UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 E. LAMAR BLVD
ARLINGTON TX 76011-4511

December 17, 2015

Mr. Louis Cortopassi
Site Vice President and Chief Nuclear Officer
Omaha Public Power District
Fort Calhoun Station FC-2-4
P.O. Box 550
Blair, NE 68023-0550

SUBJECT: FORT CALHOUN STATION – NRC TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000285/2015012

Dear Mr. Cortopassi:

On November 6, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Fort Calhoun Station and discussed the results of this inspection with you and other members of your staff. The inspectors documented the results of this inspection in the enclosed inspection report.

The inspectors documented three findings of very low safety significance (Green) in this report. All three of these findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of the violations in this report, you should provide a written response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC resident inspector at the Fort Calhoun Station.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region IV, and the NRC resident inspector at the Fort Calhoun Station.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390, “Public Inspections, Exemptions, Requests for Withholding,” a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC’s Public Document Room

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Sincerely,

/RA/

Gregory E. Werner, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-285
License No. DPR-40

Enclosure:
Inspection Report 05000285/2015012
w/Attachment: Supplemental Information

cc w/encl: Electronic Distribution

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Letter to Louis Cortopassi from Gregory E. Werner, dated December 17, 2015

SUBJECT: FORT CALHOUN STATION – NRC TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000285/2015012

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000285
License:	DPR-40
Report Nos.:	05000285/2015012
Licensee:	Omaha Public Power District
Facility:	Fort Calhoun Station
Location:	9610 Power Lane, Blair, NE 68008
Dates:	October 19 through November 6, 2015
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Accompanying Personnel:	H. Barrett, Senior Fire Protection Engineer, Office of Nuclear Reactor Regulation, Division of Risk Assessment
Approved By:	Gregory E. Werner Chief, Engineering Branch 2 Division of Reactor Safety

SUMMARY

IR 05000285/2015012; 10/19/2015 – 11/06/2015; Fort Calhoun Station; Triennial Fire Protection Team Inspection.

The report covered a two week triennial fire protection team inspection by specialist inspectors from Region I and Region IV. Three findings of very low safety significance (Green) are documented in this report. These findings involved violations of NRC requirements. The significance of inspection findings is indicated by their color (i.e., Green, White, Yellow, or Red) and determined using Inspection Manual Chapter 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified two examples of a non-cited violation of License Condition 3.D, "Fire Protection Program," for the failure to adequately implement required National Fire Protection Association Standard 805 implementation items in accordance with the approved fire protection program. Specifically, the licensee did not implement two items listed in Table S-3, "Implementation Items," of Omaha Public Power District letter LIC-14-0042 by June 15, 2015. There was no immediate safety concern with either example and the licensee entered this violation into the corrective action program as Condition Reports 2015-2620 and 2015-2683.

  The failure to implement a requirement of a license condition within the allowed implementation period was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated this finding using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," and determined that the issue was of very low safety significance (Green). These findings had a cross-cutting aspect associated with change management within the human performance area since the leaders failed to use a systematic process for evaluating and implementing change so that nuclear safety remains the overriding priority. Specifically, the inspectors determined that the licensee did not have a process in place to ensure system level design basis documents were updated within the period required by a license condition and to assure plant-specific requirements were incorporated into the appropriate procedures (H.3). (Section 1R05.01.b)

- Green. The inspectors identified a non-cited violation of License Condition 3.D, "Fire Protection Program," for the failure to ensure one success path necessary to achieve and maintain the nuclear safety performance criteria was maintained free of fire damage for all single fires. Specifically, the licensee failed to provide adequate isolation for the pressurizer heaters credited for achieving safe and stable plant conditions for fires that require shutdown from outside the control room. The licensee entered this issue into their corrective action program as Condition Report 2015-12195 and added this issue to their compensatory measures for the control room and cable spreading room.

  The failure to provide adequate isolation for equipment relied upon to achieve safe and stable plant conditions for a shutdown from outside of the control room was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated this finding using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." Because the finding affected the ability to reach and maintain safe shutdown conditions in case of a fire requiring evacuation of the control room, a senior reactor analyst performed a Phase 3 evaluation and determined that the issue was of very low safety significance (Green). This finding did not have a cross-cutting aspect since it was not indicative of present performance in that the performance deficiency occurred more than three years ago. (Section 1R05.05.b)

- Green. The inspectors identified a non-cited violation of License Condition 3.D, "Fire Protection Program," for the failure to establish an appropriate monitoring program in accordance with National Fire Protection Association Standard 805, Section 2.6. Specifically, the licensee failed to set the action level for the availability of the raw water system pumps to ensure that the assumptions in the engineering analysis remained valid. There was no immediate safety concern since the raw water pumps availability remained above the value assumed in the analysis and the licensee entered this violation into the corrective action program as Condition Report 2015-12612.

  The failure to set the action level for the availability of the raw water system pumps to ensure that the assumptions in the engineering analysis remained valid was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated this finding using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," and determined that the issue was of very low safety significance (Green). This finding had a cross-cutting aspect associated with change management within the human performance area since the leaders failed to use a systematic process for evaluating and implementing change so that nuclear safety remains the overriding priority. Specifically, the inspectors determined that the licensee did not use the process that was in place to ensure that the appropriate fire risk

assessment monitoring action levels were incorporated into the maintenance rule program and monitored (H.3). (Section 1R05.13.b)

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R05 Fire Protection (71111.05XT)

This report presents the results of a triennial fire protection inspection conducted in accordance with NRC Inspection Procedure 71111.05XT, "Fire Protection - NFPA 805 (Triennial)," issued January 31, 2013. The inspectors reviewed the licensee's fire protection program against the requirements of NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition, as incorporated by Title 10 of the *Code of Federal Regulation* (CFR) 50.48(c). The NFPA 805 standard establishes a comprehensive set of requirements for fire protection programs at nuclear power plants. The standard incorporates both deterministic and risk-informed performance-based concepts. The inspectors evaluated the implementation of the approved fire protection program in selected risk-significant areas with an emphasis on the procedures, equipment, fire barriers, and systems that ensure the post-fire capability to safely shutdown the plant.

Inspection Procedure 71111.05XT requires the selection of three to five fire areas and one or more mitigating strategies for review. The inspectors used the Fort Calhoun Station NFPA 805 Fire Probabilistic Risk Assessment to select the following four fire areas (inspection samples) for review:

Fire Area	Description	Category
34B-1	Electrical Penetration Area Ground and Intermediate Levels (Room 57)	Performance-Based
36B	West Switchgear Area (Room 56W)	Performance-Based
42	Control Room Complex	Performance-Based
43	Emergency Feedwater Tank Area (Room 81)	Performance-Based

Since this was the first triennial inspection following NRC approval of the risk-informed, performance-based fire protection program, the inspectors reviewed samples of the implementation items required to have been completed in accordance with Operating License Condition 3.D. The inspectors also reviewed samples of the plant modifications credited to support the approved fire protection program.

The inspectors evaluated the licensee's fire protection program using the applicable requirements, which included plant Technical Specifications, Operating License Condition 3.D, NRC safety evaluations, 10 CFR 50.48, and NFPA 805. The inspectors also reviewed related documents that included the Updated Safety Analysis Report Section 9.5, the nuclear safety capability assessment, and the fire safety analyses. Specific documents reviewed by the inspectors are listed in the attachment.

Four fire area inspection samples and one mitigating strategy sample were completed.

.01 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The inspectors reviewed the nuclear safety capability assessment, piping and instrumentation diagrams, and fire response procedures to verify that a safe shutdown success path, free of fire damage, would be available to meet the nuclear safety goals, objectives, and performance criteria in the event of a fire under any plant operational mode or configuration.

The inspectors reviewed applicable sections of the fire response procedures for the selected fire areas and their associated fire scenarios to verify that the shutdown methodology properly identified the components and systems necessary to achieve and maintain safe and stable plant conditions. The inspectors performed walk-throughs of procedure steps to ensure the implementation and human factors adequacy of the procedures. The inspectors verified that licensee personnel credited for procedure implementation had procedures available, were trained on implementation, and were available in the event a fire occurred. The inspectors verified that the operators could reasonably be expected to perform the specific actions within the time required to maintain plant parameters within specified limits.

b. Findings

Introduction. The inspectors identified two examples of a Green non-cited (NCV) violation of License Condition 3.D, "Fire Protection Program," for the failure to adequately implement required NFPA 805 implementation items in accordance with the approved fire protection program.

Description. The licensee adopted a performance-based, risk-informed fire protection program meeting the requirements of NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition, as allowed per 10 CFR 50.48(c).

The fire protection program was approved by the NRC in a revised License Condition 3.D, "Fire Protection Program," issued in License Amendment Number 275 on June 16, 2014. License Condition 3.D, Section (3), "Transition License Condition," Sub-Section (c) states:

> The licensee shall implement the items listed in Enclosure 1, Attachment S, Table S-3, "Implementation Items," of OPPD letter LIC-14-0042, dated April 10, 2014, no later than 12 months after issuance of the license amendment.

The inspectors identified two examples of the licensee failing to adequately implement items listed in Table S-3.

Example 1: Failure to Complete a Required Implementation Item within the Allowable Time Period

Implementation item REC-104 states, "Update system level design basis documents to reflect the NFPA 805 NSPC [Nuclear Safety Performance Criteria] role that the system components now play (as described in Section 2.7.2 of NFPA 805)."

The licensee failed to complete this implementation item within the required 12-month period. The applicable NFPA 805 information was not incorporated into the system design basis documents currently available for use by plant personnel. An engineering change was created to update all the impacted system design basis documents as part of the Design Basis Reconstitution Project and marked-up system design basis documents were provided to the project, but revised documents have not been issued.

Analysis. The failure to implement a requirement of a license condition within the allowed implementation period was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency could adversely affect the capability for the systems that are used to respond to fire initiating events.

The finding was screened in accordance with NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," dated June 19, 2012. The inspectors determined that an IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated September 20, 2013, review was required as the finding affected the ability to reach and maintain safe shutdown conditions in case of a fire. Using IMC 0609, Appendix F, Attachment 1, "Fire Protection Significance Determination Process Worksheet," dated September 20, 2013, the finding was screened as a Green finding of very low safety significance in accordance with Step 1.3, "Ability to Achieve Safe Shutdown," Question A. The inspectors concluded that the failure to update the system design basis documents with the NFPA 805 fire protection program in a timely manner did not directly impact the plant's ability to achieve and maintain hot shutdown conditions as required by the approved fire protection program.

Example 2: Failure to Adequately Maintain a Required Implementation Item

Implementation item REC-136 stated, in part, that revisions will be made to Standing Order SO-O-21, "Shutdown Operations Protection Plan," Standing Order SO-O-25, "Temporary Modification," and General Form FC-66, "Temporary Modification Control Form," to caution against the use of temporary electrical installations during higher risk evolutions that take place in planned outages.

Section 4.1 of Standing Order SO-O-21, Revision 55, contained the following note:

> NOTE: The performance of, or use of temporary modifications during "HIGHER RISK EVOLUTIONS" (as defined for NFPA 805, see definition 2.11 in Section 2.0) must be evaluated for impact to identify where the station departs from the assumptions of the non-power operations separation analysis, and that heightened administrative controls or other compensatory measures be applied, as applicable, to address the change(s) from the perspective of fire risk.

The inspectors identified that this note did not adequately implement the specific requirement of implementation item REC-136.

Section 4.4.12.A of Standing Order SO-O-25, Revision 86, and General Form FC-66, Revision 69, were reviewed and the inspectors determined that the requirements of implementation item REC-136 had been incorporated. However, Standing Order SO-O-25, Section 1.1.3.A, also stated, "All new Temporary Configuration Changes (previously called Temporary Modifications) will be processed using CC-AA-112." Procedure CC-AA-112, "Temporary Configuration Changes," Revision 21, did not list any Fort Calhoun Station specific commitments. Section 4.5.1.4 stated, "Determine applicable design consideration impacts using the Design Impact Screening Procedure CC-AA-102 and the Design Attribute Review (DAR), Attachment 1 in CC-AA-102."

The inspectors reviewed Procedure CC-AA-102, "Design Input and Configuration Change Impact Screening," Revision 1, and the additional procedures referenced for reviewing the impact on the fire protection program, Procedure CC-AA-209, "Fire Protection Program Configuration Change Review," Revision 5, and Procedure CC-AA-209-1001, "Guidelines for Performing Fire Protection Program Configuration Change Review," Revision 1. The inspectors determined that all three procedures had a general requirement to review the change for impact on the fire protection program, but did not have the specific information required by implementation item REC-136.

Analysis. The failure to implement a requirement of a license condition within the allowed implementation period was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency could adversely affect the availability of systems that are used to respond to fire initiating events during higher risk evolutions that take place in planned outages.

The finding was screened in accordance with NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," dated June 19, 2012. The inspectors determined that an IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated September 20, 2013, review was required as the finding affected the ability to reach and maintain safe shutdown conditions in case of a fire. Using IMC 0609, Appendix F, Attachment 1, "Fire Protection Significance Determination Process Worksheet," dated September 20, 2013, the finding was screened as a Green finding of very low safety

significance in accordance with Step 1.3, “Ability to Achieve Safe Shutdown,” B Question. Based on the criteria in Appendix F, Attachment 2, “Degradation Rating Guidance Specific to Various Fire Protection Program Elements,” dated February 28, 2005, the inspectors assigned the finding a “Low” degradation rating. Using Table A2.3, the inspectors considered a low degradation rating because the procedural deficiencies were not significant since there was a general requirement to review the impact of changes on fire protection program, and other licensee procedures require risk impacts to be evaluated during outages.

These findings had a cross-cutting aspect associated with change management within the human performance area since the leaders failed to use a systematic process for evaluating and implementing change so that nuclear safety remains the overriding priority. Specifically, the inspectors determined that the licensee did not have a process in place to ensure system level design basis documents were updated within the period required by a license condition and to assure plant-specific requirements were incorporated into the appropriate procedures (H.3).

Enforcement. License Condition 3.D, “Fire Protection Program,” states, in part, “Omaha Public Power District shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c).” The fire protection program was approved by the NRC in the revised License Condition 3.D, issued in License Amendment Number 275 on June 16, 2014.

License Condition 3.D, Section (3), “Transition License Condition,” Sub-Section (c) states:

> The licensee shall implement the items listed in Enclosure 1, Attachment S, Table S-3, “Implementation Items,” of OPPD letter LIC-14-0042, dated April 10, 2014, no later than 12 months after issuance of the license amendment.

Implementation item REC-104, from Table S-3 states, “Update system level design basis documents to reflect the NFPA 805 NSPC role that the system components now play (as described in Section 2.7.2 of NFPA 805).”

Implementation item REC-136, From Table S-3 states, in part, that, “Revisions will be made to Standing Order SO-O-21, “Shutdown Operations Protection Plan,” Standing Order SO-O-25, “Temporary Modification,” and General Form FC-66, “Temporary Modification Control Form,” to caution against the use of temporary electrical installations during higher risk evolutions that take place in planned outages.”

Contrary to the above, from June 16, 2015, to November 6, 2015, the licensee failed to implement two items listed in Table S-3 of OPPD letter LIC-14-0042 within the required 12-month period that ended June 15, 2015. Specifically, the license did not implement items: (1) REC-104, update of system level design basis documents to reflect NFPA 805 nuclear safety performance criteria, and (2) REC-136, which cautioned against the use of temporary modifications during higher risk evolutions while in planned outages.

The licensee entered this violation into the corrective action program as Condition Reports 2015-12620 and 2015-12683 and were developing corrective actions. Because this violation was of very low safety significance and no immediate safety concerns existed, this violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000285/2015012-01, "Failure to Adequately Implement and Maintain Required NFPA 805 Implementation Items."

.02 Passive Fire Protection

a. Inspection Scope

The inspectors walked down accessible portions of the selected fire areas to observe the material condition and configuration of the installed fire area boundaries (including walls, fire doors, and fire dampers) and verify that the electrical raceway fire barriers were appropriate for the fire hazards in the area. The inspectors compared the installed configurations to the approved construction details, supporting fire tests, and applicable license commitments.

The inspectors reviewed installation, repair, and qualification records for a sample of penetration seals to ensure the fill material possessed an appropriate fire rating and that the installation met the engineering design. The inspectors also reviewed similar records for the rated fire wraps to ensure the material possessed an appropriate fire rating and that the installation met the engineering design.

The inspectors also reviewed recent inspection and functional test records for fire dampers to verify whether the inspection and testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified.

b. Findings

No findings were identified.

.03 Active Fire Protection

a. Inspection Scope

The inspectors reviewed the design, maintenance, testing, and operation of the fire detection and suppression systems in the selected fire areas. The inspectors verified the automatic detection systems and the manual and automatic suppression systems were installed, tested, and maintained in accordance with the NFPA code of record or approved deviations, and that each suppression system was appropriate for the hazards in the selected fire areas.

The inspectors performed a walkdown of accessible portions of the detection and suppression systems in the selected fire areas. The inspectors also performed a walkdown of major system support equipment in other areas (e.g., fire pumps and Halon supply systems) to assess the material condition of these systems and components.

The inspectors reviewed the electric and diesel fire pumps' flow and pressure tests to verify that the pumps met their design requirements. The inspectors reviewed the fire main flow tests to verify that the flow loops met their design requirements. The inspectors also reviewed the Halon suppression functional tests to verify that the system capability met the design requirements.

The inspectors assessed the fire brigade capabilities by reviewing training, qualification, and drill critique records. The inspectors also reviewed pre-fire plans and smoke removal plans for the selected fire areas to determine if appropriate information was provided to fire brigade members and plant operators to identify safe shutdown equipment and instrumentation, and to facilitate suppression of a fire that could impact post-fire safe shutdown capability. In addition, the inspectors inspected fire brigade equipment to determine operational readiness for firefighting.

The inspectors observed an unannounced fire drill and subsequent drill critique on November 3, 2015, using the guidance contained in Inspection Procedure 71111.05AQ, "Fire Protection Annual/Quarterly." The inspectors observed fire brigade members fight a simulated fire in the compressor area. The inspectors verified that the licensee identified problems, openly discussed them in a self-critical manner at the drill debrief, and identified appropriate corrective actions. Specific attributes evaluated were: (1) proper wearing of turnout gear and self-contained breathing apparatus, (2) proper use and layout of fire hoses, (3) employment of appropriate firefighting techniques, (4) sufficient firefighting equipment brought to the scene, (5) effectiveness of fire brigade leader communications, command, and control, (6) utilization of pre-planned strategies, (7) adherence to the pre-planned drill scenario, and (8) drill objectives.

b. Findings

No findings were identified.

.04 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

The inspectors performed plant walkdowns and reviewed documents to verify that redundant success paths for achieving safe and stable plant conditions, which are located in the same fire area, would not be subject to damage from fire suppression activities, or from the rupture or inadvertent operation of fire suppression systems. Specifically, the inspectors verified:

- A fire in one of the selected fire areas would not directly, through production of smoke, heat, or hot gases, cause activation of suppression systems that could potentially damage all redundant success paths.

- A fire in one of the selected fire areas or the inadvertent actuation or rupture of a fire suppression system would not directly cause damage to all redundant success paths (e.g., sprinkler-caused flooding of other than the locally affected train).

- Adequate drainage was provided in areas protected by water suppression systems and for manual use of fire hoses by the fire brigade.

b. Findings

No findings were identified.

.05 Shutdown from a Primary Control Station

a. Inspection Scope

Review of Methodology

The inspectors reviewed the nuclear safety capability assessment, procedures, piping and instrumentation drawings, electrical drawings, and other supporting documents to verify that the licensee can achieve and maintain safe and stable plant conditions from the primary control station in the event a fire required evacuation of the control room.

The inspectors verified that the nuclear safety capability assessment properly identified the components and systems necessary to meet the nuclear safety performance criteria for the fire area selected. Specifically, the inspectors determined the adequacy of the systems selected to meet the criteria for reactivity control, inventory and pressure control, decay heat removal, vital auxiliaries, and process monitoring. For the primary control station, which was analyzed using a performance-based approach, the inspectors verified that the analysis included a consideration of all the necessary cables and equipment associated with operation and control of off-site power.

The inspectors verified that the transfer of command and control from the control room to the primary control station would be unaffected by fire-induced circuit faults (e.g., by the provision of separate fuses and power supplies for shutdown control circuits).

Review of Operational Implementation

The inspectors verified that the training program for licensed and non-licensed operators included the procedures for achieving and maintaining safe and stable plant conditions, including any necessary recovery actions. The inspectors also verified that sufficient personnel required to achieve and maintain safe and stable plant conditions were properly trained and were available at all times among the normal on-site staff, exclusive of the fire brigade.

The inspectors performed a timed walkdown of Procedure AOP-06, “Fire Emergency,” Revision 29, with licensed and non-licensed operators to determine the adequacy of the procedure. The inspectors verified that the recovery actions taken were feasible and

that operators could reasonably be expected to implement the procedure within the applicable time requirements to achieve the nuclear safety performance criteria. The inspectors evaluated the feasibility of the recovery actions using the criteria established in the licensee's approved fire protection program.

The inspectors also verified that the licensee conducted periodic operational tests of the transfer and isolation capability and instrumentation and control functions used for transferring control from the main control room to the primary control station and other locations where recovery actions would be performed. The inspectors verified that the tests were adequate to prove the functionality of the primary control stations' capability to meet performance criteria and achieve and maintain safe and stable plant conditions.

b. Findings

Introduction. The inspectors identified a Green non-cited violation of License Condition 3.D, "Fire Protection Program," for the failure to ensure one success path necessary to achieve and maintain the nuclear safety performance criteria was maintained free of fire damage for all single fires. Specifically, the licensee failed to provide adequate isolation for the pressurizer heaters credited for achieving safe and stable plant conditions for fires that require shutdown from outside the control room.

Description. For fires in the control room or cable spreading room that require control room evacuation and shutdown from outside the control room, the licensee was required to achieve and maintain safe and stable plant conditions by entering Hot Shutdown (Mode 3) and maintaining that condition for an initial 24-hour coping time. The licensee documented their compliance strategy for each fire area in the plant in Attachment 8 of NFPA 805 analysis, EA10-036, "Fort Calhoun Station Automation and Update of Safe Shutdown Analysis." For the control room and cable spreading room fire areas, the licensee documented that the inventory and pressure control nuclear safety performance criterion would be satisfied using the pressurizer backup heater bank 4 (RC4-4) for fires that require shutdown from outside the control room.

Attachment C, "NEI 04-02 Table B-3 – Fire Area Transition," of the license amendment request, dated September 28, 2011, provided the method of accomplishment for the performance goals for each fire area. This table also specified that operators would initially maintain reactor coolant system pressure by operating the pressurizer backup heater bank 4 locally at the breaker for the reactor coolant system pressure control performance goal for fires that require shutdown from outside the control room.

The licensee used Procedure AOP-06, "Fire Emergency," Revision 29, to shut down the reactor in the event a control room or cable spreading room fire required control room evacuation and shutdown from outside the control room. During a walkdown of this procedure, the inspectors inquired about the isolation of pressurizer backup heater bank 4 from the control room.

In response to the inspectors' questions, the licensee reviewed the drawings for pressurizer backup heater bank 4 and identified a circuit vulnerability that could result in the loss of control for the pressurizer heater bank when performing a shutdown from

outside the control room. This vulnerability involved an external hot short affecting the conductor connecting to the control room switch which could keep a relay energized and defeat control of the heater from the motor control center. If this condition occurred, operators would be unable to control pressurizer backup heater bank 4, which was relied upon to achieve safe and stable plant conditions for fires that require shutdown from outside the control room.

The licensee reported this issue as an unanalyzed condition in Event Notification 51487 on October 21, 2015.

Analysis. The failure to provide adequate isolation for equipment relied upon to achieve safe and stable plant conditions for a shutdown from outside of the control room was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency could adversely affect the availability, reliability, and capability of pressurizer heater bank 4, which is used to respond to fire initiating events. The finding was screened in accordance with NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," dated June 19, 2012. The inspectors determined that an IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated September 20, 2013, review was required as the finding affected the ability to reach and maintain safe shutdown conditions in case of a fire. A senior reactor analyst performed a Phase 3 evaluation to determine the risk significance of this finding since it involved a postulated control room fire that led to control room evacuation.

For the control room, the senior reactor analyst assigned a plant-specific fire ignition frequency for the main control board (FIF_{MCB}) from Calculation CN-RAM-09-021, "Fire Ignition Frequencies for Fort Calhoun Station," Revision 2. The analyst multiplied the fire ignition frequency by a severity factor (SF) and a non-suppression probability indicating that operators failed to extinguish the fire within 20 minutes, assuming a 2-minute detection that required a control room evacuation (NP_{CRE}). The resulting control room evacuation frequency (F_{CR}) was:

$F_{CR} = FIF_{MCB} * SF * NP_{CRE}$

$= 1.63E\text{-}3/year * 0.1 * 1.3E\text{-}2$

$= 2.12E\text{-}6/year$

The main control board had a total of 7 panels. The analyst determined that only a fire in one of these panels (CB-1) could lead to the loss of the credited pressurizer heater. Therefore, a bounding change in core damage frequency for a control room fire that leads to evacuation and the loss of the pressurizer heater (F_{CR+PZR}) was determined to be:

F_{CR+PZR} = F_{CR} * (1 / 7)

= 2.12E-6/year * (1 / 7)

= 3.03E-7/year

For the cable spreading room, the senior reactor analyst limited the risk determination to transient and hot work fires since there were no fixed ignition sources in the cable spreading room. The senior reactor analyst assigned a plant-specific fire ignition frequency for transients (FIF_{CSR-TR}) and hot work activities (FIF_{CSR-HW}) from Calculation CN-RAM-10-013, "Fire Scenario Selection and Characterization for Fort Calhoun Station," Revision 1.

Based on a walkdown of the cable spreading room, the senior reactor analyst assigned a screening weighting factor (W) of 0.1 for transient and hot work fires. The senior reactor analyst noted that the cable spreading room was protected by a Halon system. The senior reactor analyst assigned a nominal failure probability of the Halon system (NP_{Halon}) from Calculation CN-RAM-10-013.

Therefore, a bounding change in core damage frequency for a cable spreading room fire that leads to evacuation and the loss of the credited pressurizer heater ($F_{CSR+PZR}$) was determined to be:

$F_{CSR+PZR}$ = $(FIF_{CSR-TR} + FIF_{CSR-HW}) * W * NP_{Halon}$

= (2.3E-5/year + 7.52E-6/year) * 0.1 * 0.069

= 2.11E-7/year

Since fires in the control room are independent of fires in the cable spreading room, the senior reactor analyst calculated a bounding total change in core damage frequency (ΔCDF_{TOT}) for the performance deficiency by adding the change in core damage frequencies for the control room and cable spreading room calculated above. The senior reactor analyst calculated a bounding total change in core damage frequency of:

ΔCDF_{TOT} = $F_{CR+PZR} + F_{CSR+PZR}$

= 3.03E-7/year + 2.11E-7/year

= 5.1E-7/year

This change in core damage frequency was considered to be bounding since it assumed:

- A fire in any of the applicable main control board panels or the cable spreading room areas would cause a loss of the credited pressurizer heater,

- The conditional core damage probability given a control room fire with evacuation and the loss of the credited pressurizer heater was equal to one, and

- The performance deficiency accounted for the entire change in core damage frequency (i.e., the baseline core damage frequency for this event was zero).

In accordance with the guidance in Inspection Manual Chapter 0609, Appendix H, "Containment Integrity Significance Determination Process," dated May 6, 2004, the senior reactor analyst screened the performance deficiency for its potential risk contribution to large early release frequency since the bounding change in core damage frequency provided a risk significance estimate greater than 1E-7/yr. Given that Fort Calhoun Station has a large dry containment and that control room evacuation sequences do not include steam generator tube ruptures or intersystem loss of coolant accidents, the analyst determined that this example was not significant with respect to large early release frequency. The analyst determined this example was of very low risk significance (Green).

This finding did not have a cross-cutting aspect since it was not indicative of present performance in that the performance deficiency occurred more than three years ago.

Enforcement. License Condition 3.D, "Fire Protection Program," states, in part, that the licensee shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee amendment request, dated September 28, 2011 (and supplements, dated December 19, 2011; December 22, 2011; March 20, 2012; July 24, 2012; August 24, 2012; September 27, 2012; April 23, 2013; May 21, 2013; July 29, 2013; September 12, 2013; October 11, 2013; November 4, 2013; November 11, 2013; December 18, 2013; January 24, 2014; February 28, 2014; April10, 2014; and June 11, 2014) and as approved in the safety evaluation, dated June 16, 2014. Table B-3, "Fire Area Transition," of the license amendment request, dated September 28, 2011, states that the licensee would initially maintain reactor coolant system pressure by operating pressurizer heater RC4-4 locally at the breaker for fires in the control room or cable spreading room.

Contrary to the above, from September 28, 2011, to November 6, 2015, the licensee failed to implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c). Specifically, a fire in the control room or cable spreading room could disable the pressurizer heater RC4-4 such that the heater could not maintain reactor coolant system pressure.

The licensee entered this issue into their corrective action program as Condition Report 2015-12195 and added this issue to their compensatory measures for the control room and cable spreading room. Because this violation was of very low safety significance and has been entered into the corrective action program, this violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000285/2015012-02, "Failure to Provide Adequate Isolation for Pressurizer Heaters."

.06 Circuit Analyses

a. Inspection Scope

The inspectors reviewed the nuclear safety capability assessment to verify that the licensee identified the circuits that may impact the ability to achieve and maintain safe and stable conditions. The inspectors verified, on a sample basis, that the licensee properly identified the cables for equipment required to achieve and maintain safe and stable conditions in the event of a fire in the selected fire areas. The inspectors verified that these cables were either adequately protected from the potentially adverse effects of fire damage or were analyzed to show that fire-induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not prevent achieving safe and stable conditions. The inspectors verified that the licensee's analyses considered potential spurious operations due to fire-induced cable faults.

The inspectors' evaluation focused on the cables of selected components from the reactor coolant system, the credited charging pump, the pressurizer power-operated relief valves, emergency diesel generator, 125Vdc system, and the credited motor-driven auxiliary feedwater pump. For the sample of components selected, the inspectors reviewed process and instrumentation drawings, electrical elementary and block diagrams and identified power, control, and instrument cables necessary to support their operation. In addition, the inspectors reviewed cable routing information to verify that fire protection features were in place as needed to satisfy the separation requirements specified in the fire protection license basis.

b. Findings

No findings were identified.

.07 Communications

a. Inspection Scope

The inspectors reviewed the contents of designated emergency storage lockers and reviewed the procedure for shutdown from outside of the control room to verify that portable radio communications and fixed emergency communications systems were available, operable, and adequate for the performance of designated activities. The inspectors verified the capability of the communication systems to support the operators in the conduct and coordination of their required actions. The inspectors also verified that the design and location of communications equipment, such as repeaters and transmitters, would not cause a loss of communications during a fire. The inspectors discussed system design, testing, and maintenance with the system engineer.

b. Findings

No findings were identified.

.08 Emergency Lighting

a. Inspection Scope

The inspectors reviewed the emergency lighting provided, both in fixed and portable form, along access routes and egress routes and at control stations, plant parameter monitoring locations, and recovery action locations. The inspectors verified that the emergency lighting was adequate for operators to perform the required recovery actions during a walkdown of the procedure for shutdown from outside of the control room.

b. Findings

No findings were identified.

.09 Cold Shutdown Repairs

a. Inspection Scope

The inspectors determined that the licensee did not credit cold shutdown repairs to meet the nuclear safety performance criteria. The inspectors reviewed the nuclear safety capability assessment and interviewed licensee personnel and determined that the licensee does not require transitioning to cold shutdown to achieve a safe and stable condition.

b. Findings

No findings were identified.

.10 Compensatory Measures

a. Inspection Scope

The inspectors verified that compensatory measures were implemented for out-of-service, degraded, or inoperable fire protection and success path equipment, systems, or features (e.g., detection and suppression systems and equipment; passive fire barriers; or pumps, valves, or electrical devices providing nuclear safety functions or capabilities for meeting performance criteria) necessary to achieve and maintain safe and stable plant conditions. The inspectors also verified that the short-term compensatory measures compensated for the degraded function or feature until appropriate corrective action could be taken and that the licensee was effective in returning the equipment to service in a reasonable period of time.

b. Findings

No findings were identified.

.11 Radiological Release

a. Inspection Scope

The inspectors verified that the licensee provided reasonable assurance that a fire would not result in a radiological release that adversely affects the public, plant personnel, or the environment. The inspectors also verified that the licensee evaluated that any radiation release to any unrestricted area resulting from fire suppression activities were as low as reasonably achievable and would not exceed applicable 10 CFR Part 20 limits. The inspectors verified that the licensee analyzed radioactive release on a fire area basis in accordance with NFPA 805, Section 2.2.4. The inspectors walked down the selected fire zones and verified that the pre-fire plan tactics and instructions were consistent with the potential radiological conditions identified in the analyses.

b. Findings

No findings were identified.

.12 Non-Power Operations

a. Inspection Scope

The plant did not enter an outage during the inspection. However, the inspectors verified that the licensee defined specific points where one or more key safety functions could be lost during non-power operations. The inspectors reviewed the actions that the licensee would take during higher-risk evolutions where those key safety functions could be lost.

b. Findings

See Example 2 of Non-cited Violation 05000285/2015012-01 in Section 1R05.01.b.

.13 Monitoring Program

a. Inspection Scope

The inspectors verified that the licensee established a monitoring program to ensure that the availability and reliability of the fire protection systems, structures, and components credited in the performance-based analyses are maintained and to assess the performance of the fire protection program in meeting the performance criteria specified in NFPA 805. The inspectors verified that the monitoring program ensured the assumptions in the engineering analysis remain valid. The inspectors also verified that the licensee was maintaining acceptable levels of availability, reliability, and performance per its license condition. When the established levels of availability, reliability, and performance were not met, the inspectors verified that the licensee took appropriate corrective actions to return to the established levels.

b. Findings

Introduction. The inspectors identified a Green non-cited violation of License Condition 3.D, "Fire Protection Program," for the failure to establish an appropriate monitoring program in accordance with NFPA 805, Section 2.6. Specifically, the licensee failed to set the action level for the availability of the raw water system pumps to ensure that the assumptions in the engineering analysis remained valid.

Description. The inspectors reviewed selected samples of equipment monitored by the licensee utilizing Procedure ER-AA-610-1003, "NFPA 805 Monitoring Program," Revision 0, to ensure that the licensee's program properly implemented the requirements of NFPA 805, Section 2.6.

Licensee letter LIC-11-0099, Section 4.6.2, "Overview of Post-Transition NFPA 805 Monitoring Program," states that, "Monitoring will ensure that assumptions in engineering analysis remain valid. The monitoring program will be documented in an administrative process (i.e., program manual or directive) that provides the process and sets clear guidelines to consistently measure the performance of the fire protection program. Table S-3, "Implementation Items", item REC-101, states: "Development of the NFPA 805 monitoring program for FCS utilizing guidance from FAQ [Frequently Asked Question] 10-0059 (as described in Section 2.6 of NFPA 805)." Frequently Asked Question 10-0059, "NFPA 805 Monitoring," Revision 5, states in the Details section, Item 3, "Action level threshold – When establishing the action level threshold for reliability and availability, the action level should be no lower than the fire PRA [probabilistic risk assessment] assumptions."

For the raw water system pumps, the licensee opted to use their maintenance rule program as the monitoring program. The inspectors noted that the maintenance rule program allowable availability was 95 percent. However, the fire probabilistic risk assessment basic event for test and maintenance unavailability was 0.0134, which relates to an availability of 98.66 percent. Therefore, the action level for availability in the monitoring program was lower than the assumptions in the fire probabilistic risk assessment.

Equipment Reliability Procedure ER-AA-610-1003, "NFPA 805 Monitoring Program," Section 2.1, defines Action Level, "For those SSCs monitored by the NFPA 805 Monitoring Program, the action level is the threshold at which mitigating actions are required to keep assumptions made in the engineering analysis valid." Section 4.4 "Risk Target Value Determination," Item 4.4.1, states, "Using the Fire PRA, or other processes as appropriate, to determine target values of reliability and availability for the HSS fire protection/NSCA SSCs and programmatic elements established in Section 4.3 as requiring additional monitoring beyond inspection and test programs and system/ program health programs." Item 4.4.4 states, "If HSS SSCs have been identified using the maintenance rule guidelines, then the associated SSC specific performance criteria may be ESTABLISHED as in the Maintenance Rule, provided the criteria are consistent with Fire PRA assumptions." The fourth criteria provided states, "If the maintenance rule criteria does not bound the Fire PRA assumptions, then SUBMIT a Maintenance Rule Change request per reference 6.2.5." The inspectors noted that the licensee had not

submitted a maintenance rule change request despite the maintenance rule criteria failing to bound the fire probabilistic risk assessment assumptions.

Analysis. The failure to set the action level for the availability of the raw water system pumps to ensure that the assumptions in the engineering analysis remained valid was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency could adversely affect the acceptable level of availability of the raw water pumps, which are used to respond to fire initiating events.

The finding was screened in accordance with NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," dated June 19, 2012. The inspectors determined that an IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated September 20, 2013, review was required as the finding affected the ability to reach and maintain safe shutdown conditions in case of a fire. Using IMC 0609, Appendix F, Attachment 1, "Fire Protection Significance Determination Process Worksheet," dated September 20, 2013, the finding was screened as a Green finding of very low safety significance in accordance with Step 1.3, "Ability to Achieve Safe Shutdown," B Question. Based on the criteria in Appendix F, Attachment 2, "Degradation Rating Guidance Specific to Various Fire Protection Program Elements," dated February 28, 2005, the finding was assigned a "Low" degradation rating. Using Table A2.3, the inspectors considered a low degradation rating because the issue involved monitoring of components that did not degrade below acceptable levels during the exposure period.

This finding had a cross-cutting aspect associated with change management within the human performance area since the leaders failed to use a systematic process for evaluating and implementing change so that nuclear safety remains the overriding priority. Specifically, the inspectors determined that the licensee did not use the process that was in place to ensure that the appropriate NFPA 805 fire risk assessment monitoring action levels were incorporated into the maintenance rule program and monitored (H.3).

Enforcement. License Condition 3.D, "Fire Protection Program," states, in part, that the licensee shall implement and maintain in effect all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in the licensee amendment request dated September 28, 2011 (and supplements, dated December 19, 2011, December 22, 2011, March 20, 2012, July 24, 2012, August 24, 2012, September 27, 2012, April 23, 2013, May 21, 2013, July 29, 2013, September 12, 2013, October 11, 2013, November 4, 2013, November 11, 2013, December 18, 2013, January 24, 2014, February 28, 2014, April10, and June 11, 2014), and as approved in the safety evaluation, dated June 16, 2014.

The approved fire protection program is a risk-informed performance-based program in accordance with NFPA 805, "Performance-Based Standard for Fire Protection for Light

Water Reactor Electric Generating Plants, 2001 Edition" (NFPA 805), incorporated by reference into 10 CFR 50.48(c). NFPA 805, Section 2.6, "Monitoring," states that, "Monitoring shall ensure that the assumptions in the engineering analysis remain valid." Contrary to the above, from June 16, 2015, to November 6, 2015, the licensee failed to appropriately monitor plant equipment to ensure that the assumptions in the NFPA 805 engineering analysis remained valid. Specifically, the licensee's monitoring program did not monitor the availability of the raw water system pumps to ensure that it was no lower than the fire probabilistic risk assessment assumptions.

Because the finding was of very low safety significance (Green), was entered into the licensee's corrective action program as Condition Report 2015-12612, the availability of the pumps was greater than that assumed in the fire probabilistic risk assessment, and the licensee was in the process of developing corrective actions to address the monitoring of the pumps, this finding is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement policy. This finding is identified as NCV 05000285/2015012-03, "Failure to Set Action Levels to Ensure that the Assumptions in the Engineering Analysis Remain Valid."

.14 Plant Change Evaluation

a. Inspection Scope

The inspectors reviewed plant change evaluations to verify that where performance-based methods were applied, the methods adequately represented plant design and conditions in the fire area, were performed by qualified persons, were acceptable for the application and met the requirements of the fire protection license condition for self-approved changes to the fire protection program. The licensee had not yet implemented the plant changes. Therefore, the inspectors reviewed a sample of engineering changes planned by the licensee. Additionally, the inspectors reviewed the governing procedures related to engineering changes and the requirements for performing plant change evaluations.

The inspectors sampled the following changes:

- REC-111, high energy arc fault shielding to limit damage.
- REC-114, provide protection for SOV HCV-247 control cables to prevent spurious isolation of CVCS injection flow path.
- REC-116, modification to ensure that diesel generator 1 supply breaker cannot close unless breakers 1A3-1 and 1A3-3 are open. Offsite power can potentially be lost with fire in DG1 area and diesel connects to grid.
- REC-131, provide nitrogen backup to valve YCV-1045 so that pump FW-10 can operate for 24 hours.

b. Findings

No findings were identified.

.15 Implementation of Risk-Related Implementation Items

a. Inspection Scope

The inspectors verified that the licensee appropriately implemented risk-related items in the establishment and early operation of their NFPA 805 program. This review included the risk management policy for fire brigade emergency response, upgraded fire human reliability analysis methods, alternate steam generator level monitoring methods, and incorporation of revised fire risk methods in the fire probabilistic risk assessment. The inspectors also reviewed the licensee's integration of multi-compartment scenarios into the base fire probabilistic risk assessment. Finally, the inspectors reviewed the licensee's probabilistic risk assessment to ensure the basic event data in the fire probabilistic risk assessment matched the internal events probabilistic risk assessment basic events, which included a verification of multiple spurious operation and human reliability analysis treatment.

The inspectors sampled the following alternate methods to ensure that the licensee appropriately replaced them with approved methods:

- Fire Pump Frequency Apportioning

  The licensee based apportioning on pump runtime to account for lower usage with standby pumps. Standard NFPA 805 suggested apportioning on pump count alone. The licensee had performed sensitivity studies using pump count apportioning. Acceptable results were achieved.

- Diesel Generator Fire Treatment

  The licensee assumed that most fires occur during surveillance testing. Therefore, it was assumed that an operator would be physically stationed in the room. This artificially improved manual suppression credit. Standard NFPA 805 suggested that surveillance testing is indicative of demand runs and likely will not have manual suppression. The licensee had performed sensitivity indicated studies indicating that the acceptance criteria were still met.

- Use of Draft Frequently Asked Question 08-0050

  The licensee indicated there was no change to their conclusions given implementation of the final frequently asked question.

- Electrical Cabinet Generic Severity Factor

  The licensee assumed that 10 percent of fires will damage targets external to the cabinet. However, the acceptance criteria were still met when the severity factor was set to 1.0.

b. Findings

No findings were identified.

.16 Alternative Mitigation Strategy Inspection Activities

a. Inspection Scope

The inspectors reviewed the licensee's implementation of guidance and strategies intended to maintain or restore core, containment, and spent fuel pool cooling capabilities under the circumstances associated with the potential loss of large areas of the plant due to explosions or fire as required by 10 CFR 50.54(hh)(2).

The inspectors verified that the licensee maintained and implemented adequate procedures, maintained and tested equipment necessary to properly implement the strategies, and ensured station personnel were knowledgeable and capable of implementing the procedures. The inspectors performed a visual inspection of portable equipment used to implement the strategy to ensure the availability and material readiness of the equipment, including the adequacy of portable pump trailer hitch attachments, and verify the availability of on-site vehicles capable of towing the portable pump. The inspectors evaluated the containment flooding with portable pump strategy.

One mitigating strategy sample was completed.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES (OA)

4OA2 Identification and Resolution of Problems

Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The inspectors selected a sample of condition reports associated with the licensee's fire protection program to verify that the licensee had an appropriate threshold for identifying deficiencies. The inspectors reviewed the corrective actions proposed and implemented to verify that they were effective in correcting identified deficiencies. The inspectors

evaluated the quality of recent engineering evaluations through a review of condition reports, calculations, and other documents during the inspection.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

The inspectors presented the inspection results to Mr. L. Cortopassi, Site Vice President and Chief Nuclear Officer, and other members of the licensee staff at an exit meeting on November 6, 2015. The licensee acknowledged the findings presented.

The inspectors verified that proprietary information was retained by the inspectors would be appropriately controlled.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

K. Ahrens, Fire Protection System Engineer
C. Averett, Site Communicator
D. Bacalan, Site Security Manager
R. Beck, Chemistry Manager
B. Bittle, Design Engineer
B. Blame, Site Regulatory Assurance Manager
D. Brehm, Radiological Protection Supervisor
C. Cameron, Regulatory Assurance
H. Childs, Site Security Manager
G. Coleman, Training
L. Cortopassi, Site Vice President and Chief Nuclear Officer
S. Dean, Plant Manager
S. Fatora, Work Management Director
J. Geschwender, Probabilistic Risk Assessment Engineer
H. Goodman, Site Engineering Director
H. Hackeroft, Probabilistic Risk Assessment Engineer
B. Heimes, Security
R. Hugenroth, Nuclear Oversight Manager
T. Kapuan, Maintenance Director
J. LeMaire, Fire Protection Engineer (EPM Contractor)
S. Lindquist, Unit Supervisor
E. Matzke, Regulatory Assurance
J. McManuis, Project Engineering Manager
H. Minassian, Program Engineer
T. Muff, Maintenance
F. Pellizzori, Safe Shutdown Analyst (EPM Contractor)
C. Pragman, Exelon Corporate Fire Protection
M. Prospero, Executive Outage Manager
A. Rochon, Westinghouse (Fire PRA Support)
T. Swanson, Fire Marshall
M. Seip, Fire Brigade Instructor
A. Sublett, NFPA 805 Safe Shutdown Engineer
S. Swanson, Operations Director
R. Swerczek, Fire Protection Engineer
J. Tarpinian, NFPA 805 Fire Protection Engineer (EPM Contractor)
T. Uehling, Training
J. Wiegand, Operations Support and Services Manager
J. Wilson, Design Engineer
Z. Wineinger, Design Engineer

NRC Personnel

S. Schneider, Senior Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000285/2015012-01	NCV	Failure to Adequately Implement and Maintain Required NFPA 805 Implementation Items (Section 1R05.01.b)
05000285/2015012-02	NCV	Failure to Provide Adequate Isolation for Pressurizer Heaters (Section 1R05.05.b)
05000285/2015012-03	NCV	Failure to Set Action Levels to Ensure that the Assumptions in the Engineering Analysis Remain Valid (Section 1R05.13.b)

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LIST OF DOCUMENTS REVIEWED

Cable Routing Data Components

EC399 ED363A ED362 EC391A EC391 EC392 ED363 EB365 EA396 ED985

Calculations

Number	Title	Revision
CN-RAM-09-021	Fire Ignition Frequencies for Fort Calhoun Station	2
CN-RAM-09-026	Fire Human Reliability Analysis for Fort Calhoun Station	2
CN-RAM-09-048	Fire PRA Plant Response Model for Fort Calhoun Station	2
CN-RAM-10-013	Fire Scenario Selection and Characterization for Fort Calhoun Station	1 and 2
CN-RAM-10-015	Fire PRA Qualitative Screening, Quantitative Screening, Quantification, and Uncertainty Analysis for Fort Calhoun Station	3 and 4
CN-RAM-10-021	Fire Ignition Frequencies for Fort Calhoun Station	3
CN-RAM-10-025, Attachment 9	Fire Risk Assessment of NFPA 805 Variances from the Deterministic Requirements in Fire Compartment 36B	2C
CN-RAM-10-025, Attachment 11	Fire Risk Assessment of NFPA 805 Variances from the Deterministic Requirements in Fire Compartment 42	2C
CN-RAM-10-025, Attachment 12	Fire Risk Assessment of NFPA 805 Variances from the Deterministic Requirements in Fire Compartment 43	2C
FC05690	Battery Load Profile and Voltage Drop Calculation	11
FC6506	Hydraulic Model of Fire Protection Water Supply System	8
FC07869	NFPA 805 Recovery Actions Evaluation at FCS for EPU	0

Condition Reports

2014-14866	2015-11525*	2015-12156*	2015-12590*
2015-01736	2015-11566*	2015-12158*	2015-12599*
2015-07943	2015-11702	2015-12160*	2015-12604*
2015-08746	2015-11750*	2015-12173	2015-12611*
2015-08835	2015-11755*	2015-12190*	2015-12612*
2015-09850	2015-11758*	2015-12195*	2015-12620*
2015-11044	2015-11821*	2015-12204*	2015-12631*
2015-11076	2015-11819*	2015-12208*	2015-12623*
2015-11079	2015-11904*	2015-12221*	2015-12634*
2015-11080	2015-11905*	2015-12223	2015-12653*
2015-11088	2015-11935*	2015-12436	2015-12657*
2015-11901	2015-12107*	2015-12254	2015-12662*
2015-11345	2015-12057*	2015-12444	2015-12665*
2015-11346	2015-12120*	2015-12465	2015-12730
2015-11347	2015-12173*	2015-12505	2015-12789
2015-11519	2015-12144	2015-12535	2015-13041

*Issued as a result of inspection activities

Drawings

Number	Title	Revision
B-4250, Sheet 17	Cable Block Diagram FCV-1368	3
B-4250, Sheet 260	Cable Block Diagram YCV-1045	2
B-4250, Sheet 261	Cable Block Diagram, YCV-1045A	3
B120F11503, Sheet 2	Emergency Generators Schematic Diagram, A1-132A & A1-133B	20
B120F14501, Sheet 1	Schematic Engine Control	15
B120F15503, Sheet 1	Schematic 480 VAC Auxiliary System	18
B120F15503, Sheet 2	Emergency Generators 480 VAC Auxiliary System Schematic	20

Drawings

Number	Title	Revision
B-4347, Sheet 1	Penetration Typical Drawing Conduit/Tubing/Piping thru Sleeve or Corebore Mechanical or Electrical Seal-Floor/Wall	6
B-4347, Sheet 2	Penetration Typical Drawing Conduit/Tubing/Piping thru Sleeve or Corebore Mechanical or Electrical Seal-Floor/Wall	2
B-4339, Sheet 1	Penetration Typical Drawing Single Conduit – Sleeve or Corebore-9/16” or Less Average Annulus Electrical Seal Floor/Wall	8
B-4342, Sheet 1	Penetration Typical Drawing Cable Trays Thru Walls of 11” or Greater Thickness Electrical Seal-Wall	9
CC-FC-211	Fire Protection Diagram	0
D-4098, Sheet 1	Auxiliary Building Fire Areas Operating Level	3
D-4098, Sheet 2	Auxiliary Building Fire Areas Ground Level	6
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EC-95-22	NFPA Code Compliance	4
EC-43758	Loop 106 Upgrade, Replace Transmitter, Manifold & Indicator	0
EC-63269	Replace Cable EC68 for the AC-1 OC-M Raw Water Pump Motor	0

Miscellaneous Documents

Number	Title	Revision/Date
Design Analysis EA 10-036	Fort Calhoun Station Automation and Update of Safe Shutdown Analysis	4
Design Analysis EA 10-037	Fort Calhoun Station NFPA-805 NSPC and Fire PRA Circuit Analysis, Cable Selection and Cable Location	0
Design Analysis EA 10-041	NFPA 805 recovery Action Feasibility Assessment	0
Design Analysis EA 10-042	Non-Power Operations Mode Transition Report	0
Design Analysis EA 10-044	Fort Calhoun Station Fire Area Review / Licensing Action Review	0
Design Analysis EA 11-013	NFPA 805 Risk Informed Performance Based Fire Risk Evaluation for Fire Area 34B-1	0
Design Analysis EA 11-015	NFPA 805 Risk Informed Performance Based Fire Risk Evaluation for Fire Area 36B	0
Design Analysis EA 11-017	NFPA 805 Risk Informed Performance Based Fire Risk Evaluation for Fire Area 42	0
Design Analysis EA 11-018	NFPA 805 Risk Informed Performance Based Fire Risk Evaluation for Fire Area 43	0
Design Analysis EA 15-015	NFPA 805 Fire Protection Monitoring Program	0
Design Analysis EA 97-001	Updated Fire Hazard Analysis (UFHA)	19

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Design Analysis EA 99-023	Fire Suppression Effects Analysis	1
Email From L. Wilkins to J. Sebrosky	Fort Calhoun Station RAIs Re: NFPA-805 (ME7244)	December 23, 2013
EPM Report R2407-006-001	Task 6 Review of Technical Specifications (Implementation Item From FCS LAR 10-07 Attachment S-3, Item # REC-138)	1
Event Notification 51487		October 21, 2015
FAQ 07-0035	Bus Duct Counting Guidance for High Energy Arcing Faults	2
FAQ 13-0005	Cable Fires Special Cases: Self Ignited and Caused by Welding and Cutting	5
General Form FC-66	Temporary Modification Control Form	69
NRC Letter ML14098A092	Fort Calhoun Station – Issuance of Amendment Regarding Transition to a Risk-Informed, Performance-Based Fire Protection Program in Accordance With 10 CFR 50.48(c) (TAC No. ME7244)	June 16, 2014
OPPD Letter LIC-13-0060	Remaining Responses to Second Request for Additional Information Re: License Amendment Request to Adopt NFPA 805 at Fort Calhoun Station (TAC No. ME7244)	May 21, 2013
OPPD Letter LIC-14-0004	Probabilistic Risk Assessment (PRA) RAO Responses 26.01 and 24.01 – NFPA-805 Transition (ME7244)	January 24, 2014
Project Document 649-30-06	Initiator Frequency Data Notebook	8
Regulatory Guide 1.174	An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis	2
RERP-Appendix A	Blair Fire Department Aid Agreement	June 6, 2006

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SDBD-EE-200	120 VAC Vital Distribution	18
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USAR-8.5	Electrical Systems, Initial Cable Installation Design Criteria	14
USAR-9.11	Auxiliary Systems, Fire Protection System	28
Westinghouse Letter LTR-RAM-II-15-006	Focused Scope Fire PRA Peer Review	0
	Fort Calhoun Fire & Rescue Agreement	January 1, 2015
	Fire Protection System Health Report 1st Quarter 2015	September 10, 2015
	Fire Protection System Health Report 4th Quarter 2014	September 10, 2015

NFPA 805 Implementation Items

REC-001	REC-037	REC-103	REC-144
REC-002	REC-039	REC-104	REC-145
REC-004	REC-050	REC-105	REC-147
REC-006	REC-055	REC-106	REC-149
REC-008	REC-059	REC-107	REC-150
REC-011	REC-067	REC-108	REC-151
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AOP-30	Emergency Fill of Emergency Feedwater Storage Tank	13
CC-AA-102	Design Input and Configuration Change Impact Screening	1
CC-AA-112	Temporary Configuration Changes	21
CC-AA-209	Fire Protection Program Configuration Change Review	5
CC-AA-209-1001	Guidelines for Performing Fire Protection Program Configuration Change Review	1
CC-FC-102	Design Input and Configuration Change Impact Screening	1
CC-FC-211	Fire Protection Program	0
EN-FC-402-0002	Storm Water Pollution Prevention Plant	0
EM-ST-060FDZH-QA	Calibration and Functional Test of QA Vault Halon Fire Detection and Protection System	0
EM-ST-06-FDZ-TG	Disassembly, Reassembly, and Testing of Turbine Generator Fire Detector System	0
EM-ST-EE-0011	Annual Testing of Emergency Lighting Panels	9
EP-FC-124-AD-F-01	Control Room Inventory	1
ER-AA-310-1003	Maintenance Rule – Performance Criteria Selection	4
ER-AA-600-1068	Fire PRA Risk Evaluation Support for NFPA 805 Program	1
ER-AA-610	NFPA 805 Monitoring Program	0
ER-AA-610-1003	NFPA 805 Monitoring Program	0
GM-ST-FP-0002	Fire Door Eighteen Month Inspection	13

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GM-ST-FP-0004	Semi-Annual Control Room Halon Cylinders Weight and Pressure Test	13
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IC-ST-FP-0001	Calibration and Functional Test of Auxiliary Building, Elevation 1036' (Room 81) Fire Detection System (AI-230 and AI-231)	5
LA-AA-128-101	Regulatory Review of Proposed Changes to the Approved NFPA 805 Fire Protection Program	0
MM-ST-FP-0001	Inspection of Diesel Fire Pump Engine	18
MM-ST-FP-0002	Inspection of Fire Pump Strainer FP-6A	17
MM-ST-FP-0003	Inspection of Fire Pump Strainer FP-6B	5
N-AN-ENG-CERT-RM09	Engineering Training Certification Guide for N-AN-ENG-CERT-RM09 Risk Management Engineer – Fire External Events	1
NO-FC-10	Quality Assurance Topical Report (QATR)	3
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OP-AA-201-006	Control of Temporary Heat Generating Equipment	8
OP-AA-201-009	Control of Transient Combustible Material	17
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OP-ST-FP-0011	Fire Protection System Hose Station Operability Test	10
OP-ST-FP-0013	Fire Protection System Turbine Building Sprinkler Systems Monthly Inspection	0
OP-ST-FP-0019	Fire Protection System Motor Driven Fire Pump Full Flow Test	0
OP-ST-FP-1000	Quarterly Fire Protection Drain Valve Flush and Alarm Test	0
OP-ST-HG-0001	Hydrogen Bottle Dock Inspection and Maintenance Test	0
OP-PM-FP-1001A	Monthly Fire Protection System Inspection (Week 1)	34
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PE-RR-AE-1001	Flood Barrier and Sandbag Staging and Installation	22
PRA-PR-5	Systems Analysis Procedure	4
SA-AA-129-2118	Management and Control of Temporary Power	8
SE-ST-FP-0005	Fire Barrier and Penetration Seals Eighteen Month Inspection	17

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SO-O-25	Temporary Modification Control	86
	Initial and Annual Re-Qual Fire Brigade Training	0

Vendor Documents

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TD E155.0020	Series 24 Instrument & Control Switches for Power Industry & Heavy Duty Industrial Applications	4
IM-09313031-1	Instruction Manual for Square D Magnum Circuit Breakers	4
TD A499.0030	3 and 4 Way Solenoid Valves for Pilot Control of Diaphragm & Cylinder Operated Valves in Nuclear Power Plants	2
TD E155.0030	High Speed Multi-Contact Lockout Relays for Power Industry Application	5

Work Orders

00528260	00502848	00521344	00547850
00458293	00517076	00523555	00427634
00485992	00521343	00532522	00527255
00547494	00524835	00535833	00435313
00526289	00532524	00536697	00465191
00495997	00532526	00511394	00495803
00459107	00535870	00513561	00499992
00520797	00542289	00519996	00522079
00493412	00544555	00532520	00470554
00543564	00423873	00553033	00538685
00136878	00433574	00427081	00530856
00481787	00454813	00495989	00559496
00490734	00474319	00428827	00545026
00545104	00489480	00465988	00540965
00423873	00502729	00541251	00543971
00468421	00515670	00542788	00544556
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