

July 16, 2003

Mr. A. C. Bakken III
Senior Vice President
Nuclear Generation Group
American Electric Power Company
500 Circle Drive
Buchanan, MI 49107

SUBJECT: D.C. COOK NUCLEAR POWER PLANT, UNITS 1 AND 2
NRC INSPECTION REPORT 50-315/03-05; 50-316/03-05

Dear Mr. Bakken:

On April 11, 2003, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your D.C. Cook Nuclear Power Plant facility. The enclosed report documents the inspection findings which were preliminarily discussed on April 11, 2003 with you and members of your staff.

The inspection examined the effectiveness of activities conducted under your license as they related to the implementation of your NRC approved Fire Protection Program. The inspection consisted of a selected examination of design drawings, calculations, analyses, procedures, audits, field walkdowns, and interviews with personnel.

Based on the results of this inspection, there were four NRC-identified findings of very low safety significance which involved violations of NRC requirements. However, because these violations were non-willful and non-repetitive and because they were entered into your corrective action program, the NRC is treating these findings as Non-Cited Violations, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. We note that your staff had previously identified issues which should have resulted in three of the four violations being addressed. However, your staff did not properly resolve the identified issues in these three cases.

If you contest the subject or severity of a 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, DC 20555-0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the D.C. Cook Nuclear Power Plant facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your responses will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Julio F. Lara, Chief
Electrical Engineering Branch
Division of Reactor Safety

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

Enclosure: Inspection Report 50-315/03-05; 50-316/03-05

cc w/encl: J. Pollock, Site Vice President
M. Finissi, Plant Manager
R. Whale, Michigan Public Service Commission
Michigan Department of Environmental Quality
Emergency Management Division
MI Department of State Police
D. Lochbaum, Union of Concerned Scientists

A. Bakken

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U.S. NUCLEAR REGULATORY COMMISSION
REGION III

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

Report No: 50-315/03-05; 50-316/03-05

Licensee: Indiana Michigan Power Company

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

Location: Bridgman, Michigan

Dates: March 24 through April 11, 2003

Lead Inspector: R. Langstaff, Senior Reactor Inspector

Inspectors: R. Daley, Reactor Inspector
D. Schrum, Reactor Inspector

Observer: A. Klett, Nuclear Safety Intern

Approved By: Julio F. Lara, Chief
Electrical Engineering Branch
Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000315-03-05; 05000316-03-05; Indiana Michigan Power Company; 03/24/03-04/11/03; D.C. Cook Nuclear Power Plant, Units 1 and 2; Fire Protection Triennial.

This report covers an announced baseline triennial fire protection inspection. The inspection was conducted by three Region III inspectors. Four Green findings associated with four Non-Cited Violations were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be "Green" or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. Inspector-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- Green. A finding of very low safety significance was identified by the inspectors in that the control room heating, ventilation, and air conditioning (HVAC) system would be damaged for a postulated fire in fire zone 41. The cause of this finding was related to the cross-cutting area of Problem Identification and Resolution. Despite previously identifying this issue, the licensee failed to properly address this issue in that they mistakenly believed that performing a repair to the control room HVAC system in the event of a fire would meet regulatory requirements.

This finding was more than minor because one train of systems (i.e., control room HVAC) necessary to achieve and maintain hot shutdown conditions would not be free of fire damage for a postulated fire. The finding was of very low safety significance because actions to repair the control room HVAC system were proceduralized and provisions for providing temporary ventilation existed. This issue was a violation of 10 CFR 50.48 and 10 CFR Part 50, Appendix R, Section III.G.1 which required that one train of systems necessary to achieve and maintain hot shutdown conditions be free of fire damage (Section 1R05.2b).

- Green. A finding of very low safety significance was identified by the inspectors in that the licensee failed to ensure that alternative shutdown capability for a fire area could accommodate post-fire conditions where off-site power would not be available. Specifically, for a postulated fire in fire zone 41, onsite power (i.e., emergency diesel generators) may not be available due to fire damage.

This finding was more than minor because alternative shutdown capability was not assured for when off-site power would not be available. The finding was of very low safety significance because off-site power would not be affected by a fire in fire zone 41. This issue was a violation of 10 CFR 50.48 and 10 CFR Part 50, Appendix R, Section III.L.3 which required alternative shutdown capability to accommodate post-fire conditions where off-site power is available and where off-site power is not available for 72 hours (Section 1R05.4b).

- Green. A finding of very low safety significance was identified by the inspectors in that the licensee had failed to ensure that there was adequate emergency lighting (i.e., in the shift manager's office) for required safe shutdown actions (i.e., the retrieval of safe shutdown emergency procedures and equipment). The cause of this finding was related to the cross-cutting area of Problem Identification and Resolution. Despite previously identifying this issue, the licensee failed to properly address this issue in that they mistakenly believed that the shift manager's office was not a safe shutdown pathway.

This finding was more than minor because the lack of emergency lighting could result in delay of accomplishing safe shutdown actions. The finding was of very low safety significance because of the availability of portable head lamps. This issue was a violation of 10 CFR 50.48 and 10 CFR Part 50, Appendix R, Section III.J which required that emergency lighting units with at least an 8-hour battery power supply be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto (Section 1R05.7b).

- Green. A finding of very low safety significance was identified by the inspectors in that the licensee had failed to ensure that minimum required carbon dioxide (CO₂) system concentrations would be achieved for two fire zones. The cause of this finding was related to the cross-cutting area of Problem Identification and Resolution. Despite previously identifying this issue, the licensee failed to properly address this issue because they failed to address non-compliance with the applicable National Fire Protection Association (NFPA) code.

This finding was more than minor because a fire protection feature (i.e., a fixed suppression system) was adversely affected. The finding was of very low safety significance because of remaining available mitigation capability. This issue was a violation of a license condition which, by reference, invoked the applicable NFPA code which required a minimum CO₂ concentration (Section 1R05.10b).

REPORT DETAILS

Summary of Plant Status: Both units were operated at or near full power during the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R05 Fire Protection (71111.05)

The purpose of this inspection was to review the D.C. Cook Nuclear Power Plant fire protection program for selected risk-significant fire areas. Emphasis was placed on verifying 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 inspection was performed in accordance with the NRC regulatory oversight process using a risk-informed approach for selecting the fire areas and attributes to be inspected. The lead inspector used the D.C. Cook Nuclear Power Plant Individual Plant Examination for External Events to choose several risk-significant areas for detailed inspection and review. The fire areas and zones chosen for review during this inspection were:

<u>Fire Zone</u>	<u>Description of Fire Area Reviewed</u>
41	Engineered Safety System and Motor Control Center Room, Unit 1
53	Unit 1 Control Room
57	Unit 1 Control Room Cable Vault

The primary focus for this inspection was on the safe shutdown procedures and safe shutdown methodology for the selected fire areas. The determination of license commitments and changes to the fire protection program were reviewed for the selected fire zones.

.1 Systems Required to Achieve and Maintain Post-Fire Safe Shutdown

Title 10 CFR Part 50, Appendix R, Section III.G.1, required the licensee to provide fire protection features that were capable of limiting fire damage to structures, systems, and components important to safe shutdown. The structures, systems, and components that were necessary to achieve and maintain post-fire safe shutdown were required to be protected by fire protection features that were capable of limiting fire damage to the structures, systems, and components so that:

- One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) was free of fire damage; and
- Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) could be repaired within 72 hours.

Specific design features for ensuring this capability were specified by 10 CFR Part 50, Appendix R, Section III.G.2.

a. Inspection Scope

The inspectors reviewed the plant systems required to achieve and maintain post-fire safe shutdown to determine if the licensee had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions for each fire zone selected for review. Specifically, the review was performed to determine the adequacy of the systems selected for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring, and support system functions. This review included the fire protection safe shutdown analysis.

The inspectors also reviewed the operators' ability to perform the necessary manual actions for achieving safe shutdown including a review of procedures, accessibility of safe shutdown equipment, and the available time for performing the actions.

The inspectors reviewed the updated final safety analysis report and the licensee's engineering and/or licensing justifications (e.g., NRC guidance documents, license amendments, technical specifications, safety evaluation reports, exemptions, and deviations) to determine the licensing basis.

b. Findings

No findings of significance were identified.

.2 Fire Protection of Safe Shutdown Capability

Title 10 CFR Part 50, Appendix R, Section III.G.2, required separation of cables and equipment and associated circuits of redundant trains by a fire barrier having a 3 hour rating. If the requirements cannot be met, then alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, or zone under consideration should be provided (Section III. G.3).

a. Inspection Scope

For each of the selected fire areas, the inspectors reviewed the licensee's safe shutdown analysis to ensure that at least one post-fire safe shutdown success path was available in the event of a fire. This included a review of manual actions required to achieve and maintain hot shutdown conditions and make the necessary repairs to reach cold shutdown within 72 hours. The inspectors also reviewed procedures to verify that adequate direction was provided to operators to perform these manual actions. Factors, such as timing, access to the equipment, and the availability of procedures, were considered in the review.

The inspectors also evaluated the adequacy of fire suppression and detection systems, fire area barriers, penetration seals, and fire doors to ensure that at least one train of safe shutdown equipment was free of fire damage. To accomplish this, the inspectors observed the material condition and configuration of the installed fire detection and

suppression systems, fire barriers, and construction details and supporting fire tests for the installed fire barriers. In addition, the inspectors reviewed license documentation, such as deviations, detector placement drawings, fire hose station drawings, carbon dioxide pre-operational test reports, smoke removal plans, fire hazard analysis reports, safe shutdown analyses, and National Fire Protection Association (NFPA) codes to verify that the fire barrier installations met license commitments.

b. Findings

Introduction: The inspectors identified that the licensee failed to ensure that one train of equipment necessary for safe shutdown would be free of fire damage. This issue was determined to be of very low safety significance and was dispositioned as a Green Non-Cited Violation (NCV).

Description: The inspectors identified that for a postulated fire in fire zone 41, the control room heating, ventilation, and air conditioning (HVAC) system would be damaged. The licensee had analyzed the failure of the control room HVAC system. However, in the event of a fire, the licensee determined that repairing the control room HVAC system was achievable by re-powering the control room HVAC blower motors using temporary power cables after the fire occurred. The inspectors verified that actions to provide temporary power to the control room HVAC were proceduralized. In addition, the inspectors noted that the licensee had temporary ventilation fans available should such an alternate means of providing ventilation be required. As such, the inspectors determined that steps to provide control room HVAC could reasonably be accomplished from a risk perspective (as opposed to a compliance perspective).

The inspectors concluded that restoration of the control room HVAC system after a fire was essential due to the effect that potential heat stress would have on operators. Calculations performed by the licensee showed that control room temperatures could eventually reach levels sufficiently high that operators would not be able to perform required actions. Specifically, the calculations showed that the control room could reach 120 degrees (°) Fahrenheit (F) in two hours, 135° F in ten hours, and 175° F in 72 hours. This condition was originally identified by the licensee in Condition Report (CR) 02205039. The licensee resolved the issue by concluding that the restoration of control room HVAC was a cold shutdown activity.

Since manning the control room would be necessary to maintain hot shutdown conditions for a postulated fire in fire zone 41, the inspectors determined that actions to repair the control room HVAC system were hot shutdown repairs. The inspectors determined that the licensee's resolution was not appropriate because the restoration was a hot shutdown activity (rather than a cold shutdown activity). As a result, the licensee failed to correct the condition even though it had been identified through the corrective action program.

Analysis: In accordance with Inspection Manual Chapter (IMC) 0612, the inspectors determined that the issue was more than minor because the finding was associated with the protection against external factors (i.e., fire) attribute of the mitigating systems objective in that one train of systems necessary to achieve and maintain hot shutdown conditions would not be free of fire damage for a postulated fire. In accordance with

IMC 0609, Appendix A, the inspectors performed a Significance Determination Process (SDP) Phase 1 screening and determined that the finding degraded the Fire Protection portion of the Mitigating Systems Cornerstone. As such, screening under IMC 0609, Appendix F, was required. Based on review of IMC 0609, Appendix F, the inspectors determined that the finding did require a Phase 2 analysis because a fire protection features was inadequate. However, because steps to provide control room HVAC could reasonably be accomplished, the inspectors determined that the finding was of very low safety significance (Green).

Enforcement: Title 10 CFR 50.48(b)(2) requires, in part, that all nuclear power plants licensed to operate before January 1, 1979, must satisfy the applicable requirements of Appendix R to this part, including specifically the requirements of Sections III.G, III.J, and III.O. Title 10 CFR Part 50, Appendix R, Section III.G.1 requires, in part, that fire protection features be provided for structures, systems, and components important to safe shutdown. Title 10 CFR Part 50, Appendix R, Section III.G.1 also requires, in part, that the fire protection features be capable of limiting fire damage so that one train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage. The inspectors noted that 10 CFR Part 50, Appendix R, does not have a provision which allows repairs of a system which is required to achieve or maintain hot shutdown conditions. As such, the licensee's failure to ensure one train of systems (i.e., control room HVAC) necessary to achieve and maintain hot shutdown would be free of fire damage for a postulated fire in fire zone 41 is a violation of 10 CFR 50.48 and 10 CFR Part 50, Appendix R, Section III.G.1. This violation is associated with a finding that is characterized by the SDP as having very low risk significance (Green) and is being treated as NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. This violation was entered into the licensee's corrective action program as CR 03100011. (NCV 050-315/03-05-01; 050-316/03-05-01)

.3 Post-Fire Safe Shutdown Circuit Analysis

Title 10 CFR Part 50, Appendix R, Section III.G.1, required that structures, systems, and components important to safe shutdown be provided with fire protection features capable of limiting fire damage to ensure that one train of systems necessary to achieve and maintain hot shutdown conditions remained free of fire damage. Options for providing this level of fire protection were delineated in 10 CFR Part 50, Appendix R, Section III.G.2. Where the protection of systems whose function was required for hot shutdown did not satisfy 10 CFR Part 50, Appendix R, Section III.G.2, an alternative or dedicated shutdown capability and its associated circuits, was required to be provided that was independent of the cables, systems, and components in the area. For such areas, 10 CFR Part 50, Appendix R, Section III.L.3, specifically required the alternative or dedicated shutdown capability to be physically and electrically independent of the specific fire areas and capable of accommodating post-fire conditions where offsite power was available and where offsite power was not available for 72 hours.

a. Inspection Scope

On a sample basis, the inspectors evaluated the adequacy of separation provided for the power and control cabling of redundant trains of shutdown equipment. This investigation focused on the cabling of selected components in systems important for safe shutdown. The inspectors' review also included a sampling of components whose inadvertent operation due to fire may adversely affect post-fire safe shutdown capability. The purpose of this review was to determine if a single exposure fire, in one of the fire areas selected for this inspection, could prevent the proper operation of both safe shutdown trains.

b. Findings

No findings of significance were identified.

.4 Alternative Safe Shutdown Capability

Title 10 CFR Part 50, Appendix R, Section III.G.1, required that structures, systems, and components important to safe shutdown be provided with fire protection features capable of limiting fire damage to ensure that one train of systems necessary to achieve and maintain hot shutdown conditions remained free of fire damage. Options for providing this level of fire protection were delineated in 10 CFR Part 50, Appendix R, Section III.G.2. Where the protection of systems whose function was required for hot shutdown did not satisfy 10 CFR Part 50, Appendix R, Section III.G.2, an alternative or dedicated shutdown capability independent of the area under consideration was required to be provided. Additionally, alternative or dedicated shutdown capability must be able to achieve and maintain hot standby conditions and achieve cold shutdown conditions within 72 hours and maintain cold shutdown conditions thereafter. During the post-fire safe shutdown, the reactor coolant process variables must remain within those predicted for a loss of normal alternating current power, and the fission product boundary integrity must not be affected (i.e., no fuel clad damage, rupture of any primary coolant boundary, or rupture of the containment boundary).

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.

b. Findings

Introduction: The inspectors identified that the licensee failed to ensure that alternative shutdown capability for a fire area could accommodate post-fire conditions where off-site power would not be available. This issue was determined to be of very low safety significance and was dispositioned as a Green NCV.

Description: The inspectors identified that for a postulated fire in fire zone 41, on-site power (i.e., emergency diesel generators) may not be available due to fire damage. The licensee had identified fire zone 41 as a zone which required alternative shutdown capability, i.e., fire zone 41 was required to meet the requirements of 10 CFR Part 50, Appendix R, Section III.G.3. However, the licensee had analyzed that off-site power would be unaffected by any fire in fire zone 41, and therefore would be available to provide power to credited safe shutdown equipment.

Analysis: In accordance with IMC 0612, the inspectors determined that the issue was more than minor because the finding was associated with the protection against external factors (i.e., fire) attribute of the mitigating systems reactor safety cornerstone and affected the mitigating systems objective in that alternative shutdown capability was not assured for when off-site power would not be available. In accordance with IMC 0609, Appendix A, the inspectors performed a SDP Phase 1 screening and determined that the finding degraded the Fire Protection portion of the Mitigating Systems Cornerstone. As such, screening under IMC 0609, Appendix F, was required. Based on review of IMC 0609, Appendix F, the inspectors determined that the finding did not require a Phase 2 analysis because no fire protection feature was affected. Additionally, the inspectors did note that offsite power would not be affected by a fire in fire zone 41. As such, this finding was considered to be of very low safety significance (Green).

Enforcement: Title 10 CFR 50.48(b)(2) requires, in part, that all nuclear power plants licensed to operate before January 1, 1979, must satisfy the applicable requirements of Appendix R to this part, including specifically the requirements of Sections III.G, III.J, and III.O. Compliance with 10 CFR Part 50, Appendix R, Section III.L is considered necessary in order to satisfy the requirements of 10 CFR Part 50, Appendix R, Section III.G. The performance goals contained within 10 CFR Part 50, Appendix R, Section III.L, provide additional measures that must be taken to ensure safety when an alternative shutdown capability is required. These additional measures provide the defense-in-depth necessary when using a method that is not normally used for safe shutdown. This defense-in-depth was not maintained in Fire Zone 41 since only off-site power was credited for a postulated fire in this area. Title 10 CFR Part 50, Appendix R, Section III.L.3, specified, in part, that alternative shutdown capability shall accommodate post-fire conditions where off-site power is available and where off-site power is not available for 72 hours. The failure to ensure alternative shutdown capability that accommodated post-fire conditions where off-site power would not be available is a violation of 10 CFR 50.48 and 10 CFR Part 50, Appendix R, Section III.L.3. This violation is associated with a finding that is characterized by the SDP as having very low risk significance (Green) and is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. This violation was entered into the licensee's corrective action program as CR 03086071. (NCV 050-315/03-05-02; 050-316/03-05-02)

.5 Operational Implementation of Alternative Shutdown Capability

Title 10 CFR Part 50, Appendix R, Section III.L.2.d, required that the process monitoring function should be capable of providing direct readings of the process variables necessary to perform and control the functions necessary to achieve reactivity control, reactor coolant makeup, and decay heat removal.

a. Inspection Scope

The inspectors performed a walkdown of a sample of the actions defined in procedure 01-OHP-4025-001-001, "Emergency Remote Shutdown," and other procedures which were referenced by procedure 01-OHP-4025-001-001. Procedure 01-OHP-4025-001-001 was the procedure for performing a plant alternative shutdown from outside the control room for a fire in the control room, cable vault, and 4 kiloVolt (kV) switchgear rooms. The inspectors reviewed the ability of operators to perform procedure actions within applicable plant shutdown time requirements. The inspectors also focused on equipment labeling being consistent with the procedure.

The inspectors' reviews of the adequacy of communications and emergency lighting associated with these procedures are documented in Sections 1R05.6 and 1R05.7 of this report.

b. Findings

No findings of significance were identified.

.6 Communications

For a fire in an alternative shutdown fire area such as the cable spreading room, control room evacuation is required and a shutdown is performed from outside the control room. Radio communications are relied upon to coordinate the shutdown of both units and for fire fighting and security operations. 10 CFR Part 50, Appendix R, Section III.H., required that equipment provided for the fire brigade include emergency communications equipment.

a. Inspection Scope

The inspectors reviewed the adequacy of the communication system to support plant personnel in the performance of alternative safe shutdown functions and fire brigade duties.

b. Findings

No findings of significance were identified.

.7 Emergency Lighting

Title 10 CFR Part 50, Appendix R, Section III.J., required that emergency lighting units with at least an 8 hour battery power supply be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto.

a. Inspection Scope

The inspectors performed a walkdown of a sample of the actions defined in procedure 01-OHP-4025-001-001, "Emergency Remote Shutdown," and other procedures which were referenced by procedure 01-OHP-4025-001-001. 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.

b. Findings

Introduction: The inspectors identified that the licensee failed to ensure that there was adequate emergency lighting for required safe shutdown actions. The issue was considered to be of very low safety significance and was dispositioned as a Green NCV.

Description: The inspectors identified that there was inadequate emergency lighting for actions required by the alternative shutdown procedure, procedure 01-OHP-4025-001-001, and referenced procedures. Specifically, there was no emergency lighting in the shift manager's office. Portable radios, extra procedures, and keys necessary for performing safe shutdown actions were stored in the shift manager's office. There was inadequate lighting for storage lockers containing safety gear necessary for operators performing actions involving high voltage switchgear. There was inadequate lighting in the entry area for the radiologically control area for operators to retrieve emergency dosimetry.

The licensee had previously identified that there was no emergency lighting in the shift supervisors's office for the purpose of obtaining keys. The issue was documented on CR P-99-16289, dated June 22, 1999. However, the licensee noted that portable lighting (e.g., head lamps) was available and did not take any further immediate corrective actions. The licensee later concluded, inappropriately, that the shift supervisor's office was not part of the Appendix R pathway requiring emergency lighting. The licensee subsequently closed the condition report without adding emergency lighting to the shift manager's office.

Analysis: In accordance with IMC 0612, the inspectors determined that the issue was more than minor because the finding was associated with the protection against external factors (i.e., fire) attribute of the mitigating systems reactor safety cornerstone and affected the mitigating systems objective in that the failure to have required emergency lighting could result in a delay of accomplishing safe shutdown actions. In accordance with IMC 0609, Appendix A, the inspectors performed a SDP Phase 1 screening and determined that the finding degraded the Fire Protection portion of the Mitigation Systems Cornerstone. As such, screening under IMC 0609, Appendix F, was required. Based on review of IMC 0609, Appendix F, the inspectors determined that the finding did not require a Phase 2 evaluation because no fire protection feature was affected. Moreover, the inspectors concluded that necessary safe shutdown actions could be accomplished in areas lacking emergency lighting due to the availability of portable head lamps which could be obtained from the control room. As such, this finding was considered to be of very low safety significance (Green).

Enforcement: Title 10 CFR 50.48(b)(2) requires, in part, that all nuclear power plants licensed to operate before January 1, 1979, must satisfy the applicable requirements of Appendix R to this part, including specifically the requirements of Sections III.G, III.J, and III.O. Title 10 CFR Part 50, Appendix R, Section III.J requires, in part, that emergency lighting units with at least an 8-hour battery power supply be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto. The failure to provide emergency lighting in the shift managers's office, dosimetry issue area at the auxiliary building entrance, and safety gear lockers outside 4 kV switchgear rooms was a violation of 10 CFR 50.48(b)(2) and 10 CFR Part 50, Appendix R, Section III.J.

The failure to provide adequate emergency lighting is a violation of 10 CFR 50.48(b)(2) and 10 CFR Part 50, Appendix R, Section III.J. This violation is associated with a finding that is characterized by the SDP as having very low risk significance (Green) and is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. This violation was entered into the licensee's corrective action program as CR 03085009. (NCV 050-315/03-05-03; 050-316/03-05-03).

.8 Cold Shutdown Repairs

Title 10 CFR Part 50, Appendix R, Section III.L.5, required that equipment and systems comprising the means to achieve and maintain cold shutdown conditions should not be damaged by fire; or the fire damage to such equipment and systems should be limited so that the systems can be made operable and cold shutdown achieved within 72 hours. Materials for such repairs shall be readily available onsite and procedures shall be in effect to implement such repairs.

a. Inspection Scope

The inspectors reviewed the licensee's procedures to determine if any repairs were required to achieve cold shutdown. The inspectors determined that the licensee did require repair of some equipment to reach cold shutdown based on the safe shutdown methods used. The inspectors reviewed the procedures for adequacy.

b. Findings

No findings of significance were identified.

.9 Fire Barriers and Fire Zone/Room Penetration Seals

Title 10 CFR Part 50, Appendix R, Section III.M, required that penetration seal designs be qualified by tests that are comparable to tests used to rate fire barriers.

a. Inspection Scope

The inspectors reviewed the test reports for three-hour rated barriers installed in the plant and performed visual inspections of selected barriers to ensure that the barrier installations were consistent with the tested configuration. In addition, the inspectors

reviewed the fire loading for selected areas to ensure that existing barriers would not be challenged by a potential fire.

b. Findings

Introduction: During this inspection, the inspectors identified an unresolved item (URI) with respect to use of epoxy floor covering. Specifically, the inspectors identified that the epoxy floor covering applied over cement flooring, such as applied in the auxiliary building and other plant areas, may be a combustible not accounted for in the licensee's fire protection program.

Description: The licensee issued CR03092067 to track weaknesses in the coating's program with respect to procurement, fire protection evaluation, and installation of epoxy floor coatings. Specifically, Design Specification ES-CIVIL-0408-QCN, "Protective Coating Systems: Requirements for Material Selection, Surface Preparation, Application and Inspection," and Installation Procedure 12-CHP-5021-CCD-014, "Protective Coating Installation Instructions," identified specific design attributes and installation requirements for epoxy floor coatings. Although the licensee had vendor product literature on coatings, no formal flame spread test reports had been maintained.

The NFPA Fire Protection Handbook defines interior finish as materials thicker than 0.9mm (0.03537 inches or 35.37 mils). Procedure 12-CHP-50210-CCD-014 identified the use of Carboline System using a surfacer, primer, and finish coat, with respective thicknesses of 0-20 mils, 1.5-6 mils, and 1.5-6 mils. The procedure also identified Pruett-Schaffer self-leveling epoxy floor coating system which used a primer, intermediate, and finish coat of 5-10 mils, 20-40 mils, and 10-15 mils, respectively. The overall thickness for the Carboline and Pruett-Schaffer epoxy floor coating systems was 32 mils and 65 mils respectively. The licensee measured selected areas for epoxy floor thickness. Floor coating thickness as measured in the Unit 1 4kV switchgear room, Elevation 609, ranged from 6 to 59 mils. Therefore, the Pruett-Schaffer epoxy floor coating would have to be considered an interior finish. In addition, the Carboline would have to be considered an interior finish if it exceeds the thickness requirements identified by the vendor data.

License condition 2.C(4) specified that the licensee shall implement and maintain, in effect, all provisions of the approved Fire Protection Program as described in the Updated Final Safety Analysis Report (UFSAR). Section 9.8.1 of the UFSAR referenced the Fire Protection Program Manual as one of the specific documents to address different facets of the fire protection program. Design Basis Table 5.1 Section D.1 of the Fire Protection Program Manual documented the licensee's commitment as:

Interior finishes should be non-combustible or listed by a nationally recognized testing laboratory such as Factory Mutual or Underwriters' Laboratory, Inc. for flame spread, smoke and fuel contribution of 25 or less in its use configuration (ASTM [American Society for Testing and Materials] E-84 Test, "Surface Burning Characteristics of Building Materials"). The licensee documented in response to this requirement: "Comply with Exception." Specific exceptions to this commitment were listed; however, the epoxy floor covering was not listed as an exception to this commitment.

One area of relief from the licensed requirement is Generic Letter (GL)86-10. GL 86-10 Supplement 1 defines a "non-combustible material" as follows:

Noncombustible Material - (a) Material which, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat; (b) Material having a structural base of noncombustible material, with a surfacing not over 1/8-inch thick that has a flame spread rating of not higher than 50 when measured in accordance with ASTM E-84, "Surface Burning Characteristics of Building Materials."

The licensee obtained an Underwriters Laboratory approved test for Carboline 890 epoxy flooring. The results of this test were documented in a Southwest Research Institute Report "SwRI Project No. 01-4510-566-a, Investigation of the Surface Burning Characteristics of Two Coats of a Two-Component Cross-Linked Epoxy Coating Applied to 0.25-Inch Thick Glass-Reinforced Cement Board at a Thickness of 4 to 6 Mils Per Coat: Carboline 890 (System 1); November 2, 1992." The results of the test indicated that Carboline 890 was a Class A material. However, the inspectors determined that this test did not bound the thickness of this type of epoxy flooring. The thickness of the coating used during the tests can result in the same material testing Class A, B, or C material. At the time of this inspection, the licensee had not obtained testing information for the Pruet-Schaffer epoxy floor coating system.

The licensee planned to perform an evaluation, including testing samples of epoxy flooring for flame spread, which would demonstrate acceptability to use epoxy floor covering. This issue will be tracked as an Unresolved Item (URI) pending NRC review of the licensee's evaluation. (URI 050-315/03-05-04; 050-316/03-05-04)

.10 Fire Protection Systems, Features, and Equipment

a. Inspection Scope

The inspectors reviewed the material condition, operations lineup, operational effectiveness, and design of fire detection systems, fire suppression systems, manual fire fighting equipment, fire brigade capability, and passive fire protection features. The inspectors reviewed deviations, detector placement drawings, fire hose station drawings, carbon dioxide (CO₂) system pre-operational test reports, and fire hazard analysis reports to ensure that selected fire detection systems, sprinkler systems, portable fire extinguishers, and hose stations were installed in accordance with their design, and that their design was adequate given the current equipment layout and plant configuration.

b. Findings

Introduction: The inspectors identified that the licensee failed to ensure that minimum required concentrations would be achieved for a CO₂ system. This issue was determined to be of very low safety significance and was dispositioned as a Green NCV.

Description: In June 2000, the licensee identified that documentation could not be located demonstrating a pre-operational test for the Unit 1 4kV switchgear room demonstrating that an adequate CO₂ concentration could be achieved (documented by CR P-00-10559). In August 2002, the licensee documented (via CR 02239012) the apparent failure of fire zones 40 (Unit 1 4kV switchgear room) and 42 (Unit 1 Emergency Power Systems Area) to meet minimum CO₂ system concentration requirements. To address CR 02239012, the licensee performed Technical Evaluation 12.19 as an evaluation of the CO₂ system. The evaluation concluded that the CO₂ systems were capable of performing their intended function of containing a fire until the fire brigade arrives. However, the inspectors noted that the evaluation failed to address the non-compliance with NFPA 12 - 1968, "Standard on Carbon Dioxide Extinguishing Systems," in that the CO₂ systems failed to achieve the required concentrations. Additionally, the inspectors noted that the purpose of a total flooding gaseous suppression system is to extinguish the fire rather than merely contain a fire until the fire brigade arrived at the postulated fire location.

The inspectors reviewed the pre-operational test report for the fire zone 40 CO₂ system. Fire zone 40 consisted of two Unit 1 4.16 kV switchgear rooms and was classified by the licensee as meeting the requirements of 10 CFR Part 50, Appendix R, Section III.G.3. The test report indicated that maximum concentrations of only 49 percent (%) and 48% were reached at two sample locations with the maximum concentrations being indeterminate for a third sample location due to a test equipment problem.

The inspectors reviewed the pre-operational test report for the fire zone 42 CO₂ system. Fire zone 42 included the Unit 1 4.16 kV/600 V transformers, control rod drive and inverter rooms and was classified by the licensee as meeting the requirements of 10 CFR Part 50, Appendix R, Section III.G.3. The test report indicated that maximum concentrations of only 46% and 40% were reached at the two sample locations. In addition, in 2000, the licensee performed a modification (Design Change Package 1-DCP-4578) to the configuration of the room that replaced two roll-up doors with sets of fire dampers. The inspectors noted that the fire dampers which replaced the roll-up doors introduced a number of leakage paths which were different than those of the previously installed roll-up doors. No discharge or leakage testing had been conducted to verify that achievable CO₂ concentrations would not be adversely affected by the modification.

License condition 2.C(4) specified that the licensee shall implement and maintain, in effect, all provisions of the approved Fire Protection Program as described in the UFSAR. Section 9.8.1 of the UFSAR referenced the Fire Protection Program Manual as one of the specific documents to address different facets of the fire protection program. Additionally, Section 9.8.1 of the UFSAR listed the Unit 1 electrical switchgear rooms (including both the 4.16 kV switchgear room and the 4.16kV/600V transformers, control rod drive and inverter rooms) as being protected by a low pressure CO₂ system. Design Basis Table 5.1 Section E.5 of the Fire Protection Program Manual indicated that the licensee complied with NFPA 12 requirements for minimum required CO₂ concentrations with no exceptions. Standard NFPA 12 - 1968, Carbon Dioxide Extinguishing Systems, was the code of record for the CO₂ systems installed in fire zones 40 and 42. Section 2421 and Table 6 of NFPA 12 - 1968 specified a design concentration of 50% for dry electrical, wiring insulation hazards in general. Fire zones 40 and 42 contained dry electrical and wiring insulation hazards in general.

Analysis: In accordance with IMC 0612, the inspectors determined that the issue was more than minor because the finding was associated with the protection against external factors (i.e., fire) attribute of the mitigating systems reactor safety cornerstone and affected the mitigating systems objective in that a fire protection feature (i.e., a fixed suppression system) was adversely affected. In accordance with IMC 0609, Appendix A, the inspectors performed a SDP Phase 1 screening and determined that the finding degraded the Fire Protection portion of the Mitigation Systems Cornerstone. As such, screening under IMC 0609, Appendix F, was required. Based on review of IMC 0609, Appendix F, the inspectors determined that the finding did require a Phase 2 evaluation because a fire protection feature was affected.

For fire zone 40, the inspectors noted that the two Unit 1 4.16 kV switchgear rooms were separated by a concrete wall having at least a 3-hour fire rating. As such, the inspectors determined that a fire could only realistically affect one of the two rooms thereby only affecting one division. Each of the 4.16 kV switchgear rooms had an ignition frequency of 2.9×10^{-3} per year. Manual fire fighting capability would be unaffected. For a fire in one of the switchgear rooms, the inspectors determined that the following mitigating equipment would remain available: one train of motor-driven auxiliary feedwater (AFW), one turbine-driven AFW pump, the ability to cross-connect AFW from Unit 2, one train of power conversion system equipment, one train of component cooling water, one train of safety injection, one train residual heat removal, and pressurizer power-operated relief valves. The inspectors determined that the finding was of very low safety significance (Green) for fire zone 40.

For fire zone 42, the inspectors noted that a fire in the transformer room could potentially affect various components important to safety. The ignition frequency for the transformer room is 7.1×10^{-3} per year. Manual fire fighting capability would be unaffected. For a fire in the transformer room, the inspectors determined that the following mitigating equipment would remain available: power conversion system equipment, both trains of motor-driven AFW pumps, one turbine-driven AFW pump, and the ability to cross-connect AFW from Unit 2. Therefore, the inspectors determined that the finding was of very low safety significance (Green) for fire zone 42.

Enforcement: The failure to ensure that CO₂ minimum required concentrations would be met for fire zones 40 and 42 is a violation of a license condition. This violation is associated with a finding that is characterized by the SDP as having very low risk significance (Green) and is being treated as a NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. This violation was entered into the licensee's corrective action program as Condition Report 03093033. (NCV 050-315/03-05-05; 050-316/03-05-05).

.11 Compensatory Measures

a. Inspection Scope

The inspectors conducted a review to verify that adequate compensatory measures were put in place by the licensee for out-of-service, degraded or inoperable fire protection and post-fire safe shutdown equipment, systems, or features. The inspectors also reviewed 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.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed the corrective action program procedures and samples of corrective action documents to verify that the licensee was identifying issues related to fire protection at an appropriate threshold and entering them in the corrective action program. The inspectors reviewed selected samples of condition reports, work orders, design packages, and fire protection system non-conformance documents.

b. Findings

Three findings of significance relating to the identification and resolution of problems were identified and are described in Sections 1R05.2b, 1R05.7b, and 1R05.10b of this report.

4OA4 Cross-Cutting Issues

1. A finding described in Section 1R05.2b of this report has, as a cause, a problem identification and resolution deficiency. Specifically, despite previously identifying that control room HVAC would be damaged for a postulated fire in fire zone 41, the licensee failed to properly address the issue because the licensee mistakenly believed that performing a repair to the control room HVAC in the event of a fire would meet regulatory requirements.
2. A finding described in Section 1R05.7b of this report has, as a cause, a problem identification and resolution deficiency. Specifically, despite previously identifying that emergency lighting was not available in the shift manger's office, the licensee failed to properly address the issue because the licensee mistakenly believed that the shift manager's office was not a safe shutdown pathway.
3. A finding described in Section 1R05.10b of this report has, as a cause, a problem identification and resolution deficiency. Specifically, despite previously identifying that minimum required concentrations for a CO₂ system would not be met for two fire zones, the licensee failed to properly address the issue in that the licensee failed to address the non-compliance with the applicable NFPA code.

4OA6 Meeting(s)

Exit Meeting

On April 11, 2003, at the conclusion of the on-site inspection activities, the inspectors presented their findings to Mr. Bakken and other members of licensee management at the D.C. Cook Nuclear Power Plant. The licensee did not identify any material reviewed during the inspection as being proprietary.

KEY POINTS OF CONTACT

Licensee

A. Bakken, Senior Site Vice-President
M. Finissi, Plant Manager
G. Gibson, Manager, Site Protective Services
J. Giessner, Regulatory Affairs/Nuclear Technical Services Director
E. Larson, Director, Operations
T. Noonan, Director, Performance Assurance
J. Pollock, Site Vice-President
P. Schoepf, Manager, Design Engineering
S. Simpson, Assistant Director, Operations
L. Weber, Manager, Performance Assurance

NRC

R. Caniano, Deputy Division Director, Division of Reactor Safety
R. Gardner, Branch Chief, Electrical Engineering Branch

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

NCV	050-315/03-05-01 050-316/03-05-01	Failure to Ensure Control Room Ventilation Would be Free of Fire Damage
NCV	050-315/03-05-02 050-316/03-05-02	Failure to Ensure Alternative Shutdown Capability Could Accommodate Post-Fire Conditions Where Off-Site Power is Not Available
NCV	050-315/03-05-03 050-316/03-05-03	Failure to Provide Adequate Emergency Lighting
URI	050-315/03-05-04 050-316/03-05-04	Fire Spread Rating and Thickness Requirements for Epoxy Floor Covering
NCV	050-315/03-05-05 050-316/03-05-05	Inadequate Carbon Dioxide Concentrations

Closed

NCV	050-315/03-05-01 050-316/03-05-01	Failure to Ensure Control Room Ventilation Would be Free of Fire Damage
NCV	050-315/03-05-02 050-316/03-05-02	Failure to Ensure Alternative Shutdown Capability Could Accommodate Post-Fire Conditions Where Off-Site Power is Not Available
NCV	050-315/03-05-03 050-316/03-05-03	Failure to Provide Adequate Emergency Lighting
NCV	050-315/03-05-05 050-316/03-05-05	Inadequate Carbon Dioxide Concentrations

Discussed

None

LIST OF DOCUMENTS REVIEWED

The following is a list of licensee documents reviewed during the inspection, including documents prepared by others for the licensee. Inclusion on this list does not imply that 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.

Assessments

Audit PA-02-12; Fire Protection; dated December 12, 2002

Safe Shutdown Capability Assessment; Rrevision 4

Safe Shutdown Capability Assessment; Revision 6

Condition Reports

P-99-16289; ESRR–Hardhat mounted emergency lights, Petzl lamps, used to supplement Appendix R lighting may not be accessible following a loss of normal lighting; dated June 22, 1999

P-00-03504; Emergency Battery Lighting Units Six Month Failure Rate; dated March 2, 2000

P-00-03784; Several Unit 1 and Unit 2 Appendix R and Remote Shutdown Emergency Battery Lighting Units Have Lights That are Not Aimed Properly on Their Aim Spot Targets; dated March 6, 2000

P-00-3884; Evaluate Need for Hydrostatic Tests of Carbon Dioxide Hose Reels; dated March 8, 2000

P-00-03995; No Documentation of Testing was Found to Show the Appendix R Headlamps Meet the 8 Hour Appendix R Requirement; dated March 10, 2000

P-00-04054; Fire Damper Failed to Close When Tripped; dated March 12, 2000

P-00-06875; Existing Fire Shaft Block Wall Not Completely Sealed at the Interface of the Floor Penetration or Support Angles; dated May 12, 2000

P-00-09188; Fire Protection Water Flow Test Could Not Be Completed; dated June 25, 2000

P-00-09930; Appendix R implementation procedure 01-OHP 4025.001.001, "Emergency Remote Shutdown," provides direction for placing RHR in service in a manner that may cause component and/or system damage; dated July 13, 2000

P-00-10559; Tracking CR to obtain documentation of successful preoperational test (PO-050-506) for Unit 1 4kV switchgear room Carbon Dioxide Fire Protection System, for 1-DCP-4578; dated July 27, 2000

00244061; The DCP For Fire Dampers Between the Turbine Building and Unit 2 600Volt Transformer Room Does Not Contain Adequate Engineering Analysis and Procedural Guidance to Assure Fire Barrier Integrity Under Potential Fire Scenarios; dated August 31, 2000

00260145; Incorrect or Missing Information for 3 Fire Dampers; dated September 16, 2000

00320029; Emergency Lighting Not Pointed in the Correct Direction; dated November 15, 2000

00331027; 3 Plugged Spray Nozzles on U-1 Wall Spray Appear to be Plugged; dated November 26, 2000

01090009; 1-ZPF-172 Fire Protection Wet Pipe Sprinkler System Will Not Alarm in Control Room; dated March 31, 2001

01138024; Industry Operating Experience OE1224 - Wet Pipe Suppression System Does Not Meet NFPA Code; dated May 18, 2001

02205039; SA-2002-DCC-003, Appendix R Program Self-Assessment; dated July 24, 2002

02220011; ERS procedure time for Operator Actions in the event of a spurious opening of a PORV can be enhanced by performing a mandatory manual action; dated August 8, 2002

02220014; Thermal-Hydraulic Calc of the Appendix R Cooldown Scenario Is not Adequately Documented; dated August 8, 2002

02221014; The Emergency Battery Lighting (ELB) Program Requires Additional Attention for Programmatic and Material Condition Improvements; dated August 9, 2002

02221018; Fire Seal Improvement Plan - Inadequate seal configuration documentation; dated August 9, 2002

02224017; Spurious Operation of Appendix R Equipment Due to Hot Shorts Between 120V Grounded and 220 V Ungrounded AC Circuits Routed in the Same Raceways; dated August 12, 2002

02239012; The apparent failure of Fire Zones 40A\B and 42A\B\C to reach the design and NFPA Code CO₂ concentration requirements of 50% during the initial system acceptance testing for deep seated fires needs to be investigated and resolved; dated August 27, 2002

Condition Reports Initiated as a Result of Inspection:

03083074; There are two emergency lights directly above 1-CHP-1 (CONDENSATE PH CONTROL RACK) which are very dirty and appear to be misaligned. These lights are fed from 1-Batlit-455; dated March 24, 2003

03085009; During the 2003 FPTI, it was noted by one of the NRC inspectors that required emergency lighting is not installed in all areas that require operator actions or associated egress/ingress pathways; dated March 25, 2003

03092067; The Purpose of this Condition Report is to Document D.C. Cook Epoxy Program Controls Identified During the March 2003 NRC Fire Protection Triennial Inspection; dated April 2, 2003

03086066; During FPTI NRC Inspectors questioned 3 - fire rated seals due to inadequate sealant/damming; dated March 27, 2003

03086071; All Appendix R Analysis Areas currently identified in Revision 6 of the SSCA and procedure 12-OHP-4025.002.002 as Partial Alternate Shutdown have to be re-identified as Full Alternate Shutdown IAW 10 CFR 50, Appendix R, Section III.G.3; March 27, 2003

03092706; The purpose of this Condition Report is to document DC Cook epoxy coating program controls identified during the March 28, 2003 NRC Fire Protection Triennial Inspection (FPTI); dated April 2, 2003

03093033; Lack of test documentation for CO₂ fire suppression system concentration tests; dated April 3, 2003

03094025; The purpose of this CR is to document a weakness in the Fire Pre-Plans associated with manual/automatic and manual actuation of CO₂ suppression in Unit One 4kV Switchgear Complex; dated April 4, 2003

03100005; A review of calculation TH-02-07 (rev 1), Appendix R Cooldown and Depressurization, and procedures 01(02)-OHP-4025-001-001 (rev4), Emergency Remote Shutdown, revealed potential problems with procedure implementation; dated April 9, 2003

03100011; The use of control room HVAC for hot standby during an Appendix R event is not in compliance with Appendix R; dated April 10, 2003

Drawings

1-7012-28, SH 422; Cable Fill Calculation for Tray 1EM-C18; dated July 31, 1990

OP-1-985842-1; Steam Pressure Protection Channel 4 Elementary Diagram; Revision 1

OP-1-985844-3; Steam Pressure Protection Channel 4 Elementary Diagram; Revision 3

OP-1-98204-21; Pressurizer Control Elementary Diagram; Revision 21

OP-1-98415-41; Essential Service Water System East Sheet #1 Elementary Diagram; Revision 41

Engineering Analyses and Technical Evaluations

12.19; CO₂ System Evaluation; Revision 0

99-0146; Batteries for Emergency Battery Lighting Unit; dated November 22, 1999

FPCE-2001-0002; Elimination of Carbon Dioxide Puff Testing; dated May 18, 2001

FPCE-2003-0002; Revision 6 of the Safe Shutdown Capability Assessment (SSCA); dated March 10, 2003

PSL-FPER-00-007; Evaluation of Unit 1 Cable Spreading Room Halon 1301 Design for Conformance With 10 CFR 50 Appendix R Section III.G.3; dated March 6, 2000

R11164-1 Project 84NK18779; Report on Partition Panel Units in a Nonload Bearing Wall Assembly; dated October 26, 1984

TH-1, Appendix G; Natural Circulation Cooldown; Revision 0

TH-02-07; Appendix R Cooldown and Depressurization; Revision 1

Fire Analysis Notebook; Revision 1

Inspection Forms

Penetration Seal Number W7182; dated March 26, 2003

Licensee Event Reports

88-014-00; Design Deficiency Results in Failure to Relocate Control Cables and Violation of Appendix R Requirements; dated January 21, 1989

Licensing Basis Documents

Section 9.8.1; Fire Protection System, Updated Final Safety Analysis Report; Revision 18

Appendix A to Branch Technical Position (BTP) APCSB 9.5-1 Section F.5 Switchgear Room Construction Boundary Evaluation; dated August 30, 1996

Fire Protection Program Manual; Revision 5

Nuclear Plant Fire Hazards Analysis; Revision 9

Modifications

1-DCP-4578; Installation of Exhaust Flow Paths at the Unit 1 East and West 600 Volt Transformer Rooms; Revision 0

LDCP 4797; Replace the Following Seven Fire Dampers: 1-HV-FD-CCP, 1-HV-ET-FD-1, 12-HV-TSC-UPS-FD-3, 12-HV-TSC-UPS-FD-4, 12-HV-TSC-UPS-FD-5, 1-HV-AS-DIA, and 1-HV-SG-BR-1; dated January 3, 2002

Procedures

4025.R-2; Restore Pressurizer PORVs; Revision 0

12-CHP-5021-CCD-014, Protective Coating Installation Instructions

12-EHP-2270-FIRE-002; Maintenance and Control of Fire Protection and Appendix R Documents; Revision 0a

12-EHP-2270-SSA-001; Safe Shutdown Analysis; Revision 0b

12-EHP-2270-SSA-004; Appendix R Safe Shutdown Cable and Associated Circuit Analysis; Revision 0b

02-EHP-4030-266-010; U2 Control Room Cable Vault Low Pressure CO2 Fire Suppression System Surveillance; dated January 10, 2003

12-EHP 4030 ATR.224; Control Room Cable Vault Halon Fire Protection System Test; dated May 26, 1999

12-EHP-5040-FIRE-011; Revision of Design Changes for Appendix R Impact; Revision 0b

12-EHP-5040-FIRE-017; Fire Protection Impact Review; Revision 0

12-EHP-5040-MOD-009; Design Change Reference Guide; Revision 2

01-IHP-4030-166-052; Unit 1 Control Rod Drive, Transformer, Switchgear Room (West 600V SWGR, CRDM, INV Rooms) CO2 Fire Suppression Test; Revision 1

12-IHP-4030.STP.203; Fire Detection Instrumentation Channel Functional Test; dated July 23, 1999

12-IHP-4030.STP.205; Fire Detection Instrumentation Channel Functional Test; dated September 13, 2000

12-IHP-5030-EMP-0101; Emergency Battery Light Units; dated April 11, 2001

01-OHP-4025-001-001; Emergency Remote Shutdown; Revision 4

01-OHP-4025-LS-1; Process Monitoring From LSI Panel; Revision 1

01-OHP-4025.LS-2; Start-Up AFW; Revision 1

01-OHP-4025-LS-3; Steam Generator 2/3 Level Control; Revision 2

01-OHP-4025-LS-4; Steam Generator 1/4 Level Control; Revision 2

01-OHP-4025-LS-6; RCS Make-up, Seal Injection, and Boration with CVCS Cross-tie; Revision 2

01-OHP-4025-LS-7; RCS Cooldown Using RHR; Revision 4

01-OHP-4025.LTI-1; Local Reactor, Turbine, MFP Trip And Generator Output BKR Trip and Isolation; Revision 0

01-OHP-4025.LTI-2; Local Main Steam Isolation; Revision 0

01-OHP-4025.LTI-4; Local RCP Trip and Isolation; Revision 0

01-OHP-4025.LTI-6; Trip/Isolation of Spuriously Actuated Pumps; Revision 0

12-OHP-4025-001-002; Fire Response Guidelines; Revision 0

12-PPP-2270-EVL-001; Preparation and Review of Fire Protection Technical Evaluation; Revision 00

12-PPP-4030-066-021; Inspection of Fire Dampers Protecting Safety-Related Areas; dated October 10, 2002

12-PPP-4030-066-022; Inspection of Fire Doors, Frames and Their Hardware Protecting Safety-Related Areas; dated December 9, 2002

12-THP 4030-STP.224; Halon Fire Protection System Surveillance Test (Fire Zone 57); dated January 10, 1985

12-THP-4030-STP.224; Perform Halon System Functional Test on Halon System for Control Room Cable Vault on Unit-2; dated July 25, 1985

PO-050-506; Low Pressure Carbon Dioxide Fire Systems; dated April 29, 1974

PMI-2270; Fire Protection; Revision 26a

PMP-2270-EVL-002; Evaluation of Fire Protection Program Changes; Revision 0

PMP-5040-MOD-007; Engineering Modifications; Revision 0a

Test Reports

Job Order No. R0075257; STP.124 D2 Fire Protection System Flush and Loop Flow; dated June 26, 2000

Job Order No. R0028624; Perform Appendix R Battery Light Discharge Test; dated September 25, 1998

Job Order No. R0209663; 18 Month Surveillance A.T.R. Fire Seals; dated February 7, 2002

Job Order No. R0209708; 18 Month Surveillance A.T.R. Fire Seals; dated January 9, 2002

Job Order No. R0232150; Perform Six Month Surveillance of A.T.R. Fire Doors; dated December 10, 2002

Job No. 2-PO-050-506; Low Pressure Carbon Dioxide Fire System; dated December 16, 1977

Job Order No. PP087; Design Review; Three Hour Barrier Rating of: West to East Transformer Room Barrier and Turbine Building to Transformer Room Barrier; dated July 30, 2000

Job No. FL15771; Field Test Report No. 4 Control Room Cable Vault; dated October 1, 1974

Job No. FL15771; Field Test Report No. 4, Unit #1: Transfer & Battery Rooms; dated October 18, 1974

Job No. FL-15771; Field Test Report No. 4, Unit #1 Switchgear Rooms; dated October 12, 1974

Job No. FL-15771; Field Test Report No. 4, Unit #1 Transfer and Engine Safety M.C.C.; dated October 12, 1974

SwRI Project No. 01-4510-566-a; Investigation of the Surface Burning Characteristics of Two Coats of a Two-Component Cross-Linked Epoxy Coating Applied to 0.25-Inch Thick Glass-Reinforced Cement Board at a Thickness of 4 to 6 Mils Per Coat: Carboline 890; dated November 2, 1992

Completed Pre-operational Test Review for 2-PO-050-506 - Low Pressure Carbon Dioxide Fire Systems; dated December 16, 1977

Safety Evaluation Reports

Fire Protection Rule-Alternate Safe Shutdown Capability - Sections III.G.3 and III.L of Appendix R to 10 CFR 50 - Donald C. Cook Nuclear Plant, Unit Nos. 1 and 2; dated November 22, 1983

Unrated Fire Hatches in Fire Area Boundaries; dated June 17, 1988

Final Resolution of Sealing Inside of Conduits Penetrating Fire Barriers at D.C. Cook; dated June 7, 1989

Evaluation of IMPC Response to Unresolved Issue Related to Post-Fire Safe Shutdown Methodology; dated April 26, 1990

Specifications

DCC-FP-101QCN "Fire Barrier Penetration Seals For Openings in Fire Rated Walls, Floors, or Ceilings;" Revision 14

ES-CIVIL-0408-QCN; Protective Coating Systems: Requirements for Material Selection, Surface Preparation, Application and Inspection; Revision 0

LIST OF ACRONYMS USED

AFW	Auxiliary Feedwater
ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
CO ₂	Carbon Dioxide
CR	Condition Report
DPR	Demonstration Power Reactor
DRS	Division of Reactor Safety
F	Fahrenheit
GL	Generic Letter
HVAC	Heating, Ventilation, and Air Conditioning
IMC	Inspection Manual Chapter
IN	Information Notice
IR	Inspection Report
kV	KiloVolt
NCV	Non-Cited Violation
NFPA	National Fire Protection Association
NRC	U.S. Nuclear Regulatory Commission
SDP	Significance Determination Process
SER	Safety Evaluation Report
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
°	Degrees
%	Percent