



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION III
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August 13, 2013

Mr. Larry Weber
Senior Vice President and
Chief Nuclear Officer
Indiana Michigan Power Company
Nuclear Generation Group
One Cook Place
Bridgman, MI 49106

**SUBJECT: DONALD C. COOK NUCLEAR POWER PLANT, UNITS 1 AND 2,
TRIENNIAL FIRE PROTECTION INSPECTION REPORT
05000315/2013009; 05000316/2013009**

Dear Mr. Weber:

On July 26, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed a Triennial Fire Protection Inspection at your D. C. Cook Nuclear Power Plant, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on June 28, 2013, with Mr. S. Lies, Vice President, Engineering, and on July 26, 2013, with Mr. M. Scarpello, Manager, Regulatory Affairs, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Four NRC-identified findings of very low safety significance (Green) were identified during this inspection. These findings were determined to involve violations of NRC requirements. However, because of their very low safety significance and because the issues were entered into your Corrective Action Program, the NRC is treating the issues as Non-Cited Violations (NCVs) in accordance with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the subject or severity of the Non-Cited Violation, 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 III; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at DC Cook Nuclear Power Plant. In addition, if you disagree with the cross-cutting aspect assigned to any finding 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 III, and the NRC Resident Inspector at DC Cook Nuclear Power Plant.

L. Weber

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure, and your response (if any), will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Robert C. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

Docket Nos. 50-315; 50-316
License Nos. DPR-58; DPR-74

Enclosure: Inspection Report 05000315/2013009 and 05000316/2013009
w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 05000315; 05000316
License Nos: DPR-58; DPR-74

Report No: 05000315/2013009; 05000316/2013009

Licensee: Indiana Michigan Power Company

Facility: D. C. Cook Nuclear Power Plant, Units 1 and 2

Location: Bridgman, MI

Dates: May 28 – July 26, 2013

Inspectors: A. K. Dahbur, Senior Reactor Inspector, Lead
M. Munir, Reactor Engineer
R. A. Winter, Reactor Engineer

Approved by: Robert C. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

Inspection Report (IR) 05000315/2013009, 05000316/2013009; 05/28/2013 – 07/26/2013; D. C. Cook Nuclear Power Plant, Units 1 and 2; Routine Triennial Fire Protection Baseline Inspection.

This report covers an announced Triennial Fire Protection Baseline Inspection. The inspection was conducted by Region III inspectors. Four (Green) findings were identified by the inspectors. The findings were considered a Non-Cited Violations (NCV) of NRC regulations. The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Cross-cutting aspects were determined using IMC 0310, "Components within the Cross Cutting Areas." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated June 7, 2012. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Initiating Events

- Green. The inspectors identified a finding of very low safety significance (Green) and associated NCV of Technical Specification 5.4.1.d, "Procedures," for the failure to control combustibles in accordance with a Fire Protection Program (FPP). Specifically, the licensee failed to obtain the FPP engineering review when they routed a fiber optics cable in a combustible exclusion area which was designated to establish separation between two fire areas required per 10 CFR Part 50, Appendix R. A twenty foot separation space with no intervening combustibles was located between Fire Areas AA36 and AA42 in the Auxiliary Building at 609 foot elevation. The licensee subsequently entered the issue into their Corrective Action Program and performed a preliminary evaluation of this issue and concluded that the cable routing did not affect the requirements of the FPP.

The inspectors determined that this finding was more than minor because if left uncorrected, it would become a more significant safety concern. Specifically, the licensee's failure to perform an engineering evaluation when introducing combustibles in the combustible exclusion zone or safety-related areas could potentially affect the validity of future evaluations. The inspectors determined that the finding screened as having very-low-safety significance in Task 1.3.1 of IMC 0609, Appendix F. This finding has a cross-cutting aspect in the area of human performance, work control, because the licensee failed to coordinate the routing of the fiber optics cable through a combustible exclusion area with the Fire Protection Engineer (FPE). [H.3(b)]. (Section 1R05.12.b(1))

Cornerstone: Mitigating Systems

- Green. The inspectors identified a finding of very low safety significance (Green) and associated NCV of the D. C. Cook Nuclear Power Plant facility operating licensee conditions for the Fire Protection Program for the licensee's failure to ensure fire doors that were propped open will automatically close at time of a fire. Specifically, Fire Doors 1-DR-AUX471 and 2-DR-AUX472 were found propped open and held by fusible links and CO₂ devices. In the event of a fire in either Fire Area AA40 or Fire Area AA43, the associated door would not automatically close due to the location of the fusible link, and

- the CO₂ pop-off devices would activate when the CO₂ System is manually actuated. The licensee subsequently entered the issue into their Corrective Action Program and established fire tours of the affected fire areas.

The inspectors determined that this finding was more than minor because the failure to ensure the propped open fire doors would automatically close in the event of a fire did not ensure that the fire would not spread between the adjacent fire areas separated by the doors and could have potentially compromised the ability to safely shutdown the plant. Based on the Detailed Risk-Evaluation completed by the Region III Senior Reactor Analysts (SRA), the inspectors determined the finding was of very low safety significance (Green) because the resulting change in the Core Damage Frequency (Δ CDF) was less than 1E-6/yr. The finding did not have a cross-cutting aspect because it was not reflective of current performance. (Section 1R05.2.b(1))

- Green. The inspectors identified a finding of very low safety significance (Green) and associated NCV of the D. C. Cook operating license condition for the Fire Protection Program for the licensee's failure to verify that the most remote sprinkler nozzle minimum required pressure was met. Specifically, the hydraulic analysis for most system demand credited two fire pumps to meet the minimum required pressure of seven pounds per square inch (psi) for the most remote sprinkler head. However, the licensee failed to verify that the auto start setpoint for a second fire pump was adequate to supply the system required demand. Subsequently, the licensee performed a preliminary engineering evaluation and determined that the affected sprinkler system was capable of performing their intended functions.

The inspectors determined that this finding was more than minor because this finding effected the Mitigating Systems cornerstones objectives of ensuring the capability of systems to respond the initiating events. Specifically, the licensee failed to ensure the capability of the system to provide 7 psi of firewater at the most remote nozzle for the sprinkler system for Fire Zones 44N and 44S in accordance with NFPA 13. The inspectors determined that the finding screened as having very low safety significance in Task 1.3.1 of IMC 0609, Appendix F. The finding did not have a cross-cutting aspect because it was not reflective of current performance. (Section 1R05.3.b(1))

- Green. The inspectors identified a finding of very low safety significance (Green) and associated NCV of Technical Specification 5.4.1.d, "Procedures," for the licensee's failure to provide adequate guidance required for safe shutdown in the response procedures. Specifically, the licensee failed to provide adequate guidance to reset the associated Emergency Diesel Generator (EDG) lockout relays to support EDG operation, which were required to power safe shutdown components to achieve shutdown in the event of a fire in either Fire Zones 79 or 85 for Units 1 or 2 respectively. The licensee subsequently entered the issue into their Corrective Action Program and added steps into the fire response procedure.

The inspectors determined that this finding was more than minor because the failure to provide adequate procedural guidance to reset the EDG lockout relays could have potentially compromised the ability to safely shutdown the plant in the event of a fire. Based on the Detailed Risk Evaluation completed by the Region III SRA, the inspectors determined the finding was of very low safety significance (Green) because the resulting change in the Core Damage Frequency (Δ CDF) was equal to 4.17E-9/yr. The finding did not have a cross-cutting aspect because it was not reflective of current performance. (Section 1R05.5.b(1))

B. Licensee-Identified Violations

No violations were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R05 Fire Protection (71111.05T)

The licensee was in transition to National Fire Protection Association (NFPA) 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition," as incorporated by 10 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 deterministic aspects of the standard are comparable to traditional requirements. However, the transition to a risk-informed, performance-based Fire Protection Program requires an in-depth nuclear safety circuit analysis for equipment identified for nuclear safety functions such as safe shutdown. Because the conversion and licensing process to NFPA 805 was expected to identify and address a variety of issues that were normally the subject of the Triennial Fire Protection Baseline Inspection, the U.S. Nuclear Regulatory Commission (NRC) modified the Enforcement Policy for licensees in transition to NFPA 805. As part of the transition to NFPA 805, certain findings not associated with findings of high safety significance that meet the four criteria established by Section A of the NRC's Interim Enforcement Policy Regarding Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48), receive enforcement discretion in accordance with the NRC's Enforcement Policy.

The purpose of the Fire Protection Triennial Baseline Inspection was to conduct a design-based, plant specific, risk-informed, onsite inspection of the licensee's Fire Protection Program's defense-in-depth elements used to mitigate the consequences of a fire. The Fire Protection Program shall extend the concept of defense-in-depth to fire protection in plant areas important to safety by:

- preventing fires from starting;
- rapidly detecting, controlling and extinguishing fires that do occur;
- providing protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by fire suppression activities will not prevent the safe shutdown of the reactor plant; and
- taking reasonable actions to mitigate postulated events that could potentially cause loss of large areas of power reactor facilities due to explosions or fires.

The inspectors' evaluation focused on the design, operational status, and material condition of the reactor plant's Fire Protection Program, post-fire safe shutdown systems, and B.5.b mitigating strategies. The objectives of the inspection were to assess whether the licensee had implemented a Fire Protection Program that:

(1) provided adequate controls for combustibles and ignition sources inside the plant; (2) provided adequate fire detection and suppression capability; (3) maintained passive fire protection features in good material condition; (4) established adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems or features; (5) ensured that procedures, equipment, fire barriers and systems exist so that the post-fire capability to safely shutdown the plant was ensured; (6) included feasible and reliable operator manual actions when appropriate to achieve safe shutdown; and (7) identified fire protection issues at an appropriate threshold and ensured these issues were entered into the licensee's Problem Identification and Resolution Program.

In addition, the inspectors' review and assessment focused on the licensee's post-fire safe shutdown systems for selected risk significant fire areas. Inspector emphasis was placed on determining that the post-fire safe shutdown capability and the fire protection features were maintained free of fire damage to ensure that at least one post-fire safe shutdown success path was available. The inspectors' review and assessment also focused on the licensee's B.5.b related license conditions and the requirements of Title 10, Code of Federal Regulations (10 CFR) 50.54 (hh)(2). Inspector emphasis was to ensure that the licensee could maintain or restore core cooling, containment, and spent fuel pool cooling capabilities utilizing the B.5.b mitigating strategies following a loss of large areas of power reactor facilities due to explosions or fires. Documents reviewed are listed in the Attachment to this report.

The fire areas and B.5.b mitigating strategies selected for review during this inspection are listed below and in Section 1R05.13. The fire areas selected constituted four inspection samples and the B.5.b mitigating strategies selected constituted two inspection samples, respectively, as defined in Inspection Procedure 71111.05T.

Fire Area	Fire Zone	Description
AA32	29A – G	Essential Service Water Area
AA36	44N	Auxiliary Building 609' Elevation
AA42	44S	Auxiliary Building 609' Elevation
AA43	45	Unit 2 - MCC Room

.1 Protection of Safe Shutdown Capabilities

a. Inspection Scope

For each of the selected fire areas, the inspectors reviewed the fire hazards analysis, safe shutdown analysis, and supporting drawings and documentation to verify that safe shutdown capabilities were properly protected.

The inspectors also reviewed the licensee's design control procedures to ensure that the process included appropriate reviews and controls to assess plant changes for any potential adverse impact on the Fire Protection Program and/or post-fire safe shutdown analysis and procedures.

b. Findings

No findings of significance were identified.

.2 Passive Fire Protection

a. Inspection Scope

For the selected fire areas, the inspectors evaluated the adequacy of fire area barriers, penetration seals, fire doors, electrical raceway fire barriers, and fire rated electrical cables. The inspectors observed the material condition and configuration of the installed barriers, seals, doors, and cables. The inspectors reviewed approved construction details and supporting fire tests. In addition, the inspectors reviewed license documentation, such as NRC safety evaluation reports, and deviations from NRC regulations and the National Fire Protection Association (NFPA) standards to verify that fire protection features met license commitments.

The inspectors walked down accessible portions of the selected fire areas to observe material condition and the adequacy of design of fire area boundaries (including walls, fire doors, and fire dampers) to ensure they were appropriate for the fire hazards in the area.

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

b. Findings

(1) Propped Open Fire Doors Required Manual Actuation of the CO₂ System to Close

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated NCV of License Conditions 2.C.4 and 2.C.3.o for Units 1 and 2 respectively, for the licensee's failure to ensure fire doors that were propped open will automatically close at time of a fire. Specifically, Fire Doors 1-DR-AUX471 and 2-DR-AUX472 were found propped open and held by fusible links and CO₂ devices. In the event of a fire in either Fire Area AA40 or Fire Area AA43, the associated door will not automatically close due to the location of the fusible link and the CO₂ pop-off devices activate when the CO₂ System is manually actuated.

Description: During the inspectors' walkdown of Fire Zones 41 (Unit 1 – MCC Room), 42B (Unit 1 – EPS Control Rod Drive Room), 45 (Unit 2 – MCC Room), and 46B (Unit 2 – EPS Control Rod Drive Room), the inspectors noticed that Fire Doors 1-DR-AUX471 and 2-DR-AUX472 were propped open and held open by fusible link and a CO₂ pop-off device installed only on one side of the doors. The doors were propped open due to ventilation concerns.

Fire Zones 41 and 45 had separate Appendix R Analyses. Fire Zone 41 was the only fire zone within Fire Area AA40 and Fire Zone 45 was the only fire zone within Fire Area AA43. Fire Zone 42B was part of Fire Area AA41, which consisted of Fire Zones 42A, 42B and 42C, and 42D. Fire Zone 46B was part of Fire Area AA44, which consisted of Fire Zones 46A, 46B, 46C and 46D.

Fire Door 1-DR-AUX471 separated Fire Zone 41 (Fire Area AA40) from Fire Zone 42B (Fire Area AA41) and was propped open into Fire Area AA41. Similarly, Fire Door 2-DR-AUX471 separated Fire Zone 45 (Fire Area AA43) from Fire Zone 46B (Fire Area AA44) and was propped open into Fire Area AA44. The fusible link and the CO₂ pop-off

devices for Fire Doors 1-DR-AUX471 and 2-DR-AUX472 was installed behind the propped open doors in Fire Areas AA41 and AA44, respectively. Thus, a fire in Fire Area AA40 may not actuate the fusible link to close the propped open Fire Door 1-DR-AUX471 before the fire could spread to the adjacent fire area. A similar condition was also applicable to Fire Door 2-DR-AUX472, in the event of a fire in Fire Area AA43. If this were to happen, each fire door could only be closed by a local manual action or by manually actuating the CO₂ System associated with Fire Areas AA40 and AA43 from the outside of the 4KV complex associated with each unit.

Fire Protection Program Manual, Revision 12, Table 5.1 "Design Basis," Section D, "General Guidelines for Plant Protection," discussed the licensee responses to the requirements of the Branch Technical Position (BTP 9.5-1), Appendix A. The table showed that the BTP required, in part, that door openings should be protected with equivalent rated doors, frames, and hardware that have been tested and approved by a nationally recognized laboratory. Such doors should be normally closed and locked or alarmed with alarm and annunciation in the control room. The licensee response indicated that some fire doors were held open by fusible links or by CO₂ pop-off devices due to ventilation requirements. The licensee referenced the original BTP 9.5-1, Appendix A Response, dated January 31, 1977.

The licensee's original response to the BTP 9.5-1, Appendix A, indicated that the CO₂ Systems in these rooms were automatically actuated by the initiation of ionization or thermistor type detectors. It also indicated that some doors and dampers that were associated with areas equipped with CO₂ Systems did not use electrical closing devices. The closing function was accomplished mechanically when CO₂ was admitted through the selector valve to the nozzle pipings. Thereafter, the licensee in February 6, 1989, submitted a fire protection Technical Specifications revision that also included a justification for changing the CO₂ Systems from automatic actuation to manual actuation. The justification did not address the impact of this change on the fire doors that were held open by CO₂ pop-off devices.

National Fire Protection Association (NFPA) – 80 "Fire Doors and Windows," 1970 Edition, Section 11 "Operation of Doors," required a closing device to be installed on every fire door and if the door was normally open, the door will close and latch the door at time of fire. This section also indicated that for the purpose of this standard the operation of doors was divided into two categories: (1) Self-closing doors those when opened returned to the closed position; and (2) Automatic closing doors those which normally remain open but which will close at time of fire. The inspectors determined that Fire Doors 471 and 472, which were each equipped with a fusible link and CO₂ pop-off device installed on one side of the door in which the CO₂ pop-off device is actuated manually, did not meet the requirements for automatic closing doors.

The inspectors were concerned that the manual activation of the CO₂ System did not meet the requirement for an automatic door closing device. The inspectors were concerned that if the propped open doors did not automatically close at the time of the fire, then a limiting fire in Fire Area AA40 or AA43 could spread into Fire Area AA41 or AA44 respectively and could result in damaging equipment associated with safe shutdown in both adjacent fire areas. At the time of the inspection, the licensee did not have an evaluation justifying the existing configuration for Fire Doors 471 and 472 allowing the doors to be closed by the manual actuation the CO₂ System.

In response to the inspectors' concern, the licensee established fire tours in the affected fire areas and initiated AR 2013-8836, "Inadequate Technical Evaluation 11.15," and AR 2013-10986, "inadequate Technical Evaluation 11-71. In addition, the licensee planning to implement a modification to switch the CO₂ System in these fire areas from manually actuated to automatically actuate per their transitioning to NFPA-805. This modification is being tracked in Open Item P1900-166.

Analysis:

The finding was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of Protection Against External Events (Fire) and affected the cornerstone objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the licensee failed to evaluate the adequacy of the existed design of these Fire Doors 1-DR-AUX471 and 2-DR-AUX472 to ensure the capability of these doors to close at the time of fire. The manual actuation of the CO₂ Systems to close Fire Doors 1-DR-AUX471 and 2-DR-AUX472 did not ensure that the fire would not spread to the adjacent fire areas and could potentially compromised the ability to safely shutdown the plant.

In accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," Table 2, the inspectors determined that the finding affected the Initiating Events cornerstone. The finding affected the ability to confine the effect of a fire, and the inspectors determined using Table 3, that it could be evaluated using Appendix F, "Fire Protection Significance Determination Process." The finding could not be screened out per Phase I and Phase II of Appendix F and, therefore, a Detailed Risk Evaluation was required.

The Senior Reactor Analysts (SRA) used the DC Cook all hazards (AHZ) draft Standardized Plant Analysis Risk (SPAR) model dated March 12, 2013, and Systems Analysis Programs for Hands-on Integrated Reliability Evaluations (SAPHIRE) Version 8.0.9.0 software to evaluate the risk significance of this finding. The exposure time for the finding was determined to be one year (i.e., the maximum exposure time allowed per the significance determination process (SDP)). Since the SPAR model is a Unit 1 model, the delta core damage frequency (Δ CDF) obtained for Unit 1 would also apply as a surrogate for the Δ CDF for Unit 2.

As discussed above, because of the performance deficiency associated with the propped open Fire Doors 1-DR-AUX471, a limiting fire in Fire Area AA40 may damage equipment associated with both Fire Areas AA40 and AA41. Similarly, for Fire Door 2-DR-AUX472, a limiting fire in Fire Area AA43 may damage equipment associated with both Fire Areas AA43 and AA44.

To calculate a delta core damage frequency (Δ CDF) associated with the finding, the Conditional Core Damage Probability (CCDP) for a limiting fire in Fire Area AA40 or AA43 was first evaluated. The result was a CCDP of 0.341. Then assuming the normally open doors separating Fire Areas AA40, AA41 and AA43, AA44 would not close by a fire in Fire Area AA40 or AA43, the CCDP for a limiting fire in Fire Area AA40 and AA43 combined with a limiting fire in the adjacent fire areas was obtained. The CCDP was again determined to be 0.341. Based on the negligible change in CCDP, the Δ CDF was less than 1E-6/yr.

Based on the above Detailed Risk Evaluation, the inspectors determined that the finding was of very low safety significance (Green).

The inspectors did not identify a cross-cutting aspect associated with this finding because the finding was not representative of current performance.

Enforcement: License Conditions 2.C.4 and 2.C.3.o of the D. C. Cook operating licenses, for Units 1 and 2, respectively, required, in part, that the licensee implement and maintain in effect all provisions of the Fire Protection Program as described in the licensee's Fire Protection Report, and as approved in the SER through March 11, 1996.

Fire Protection Program Manual, Section 14 "NFPA Code Compliance Evaluation," required D. C. Cook Nuclear Power Plant to comply with NFPA-80, 1970 Edition for fire doors.

National Fire Protection Association 80, 1970 Edition, Section 1101, stated that, "a closing device shall be installed on every fire door."

Section 1101.b stated, in part, that a closing device is a mechanism which, if kept in good working condition, will ensure that fire doors are kept in a closed position and latched or, if normally open, will close and latch the door at time of fire.

Section 1101.c, stated, in part, that for the purpose of this standard the operation of doors will be divided into two categories: (1) Self-closing doors; those when opened returned to the closed position; (2) Automatic closing doors; those which normally remained open but which will close at time of fire.

Contrary to the above, as of June 17, 2013, the licensee failed to ensure Fire Doors 1-DR-AUX471 and 2-DR-AUX472 will automatically close at time of fire in the event of a fire in Fire Areas AA40 or AA43 respectively. These Fire Doors were held open by pop-off closure devices and could be closed by manual actuation of the CO₂ Systems in Fire Area AA40 or AA43 respectively. The failure to automatically close the doors at the time of fire did not prevent the spread of a fire to adjacent fire areas.

Following the identification of this issue, the licensee established fire tours of the affected areas. Because this violation was of very low safety significance and it was entered into the licensee's Corrective Action Program as AR 2013-8836, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000315/2013009-01; 05000316/2013009-01, Propped Open Fire Doors Required Manual Actuation of the CO₂ System to Close).

.3 Active Fire Protection

a. Inspection Scope

For the selected fire areas, the inspectors evaluated the adequacy of fire suppression and detection systems. The inspectors observed the material condition and configuration of the installed fire detection and suppression systems. The inspectors reviewed design documents and supporting calculations. In addition, the inspectors reviewed license basis documentation, such as, NRC safety evaluation reports, deviations from NRC regulations, and NFPA standards to verify that fire suppression and detection systems met license commitments.

b. Findings

(1) Failure to Assure that a Second Fire Pump would Start upon Demand at the Setpoint

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated NCV of the D. C. Cook Operating License Conditions 2.C.4 and 2.C.3.o for Units 1 and 2 respectively, for the licensee's failure to verify that the most remote sprinkler head minimum required pressure was met. Specifically, the hydraulic analysis for the largest system demand credited two fire pumps to meet the minimum required pressure of 7 psi for the most remote sprinkler nozzle. However, the licensee failed to verify that the auto start setpoint for a second fire pump was adequate to supply the system required demand.

Description: Calculation MD-12-FIRE-003-S, "Hydraulic Analysis of Fire Protection System for Fire Zones 44N and 44S in Auxiliary Building," determined the demand available at the deluge valve 12-ZFP-371 for Fire Zones 44N and 44S in the Auxiliary Building, elevation 609 ft. The analysis assumed that all sprinkler heads were opened with a minimum operating pressure of 7 pounds per square inch (psi); and assumed an additional 1000 gallons per minute (gpm) was flowing to fire hoses. The hydraulic calculation was prepared in March 27, 2000, and concluded that two fire pumps were required to fulfill the worst case capacity demand.

The fire water system consisted of three fire pumps, one electric, and two diesels driven. Each pump had a 100 percent rated capacity of 2500 gpm. These pumps could also provide system flow at 150 percent capacity at a reduced pressure. Prior to 2004, the fire pumps were designed to have a sequential start delay of 2, 15, and 25 seconds for the electric pump, east diesel and west diesel fire pumps, respectively. Each timer activated by an individual pressure switch set at 140 psi. The licensee was concerned that, depending upon the accuracy and tolerance of each pressure switch, two or more fire pumps could start at the same time and potentially result in a water hammer condition in the piping system.

In 2004 the licensee implemented a setpoint change of the auto start setpoint pressure for both of the diesel fire pumps per Information Change Package, ICP-00833. After the licensee implementation the setpoint changes, the first pump (electric fire pump) was designed to auto start at 140 psi, the second fire pump (east diesel) would auto start at 130 psi, and the third fire pump (west diesel) would auto start at 120 psi.

The inspectors reviewed the auto start setpoint change package and were concerned that the licensee failed to evaluate that the second fire pump, now with a lower setpoint, would be able to auto start to meet system demand. The system pressure could remain above the auto start setpoint following the actuation of one of the suppression systems which would prevent the second fire pump from auto starting. The inspectors were concerned that if the second pump did not start, the design hydraulic requirements for the suppression system would not be met, since the most remote sprinkler nozzle may not have 7 psi. This could have an effect on the ability of the suppression system to suppress a fire in Fire Zones 44S or 44N.

In response to this issue, the licensee performed a preliminary engineering evaluation as part of a comprehensive operability evaluation which concluded that single pump operation could supply design rated flow and pressure to the affected sprinkler systems in the areas.

Analysis: The inspectors determined whether the licensee's failure to verify the adequacy of the auto start setpoint the second fire pump was contrary to the D. C. Cook Nuclear Power Plant license conditions associated with fire protection and was a performance deficiency. Specifically, in 2004, the licensee changed setpoints for the east and west diesel fire pumps without verifying that system pressure would drop below the auto start setpoint to start a second pump, thus ensuring that the most remote sprinkler nozzle would receive at least 7 psi as required by NFPA 13, Section 7-4.3.2.

The finding was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of Protection Against External Events (Fire) and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the licensee failed to ensure the capability of the system to provide 7 psi of firewater at the most remote nozzle for the sprinkler system for Fire Zones 44N and 44S in accordance with NFPA 13. The licensee failed to ensure this design attribute when the setpoints for the pumps were reset.

In accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," Table 2 the inspectors determined the finding affected the Mitigating Systems cornerstone. The finding affected the fixed fire protection systems, and the inspectors determined using Table 3, that it could be evaluated using Appendix F, "Fire Protection Significance Determination Process." The inspectors assigned a low degradation factor for this finding because the most remote sprinkler nozzle would have water flow, but at a reduced rate, and in the worst case, this finding could only have affected less than 10 percent of the total sprinkler nozzles. Therefore, the inspectors determined that the finding screened as having very low safety significance (Green) in Task 1.3.1 of IMC 0609, Appendix F.

The inspectors did not identify a cross-cutting aspect associated with this finding because the finding was not representative of current performance.

Enforcement: License Conditions 2.C.4 and 2.C.3.o of the D. C. Cook operating licenses, for Units 1 and 2, respectively, required, in part, that the licensee implement and maintain in effect all provisions of the Fire Protection Program as described in the licensee's Fire Protection Report, and as approved in the SER through March 11, 1996.

Fire Protection Program Manual, Section 14 "NFPA Code Compliance Evaluation," required D. C. Cook Nuclear Power Plant to comply with NFPA 13, 1983 Edition, for sprinkler systems.

National Fire Protection Association 13, 1983 Edition, Section 7-4.3.2, stated that, "a minimum operating pressure of any sprinkler shall be 7 psi."

Contrary to the above, from January 15, 2004, the licensee failed to assure that, under all conditions, at least 7 psi was present at each nozzle as required per Section 7-4.3.2 of National Fire Protection Association-13. Specifically, the hydraulic analysis credited two fire pumps in order to achieve the required pressure of 7 psi at the most remote sprinkler nozzle. However, the licensee failed to ensure that the revised auto start setpoint was adequate to start the second pump. Because this violation was of very low safety significance and it was entered into the licensee's Corrective Action Program as AR 2013-9251, this violation is being treated as an NCV, consistent with Section 2.3.2 of

the NRC Enforcement Policy (NCV 05000315/2013009-02; 05000316/2013009-02; Failure to Assure that the Second Fire Pump would start upon demand at the setpoint).

.4 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

For the selected fire areas, the inspectors verified that redundant trains of systems required for hot shutdown would not be subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems including the effects of flooding. The inspectors conducted walkdowns of each of the selected fire areas to assess conditions such as the adequacy and condition of floor drains, equipment elevations, and spray protection.

b. Findings

No findings of significance were identified.

.5 Alternative Shutdown Capability

a. Inspection Scope

The inspectors reviewed the licensee's systems required to achieve alternative safe shutdown to determine if the licensee had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions. The inspectors also focused on the adequacy of the systems to perform reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions.

The inspectors conducted selected area walkdowns to determine if operators could reasonably be expected to perform the alternate safe shutdown procedure actions and that equipment labeling was consistent with the alternate safe shutdown procedure. The review also looked at operator training, as well as consistency between the operations shutdown procedures and any associated administrative controls.

b. Findings

(1) Failure to Incorporate Required Shutdown Guidance into Fire Response Procedure

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated NCV of Technical Specifications (TS) 5.4.1.d, "Procedures," for the licensee's failure to have adequate guidance required for safe shutdown in the fire response procedure. Specifically, the licensee failed to implement procedural guidance, which would ensure the successful operation of the emergency diesel generators (EDGs) in the event of a fire in Fire Zones 79 or 85. Specific actions to reset the associated EDG lockout relays were required to support EDG operation in the event of a fire in either EDG Hallway that could result in a C discharge in EDG(s) rooms and initiating EDG trip signal.

Description: Each unit (Unit 1 and Unit 2) had similar configurations for their EDGs rooms' lineup; each unit had two EDGs, EDG-AB and EDG-CD. Each EDG was contained in its own room and the rooms in each plant were separated by a corridor.

The diesel generator corridors were part of Fire Zones 79 and 85, Turbine Room, 591ft elevation, for Units 1 and 2 respectively. Compliance with Appendix R for both fire zones was documented in the Safe Shutdown Capability Assessment (SSCA) for Analysis Area 2. The compliance assessment summary showed that the fire areas were in compliance with Section III.G.3 of 10 CFR Part 50, Appendix R with safe shutdown from the Control Room and SSCA credited the CD diesel of each unit to supply power to the electrical distribution system and safe shutdown equipment.

During the inspectors' walkdown of the diesel generators corridors for both units; the inspectors noticed that each corridor contained the CO₂ suppression system control panels and the actuation circuits for the CO₂ System for both EDG rooms associated with each operating unit. The inspectors inquired whether the licensee evaluated the potential for spurious discharge of the CO₂ in both of the EDG rooms for each unit as a result of a fire event in these corridors.

Fire Protection Program Manual Technical Evaluation 12.10, "Evaluation of CO₂ System Actuation Impact on the Emergency Power System (EPS)," previously identified that a single fire had the ability to cause the simultaneous discharge of CO₂ in both EDG rooms for each unit. The evaluation addressed two concerns related to this issue; (1) fire-induced spurious actuation of the CO₂ in both EDGs rooms and, rendering both EDGs inoperable; and (2) fire-induced spurious actuation of the CO₂ System flow signal generating an EDG automatic trip signal for both EDGs. The evaluation identified actions that could be taken due to a loss of an EDG caused by spurious actuation of the CO₂ in both EDG rooms concurrent with a loss of all AC power. The evaluation concluded that an EDG trip signal associated with the CO₂ actuation can be manually removed by resetting the lockout relays 87X-DGAB or 87X-DGCD in the control room. However, the inspectors noticed that these actions were never translated into safe shutdown procedures.

The SSCA credited the CD diesels for safe shutdown of the plants in the event of a fire in either corridor. However, in the event of loss of all AC power, the licensee credited Procedure 1/2-OHP-4023-ECA-0.0 "Loss of all AC Power," to recover AC power to supply safe shutdown equipment. The procedure relied on the Supplemental Diesel Generators to provide power to support safe shutdown of the affected unit. The inspectors determined that since the Supplemental Diesel Generators were neither credited nor analyzed under the Appendix R Program, the supplemental diesel may not be available to support safe shutdown. The licensee indicated that in the event that all AC power was not available including the supplemental diesels, Step 9.c of this procedure directed the operations crew, to use Procedure 1-OHP-4025-R-13-1(2) "Restore Diesel Generators." Procedure 1-OHP-4025-R-13-1(2) included steps to deactivate the electrical controls of the emergency diesel generators, placing them in a completely manual mode of operation. The steps in this procedure included repair actions to de-terminate wires and install jumpers. The inspectors determined that these repair actions were used for hot shutdown and were not approved by the NRC. Per Appendix R, Section III.G.1 and as explained in Generic Letter, GL 86-10, Section 5.3.4 one train of systems needed to achieve and maintain hot shutdown conditions must be free of fire damage. Systems necessary to achieve and maintain cold shutdown can be repaired within 72 hours; however, this allowance does not apply to the repair of equipment used to maintain hot shutdown.

In conclusion, the inspectors determined that the actions credited in the safe shutdown procedures were not consistent with the SSCA and not in compliance with the Appendix R requirements.

As immediate corrective actions, the licensee established hourly fire watch patrols in the EDG corridors in Fire Zones 79 and 85 and a Crew Noteworthy Event was issued to the Operations Crews, informing them of the identified condition and the potential need to reset relays 87X-DGAB or 87X-DGCD of the affected unit. Subsequently, the licensee revised 1-OHP-4024-101 and 2-OHP-4024-201 “Annunciator Response – Plant Fire System,” and also revised 12-OHP-4025-001-002, Attachment 2, and 3 for Units 1 and 2 respectively and added guidance to support the required actions for resetting the EDG’s associated relays in the event that the EDGs tripped solely because of a CO₂ actuation followed by a subsequent Loss of Offsite Power.

Analysis: The inspectors determined that the licensee’s failure to have adequate procedural guidance to shutdown the plant in the event of a fire in Fire Zones 79 and 85 for Units 1 and 2 respectively was contrary to Technical Specification 5.4.1.d, and was a performance deficiency. Specifically, the licensee failed to provide adequate guidance that met the SSCA and Appendix R requirements in the fire response procedure to ensure the successful operation and the restart of the EDG in the event of a fire in EDG’s hallway.

The finding was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of Protection Against External Events (Fire) and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the failure to provide adequate procedural guidance to reset the associated EDG lockout relay to restart the EDG could have potentially compromised the ability to safely shutdown the plant in the event of a fire in either fire zone 79 or 85.

In accordance with IMC 0609, “Significance Determination Process,” Attachment 0609.04, “Initial Characterization of Findings,” Table 2, the inspectors determined that the finding affected the Mitigating Systems cornerstone. The finding affected the ability to reach or maintain safe shutdown conditions in case of a fire, and the inspectors determined using Table 3, that it could be evaluated using Appendix F, “Fire Protection Significance Determination Process.” The finding could not be screened out per Phase I and Phase II of Appendix F and; therefore, a Detailed Risk Evaluation was required.

The Senior Reactor Analysts used the DC Cook all hazards draft SPAR model dated March 12, 2013, and SAPHIRE Version 8.0.9.0 software to evaluate the risk significance of this finding. The exposure time for the finding was determined to be one year (i.e., the maximum exposure time allowed per the SDP). Since the SPAR model is a Unit 1 model, the delta core damage frequency (Δ CDF) obtained for Unit 1 would also apply as a surrogate for the Δ CDF for Unit 2. Using information from the SPAR model, the following was obtained:

Description	Value
Initiating Event Frequency (IEF) for a Fire in Fire Zone 79 (where corridor is located)	4.31E-3/yr
Probability of a Loss of Offsite Power (LOOP) Given a Reactor Trip	5.29E-3

Conditional Core Damage Probability (CCDP) of a LOOP with a Failure of Diesel Generators 1AB and 1CD	1.83E-4
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Using the information from the table above, a Δ CDF for the finding is obtained as the product of the following factors: Δ CDF= [4.31E-3/yr] x [5.29E-3] x [1.83E-4] = 4.17E-9/yr.

Based on the Detailed Risk Evaluation, the inspectors determined that the finding was of very low safety-significance (Green).

The inspectors did not identify a cross-cutting aspect associated with this finding because the finding was not representative of current performance.

Enforcement: Technical Specifications 5.4.1.d, "Procedures," for Units 1 and 2 required, in part, that written procedures be established, implemented and maintained covering Fire Protection Program implementation. Procedure 12-OHP-4025-001-002 was a written procedure which covered Fire Protection Program implementation in that the procedure provided guidance to safely shutdown the plant in response to a fire in Fire Area 2A and 2B for Units 1 and 2 respectively.

Contrary to the above, as of June 12, 2013, the licensee failed to maintain written procedures covering Fire Protection Program implementation to safely shutdown the plant in the event of a fire. Specifically, Procedure 12-OHP-4025-001-002 was not maintained in that Attachments 2 and 3 of the procedure did not provide adequate guidance to safely shutdown the plant in response to a fire in Fire Area 2A and 2B, respectively. The attachments did not provide adequate guidance to restore AC power from an EDG, if both unit diesels tripped as a result of fire-induced circuit failures.

Following the identification of the procedure deficiency, the licensee revised the procedure and added steps to reset the associated EDG lockout relays. Because this violation was of very low safety significance and it was entered into the licensee's Corrective Action Program as AR 2013-8600, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000315/2013009-03; 05000316/2013009-03, Failure to Incorporate Required Shutdown Actions into Procedure).

.6 Circuit Analyses

a. Inspection Scope

The inspectors verified that the licensee performed a post-fire safe shutdown (SSD) analysis for the selected fire areas and the analysis appropriately identified the structures, systems, and components important to achieving and maintaining safe shutdown. Additionally, the inspectors verified that the licensee's analysis ensured that necessary electrical circuits were properly protected and that circuits that could adversely impact safe shutdown due to hot shorts, shorts to ground, or other failures were identified, evaluated, and dispositioned to ensure spurious actuations would not prevent safe shutdown.

The inspectors' review considered fire and cable attributes, potential undesirable consequences, and common power supply/bus concerns. Specific items included the

credibility of the fire threat, cable insulation attributes, cable failure modes, and actuations resulting in flow diversion or loss of coolant events.

The inspectors also reviewed cable raceway drawings for a sample of components required for post-fire safe shutdown to verify that cables were routed as described in the cable routing matrices.

The inspectors reviewed circuit breaker coordination studies to ensure equipment needed to conduct post-fire safe shutdown activities would not be impacted due to a lack of coordination. Additionally, the inspectors reviewed a sample of circuit breaker maintenance records to verify that circuit breakers for components required for post-fire safe shutdown were properly maintained in accordance with procedural requirements.

The inspectors verified for cables that are important to SSD, but not part of the success path, and that do not meet the separation/protection requirements of Section III.G.2 of 10 CFR Part 50, Appendix R, that the circuit analysis considered the cable failure modes. In addition, the inspectors have verified that the licensee has either: (1) determined that there is not a credible fire scenario (through fire modeling); (2) implemented feasible and reliable manual actions to assure SSD capability; or (3) performed a circuit fault analysis demonstrating no potential impact on SSD capability exists.

b. Findings

No findings of significance were identified.

.7 Communications

a. Inspection Scope

The inspectors reviewed, on a sample basis, the adequacy of the communication system to support plant personnel in the performance of alternative safe shutdown functions and fire brigade duties. The inspectors verified that plant telephones, page systems, sound powered phones, and radios were available for use and maintained in working order. The inspectors reviewed the electrical power supplies and cable routing for these systems to verify that either the telephones or the radios would remain functional following a fire.

b. Findings

No findings of significance were identified.

.8 Emergency Lighting

a. Inspection Scope

The inspectors performed a plant walkdown of selected areas in which a sample of operator actions would be performed in the performance of alternative safe shutdown functions. As part of the walkdowns, the inspectors focused on the existence of sufficient emergency lighting for access and egress to areas and for performing necessary equipment operations. The locations and positioning of the emergency lights

were observed during the walkdown and during review of manual actions implemented for the selected fire areas.

b. Findings

No findings of significance were identified.

.9 Cold Shutdown Repairs

a. Inspection Scope

The inspectors reviewed the licensee's procedures to determine whether repairs were required to achieve cold shutdown and to verify that dedicated repair procedures, equipment, and material to accomplish those repairs were available onsite. The inspectors also evaluated whether cold shutdown could be achieved within the required time using the licensee's procedures and repair methods. The inspectors also verified that equipment necessary to perform cold shutdown repairs was available onsite and properly staged.

b. Findings

No findings of significance were identified.

.10 Compensatory Measures

a. Inspection Scope

The inspectors conducted a review to verify that compensatory measures were in place for out-of-service, degraded or inoperable fire protection and post-fire safe shutdown equipment, systems, or features (e.g., detection and suppression systems, and equipment, passive fire barriers, pumps, valves or electrical devices providing safe shutdown functions or capabilities). The inspectors also conducted a review of the adequacy of 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.

.11 Review and Documentation of Fire Protection Program Changes

a. Inspection Scope

The inspectors reviewed changes to the approved Fire Protection Program to verify that the changes did not constitute an adverse effect on the ability to safely shutdown. The inspectors also reviewed the licensee's design control procedures to ensure that the process included appropriate reviews and controls to assess plant changes for any potential adverse impact on the Fire Protection Program and/or post-fire safe shutdown analysis and procedures.

b. Findings

No findings of significance were identified.

.12 Control of Transient Combustibles and Ignition Sources

a. Inspection Scope

The inspectors reviewed the licensee's procedures and programs for the control of ignition sources and transient combustibles to assess their effectiveness in preventing fires and in controlling combustible loading within limits established in the fire hazards analysis. A sample of hot work and transient combustible control permits were also reviewed. The inspectors performed plant walkdowns to verify that transient combustibles and ignition sources were being implemented in accordance with the administrative controls.

b. Findings

(1) Failure to Evaluate Routing of Fiber Optic Cable in Combustible Exclusion Zone

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation of Technical Specifications 5.4.1.d, "Procedures," for the failure to control combustible in accordance with the Fire Protection Program (FPP). Specifically, the licensee failed to implement the guidance specified in procedure PMP-2270-CCM-001, "Control of Combustible Materials," for appropriate control of combustibles within the plant. The licensee routed a fiber optics cable in a combustible exclusion area located between two separate fire areas; Fire Area AA36 and AA42 located in the Auxiliary Building at 609 foot elevation without appropriate review.

Description: Fire Zone 44N is the north half of the 609 foot elevation of the Auxiliary Building, Fire Zone 44S is the south half of the area. The north half of the area (Fire Zone 44N) contained only Unit 1 safe shutdown equipment and cables and credited alternate shutdown capability using Unit 2 systems and components. Fire Zone 44S contained predominantly Unit 2 safe shutdown cables and credited alternate shutdown capability using Unit 1 systems and components. A twenty feet separation space with no intervening combustibles between Fire Zones 44N and 44S was designated to establish separation required per 10 CFR Part 50, Appendix R. Technical Evaluation 11.43 documented the acceptability of this 20 foot wide separation space to prevent the spread of a fire between Fire Zones 44N and 44S and maintain redundant safe shutdown capability.

During the inspectors' walkdown of the area, the inspectors noticed an unidentified cable was located in the overhead and going through the 20 foot separation area. It was further identified that the cable was a fiber optic cable and was installed as part of an approved modification, EC-51838 "Plant Process Computer Network Infrastructure Installation."

The original modification package (EC-51838) did not designate that the fiber optic cables be routed in this area. The original modification was reviewed by the Fire Protection Program engineer (FPP) and was found to have no effect on the FPP. During the cable installation, a Field Change Notice (FCN) to the original modification re-designated that the cable be routed through the combustible exclusion zone located between Fire Zones 44N and 44S. Although, Step 3.4.9 of Procedure PMP-5040-MOD-010, "Field Change Notice," required the FPP engineer approval for changes that affected the FPP/Appendix R, the Field Change Notice, FCN-51838-1 was not routed to the FPP engineer for additional review.

Procedure PMP-2270-CCM-001 implemented the requirements and methods for control of combustible materials introduced into safety-related and other areas of the critical buildings/locations that in the event of a fire could impact safety-related equipment. Section 3.2.4.b of this procedure required that all permanent combustibles being introduced to safety-related areas to be undergo an engineering review to determine their effects on the FPP. The fiber optic cable was routed in the 20 foot combustible exclusion zone without the appropriate FPP engineering review and approval.

Upon discovery, the licensee entered this issue into their corrective actions as AR 2013-9767, "Cable Identified in 20 ft. Separation Area," and completed a preliminary evaluation by the FPP engineer. The licensee concluded that the fiber optic cable was an Institute of Electrical and Electronics Engineers (IEEE) 1202 flame retardant raceway and an electrically nonconductive member. The cable did not carry any electrical power source or electrical current, transmitted a light signal only; therefore, it was not subject to self-ignition. In order for the cable to burn, an external ignition source must be applied for an extended period in order to start the slow flaming process exhibited by flame retardant jacket. Based on these factors, the licensee determined that the cable in the combustible exclusion zone was acceptable and would not have affected safe shutdown.

Although, the licensee was able to conclude that the presence of the fiber optic cable in the combustible exclusion zone was acceptable, the inspectors were concerned that the failure to appropriately evaluate the presence of combustibles in the combustible exclusion zone could potentially invalidated the assumptions of Technical Evaluation 11.43 and did not limit the likelihood of fire potentially affected both safe shutdown trains in Fire Zones 44N and 44S.

Analysis: The inspectors determined that the licensee's failure to perform appropriate engineering evaluations to ensure that the presence of combustibles in combustibles exclusion zone did not affect both safe shutdown trains was contrary to the licensee's FPP, and was a performance deficiency. Specifically, the licensee routed a fiber optics cable in a combustible exclusion area without appropriated review to determine the effects on the FPP as required per procedure PMP-2270-CCM-001.

The finding was determined to be more than minor because if left uncorrected, it would become a more significant safety concern. Specifically, the licensee's failure to perform an engineering evaluation when introducing combustibles in the combustible exclusion zone or safety-related areas could potentially affect the validity of future evaluations. The inspectors concluded this finding was associated with the Initiating Events cornerstone. In addition, the finding was similar to IMC 0612, Appendix E, "Examples of Minor Issues," Example 4.K. The fiber optics cable as combustible material was routed in a combustible free zone required for separation of redundant trains without an engineering evaluation.

In accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," Table 2, the inspectors determined that the finding affected the Mitigating Systems cornerstone. The finding was associated with the failure to adequately implement fire prevention and administrative controls for combustible materials, and the inspectors determined using Table 3, that it could be evaluated using Appendix F, "Fire Protection Significance Determination Process." The inspectors completed a significance determination of this issue using Appendix F, Attachment 2, "Degradation Rating Guidance Specific to Various Fire Protection

Program Elements,” dated February 28, 2005. The inspectors determined that the quantity of the combustible material routed in the exclusion area represented a low degradation against the combustible controls program because the material was not a low flashpoint liquid. In addition, based on the low heat release rate (HRR) of a single cable, and the excessive time that it would take for a fire in the cable to travel from one fire area to another fire area (conservatively at approximately 10 ft per hour), the inspectors determined that the finding screened as having very low safety significance (Green) in Task 1.3.1 of IMC 0609, Appendix F.

The finding had a cross-cutting aspect in the area of human performance, work control, because the licensee failed to coordinate work activities consistent with nuclear safety. Specifically, the licensee failed to coordinate the routing of the fiber optics cable through a combustible exclusion area with the FPP engineer. [H.3(b)].

Enforcement: Technical Specifications 5.4.1.d, “Procedures,” for Units 1 and 2 required, in part, that written procedures be established, implemented and maintained covering Fire Protection Program implementation.

Procedure PMP-2270-CCM-001 was a written procedure which covered Fire Protection Program implementation in that the purpose of the procedure was to implement the NRC requirements and methods for control of combustible materials introduced into safety-related and other areas of the Critical Buildings/Locations that in the event of a fire could impact safety-related equipment.

Procedure PMP-2270-CCM-001, Section 3.2.4.b, stated, in part, all long term or permanent combustibles being introduced to safety-related areas must undergo an engineering review to determine their effects on the Fire Hazards Analysis and Critical Buildings/Locations commitments to Branch Technical Position (BTP) APCS 9.5-1 Appendix A and 10 CFR Part 50, Appendix R.

Contrary to the above, on January 11, 2013, the licensee failed to implement a written procedure covering Fire Protection Program implementation. Specifically, the licensee failed to perform an engineering review for combustibles introduced to a safety-related area. The licensee failed to obtain the FPP engineering review when they routed the fiber optics cable in the combustibles exclusion area located in the auxiliary building, at the 609 elevation between Fire Area 36 and 42.

Following the identification of this issue, the licensee completed an evaluation and concluded that the combustible exclusion area still met the requirements of 10 CFR 50.48, even with the fiber optics cable routed through it. Because this violation was of very low safety significance and it was entered into the licensee’s Corrective Action Program as AR 2013-8836, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000315/2013009-04; 05000316/2013009-04, Evaluate Routing of Fiber Optic Cable in Combustible Exclusion Zone).

.13 B.5.b Inspection Activities

a. Inspection Scope

The inspectors reviewed the licensee’s preparedness to handle large fires or explosions by reviewing selected mitigating strategies. This review ensured that the licensee

continued to meet the requirements of their B.5.b related license conditions and 10 CFR 50.54(hh)(2) by determining that:

- Procedures were being maintained and adequate;
- Equipment was properly staged, maintained, and tested;
- Station personnel were knowledgeable and could implement the procedures; and
- Additionally, inspectors reviewed the storage, maintenance, and testing of B.5.b related equipment.

The inspectors reviewed the licensee’s B.5.b related license conditions and evaluated selected mitigating strategies to ensure they remain feasible in light of operator training, maintenance/testing of necessary equipment and any plant modifications. In addition, the inspectors reviewed previous inspection reports for commitments made by the licensee to correct deficiencies identified during performance of Temporary Instruction (TI) 2515/171 or subsequent performances of these inspections.

The B.5.b mitigating strategies selected for review during this inspection are listed below. The offsite and onsite communications, notifications/emergency response organization activation, initial operational response actions and damage assessment activities identified in Table A.3 1 of Nuclear Energy Institute (NEI) 06-12, “B.5.b Phase II and Phase III Submittal Guidance,” Revision 2 are evaluated each time due to the mitigation strategies’ scenario selected.

NEI 06-12, Revision 2, Section	Licensee Strategy (Table)
3.2	A.3-1 Command and Control Enhancements
2.4	A.2-4 Additional Site-Specific SFP Makeup Strategies

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (71152)

a. Inspection Scope

The inspectors reviewed the licensee’s Corrective Action Program procedures and samples of corrective action documents to verify that the licensee was identifying issues related to the Fire Protection Program at an appropriate threshold and entering them in the Corrective Action Program. The inspectors reviewed selected samples of condition reports, design packages, and fire protection system non-conformance documents.

b. Findings

No findings of significance were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On June 28, 2013, the inspectors presented the preliminary inspection results to Mr. S. Lies, Vice President, Engineering, and on July 26, 2013, with Mr. M. Scarpello, Manager, Regulatory Affairs, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

S. Lies, Engineering Vice President
J. Ross, Plant Engineering Director
M. Belleville, Engineering Manager
S. Schnieder, Operation Senior Site License
K. Henderson, Regulatory Affairs
S. Partin, Plant Manager
L. Baun, Performance Assurance Director
M. Scarpello, Nuclear Regulatory Assurance Manager
C. Wohlgamuth, Nuclear Regulatory Assurance Supervisor
A. Olp, Design Engineering Mechanical Supervisor
S. Mitchell, Nuclear Regulatory Assurance Senior Compliance Coordinator
R. Pletz, Design Engineering Mechanical
D. MacDougall, Design Engineering Mechanical
C. Wohlgamuth, Regulatory Affairs Supervisor

Nuclear Regulatory Commission
J. Ellegood, Senior Resident Inspector
P. LaFlamme, Resident Inspector

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

05000315/2013009-01; 05000316/2013009-01	NCV	Propped Open Fire Doors Required Manual Actuation of the CO ₂ System to Close. (Section 1RO5.2.b(1))
05000315/2013009-02; 05000316/2013009-02	NCV	Failure to Assure that a Second Fire Pump would Start upon Demand at the Setpoint. (Section 1RO5.3.b(1))
05000315/2013009-03; 05000316/2013009-03	NCV	Failure to Incorporate Required Shutdown Guidance into Fire Response Procedure. (Section 1RO5.5.b(1))
05000315/2013009-04; 05000316/2013009-04	NCV	Evaluate Routing of Fiber Optic Cable in Combustible Exclusion Zone. (Section 1RO5.12.b(1))

Discussed

None

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

CALCULATIONS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
DDCC-FP-12-WS-15-F	Suppression System Verification for New Fire Pumps	1
FI-15771	CO ₂ Discharge Test	0
MD-01-FIREG-46-032-71M	Sheets 32 and 33	March 4, 2013
MD-01-FIREG-46-032-71M	Sheets 21	March 13, 2013
MD-12-FIREG-003-S	Hydraulic Analysis of Fire Protection System for Fire Zones 44N and 44S in Auxiliary Building	0

CORRECTIVE ACTION PROGRAM DOCUMENTS ISSUED DURING INSPECTION

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
2013-9434	Procedure Reference may be Incorrect	June 28, 2013
2013-9424	Hydrogen Bottles without Safety Caps	June 28, 2013
2013-7975	B.5.b Implementation Procedure was not Readily available	May 30, 2013
2013-9304	Transient Combustible Found in ESW Pump Room	June 26, 2013
2013-7983	Typographical Error in the Fire Hazards Analysis	May 30, 2013
2013-8680	10 CFR Part 50 Appendix R Analysis Area 32 and 33 Compliance Strategy	June 13, 2013
2013-8600	Zone 79 EDG Corridor Fire with Simulation CO ₂ Actuation	June 12, 2013
2013-7967	Cable Identified in 20' Separation Area	May 30, 2013
2013-7965	Procedure Update/Addition	May 30, 2013
2013-7981	Backup Fire Water Supply Incorrectly Referenced	May 30, 2013
2013-7979	Procedure for Performing B.5.b Strategy Needs Revising	May 30, 2013
2013-8593	Inadequate DC Ammeter Fusing	June 12, 2013
2013-8435	Head Distance of Sprinkler System in Auxiliary Building	June 10, 2013
2013-8836	Inadequate Technical Evaluation 11.15	June 17, 2013

CORRECTIVE ACTION PROGRAM DOCUMENTS REVIEWED

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
2013-8593	Inadequate DC Ammeter Fusing	June 12, 2013
2013-3346	Lack of Fusing for the DC Ammeters	March 6, 2013
2012-7848	Operating Experience 10 CFR Part 50 Appendix R Coordination Study Deficiency	June 22, 2012
2013-8678	Fire Brigade Member's Clear Command Malfunction	June 13, 2013
2012-7297	Response and Critique of Unannounced Fire Drill 2012-051D	June 7, 2012
2013-8385	Fire Extinguisher Not Hung Properly	June 7, 2013
2013-10986	Inadequate Technical Evaluation 11-71	July 30, 2013

DRAWINGS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
OP-1-5129-61	Flow Diagram CVCS – Reactor Letdown and Charging	61
OP-1-5129A-37	Flow Diagram CVCS – Reactor Letdown and Charging	37
OP-1-12002-64	Main Auxiliary One Line Diagram Bus “C” and “D” Engineered Safety System (Train “A”)	64
OP-1- 98034-35	Diesel Generator 1AB Control Elementary Diagram	35
OP-1-98035-36	Diesel Generator 1CD Control Elementary Diagram	36
OP-1-98573-46	Emergency Plant Shutdown and Cool Down Local Indication Elementary Diagram	46

MISCELLANEOUS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
	Fire Protection Program Manual	Revision 12
Fire Pre-Plans – Volume III	Fire Protection Response to a Large Fire Explosion Event	Revision 17
ECP 12-Z4-02	Dedicated Fire Protection Water Supply	November 18, 2002
ICP-00833	Setpoint Changes to the Pump Auto Start Pressure Switches for the East and West Diesel Driven Fire Pumps	0
NFPA 80	Fire Doors and Windows	1970 Edition
RFC 10-12-2230	Summary Report of CO ₂ Detectors and CO ₂ System	November 8, 1979
Fire Area AA32	Pre-Fire Plan FZ 29A, 29B, 29E, 29G	13
Fire Area AA36	Pre-Fire Plan FZ 44N	14

MISCELLANEOUS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
Fire Area AA39	Pre-Fire Plan FZ 40B	13
Fire Area AA42	Pre-Fire Plan FZ 44S	13
	Fire Impairment Log Report	June 10 and 27, 2013
R1900-0411-AA40	Detailed Fire Modeling – Fire Compartment AA40	Revision 0
R1900-0411-AA40	Detailed Fire Modeling – Fire Compartment AA403	Revision 1
	Fire Impairment Log report	July 30, 2013

PROCEDURES

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
12-OHP-4025-001-002	Fire Response Guidelines	5
1-OHP-4025-R-13	Restore Diesel Generators	4
1-OHP-4023-ECA-0.0	Loss of All AC Power	28
12-FPP-2270-066-002	Establishment of Backup Fire Protection Water Supplies	5
PMP-2270-CCM-001	Control of Combustible Materials	17
2-OHP-4025-001-001	Emergency Remote Shutdown	8
2-OHP-4025-R-6	Restore Letdown and Charging	1
2-OHP-4025-LTI-2	Local Main Steam Isolation	2
1-OHP-4030-101-044	Unit One LSI Panel Surveillance	5
12-FPP-4030-066-016	Inspection of Thermo-lag, Darnatt and Mecatiss Wrapped Enclosures and 3M Interam Material	3
12-FPP-4030-066-021	Inspection of Fire Dampers Protecting Safety-Related Areas	10
PMP-2270-CCM-001	Control of Combustible Materials	17
12-OHP-4026-EDM-001	Extensive Damage Mitigation Initial Response	2
12-OHP-4026-EDM-002	Extensive Damage Mitigation Enhanced Site Response	1
12-OHP-4026-EDM-003	Extensive Damage Mitigation Resource Management Guidance	1
PMP-2270-SDR-001	Fire Protection Suppression, Detection Systems, and Rated Assemblies	11

WORK ORDERS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
55411362 01	6 Month TRM Fire Door Inspection	March 22, 2013
55391364 04	EPDM, 12-EHP-4030-066-001, Fire Pump	August 31, 2013

LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
AHZ	All Hazards
BTP	Branch Technical Position
CCDP	Conditional Core Damage Probability
CDF	Core Damage Frequency
CFR	Code of Federal Regulations
CO ₂	Carbon Dioxide
DRS	Division of Reactor Safety
EC	Engineering Change
EDG	Emergency Diesel Generator
EPS	Emergency Power System
FPP	Fire Protection Program
FPE	Fire Protection Engineer
gpm	gallons per minute
HRR	heat release rate
ICP	Information Change Package
IEEE	Institute of Electrical and Electronics Engineers
IMC	Inspection Manual Chapter
IR	Inspection Report
MCC	Motor Control Center
NCV	Non-Cited Violation
NFPA	National Fire Protection Association
NRC	U.S. Nuclear Regulatory Commission
PARS	Publicly Available Records
PSI	Pounds per Square Inch
SAPHIRE	Systems Analysis Programs for Hands-on Integrated Reliability Evaluations
SDP	Significance Determination Process
SER	Safety Evaluation Review
SFP	Spent Fuel Pool
SPAR	Standardized Plant Analysis Risk
SRA	Senior Reactor Analysts
SSD	Safe Shutdown
TS	Technical Specification

R. Weber

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Sincerely,

/RA/

Robert C. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

Docket Nos. 50-315; 50-316
License Nos. DPR-58; DPR-74

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