachment C, to verify that the risk associated with removing fire protection features from service was properly assessed and adequate compensatory measures were implemented in accordance with the approved fire protection program. Additionally, the team reviewed the adequacy of the licensee's short term compensatory measures to compensate for a degraded function or feature until appropriate corrective actions were taken.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed CRs resulting from fire, smoke, sparks, arcing, and equipment overheating incidents for the period of November 2002 through December 2004, as well as selected fire brigade response, emergency / incidents, and fire safety inspection reports. This review was conducted to assess the frequency of fire incidents and effectiveness of the fire prevention program and any maintenance-related or material condition problems related to fire incidents.

The team also reviewed other corrective action program documents, including completed corrective actions documented in selected CRs, and operating experience program (OEP) documents to verify that industry-identified fire protection problems potentially or actually affecting Farley were appropriately entered into, and resolved by, the corrective action program process. Items included in the OEP effectiveness review were NRC Information Notices, industry or vendor-generated reports of defects and noncompliance under 10 CFR Part 21, and vendor information letters. In addition, the team reviewed a sample of the fire protection program audits and self-assessments which the licensee performed in the previous two-year period. The team evaluated the effectiveness of the corrective actions for the identified issues. The documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

4OA5 Other

(Closed) URI 50-348,50-364/2004-009-001: Corrective Actions to Resolve Unsatisfactory Halon Systems and Service Water Intake Structure Hydrants Fire Protection Piping Test Results

A URI was identified during a previous aging management program inspection documented in NRC Inspection Report 50-348/2004-009, 50-364/2004-009 (ML051100445). This URI included two issues. One issue involved the resolution of unacceptable test results obtained during 2002 surveillance tests (FNP-0-FSP-53) of the fire loop piping for hydrants located near the Service Water Intake Structure (SWIS). There had been two successive tests with results that did not meet acceptance criteria. The second issue involved a modification to the UFSAR description of the Halon systems for fire areas 1-14, 2-14, 1-15, 2-15, 1-23, and 2-23 to delete them as a regulatory requirement. The UFSAR change did not clearly indicate that the Halon systems were abandoned in place.

Unacceptable Test Results of Fire Protection Piping Surveillance Testing

The inspectors reviewed NRC FPP SER dated February 12, 1979, the Fire Protection System Functional System Description (A-181017), FNP-0-FSP-53, Fire Distribution System Flow Test, Revisions 2 and 3, the last two performance records for FNP-0-FSP-53 performed 2002 and 2004, DOEJ-SM-1040904801-001, Documentation of Engineering Judgement for FNP-0-FSP-53 Acceptance Criteria, dated November 19, 2004, and the corrective actions resolutions identified in CR 2005103676.

Subsequent to the NRC aging management programs inspection the licensee revised the surveillance testing procedure (FNP-0-FSP-53, Revision 3) to clarify the hydrant test points located near the SWIS for measuring the available water supply to the building. The revision also clarified the use of the appropriate NFPA Fire Protection Handbook guidelines for development of a graphical projection on hydraulic graph paper of fire water system flow and pressure test acceptance criteria using a “best fit” straight line for projection of test data points. The previous surveillance test method improperly used a “french curve” for graphical projection of the test data points. The fire protection water supply to the SWIS was successfully retested in October 2004 using the revised procedure. Corporate engineering evaluated the results of the October 2004 test (DOEJ-SM-1040904801-001) and concluded that the results were satisfactory.

The team determined that the test results obtained in 2004 were acceptable since the test data indicated that the available water supply to the SWIS was sufficient to produce required pressure and flow to installed automatic suppression systems and at least two fire brigade hose streams simultaneously. The team determined there was no violation of NRC requirements. Additional long-term corrective action on this issue was documented in the licensee’s corrective action program as CR 2005103676.

UFSAR Modification in the UFSAR Description of Halon Systems

Upon further review of Farley FPP License Basis, Safe Shutdown Raceway Reports, and plant change documentation associated with the Halon systems for Fire Areas 1-14, 2-14, 1-15, 2-15, 1-23, and 2-23; the inspectors considered the UFSAR modification of the description of Halon systems for the six fire areas (UFSAR change to reflect the deletion/phase-out or replacement of the systems as a regulatory requirement) met the requirements of the FPP Facility Operating License Conditions, i.e., no performance deficiency or violation of regulatory requirements occurred. Documents reviewed are listed in the Attachment. The conclusion was based upon the inspectors review of licensee SSD raceway evaluations that found no redundant trains of cables or equipment required for SSD systems were located in any of the six fire areas which would adversely affect the ability to achieve and maintain safe shutdown in the event of a fire (acceptable Appendix R compliance). This issue is documented in the licensee’s corrective action program as CR 2004104901 and Action Item 2004205494 to evaluate replacing the existing auxiliary building Halon systems with new clean-agent systems. Unresolved Item 50-348,50-364/2004-009-001 is closed.

4OA6 Meetings, Including Exit

On April 8, 2005, the lead inspector presented the inspection results to Mr. J. R. Johnson and other members of his staff. Proprietary information was reviewed during this

inspection, but is not included in this report. Following completion of additional review in the Region II office, another exit was held by telephone with Mr. J. R. Johnson on May, 23, 2005, to provide an update on changes to the preliminary inspection findings. The licensee acknowledged the findings.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel:

D. Bernstrom, Operations Training
S. Chestnut, Engineering Support manager
D. Davidson, Fire Marshall
R. Fucich, Work Control Superintendent
P. Harlos, Health Physics Manager
J. Hayes, Plant Instructor
J. Jerkins, Fire Protection System Engineer
D. Javorka, Administrative Assistant
R. Johnson, Plant General Manager
J. Kale, Senior Engineer
D. Lisenby, Engineering Supervisor
R. Lulling, Shift Manager
R. Martin, Operations Manager
B. McKinney, Licensing Services Manager
B. Moore, Maintenance Manager
B. Oldfield, Quality Assurance Supervisor
D. Parker, Engineer
P. Pezzani, Technical Advisor
C. Price, Senior Engineer
J. Seay, Licensing Engineer
R. Wells, Operations Superintendent

Other Personnel:

D. Butani, Bechtel Electrical Engineer
C. Foltz, Bechtel Electrical Designer

NRC Personnel:

J. Baptist, Resident Inspector
C. Patterson, Senior Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000348,364/2005006-001	URI	Fire Procedure Did Not Identify the Appropriate Diagnostic Instruments (Section 1R05.03.b.2)

Attachment

05000348,364/2005006-002	URI	Fire Procedure Failed to Ensure that AC Power Would Be Available (Section 1R05.05.b.1)

Opened and Closed

05000364/2005006-003	NCV	Unapproved Local Manual Operator Actions for Post-Fire Safe Shutdown (Section 1R05.05.b.2)

Closed

050000348,364/2004009-001	URI	Corrective Actions to Resolve Unsatisfactory Halon Systems and Service Water Intake Structure Hydrants Fire Protection Piping Test Results (Section 4OA5)

Discussed

None

SECTIONS 1R05.01.a AND 1R05.03.a LIST OF INSPECTED COMPONENTS

Auxiliary Feedwater System.

Component No.	Description
MOV 3350A-A	AFW to SG 2A
MOV 3350B-A	AFW to SG2B
MOV 3350C-A	AFW to SG2C
SV3227A	MDAFW TO SG A
SV3227B	MDAFW TO SG B
SV3227C	MDAFW TO SG C
MOV3764A	AFW PMP DISCHARGE TO SG A
MOV3764B	AFW PMP DISCHARGE TO SG B
MOV3764C	AFW PMP DISCHARGE TO SG C

Chemical and Volume Control System (CVCS)

Component No.	Description
P002A, B and C	Charging Pumps A, B and C
LCV0115C-A	Volume Control Tank (VCT) Outlet Valve
LCV0115E-B	VCT Outlet Valve
LCV0115D	Refueling Water Storage Tank (RWST) to CVCS
LCV0115B	RWST to CVCS
FCV122-2	Normal Charging Flow Control
MOV8107	Normal Charging Flow RCS Isolation

MOV8108	Normal Charging Flow RCS Isolation
HCV-186	RCP Seal Water Injection
MOV8130A	Charging Pump Suction
MOV8130B	Charging Pump Suction
MOV8109A	Charging Pump “A” Min Flow
MOV8109B	Charging Pump “B” Min Flow
MOV8109C	Charging Pump “C” Min Flow
MOV8106A	Min Flow Isolation
MOV8145	Pressurizer Aux Spray

Reactor Coolant System (RCS)

Component No.	Description
PCV 445A	Power Operated Relief Valve (PORV)
PCV444B	PORV
MOV 8000A	PORV Block Valve
MOV 8000B	PORV Block Valve

Instrumentation

Component No.	Description
PT475-P3	SG2A Discharge Press
PT476-P4	SG2A Discharge Press
PT486-P4	SG2B Discharge Press
PT485-P3	SG2B Discharge Press
PT495-P3	SG2C Discharge Press
PT496-P4	SG2C Discharge Press

Residual Heat Removal System (RHR)

Component No.	Description
MOV8701A-A	RHR Inlet Isolation
MOV8701B-B	RHR Inlet Isolation
MOV8702A-A	RHR Inlet Isolation
MOV8702B-B	RHR Inlet Isolation

SECTION 1R05.09 LIST OF INSPECTED FIRE BARRIER FEATURES IN RELATION TO SAFE SHUTDOWN SEPARATION REQUIREMENTS

Floors/Walls/Ceilings	**Description**
Concrete Block Wall - Door Transom Assembly	Diesel Generator Building, Fire Area 56B to Fire Area 56A
Concrete Wall Assembly	Control Room, Fire Area 44 to Fire Area 51

Fire Dampers	**Description**
2-121-115-01	Fire Area 2-21 to Fire Area 2-20
2-121-116-06	Fire Area 2-21 to Fire Area 2-23
2-121-116-07	Fire Area 2-21 to Fire Area 2-23
2-121-116-10	Fire Area 2-21 to Fire Area 2-20

2-121-116-11	Fire Area 2-21 to Fire Area 2-20

Fire Doors	**Description**
2219	Fire Area 2-21 to Fire Area 2-20
2222	Fire Area 2-21 to Fire Area 2-20
2227	Fire Area 2-21 to Fire Area 2-23
453	Fire Area 44 (Room 471) to Fire Area 44 (Room 2453)
418	Fire Area 44 to Fire Area 1-4
734	Fire Area 56B to Fire Area 56A

Fire Barrier Penetration Seals	**Description**
02-121-12	Fire Area 2-21, Wall Penetration Seal to Fire Area 2-20
03-121-07	Fire Area 2-21, Wall Penetration Seal to Fire Area 2-23
07-121-07	Fire Area 2-21, Wall Penetration Seal to Fire Area 2-23
10-121-07	Fire Area 2-21, Wall Penetration Seal to Fire Area 2-23
20-121-12	Fire Area 2-21, Wall Penetration Seal to Fire Area 2-20
24-121-12	Fire Area 2-21, Wall Penetration Seal to Fire Area 2-20

LIST OF DOCUMENTS REVIEWED

Procedures

FNP-0-ACP-35.2, Flammable, Combustible, and Chemical Product Storage, Rev. 7
FNP-0-ACP-61.0, Control of Portable RF Transmitters, Version (Ver.) 61.0
FNP-0-AOP-29.0, Plant Fire, Rev. 29
FNP-0-AP-35, General Plant Housekeeping and Cleanliness Control, Rev. 27
FNP-0-AP-36, Fire Surveillance Procedures and Inspections, Rev. 16
FNP-0-AP-37, Fire Brigade Organization, Revision 16
FNP-0-AP-38, Use of Open Flame, Rev. 14.0
FNP-0-AP-39, Fire Patrols and Watches, Revision 16
FNP-0-EIP-13.0, Fire Emergencies, Ver. 17.0
FNP-0-EIP-16.0, Emergency Equipment and Supplies, Ver. 42
FNP-0-FSP-10, Yard Loop - Semi Annual, Inspection of Hose Houses and Fire Trailer, Rev. 1
FNP-0-FSP-38, Engine Driven Emergency Blowers Functional Test, Rev.3
FNP-0-FSP-41.2, Fire Dampers-Functional Test, Rev. 13
FNP-0-FSP-41.3, Fire Dampers-Functional Test, Rev. 10
FNP-0-FSP-44, Inspection of AFFF Foam, Rev. 3
FNP-0-FSP-53, Fire Distribution System Flow Test, Rev. 2
FNP-0-FSP-53, Fire Distribution System Flow Test, Rev. 3
FNP-0-FSP-64, Firefighter Primary Protective Garment Inspection, Rev. 1
FNP-0-FSP-203.1, Motor Driven Fire Pump Functional Test, Rev. 4

FNP-0-FSP-303, Heat Detector Functional Test, Rev. 4
FNP-0-FSP-307, Smoke Detectors-Biennial Operability and Adjustment, Rev. 5
FNP-0-FSP-400, Diesel-Driven Fire Pump Inspection, Rev. 8
FNP-0-FVP-1.0, Non-Radwaste Area and Ccw Pump Room Fire Ventilation Procedure, Rev.3
FNP-0-FVP-3.0, Control Room and Computer Room Fire Ventilation Procedure, Rev. 6
FNP-0-FVP-11.0, Diesel Generator Building Fire Ventilation Procedure, Rev. 4
FNP-0-SHP-62, General Requirements Governing the Use of Trailers and Temporary Buildings, Rev. 7
FNP-0-SOP-61.0, Fire Protection - Pump House and Yard Main, Rev. 33
FNP-0-SOP-61.0A, Fire Protection - Pump House and Yard Main Valve Alignment Verification, Rev. 8
FNP-2-AOP-28.2, Fire in the Control Room, Rev. 20
FNP-2-AOP-29.2, Plant Stabilization in Hot Standby and Cooldown Without “B” Train AC or DC Power, Rev. 14
FNP-2-FSP-1, Portable Smoke Removal - Semi Annual Equipment Inspection, Rev. 5
FNP-2-FSP-310, Annual Maintenance of Emergency Lighting Unit 2 Appendix "R,” Rev. 4.0
FNP-2-FSP-311, Semi-Annual Maintenance and Testing of Emergency Lighting Unit 2 Appendix "R,” Rev. 5.0
FNP-2-FVP-1.0, Fire Ventilation Procedure for Non-Radwaste Area and CCW Pump Room Area, Rev. 3

Completed Surveillance Procedures and Test Records

FNP-0-EMP-1313.04, Maintenance of Siemens-Allis 4.16 KV Switchgear, Rev. 15, completed July 7, 2003
FNP-0-FSP-41.3, Fire Dampers-Functional Test, Rev. 8, completed April 28, 2001
FNP-0-FSP-53, Fire Distribution System Flow Test, Rev. 2, completed March 25, 1999
FNP-0-FSP-53, Fire Distribution System Flow Test, Rev. 2, completed June 3, 2002
FNP-0-FSP-53, Fire Distribution System Flow Test, Rev. 3, completed October 6, 2004
FNP-0-FSP-303.1, Heat Detector Functional Test, Rev. 13, completed November 6, 2003
FNP-0-FSP-307, Smoke Detectors-Biennial Operability and Adjustment, System 1D-115, Rev. 5, completed June 16, 2003
FNP-0-FSP-307, Smoke Detectors-Biennial Operability and Adjustment, System 2A-104, Rev. 6, completed December 6, 2004
FNP-413-3-006, Carbon Dioxide Fire System Calibration and Functional Test, Rev. 1, completed December 3, 1976

Calculations, Evaluations, and Specifications

A-203580, Unit 2 Safe Shutdown Equipment Report, Rev. 30
A-350970, Units 1 & 2 Alternative Shutdown Capability Report, Rev. 14
A-350971, Unit 2 Safe Shutdown Function Primary Component Report, Section for Fire Area 56B & C, Rev. 2
A-350971, Unit 2 Safe Shutdown Function Primary Component Report, Section for Fire Area 2-021, Rev. 4
A-350971, Unit 2 Safe Shutdown Function Primary Component Report, Rev. 4
ABN 99-0-1488, 10 CFR 50.59 Evaluation of the Deletion of Raceway Fire Barriers for 10 CFR 50, Appendix R Compliance

ABN 99-0-1491, 10 CFR 50.59 Evaluation of the Acceptability of Modifying the UFSAR Description of Halon Systems to Delete Them as a Regulatory Requirement
B508901, Fire Damper Report, Rev. 15
BM-99-1932-001, Internal Flooding Assessment,
E-082, Plant Electrical Distribution System Coordination Study, Rev. 8
U-276246 A, Chemetron Flow Calculation for 600 V LC Bus 2B, dated November 24, 1992
U-276262 A, Chemetron Flow Calculation for 4160 V SWGR Bus 2G, dated November 24, 1992

Drawings

A-181017, Fire Protection System, Rev. 0
A-203583, Fire Protection Communication Report by Fire Area, Rev. 3
A-350970, Alternate Shutdown Capability Analysis, Rev. 3
A-508651, Fire Zone Data Sheet, Sheet 06, Diesel Generator Building (West), Rev. 2
A-508651, Fire Zone Data Sheet, Sheet 22, Aux. Bldg. - Control Room El. 155'-0", Rev. 1
A-509018, Fire Zone Data Sheet, Sheet 18, Aux. Bldg. El. 121'-0" (SW Quad), Rev. 11
D-205610, Appendix R Fire Protection Analysis P&ID Unit 2 Main Steam Sh1, Rev 0
D-205610, Appendix R Fire Protection Analysis P&ID Unit 2 Main Steam Sh2, Rev.0
D-205612, Appendix R Fire Protection Analysis P&ID Auxiliary Feedwater System, Rev. 1
D-205615, Appendix R Fire Protection Analysis P&ID Instrument Air System, Sheet 1, Rev. 3
D-205615, Appendix R Fire Protection Analysis P&ID Instrument Air System, Sheet 2, Rev. 1
D-205615, Appendix R Fire Protection Analysis P&ID Instrument Air System, Sheet 3, Rev. 1
D-205619, Appendix R Fire Protection Analysis P&ID CVCS, Sh.1 Rev. 2
D-205619, Appendix R Fire Protection Analysis P&ID CVCS., Sh. 2, Rev. 4
D-205619, Appendix R Fire Protection Analysis P&ID CVCS Sh. 3, Rev. 1
D-205620, Appendix R Fire Protection Analysis P&ID Unit 2 RHR, Rev.0
D-206003, Containment & Aux. Bldg. - Floor Plan El. 100'-0" & 105'-6", Rev. 20
D-206004, Containment & Aux. Bldg. - Floor Plan El. 121'-0" & 129'-0", Rev. 16
D-206005, Containment & Aux. Bldg. - Floor Plan El. 139'-0", Rev. 24
D-206006, Containment & Aux. Bldg. - Floor Plan El. 155'-0" & 165'-0", Rev. 36
D-207143, Elementary Diagram 4160V Bus 2F, Sh. 1, Rev. 19
D-207155, Elementary Diagram 4160V Bus 2F, Sh. 1, Rev. 10
D-207569, Elementary Diagram 575V Motor Operated Valves, Sh. 43, Rev. 8
D-207570, Elementary Diagram 575V Motor Operated Valves, Sh. 44, Rev. 7
D-207572, Elementary Diagram Motor Operated Valves, Sh. 40, Rev. 0
D-207838, Elementary Diagram 575V Motor Operated Valves, Sh. 40A, Rev. 12
D-207838, Elementary Diagram 575V Motor Operated Valves, Sh. 44A, Rev. 7
D-207839, Elementary Diagram 575V Motor Operated Valves, Sh. 43A, Rev. 9
D-170340, Fire Protection Piping- Yard Mains, Rev. 9
D-170349, Fire Protection Piping- Auxiliary Building, Rev. 22
D-170384, Fire Protection P&ID, Low Pressure Carbon Dioxide, Rev. 15
D-170445, Diesel Generator Building, Base Slab Drains, Rev. 1
D-171817, Architectural - Diesel Generator Building, Rev. 6
D-172868, Elementary Diagram, Diesel Driven Fire Pump, Rev. 15
D-172869, Elementary Diagram, Electric Motor Driven Fire Pump, Rev. 3
D-175046, Flow Diagram - HVAC Control Room & Computer Room, Rev. 18

D-18097, Detector Layout, Diesel Generator Building, System 1D-115, Rev. 1
D-205005, P&ID - Unit 2 Auxiliary Building Drains Non-Rad Area, Rev. 20
D-205014, P&ID - Unit 2 HVAC Non-Rad Area, Rev. 23
D-205049, Fire Protection P&ID, Low Pressure Carbon Dioxide, Rev. 1
D-206026, Architectural Door Schedule, Rev. 0
D-207668, Wiring Diagrams Lighting Panel Boards-Receptacles Unit 2, Rev. 28
D-207797, Elementary Diagram - Fire Prot. Aux. Header Valves, Rev. 4
D-508522, Detector Layout, Control Room, System 1A-54, Rev. 0
D-508979, Detector Layout, Unit 2 Auxiliary Building, System 2A-104, Rev. 0

Work Orders

2040869101, Perform FNP-2-FSP-311.0 Semi-Annual Maintenance and Testing of Appendix "R" Emergency Lighting, Completed 01/19/05
W00711468, Perform FNP-2-FSP-311 on Appendix "R" Elites, Completed 01/21/04
W00692381, Perform FNP-2-FSP-311 on Appendix "R" Elites, Completed 03/03/03
W072169901, Perform FNP-2-FSP-311 on Appendix "R" Elites, Completed 07/10/04
W00678588, Perform FNP-2-FSP-311 on Appendix "R" Elites, Completed 08/05/02
W00701912, Perform FNP-2-FSP-311 on Appendix "R" Elites, Completed 08/09/03

Design Changes

RER Transmittal 1040904801, Evaluate FNP-FSP-53 Test Results, dated November 22, 2004
PCN S-90-0-6404, Design, to Install a 12' X 12' Modular Office in the Diesel Generator Building, Rev. 9

Applicable Codes and Standards

NFPA 12, Carbon Dioxide Fire Extinguishing Systems, 1973 Edition
NFPA 12A, Halon-1301 Fire Extinguishing Systems, 1973 Edition
NFPA 14, Standard for the Installation of Standpipe and Hose Systems, 1973 Edition
NFPA 20, Standard for the Installation of Centrifugal Fire Pumps, 1970 Edition
NFPA 72D, Standard for the Installation, Maintenance, and Use of Proprietary Protection Signaling Systems, 1975 Edition
NFPA 80, Standard on Fire Doors and Windows, 1970 Edition
NFPA 90A, Standard on Air Conditioning and Ventilating Systems, 1981 Edition
NUREG-1552, Supplement 1, Fire Barrier Penetration Seals in Nuclear Power Plants, dated January 1999
Underwriters Laboratory, Fire Resistance Directory, UL Design No. N722, January 1998
Occupational Safety and Health Administration Standard 29 CFR 1910, Occupational Safety and Health Standards
Underwriters Laboratory Standard 401, Standard for Portable Spray Hose Nozzles for Fire Protection Service, dated August 27, 1993
Underwriters Laboratory Standard 555, Standard for Fire Dampers and Ceiling Dampers, dated May 14, 1979

Technical Manuals and Vendor Information

AFH-01-Redskin, Angus Industrial Fire Hose Specifications, Rev. 1987
C-303, Data Sheet for Chemgard AFFF Foam, 3% AFFF, dated April 1, 2001

10-453-97, Dow Corning 561 Silicone Transformer Fluid Technical Manual, dated 1997
Data Sheet for Fenwal Detect-A-Fire Heat Detectors, Series 27100, dated May 1999
Data Sheet for Pyrotronics Ionization Smoke Detector, Models DIS-5B, and DIS-3/5A, dated June 1973
Data Sheet for Akron Electrical Assault Nozzle, Model 4815E, dated September 2000
Ventilator Users Guide for SuperVac Smoke Ventilators, dated August 28, 1998

Audits and Self-Assessments

Regulatory Issue Summary 2004-03 Independent Assessment for the Joseph M. Farley Nuclear Plant (AREVA Assessment Report), Rev. 0, dated 3/7/05
Farley Nuclear Plant QA Audit Report (Tri-En Audit Report), dated 8/16/04
Fire Protection Program Reports (quarterly), 2nd Quarter 2003 through 3rd Quarter 2004
Fire Service System Health Reports, 2nd Quarter 2003 through 4th Quarter 2004

Licensing Basis Documents

Appendix A to Branch Technical Position (BTP) APCSB 9.5-1 Guidelines for Fire Protection for Nuclear Power Plants, dated August 23, 1976
Farley UFSAR Appendix 9B, – Plant Fire Protection Program, Rev. 28
Farley UFSAR Appendix 9B, Attachment C, Operability and Surveillance Requirements for Fire Suppression Systems, Fire Detection Systems, And Fire Barrier Penetrations Required to Support the Safe Shutdown of Farley Nuclear Plant, Rev. 28
Farley Facility Operating License Nos. NPF-2 Condition 2.C (4) (Unit 1) & NPF-8, Condition 2.C (6) (Unit 2)
Farley Fire Protection Safety Evaluation Reports, dated 2/12/79, 8/24/83, 11/19/85, 9/10/86 and 12/29/86

Other Documents

U1/U2 Appendix R Elite Illumination Preliminary Review (Draft), not dated
A-181017, Fire Protection System Functional System Description, Rev. 12
A-508651, Sheet 05, Fire Zone Data Sheet, Diesel Generator Building (West), Rev. 2
A-508651, Sheet 06, Fire Zone Data Sheet, Diesel Generator Building (East), Rev. 2
A-509018, Sheet 18, Fire Zone Data Sheet, Auxiliary Building 121'-0", Rev. 11
A-509018, Sheet 36, Fire Zone Data Sheet, Auxiliary Building 155'-0", Rev. 13
Cable Schedule for the Farley Motor Driven and Diesel Driven Fire Pumps, dated 3/22/05
Clean Air /Smoking Policy - Plant Farley, dated November 1, 2004
DOEJ-SM-1040904801-001, Documentation of Engineering Judgement for FNP-0-FSP-53 Acceptance Criteria, dated November 19, 2004
FNP-0-TCP-17.21, Appendix A Fire Drill Package, Diesel Building “B” Train Switchgear Room, dated March 23, 2005
Farley Fire Protection Status Reports, Units 1&2 and Shared, dated April 5 through 7, 2005
GEN-41101E, Fire Brigade Training, Instructor Guide, Ventilation, dated October 28, 2003
Southern Nuclear Fire Training System Master Plan, Rev. 1
NRC Information Notice 2003-08, Potential Flooding through Unsealed Concrete Floor Cracks, dated June 25, 2003
Transient Combustible Permits, FNP-0-ACP-35.2, issued for the period May 2004 through March 2005

U. S. Consumer Product Safety Commission, Recall of Whirlpool Dehumidifiers, dated January 31, 2002
Request for Engineering Assistance (REA) No.98-1877 concerning conductance testing of the emergency lighting unit batteries

Condition Reports Reviewed During This Inspection

CRs Resulting from Fire, Smoke, Sparks, Arcing, and Equipment Overheating Incidents for the period November 2002 through December 2004
CR 2002001861, Evaluate NFPA 101 Life Safety Code Study Evaluation for Emergency Lighting for Fire Brigade Emergency Operations
CR 2003001833, NRC Information Notice 2003-08, Flooding Through Unsealed Concrete Floor Cracks Evaluation Summary
CR 200405720**,** Replace 26 Fire Hose Nozzles in the Unit 2 Auxiliary Building and DG Building
CR 2004104901, Generate RERs to retire Halon 1301 Fire Suppression Sytems
CR 2004107099**,** Run a Flow Test to Look for Any Excessive Pressure Drop in the Fire Protection System Supplying Water to the SWIS

Condition Reports Generated as a Result of This Inspection

CR 2005100139, RIS-2004-03 Self-Assessment
CR 2005103251, Correct Fire Zone Data Sheet A-509018 and A-509651
CR 2005103414, Corrections to A-181017, Fire Protection System Functional System Description, Table 8.3-1 for Fire Hydrant Identification
CR 2005103499, Testing of Emergency Lights
CR 2005103500, Testing of Emergency Lights
CR 2005103585, Not All Room Numbers Shown on Fire Zone Data Sheets for Fire Area 44
CR 2005103587, Combustible Load Calculation Does Not Include Certain Combustibles
CR 2005103588, Adequacy of Lighting at Fire Brigade Lockers
CR 2005103602, Several Errors Found in UFSAR Section 9B Attachment A and AOP-29.0
CR 2005103624, JPMs do not Address Sufficient Level of Detail to Perform within Realistic Timeframe
CR 2005103625, EIP-16 Attachments X&Y does not include all procedures required for AOP-28.2/1
CR 2005103629, Evaluate Reformatting Fire Procedures AOP-28.2 & AOP-29.0
CR 2005103630, Several Errors were identified in the Fire Zone Data Sheets
CR 2005103632, Fire Ventilation Procedures do not identify Switch Locations
CR 2005103634, Evaluate Basis for 15-20 Minute Wait Time Before Entering Fire Areas
CR 2005103649, There are no Emergency Operating Procedures Stored at the Hot Shutdown Panel
CR 2005103653, For a MCR Fire No Credit is Taken for Restoring the Service Air Compressor
CR 2005103655, Procedure Change to Open the Breaker
CR 2005103658, No Actions to Isolate the MCR in the Event of Fire
CR 2005103659, A Fire in the MCR Could Potentially Damage Control Cabling
CR 2005103665, Diagnostic Instrumentation Credited in the Post-Fire Procedures Were Not Listed in A-350971
CR 2005103666, Errors in the Alternative Shutdown Analysis A-350970 Were Identified

CR 2005103667, For Alternative Shutdown the Only Credited Action From the MCR is the Reactor Trip
CR 2005103676, Evaluate Resolution Action Plan for Fire Protection Water Distribution Testing
CR 2005103686, Evaluate Need for Hydraulic Analysis to Further Verify Calculations

LIST OF ACRONYMS

AC	alternating current
ADAMS	Agency-Wide Documents Access and Management System
AFW	auxiliary feedwater
AOP	Abnormal Operating Procedure
APCSB	Auxiliary and Power Conversion Systems Branch
CCW	Component Cooling Water
CFR	Code of Federal Regulations
CR	condition report
DC	direct current
EDG	emergency diesel generator
ELU	emergency lighting unit
FCV	flow control valve
FHA	Fire Hazards Analysis
FNP	Farley Nuclear Plant
FPP	Fire Protection Program
FVP	Fire Ventilation Procedure
ft	foot
kV	kilo-volt
LOOP	loss of offsite power
MCR	main control room
NCV	non-cited violation
NFPA	National Fire Protection Association
NRC	U. S. Nuclear Regulatory Commission
OEP	operating experience program
PARS	Publicly Available Records Systems
RCP	reactor coolant pump
RCS	reactor coolant system
RHR	residual heat removal system
RIS	Regulatory Information Summary
SCBA	self contained breathing apparatus
SDP	Significance Determination Process
SER	safety evaluation report
SO	system operator
SSA	safe shutdown analysis
SSD	safe shutdown
SWIS	Service Water Intake Structure
UFSAR	Updated Final Safety Analysis Report
V	volt