September 13, 2004

Mr. Thomas Coutu
Site Vice President
Kewaunee Nuclear Power Plant
Nuclear Management Company, LLC
N490 State Highway 42
Kewaunee, WI 54216-9511

SUBJECT: KEWAUNEE NUCLEAR POWER PLANT
NRC TRIENNIAL FIRE PROTECTION BASELINE INSPECTION
REPORT NO. 05000305/2004005(DRS)

Dear Mr. Coutu:

On July 30, 2004, the U. S. Nuclear Regulatory Commission (NRC) completed a fire protection triennial baseline inspection at your Kewaunee Nuclear Power Plant. The enclosed report documents the inspection findings which were discussed on July 30, 2004, with you and other 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 for selected risk-significant fire areas. 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, six NRC-identified findings of very low safety significance involving violations of NRC requirements were identified. However, because of their very low safety significance and because they are entered into your corrective action program, the NRC is treating these six findings as Non-Cited Violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest the subject or severity of any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, NRC - RIII, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington DC 20555-0001; and the NRC Resident Inspector Office at the Kewaunee Nuclear Power Plant.

In accordance with 10 CFR Part 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA by Kenneth Riemer for/

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

Docket No. 50-305
License No. DPR-43

Enclosure: Inspection Report 05000305/2004005(DRS)
w/ Attachment: Supplemental Information

cc w/encl: J. Cowan, Executive Vice President,
Chief Nuclear Officer
Plant Manager
Manager, Regulatory Affairs
J. Rogoff, Vice President, Counsel & Secretary
D. Molzahn, Nuclear Asset Manager,
Wisconsin Public Service Corporation
L. Weyers, Chairman, President and CEO,
Wisconsin Public Service Corporation
D. Zellner, Chairman, Town of Carlton
J. Kitsembel, Public Service Commission of Wisconsin

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-305
License No:	DPR-43
Report No:	05000305/2004005(DRS)
Licensee:	Nuclear Management Company, LLC
Facility:	Kewaunee Nuclear Power Plant
Location:	N 490 Highway 42 Kewaunee, WI 54216
Dates:	July 12 through July 30, 2004
Inspectors:	Z. Falevits, Senior Reactor Engineer, Lead R. Langstaff, Senior Reactor Engineer D. Schrum, Reactor Engineer
Observer:	M. Munir, Reactor Engineer
Approved by:	J. Lara, Branch Chief Electrical Engineering Branch Division of Reactor Safety

Enclosure

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SUMMARY OF FINDINGS

IR 05000305/2004005(DRS); 07/12/2004 - 07/30/2004; Kewaunee Nuclear Power Plant; Fire Protection Triennial Baseline Inspection.

This report covers an announced baseline triennial fire protection inspection. The inspection was conducted by Region III inspectors. Six Green findings associated with six 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. The team identified a Non-Cited Violation of a license condition for fire protection. The licensee failed to take timely corrective actions to repair several maintenance storage area deluge system rate-of-rise heat detectors which were inoperable for an extended period of time. At the time of this inspection, the detectors had been repaired and returned to operability.

  The finding was greater than minor because it affected the mitigating systems cornerstone attribute of protection against external factors (fire). Specially, a partially inoperable deluge system can increase the likelihood of a fire which could challenge safe shutdown. The finding was of very low safety significance because this fire area has Pyr-A-Larm ionization detectors located at the ceiling level. These detectors would alarm in the control room and the fire brigade would respond to a fire in this area. In addition, other defense-in-depth fire protection elements remained unaffected and fire in this area would not result in a loss of dedicated safe shutdown systems. (Section 1R05.10.b.1)

- Green. A finding of very low safety significance was identified by the team for a violation of a license condition for fire protection. The licensee failed to include pertinent information in their fire strategies. Specifically, the licensee failed to include information about the potential unavailability of certain fire hose stations and identify hydrogen and propane piping hazards in a fire zone. Once the issues were identified, the licensee entered the issue into their corrective action program and planned to revise their fire strategies to include the pertinent information.

  The issue was greater than minor because the failure to include pertinent information relating to the water supply used for manual fire fighting and hazards associated with hydrogen and propane piping in fire strategies could adversely impact fire fighting strategies used by the fire brigade in fighting a fire. The issue was of very low safety significance because of the extensive training provided to fire brigade members to deal with unexpected contingencies. The issue was a Non-Cited Violation of License

Condition 2.C(3) which required, in part, that fire area strategies provide the fire brigade pertinent information on a given plan area to help the brigade to be better prepared for fire fighting within that area. (Section 1R05.10.b.2)

- Green. The team identified a Non-Cited Violation of License Condition 2.C(3), which requires the licensee to implement all provisions of their NRC approved fire protection program. The licensee failed to meet the fire protection program requirements for hose lengths to maintain an acceptable water pressure and flow to hose stations. The licensee's corrective actions included replacing hoses to increase water flow at hose stations

  The finding was greater than minor because it affected the mitigating systems cornerstone attribute of protection against external factors (fire). Specifically, the failure to maintain acceptable water pressure and water flow to hose stations can hamper the brigade's ability to fight a fire, thereby, potentially endangering mitigating systems. The finding was of very low safety significance because the problem only impacts the effectiveness of the fire brigade while other fire protection features, such as fire barriers and physical separation remain available. (Section 1R05.10.b.3))

- Green. The team identified a Non-Cited Violation of License Condition 2.C.(3), which requires the licensee to implement all provisions of their approved fire protection program. Amendment No. 23 to Facility Operating License Safety Evaluation Report dated December 12, 1978, required fire extinguishers in accordance with the National Fire Protection Association Code. The licensee failed to meet the Code requirements for extinguisher placement in Fire Area AX-32. Once identified, the licensee initiated corrective actions to meet the Code requirements.

  The finding was greater than minor because it affected the mitigating systems cornerstone attribute of protection against external factors (fire). Specially, not having an extinguisher to put out a small fire can increase the likelihood of a fire which could challenge safe shutdown. The finding was of very low safety significance because this fire area has fire detectors that would alarm in the control room and the fire brigade would respond to a fire in this area. In addition, other defense-in-depth fire protection elements remained unaffected and fire in this area would not result in a loss of dedicated safe shutdown systems. (Section 1R05.10.b.4)

- Green. The team identified a Non-Cited Violation of License Condition 2.C(3) for failure to adequately control transient combustibles in fire area AX-32. Specifically, authorization for the storage and use of combustibles in safety-related areas was not obtained. Once uncontrolled transient combustibles were identified, the materials were either included in the transient combustible permit system or removed from the area.

  The issue was greater than minor because the failure to adequately control combustible materials could result in a more significant safety issue. Uncontrolled combustibles could result in the greater likelihood or severity of a fire which affects equipment important to safety. The finding was of very low safety significance because of mitigation capability available in the event of a fire in fire area AX-32.
  (Section 1R05.10.b.5 (1))

- Green. The team identified a Non-Cited Violation of License Condition 2.C(3), in that a hazardous quantity of transient combustibles was present in fire area AX-24. The hazardous quantity of transient combustibles present exceeded the quantity of combustibles allowed with no fire detection systems in this fire area.

  The finding was greater than minor because it affected the mitigating systems cornerstone attribute of protection against external factors (fire). Specifically, the presence of transient combustibles beyond what was approved by the NRC could result in the increased likelihood of a fire which could challenge safe shutdown. The finding was of very low safety significance because a fire from the observed transient combustibles would not result in a loss of the alternate shutdown systems. (Section 1R05.10.b.5 (2))

B. <u>Licensee-Identified Violations</u>

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R05 Fire Protection (71111.05)

The purpose of this inspection was to review the Kewaunee Nuclear Power Plant (KNPP) 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 reactor oversight process using a risk-informed approach for selecting the fire areas and attributes to be inspected. The team used the KNPP Individual Plant Examination for External Events (IPEEE) along with insights gained during plant walkdowns to choose risk-significant areas for detailed inspection and review. The fire areas chosen for review during this inspection were:

Fire Area	Description of Fire Area Reviewed
AX-32	Auxiliary Building, Service Rooms
TU-90	Diesel Generator 1-A Room

The above two areas were selected based on risk insights and the large physical area encompassed within the AX-32 designated fire area. As the AX-32 large fire area consisted of the numerous rooms within the auxiliary building, the team considered these two inspection samples as equivalent in complexity to three samples as specified in the fire protection inspection procedure.

For each of these fire areas, the inspectors focused on the fire protection features, the systems and equipment necessary to achieve and maintain safe shutdown conditions, determination of licensee commitments, and changes to the fire protection program.

.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. These features were required to be 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 team 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 team 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 team reviewed the Updated Safety Analysis Report (USAR) 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 three 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 (10 CFR Part 50, Appendix R, Section III.G.3).

a. Inspection Scope

For each of the selected fire areas, the team 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 team 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 team 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 team 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 team reviewed license documentation, such as fire code deviations, detector placement drawings, fire house station drawings, smoke removal plans, fire hazard analysis reports, safe shutdown analyses, and the National Fire Protection Association (NFPA) codes to verify that the fire barrier installations met license commitments.

b. Findings

No findings of significance were identified.

.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 team evaluated the adequacy of separation provided for the power and control cabling of redundant trains of shutdown equipment. This inspection focused on the cabling of selected components in systems important for safe shutdown. The team's 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.

The team reviewed a sample of the licensee's fuse/breaker coordination analysis for the 120/208 Vac and the 125 Vdc systems required for post-fire safe shutdown. The purpose of this review was to verify that selective coordination exists between branch circuit protective devices (fuses, breakers, etc.) and the bus feeder breaker/fuse to

ensure that in the event of a fire-induced short circuit, the fault is isolated before the feeder device trips. The team also reviewed a sample of design drawings including schematic, wiring and cable block diagrams related to Appendix R components to verify that the required safe shutdown cables were identified on the drawings and that the cables were correctly accounted for in the KNPP Appendix R safe shutdown analysis.

b. Findings

.1 Breaker/Fuse Coordination of Appendix R Circuits

Introduction: The team identified an Unresolved Item concerning the licensee's corrective actions to address lack of coordination between the downstream and the upstream protective devices of 15 Appendix R associated circuits which share a common power source with other circuits on the bus.

Description: The team reviewed a number of coordination calculations related to Appendix R circuits. Calculation No. C11015, "Detailed Branch Circuit Review of Upstream and Downstream Molded Case Circuit Breaker Coordination," Revision Original, Addendum A, was prepared by the licensee on June 3, 2004. The calculation was prepared in response to concerns identified in Corrective Action Program (CAP) CA014089, which documented inadequate coordination of molded case circuit breakers used in Appendix R applications. The CAP documented that coordination between upstream and downstream circuit breakers for 15 Appendix R associated circuits could not be demonstrated for fault currents above the magnetic transfer point of the upstream supply circuit breakers.

Addendum A of the calculation documented the review of 160 Appendix R molded case circuit breakers distribution cabinet associated circuits for coordination to determine if either: (1) the branch circuit remains totally within the same Appendix R Safe Shutdown Fire Area; or (2) that the branch circuit cable length provides sufficient added resistance to reduce the available short circuit current at the distribution cabinet to the lower limit of the magnetic transfer point of the upstream molded case circuit breaker before crossing into the opposite Appendix R Safe Shutdown Fire Area. Section 6.0 of the calculation documented that at three locations involving 15 branch circuits, the branch circuits extended into an opposite Fire Zone before critical cable length is reached. Consequently, there was a lack of coordination between the downstream and the upstream protective devices. Some of these branch circuits share a common power source with other Appendix R and non-Appendix R circuits. The time-current characteristic curves for these branch circuits indicated that there was an overlap in the instantaneous (magnetic) region between the upstream and the downstream protective devices. In the event of a fault in one these branch circuits, there is a likelihood that the power to the entire bus may be lost due to undesirable tripping of the bus feeder circuit breaker as a result of lack of coordination.

The team noted that the justification given in the calculation for the acceptability of lack of coordination was based on the speculative behavior of the cables during a postulated fire. The licensee's position was that failure of the cables involved due to fire would not begin as a bolted fault but instead will be a gradual increase in circuit current as the cable insulation degraded due to fire. The licensee stated that this would result in

tripping the downstream breaker in the thermal region before reaching the upstream breaker's magnetic tripping region.

Based on the team's question, on July 30, 2004, the licensee initiated CAP 022033 to re-evaluate the coordination concerns identified with the 15 branch circuits. In the new evaluation, the licensee was planning on incorporating the breaker resistance and improved cable resistance values into the fault current determination. This issue is considered an Unresolved Item (URI) pending NRC review of licensee re-evaluation results (URI 05000305/2004005-01).

.2 Fuse Coordination and Post Fire Safe Shutdown Procedures

Coordination of Emergency Diesel Generator (EDG) 1A Fuses F4/F5 and F1/F2

Introduction: The team identified an unresolved item concerning the licensee's actions to address lack of coordination between the downstream and the upstream protective fuses for the EDG 1A control circuit.

Description: During review of licensee actions to address identified electrical coordination issues, the team noted that CAP 018612 was issued on October 24, 2003, to document "weaknesses" in coordination identified during independent reviews of the licensee's Appendix R design description. The independent reviews were initiated as part of the extent of condition for a previously identified White finding.

On March 11, 2004, the fire protection self-assessment conducted in preparation for the NRC Triennial Fire Protection Inspection identified a specific concern regarding coordination of the 15 amp fuses (F4/F5) and the 25 amp fuses (F1/F2) for EDG 1A controls in that there was no vendor design information available to verify that the 15 amp and 25 amp fuses were electrically coordinated. On March 11, 2004, CAP 020396, "Additional Evaluation Required for Fuse Coordination Issue from Self-Assessment," was issued to evaluate and address this concern. This CAP categorized this coordination issue as a concern with documentation of fuse coordination rather than lack of design documents to demonstrate that adequate coordination exists between the fuses used for protection of the EDG 1A control circuitry.

On March 16, 2004, the licensee issued Engineering Work Request (EWR) 015573 to perform additional evaluation for the fuse coordination issue identified in the self-assessment and to develop corrective actions, as required to resolve the concern identified in CAP 020396. This EWR was subsequently closed on March 18, 2004, and the corrective action (CA) was transferred to CA 014089 dated October 27, 2003, per CAP 018612 issued on October 24, 2003. The team noted that the licensee could not obtain documentation regarding the type of 15 amp and 25 amp fuses installed in the field and when they were manufactured. Since the licensee could not verify the vintage of fuses F1/F2 (25 amp), a recommendation was made in CAP 014089 to revise procedure E-0-06 ,"Fire in Alternate Fire Zone," and add steps to ensure that the operators would replace the 25 amp fuses in case of a fire in the control or relay room. The team reviewed the calculation and the E-0-06 procedure and noted that the coordination issue was not yet resolved and the procedure was not revised to include the required steps for the operator to replace the 25 amp fuses in case of a postulated

fire. In addition, the team determined that 25 amp spare replacement fuses were not available in stock.
The team was concerned that coordination of these fuses was questionable since no documentation was available to demonstrate positive coordination. The team also noted that the 15 and 25 amp fuses were not scheduled for replacement. Subsequently, following NRC inquiry, the licensee scheduled the fuse replacement for mid-September 2004.

Following NRC inquiry, CAP 022016 was initiated on July 29, 2004, to document and address how the licensee would return EDG 1A to service following a postulated fire in the control room or relay room, which would cause a short on the EDG 1A control circuitry resulting in blown F1/F2 (25 amp) and/or F4/F5 (15 amp) fuses.

To address the team's concern, the licensee initiated another fuse coordination evaluation to determine if the fuses were coordinated. On August 24, 2004, the licensee completed the fuse coordination evaluation of EDG 1A control fuses and the 70 amp upstream breaker. The licensee could not confirm whether the installed 15 amp and 25 amp fuses were of the 1967 vintage or 1984 vintage. The engineers used KNPP available time-current characteristic curves to extrapolate coordination of the pre-1984 Bussmann NON 15 amp and 25 amp fuses assumed to be installed in the EDG 1A circuitry. The licensee determined that a 1967 vintage 15 amp fuse would not coordinate with a 1967 vintage 25 amp fuse for Appendix R fire scenario for train A EDG. The licensee also determined that a 1967 vintage 15 amp fuse would not coordinate with a 1984 vintage 25 amp fuse. The licensee also determined that if both fuses were 1984 vintage they would coordinate to 0.01 seconds but not at some point below 0.01 seconds. The vendor apparently changed the time current characteristic curves for these fuses in 1984 but did not provide the revised curves to the licensee.

Translation of Calculation Results into the Safe Shutdown Procedure

The team reviewed Addendum B, "Coordination of Fuses Requiring Replacement Capability with Upstream Breakers," Attachment 1, of calculation C11015, "Appendix R Associated Circuit Protective Device Review." The purpose of the calculation was to evaluate the 125 Vdc and 120 Vac circuits that supplied safe shutdown equipment for adequate coordination such that a fire induced fault would not impact the shutdown capability of the plant. The calculation output required that procedure E-0-06, "Fire in Alternate Fire Zone," Revision 5, include in step 14.b.2, a requirement for the operators to replace EDG 1A control circuitry fuses F1 and F2 following a fire. These fuses are located in shutdown panels SD-100 and SD-101 and are assumed to blow during a Control Room/Relay Room fire to protect EDG 1A control circuit logic conductors.

The team determined that procedure E-0-06, Revision 5, did not include the needed steps for EDG 1A control circuit fuses F1 and F2 fuse replacement as required by the calculation. The team also identified that an inter-discipline review of Appendix R procedures was not performed by the Appendix R engineer for revisions made to shutdown procedure E-0-06. On July 16, 2004, the licensee initiated CAP 021877 to evaluate and address this issue.

The team noted that for a fire which would require the evacuation of the main control room (MCR), the operators would initiate procedure E-0-06. The purpose of procedure

E-0-06 is to place the plant in Hot Shutdown and cooldown to Cold Shutdown using the Dedicated Shutdown System, in the event a fire removes the ability to monitor or control plant operation from the Control Room. Only train A equipment can be controlled from the Dedicated Shutdown Panel. Offsite power is assumed to be lost or unreliable and all control/instrumentation routed through the Relay Room will be inaccurate and/or unreliable. Replacement of these fuses was essential in assuring that control power was available to the electrical circuit components in the control circuitry used for EDG 1A startup and operation following the fire. Lack of a procedure step to direct the operator that the fuses needed to be replaced could delay achieving Hot Shutdown following a fire that required shutdown from outside of the control room. In addition, the team noted that no spare 25 amp fuses were available onsite at the time of the inspection.

In response to the team's concern, on July 30, 2004, the licensee issued CAP 022036 to address several concerns noted by the team, including a revision to procedure E-0-06. On the same date, the licensee revised the E-0-06 procedure and added in step 15.b, a requirement for replacement of EDG 1A control fuses F1 and F2, following a fire and the re-energization of 4160V and 480V dedicated shutdown electrical system.

This item is considered Unresolved pending NRC staff review of the last EDG 1A control circuit fuse coordination evaluation which was performed by the licensee after the end of this inspection. (URI 05000305/2004005-02)

.3 Field Walkdowns

a. Inspection Scope

The team conducted a field inspection of several cabinets and motor control centers (MCC) to determine if adequate spare fuses were available at designated cabinets for use in case of a fire. The team also inspected Appendix R related breakers to determine whether they were maintained locked in the appropriate position.

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 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 team 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 team 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

No findings of significance were identified.

.5 Operational Implementation of 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 team reviewed a sample of the actions outlined in procedure E-FP-08, "Emergency Operating Procedure - Fire," and procedure E-O-06, "Fire in Alternate Fire Zone." The team verified that operators could reasonably be expected to perform the procedure actions within the identified applicable plant shutdown time requirements and that the actions were consistent with the plant safe shutdown analyses.

b. Findings

No findings of significance were identified.

.6 Communications

For a fire in an alternative shutdown fire area, control room evacuation is required and a unit shutdown is performed from outside the control room. Radio communications are relied upon to coordinate plant shutdown and for fire fighting. Title 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 team 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 team performed a walkdown of a sample of the actions defined in procedure E-O-06, "Fire in Alternate Fire Zone." As part of the walkdowns, the team focused on the existence of sufficient emergency lighting for access and egress to areas and for performing necessary equipment operations.

b. Findings

No findings of significance were identified.

.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 team reviewed the licensee's procedures to determine if any repairs were required to achieve cold shutdown. The team determined that the licensee did require repair of some equipment to reach cold shutdown based on the safe shutdown methods used. The team 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 team 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 team reviewed the fire loading for selected areas to ensure that existing barriers would not be challenged by a potential fire.

b. Findings

No findings of significance were identified.

.10 Fire Protection Systems, Features, and Equipment

a. Inspection Scope

The team 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 team reviewed deviations, detector placement drawings, fire hose station drawings, 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

.1 Inoperable Heat Detectors for Extended Period of Time

Introduction: The team identified a Non-Cited Violation NCV of License Condition 2.C(3) having very low safety significance (Green) for the failure to repair a deluge sprinkler system in a timely manner.

Description: The NRC required the licensee to install a deluge sprinkler system in the Material Storage Area of the AX-32 fire area. This area contained a significant number of safety-related cables in cable trays. Amendment No. 23 was issued on December 12, 1978 and stated in Paragraph 3.1.4, that for the Maintenance Storage Area Suppression System, the existing wet pipe sprinkler system will be modified to an automatic deluge system. As a result, the licensee installed seven rate-of-rise detectors to provide an initiating signal for this deluge system.

The team noted that the licensee had allowed these detectors to be inoperable for an extended period of time. Several detectors failed surveillance procedure PMP-08-09. Detector 3 was identified failed on February 11, 2002, and not repaired until December 15, 2003. Detector 4 was identified failed on February 14, 2003, and not repaired until November 10, 2003. Detector 6 failed on November 5, 2003. Following the third failed detector the licensee declared the deluge system inoperable. These detectors actuate the deluge system when the temperature rise exceeds 15 degrees per minute. During the time that these detectors were inoperable a significant area of the material storage area was not protected from certain size of fires.

Analysis: The team determined that the licensee's failure to take prompt corrective actions to repair the failed detectors was a performance deficiency warranting a significance evaluation. The team concluded that the finding was greater than minor in accordance with Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports" Appendix B, Issue Disposition Screening," June 30, 2003, because if left uncorrected, the failure of the deluge system to actuate increases the likelihood of a fire that could challenge safe shutdown. The finding involved the attribute of protection against external factors (fire) and could have affected the mitigating systems objective of ensuring the availability of systems that respond to initiating events.

The inspectors completed a significance determination of this issue using IMC 0609, "Significance Determination Process (SDP)," dated April 21, 2003, Appendix F, "Fire Protection Significance Determination Process," dated May 28, 2004. The finding affected the Fixed Fire Protection System Category. The inspectors assigned a degradation rating of low safety significance because there were Pyr-A-Larm ionization detectors located at the ceiling level above this area. These detectors would alarm in the control room and the fire brigade would respond to a fire. In addition, other defense-in-depth fire protection elements remained unaffected and a fire in this area would not result in a loss of dedicated safe shutdown systems.

Enforcement: License Condition 2.C.(3), required, in part, that the Nuclear Management Company (NMC) implement and maintain in effect all provisions of the approved fire protection program as described in the KNPP Fire Plan, as referenced in the USAR, and as approved in the Safety Evaluation Reports, dated November 25, 1977, and December 12, 1978 (and supplement dated February 13, 1981). The NRC safety evaluation report dated December 12, 1978, based acceptance of the licensee's quality assurance provisions for fire protection on the licensee's May 15, 1978, commitment to implement fire protection quality assurance under the licensee quality assurance program docketed with the NRC. The KNPP Operational Quality Assurance Program Description was the licensee quality assurance program docketed with the NRC. Section 16, "Corrective Action," of the KNPP Operational Quality Assurance Program required, in part, that conditions adverse to quality, such as failures and malfunctions, be identified on corrective action forms and that measures shall be provided for prompt processing of these forms to ensure expeditious investigation, evaluation, and implementation of corrective action. Contrary to the above, the licensee failed to provide measures for prompt processing of corrective action forms relating to failures of the detectors for the materials storage area deluge system to ensure expeditious investigation, evaluation, and implementation of corrective action. As a result, the detection system for the materials storage area became inoperable due to individual failures of the detectors. The licensee entered this issue into their corrective action program under CAP 22615. At the time of this inspection, the detectors had been repaired and returned to operability. This violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy. (NCV 05000305/2004005-03)

.2 Inadequate Pre-fire Strategies

Introduction: The team identified a NCV of License Condition 2.C.(3) having very low safety significance (Green) for failing to include pertinent information in fire strategies. Specifically, the licensee failed to include information about the potential unavailability of certain fire hose stations and identify hydrogen and propane piping hazards in a fire zone.

Description: The team identified that the fire strategies did not provide pertinent information on plant areas to assist the fire brigade to be better prepared for fire fighting within those areas.

The team identified that water could become unavailable to certain hose stations during a fire as a result of operator actions to address mal-operation of plant equipment. The team noted that seven fire hose stations within the auxiliary building were connected to the service water system rather than the fire water system. Unlike the fire water system, the service water system could become divisionally separated under certain conditions such as a safety injection signal. A safety injection signal could be generated spuriously as a result of a fire. Procedure E-FP-08, "Emergency Operating Procedure - Fire," provided operators the option to de-energize one of the vital buses to address mal-operation of equipment due to the fire. As a result, one of the divisions of the service water system and associated hose stations could be rendered non-functional. In addition, for a fire requiring shutdown from the remote shutdown panel, all water systems could become unavailable temporarily until power was restored to one vital bus. The team considered the potential loss of certain hose stations to have a significant impact on manual fire fighting capability and associated fire fighting strategies. The team noted that the fire strategies, including Fire Strategy PFP-24, did not identify the source of the water for affected hose stations and did not identify the potential for the water source for certain hose stations to become unavailable. The licensee entered this issue in their corrective action program under CAP 21901 for further evaluation and corrective action.

Based on a review of licensing correspondence, the team also noted that hydrogen and propane piping ran through the AX-32 fire zone. The licensee confirmed that both a three-quarter inch hydrogen line and a one inch propane line ran through the area. The team considered a potential leak of hydrogen or propane to significantly affect fire fighting strategies. The presence of hydrogen and propane piping was not identified in Fire Strategy PFP-24, the fire strategy for fire zone AX-32. The licensee entered this issue in their corrective action program under CAP 21915 and planned to provide additional information in their fire strategy for the zone.

Analysis: In accordance with IMC 0612, "Power Reactor Inspection Reports," dated January 14, 2004, the team determined that the issue of not maintaining acceptable fire pre-plans was a performance deficiency. This performance deficiency was determined to be greater than minor because it affected the mitigating systems cornerstone attribute of protection against external factors (fire). Specifically, the failure to provide adequate warnings and guidance relating to the water supply used for manual fire fighting and hazards associated with hydrogen and propane piping in fire strategies could adversely impact fire fighting strategies used by the fire brigade in fighting a fire. In accordance with IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," dated, March 18, 2002, the team performed a SDP Phase 1 screening and determined that the finding affected fire protection defense-in-depth. As such, the team determined that a Phase 2 analysis in accordance with IMC 0609, Appendix F, "Fire Protection SDP," dated May 28, 2004, was required. As discussed by IMC 0308, Attachment 3, Appendix F, "Technical Basis, Fire Protection Significance Determination Process (IMC 609 App. F) At Power Operations," the current significance determination process does not address findings which affect the performance of the fire brigade. As such, the team used judgement based on experience to determine the safety significance of the issue. The team determined that the issue was of very low safety significance (Green)

due to extensive training provided to fire brigade members to deal with unexpected contingencies.

Enforcement: License Condition 2.C(3), required, required in part, that NMC implement and maintain in effect all provisions of the approved fire protection program as described in the KNPP Fire Plan. Section 10.3, "Fire Area Strategies," of the KNPP Fire Protection Program Plan specified that fire area strategies were documents which provided the fire brigade pertinent information on a given plant area to help the brigade to be better prepared for fire fighting within that area. Fire Strategy PFP-24 was the fire strategy for fire zone AX-32. Contrary to the above, fire Strategy PFP-24 did not contain pertinent information on a given plant area, fire zone AX-32, in that the fire strategy contained neither information relating to the possible unavailability of certain hose stations nor hydrogen and propane piping hazards contained in the fire zone. Once these issues were identified, the licensee entered the issues into their corrective action program under CAP 21901 and CAP 21915 and planned to revise their fire strategies to address the issues. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program, this violation is being treated as a NCV, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000305/2004005-04).

.3 Inadequate Water Pressure and Flow at Hose Stations

Introduction: The team identified an NCV of the Kewaunee Fire Protection Program Plan, License Condition 2.C(3), having very low safety significance (Green) for failure to meet the fire protection program requirement to maintain an acceptable water pressure and flow at hose stations.

Description: The team identified that the fire hose stations had inadequate water pressure and flow to effectively fight a fire if additional lengths of hose are used. The licensee had staged additional hoses at hose stations for compensatory measures. As a result, had the fire brigade attached these hoses to the hose stations it would have resulted in an inadequate water flow and pressure at those hose stations.

Based on the team's questions, the licensee initiated CAP021990, "Compensatory Measures for Fire Hose Stations is Inadequate," on July 28, 2004. This CAP stated that the use of additional hoses provided at hose stations supplied by service water will result in an unacceptable reduction in pressure.

Analysis: The team determined that having additional hoses that would have resulted in inadequate flow and pressure of water at hose stations was a performance deficiency warranting a significance evaluation. The team concluded that the finding was greater than minor in accordance with IMC 0612, "Power Reactor Inspection Reports" Appendix B, Issue Disposition Screening," June 30, 2003, because the lack of water pressure and flow at hose stations would hamper the fire brigades ability to fight a fire. The finding involved the attribute of protection against external factors (fire) and could have affected the mitigating systems objective of ensuring the availability of systems that respond to initiating events.

The inspectors completed a significance determination of this issue using IMC 0609, "Significance Determination Process (SDP)," dated April 21, 2003, Appendix F, "Fire Protection Significance Determination Process," dated May 28, 2004. The finding affected the Fixed Fire Protection System Category. The team assigned a degradation rating of low

safety significance (Green) because other defense-in-depth fire protection elements remained unaffected in all fire areas.

Enforcement: License Condition 2.C.(3) required that the NMC shall implement and maintain in effect all provisions of the approved fire protection program as described in the KNPP Fire Plan, and as referenced in the USAR, and as approved in the Safety Evaluation Reports, dated November 25, 1977, and December 12, 1978 (and supplement dated February 13, 1981).

By letter dated December 12, 1978, NRC issued Amendment No. 23 to the Facility Operating License which stated in Paragraph 4.3.1.4 that the licensee had provided hose stations throughout the plant to reach potential hazards to safety-related equipment with the hose being less than 100 feet and the interior fire hose installation conformed to the provisions of Appendix A to BTP 9.5-1.

Kewaunee Nuclear Power Plant Fire Protection Program Plan, Revision 5, Section 11.0, "Description of Fire Protection Systems and Features," stated that the general turbine plant and other specific areas are protected by sprinkler systems and standpipe and hose stations. These systems provide automatic and manual protection and were designed utilizing the guidelines presented in NFPA No. 13 and NFPA No. 14 respectively. NFPA No. 14, Paragraph 219 stated that for standpipe systems with Class II service that each standpipe shall be sized for a minimum flow of 100 gallons per minute.

Contrary to the above, the licensee had more than 100 feet of hose at some hose stations which would have resulted in an inadequate flow and pressure (less than 100 gallons per minute) during a fire. The failure to maintain hoses at or less than 100 feet in length and to maintain adequate water flow at the hose stations is a violation of License Condition 2.C(3). The licensee entered these findings into their corrective action program as CAP21990, "Compensatory Measures for Fire Hose Stations is Inadequate." The licensee's corrective actions included replacing 1 inch and 1-½ inch hoses with 2½-inch hoses to increase water flow at hose stations. This violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000305/2004005-05).

.4 Insufficient Number of Class A Extinguishers

Introduction: The team identified an NCV of License Condition 2.C.(3), which requires the licensee to implement all provisions of their approved fire protection program. The licensee failed to maintain NFPA Code requirements for the number of Class A extinguishers.

Description: As a result of the team's questions, it was determined that there was not an adequate number of Class A fire extinguishers in Fire Area AX-32. Amendment No. 23 to Facility Operating License (SER), Paragraph 4.3.3, dated December 12, 1978, stated that portable carbon dioxide, dry chemical and pressurized water fire extinguishers have been provided throughout the plant in accordance with the requirements of NFPA 10, "Portable Fire Extinguisher."

Section [E].6 of Appendix A to BTP 9.5-1 identified that fire extinguishers should be provided in accordance with the guideline of NFPA 10. NFPA Code 10 Section 1-1 identifies that portable extinguishers are intended as a first line of defense to cope with fires

of limited size. Section 1-3.1.1 identifies Class A fire hazards as fires in ordinary combustible materials such as wood, cloth, paper, rubber, and many plastics. Section 2-1 states that the selection of extinguishers shall be determined by the character of the fires anticipated, the construction and occupancy of the individual property, the vehicle or hazard to be protected. Section 3-2.1 stated that the maximum travel distance between Class A extinguishers used for ordinary combustibles is 75 feet.

The team determined that in Fire Zone AX-32, no Class A fire extinguishers were located in the 626-foot elevation fire zone. Two extinguishers were required to protect this area.

Analysis: The team determined that not having the correct number of Class A fire extinguishers was a performance deficiency warranting significance evaluation. The team concluded that the finding was greater than minor in accordance with IMC 0612, "Power Reactor Inspection Reports, Appendix B, Issue Disposition Screening," June 30, 2003, because not having an extinguisher to put out a limited size fire can increase the likelihood of a fire which could challenge safe shutdown. The finding involved the attribute of protection against external factors (fire) and could have affected the mitigating systems objective of ensuring the availability of systems that respond to initiating events.

The inspectors completed a significance determination of this issue using IMC 0609, "Significance Determination Process (SDP)," dated April 21, 2003, Appendix F, "Fire Protection Significance Determination Process," dated May 28, 2004. The finding affected the Fire Prevention and Administrative Controls Category. The inspectors assigned a degradation rating of low safety significance because this fire area has fire detectors that would alarm in the control room and the fire brigade would respond to a fire. In addition, other defense-in-depth fire protection elements remained unaffected and a fire in this area would not result in a loss of dedicated safe shutdown systems.

Enforcement: License Condition 2.C.(3), required that the NMC shall implement and maintain in effect all provisions of the approved fire protection program as described in the KNPP Fire Plan, and as referenced in the USAR, and as approved in the Safety Evaluation Reports, dated November 25, 1977, and December 12, 1978 (and supplement dated February 13, 1981).

Amendment No. 23 to Facility Operating License (SER), December 12, 1978, requires fire extinguishers in accordance with NFPA 10. For Fire Area AX-32 two type A extinguishers were required in accordance with NFPA 10. Contrary to the above, the licensee failed to maintain the Code requirements for the number of Class A fire extinguishers which was a violation of KNPP License Condition 2.C.(3). Once identified, the licensee initiated corrective actions and placed an extra ABC extinguisher in Fire Area AX-32. The licensee entered these findings into their corrective action program as CAP21863, "Portable Fire Extinguisher in AX-32 Not Rated for Class A Fires." This violation is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000305/2004005-06).

.5 Lack of Control of Transient Combustibles:

(2) Transient Combustibles Not Adequately Controlled Within Fire Area AX-32

Introduction: The team identified a Non-Cited Violation (NCV) of License Condition 2.C.(3) having very low safety significance (Green) for failure to adequately control transient combustibles.

Description: The team identified several examples where transient combustibles were not being adequately controlled within fire area AX-32. The examples were:

- On July 12, 2004, the team identified that materials were stacked on top of shelving in the materials storage area. The materials were stacked high enough such that a fire in the materials would neither be detected by the detectors for the automatic deluge system nor extinguished by the deluge system. The team noted that there were cables important to safety located directly above the materials. The licensee placed the issue in their corrective action program under CAP 021822 and removed the materials from on top of the shelving.

- On July 14, 2004, the team identified that wood planks were placed across electrical raceways above the materials storage area. The team noted that there were cables important to safety in the vicinity of the wood planks. The licensee placed the issue in their corrective action program under CAP 021853 and removed the wood planks.

- On July 28, 2004, the team identified that there were three plastic trash cans and a coat rack in a hallway adjacent to, but not within, the materials storage area. The team noted that cables important to safety were located directly above the trash cans and coat rack. The licensee placed the issue in their corrective action program under CAP 022025 and issued a combustibles materials permit for the materials.

The team noted that the KNPP Fire Protection Program Plan required specific authorization for the storage and use of combustibles in safety-related areas. None of the materials listed above had been reviewed or approved under the transient combustible materials permit program. Based on the identification of multiple examples, the team concluded that the licensee's control of transient combustibles was not adequate.

Analysis: In accordance with Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," dated January 14, 2004, the team determined that the issue of failing to adequately control transient combustibles was a performance deficiency. This performance deficiency was determined to be greater than minor because it affected the mitigating systems cornerstone attribute of protection against external factors (fire) and, if left uncorrected, could become a more significant safety concern. Specifically, uncontrolled transient combustibles could result in the greater likelihood or severity of a fire which affects equipment important to safety. In accordance with IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," dated, March 18, 2002, the team performed a Significance Determination Process (SDP) Phase 1 screening and determined that the finding affected the Fire Prevention and Administrative Controls Category. The team performed a Phase 2 analysis in accordance with IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated May 28, 2004, for the examples identified in fire area AX-32.

The finding affected the fire prevention administrative controls category outlined in IMC 0609, Appendix F. Step 2.9 of IMC 0609, Appendix F, outlines the formula for determining safety significance as follows:

$$\Delta CDF \approx DF \times F \times SF \times AF \times PNS \times CCDP$$

where

DF is the duration factors. For this case, the team determined that DF = 1.0 based on review of task 1.4.1 of IMC 609, Appendix F, because the conditions appeared to have existed for greater than 30 days.

F is the fire frequency. For this case, the team determined that $F = 1.7 \times 10^{-3}$ based on review of Attachment 4, "Fire Ignition Source Mapping Information: Fire Frequency, Counting Instructions, Applicable Fire Severity Characteristics, and Applicable Manual Fire Suppression Curves," of IMC 609, Appendix F, and determined that the area had a high likelihood rating for transient combustibles.

SF is the severity factor. For this case, the team conservatively assumed that SF = 1.0 because the team did not develop a fire scenario for the issue.

AF is the ignition source specific frequency adjustment factor. For this case, the team determined that AF = 3.0 based on review of task 2.4.2 of IMC 609, Appendix F, and that the finding was related to the combustible controls program of the fire protection program.

PNS is the probability of non-suppression. For this case, the team conservatively assumed that PNS = 1.0 because the team did not develop a fire scenario.

CCDP is the conditional core damage probability. For this case, the team reviewed the risk-informed notebook for the KNPP and determined that the transients without power conversion system and stuck-open power operated relief valve (PORV) significance determination process worksheets were applicable. Based on review of cable location information provided by the licensee for fire area AX-32, the team determined that auxiliary feedwater would not be affected, one train of safety injection could be affected, residual heat removal could be affected (however, one train could be recovered), and one of the pressurizer PORV valves and the opposite train pressurizer PORV block valve could be affected. In addition, based on review of Procedure E-FP-08 and interviews of licensed operators, the team concluded that it would be improbable that operators would either perform alternative shutdown from outside the control room or de-energize one of the safety-related buses due to a fire in fire area AX-32. The team evaluated the amount of mitigation credit using the transients without power conversion system and stuck-open PORV significance process worksheets. For the transients without power conversion system worksheet, the team concluded that a minimum of four points of recovery credit would be available due to auxiliary feedwater. In addition, the team noted that high pressure recirculation could be recovered and that one train of high pressure injection (safety injection) would be available. For the stuck-open PORV worksheet, the team concluded that a minimum of four points of recovery credit would be available due to the block valve for the affected PORV remaining available, recovery of low pressure recirculation, recovery of high pressure recirculation, one train of high pressure injection

would remain available, and auxiliary feedwater would be unaffected. As such, the team determined that CCDP = 1×10^{-4} due to the four points of mitigation credit.

ΔCDF is the difference in the core damage frequency due to the performance deficiency. For this case, the team determined that the ΔCDF $\approx 5.1 \times 10^{-7}$ based on the formula and values described above.

Based on review of Table 2.9.1 of IMC 609, Appendix F, the team determined that the issue of not adequately controlling transient combustibles was of very low safety significance (Green) because the ΔCDF of approximately 5.1×10^{-7} was less than 1×10^{-6}.

Enforcement: Kewaunee License Section 2.C(3), required, in part, that the NMC implement and maintain in effect all provisions of the approved fire protection program as described in the KNPP Fire Plan, and as referenced in the USAR, and as approved in the Safety Evaluation Reports, dated November 25, 1977, and December 12, 1978 (and supplemented dated February 13, 1981). Section 8.3 of the KNPP Fire Protection Program Plan specified that specific authorization was required for the storage and use of combustibles in safety-related areas. Fire area AX-32 was a safety-related area. Contrary to the above, the team identified, on July 12, July 14, and July 28, 2004, that materials were stored in fire area AX-32, a safety-related area, without specific authorization. Specifically, the team identified materials were stacked on top of shelves and wood planks above the materials storage area within fire area AX-32. In addition, the team identified three plastic trash cans and a coat rack adjacent to the materials storage area within fire area AX-32. None of these identified materials were specifically authorized. After the uncontrolled transient combustible materials were identified, the licensee entered the issues into their corrective action program (under CAP 021822, CAP 021853, CAP 022025, and CAP 022027) and either listed the materials in the transient combustible permit system or removed the materials from the area. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program, this violation is being treated as a NCV, consistent with Section VI.A of the NRC Enforcement Policy. (NCV 05000305/2004005-07)

(3) Transient Combustibles Not Adequately Controlled Within Fire Area AX-24

Description: Fire area AX-24 at the KNPP consisted of the fuel handling rooms which included the new fuel area and the spent fuel area. The fire areas consisted of primarily open areas containing the following major safe fire related shutdown equipment: Main Steam Isolation Valve MS-1A/31015; Main Steam Isolation Valve Bypass MS-2A/32007; Main Steam Header 1A Controlled Relief Valve SD-3A/31170; and Main Steam Generator Pressure Transmitter PT-21141.

Amendment No. 23 to Facility Operating License (SER), dated December 12, 1978, stated in paragraph 5.5.2 that combustibles in the various rooms at this elevation included small to moderate amounts of electrical cable insulation, and during refueling periods, the fuel pool area contained moderate amounts of transient combustibles such as plastic sheeting, anti-"C" clothing, and packaging materials.

The KNPP Fire Protection Program Plan, Revision 5, stated that automatic detection was not provided in either the new fuel or spent fuel area since there were no combustibles and no safe shutdown components in either area. Detection was provided on the 586-foot elevation and annunciated in the Control Room. Combustibles were limited to a negligible amount. Automatic extinguishing system was not provided in this area.

The license condition for the lack of an automatic suppression system and complete detection for fire area AX-24 was granted based, in part, on the fact that hazardous quantities of combustibles would not be expected in this fire zone.

Transient Combustibles are controlled by procedure FPP-08-08, FP - Control of Transient Combustible Materials, Revision D. Permits are issued during the planning stages of the associated work orders. Permits are closed in the database with the original permit is returned to the Fire Marshal. The team questioned why 275 gallons of motor oil had been left in AX-24 fire area since August 19, 2003, 12 - (55 gallon drums) of RCP motor oil since April 25, 2004, and 30 gallons of solvent in MOV Cleaning Tank since January 28, 2004. The licensee determined that both permits for motor oil should have been closed since the motor oil had been removed from this area. However, the 30 gallons of solvent and the remaining transient combustibles on the list of transient combustibles were still in the fire area. In addition, many combustibles had been permanently staged in the area for ease of use to support maintenance and operations activities. Contrary to the SER evaluation, the team noted that a significant amount of transient combustibles materials had been or were in Fire Area AX-24 as indicated by the following transient permits:

Permit Number 03-065, 12 - 55 gallon drums of RCP Motor Oil, issued April 25, 2003;
Permit Number 03-073, Wooden Pallets for Shipping Hoists, issued June 10, 2003;
Permit Number 03-079, 275 gallons of Motor Oil X-5, issued August 19, 2003;
Permit Number 03-091, RCP Motor Storage, issued September 19, 2003;
Permit Number 03-019, Plastics, Mop Heads, Gloves, etc., issued March 6, 2003;
Permit Number 04-001, RCP Maintenance 275 - 300 gallons of Oil issued January 13, 2004;
Permit Number 04-002, Propane Powered Fork Lift, issued January 13, 2004;
Permit Number 04-006, 30 gallons solvent in MOV Cleaning Tank, issued January 28, 2004; and
Permit Number 04-022, 55-gallon Drum to Collect Stud Tensioner Oil, issued April 12, 2004.

Analysis: The team determined that not controlling combustibles in Fire Area AX-24 was a performance deficiency warranting significance evaluation. The team concluded that the finding was greater than minor in accordance with IMC 0612, “Power Reactor Inspection Reports” Appendix B, Issue Disposition Screening,” June 30, 2003, because not controlling combustibles in AX-24 can increase the likelihood of a fire that could challenge safe shutdown. The finding involved the attribute of protection against external factors (fire) and could have affected the mitigating systems objective of ensuring the availability of systems that respond to initiating events.

The inspectors completed a significance determination of this issue using IMC 0609, “Significance Determination Process (SDP),” dated April 21, 2003, Appendix F, “Fire Protection Significance Determination Process,” dated May 28, 2004. The finding affected

the Fire Prevention and Administrative Controls Category. The inspectors assigned a degradation rating of low safety significance because this fire area has detectors that would alarm in the control room and the fire brigade would respond to a fire. In addition, other defense-in-depth fire protection elements remained unaffected and a fire in this area would not result in a loss of alternate safe shutdown systems.

Enforcement: License Condition 2.C.(3), required that the NMC shall implement and maintain in effect all provisions of the approved fire protection program as described in the KNPP Fire Plan, and as referenced in the USAR, and as approved in the Safety Evaluation Reports, dated November 25, 1977, and December 12, 1978 (and supplement dated February 13, 1981).

Amendment No. 23 to Facility Operating License (SER), December 12, 1978, Paragraph 5.5 stated that combustibles in the various rooms at this elevation include small to moderate amounts of electrical cable insulation. During refueling periods, the fuel pool area contains moderate amounts of transient combustibles such as plastic sheeting, anti-"C" clothing, and packaging materials.

The KNPP Fire Protection Program Plan, Revision 5, stated that automatic detection was not provided in either the new fuel or spent fuel area since there were no combustibles and combustibles were limited to a negligible amount.

Contrary to the above, the failure to limit the quantity of transient combustibles in fire area AX-24 is a violation of License Condition 2.C(3). This violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000305/2004005-08). The licensee entered this issue into their corrective action system as CAP021994, "FPP-08-08 Control of Transient Combustible Materials Not Followed."

.6 Acceptability of Cable Spreading Area Suppression System

Introduction: The team identified an URI concerning the acceptability of the cable spreading area suppression system. Specifically, the team identified issues concerning the licensing basis for the system, actuation of the closed head spray nozzles, coverage, hydraulic functionality, and installation.

Description: The cable spreading area in fire area AX-32 contained safe shutdown cables from both trains. The cable spreading area was open to the materials storage area and main feedwater and steam valves on one end. The walls and the ceiling of the cable spreading area consisted of concrete. However, the flooring of the cable spreading area consisted of 20-gauge metal decking. The radiation protection office and associated facilities were located directly below the cable spreading area.

The team estimated there was 160 linear feet of open books shelves and 105 linear feet of counter top with metal desk draws and file cabinets below within the radiation protection offices. In addition, the team counted 20 chairs, a plastic trash can, an open plastic recycle bin, and three tables. In terms of potential ignition sources, the team counted nine computers, one printer, one freezer, two refrigerators, one toaster, three microwaves, two coffee makers, and one pizza oven within the radiation protection office area. As such, the team considered the amount of transient combustibles in fire area AX-32 to be relatively

high.

The NRC performed an analysis of the radiation protection office area and concluded that hot gas layer temperatures in the radiation protection office could reach in excess of 1000 degrees Fahrenheit. The NRC analysis was based on computer fire modeling of the radiation protection office using CFAST [Consolidated Model of Fire Growth and Smoke Transport] analysis software and a time squared medium fire growth rate curve (depicted in Figure B.1-2 of NUREG-1805, "Fire Dynamics Tools (FDT^{s}) Quantitative Fire Hazard Analysis Methods for the U.S. Nuclear Regulatory Commission Fire Protection Inspection Program," draft report published June 2003). Based on this information, the team concluded that a fire in the radiation protection office area could adversely affect the safe shutdown cable trays in the cable spreading area above due to heat being conducted and radiated through the metal decking.

The fixed suppression system installed by the licensee generally consisted of a water spray system designed to protect a number of cable trays in the cable spreading area and cable trays located above the materials storage area. However, the suppression system differed from spray systems designed in accordance with the applicable fire code, NFPA 15, in that the spray nozzles were closed (i.e., containing a glass bulb) and there was no detection system for actuating the suppression system. In these respects, the suppression system was similar to a wet pipe sprinkler system. However, the suppression system did not meet requirements of the applicable fire code, NFPA 13, in that the closed spray nozzles were not located near the ceiling where they would be actuated due to a hot gas layer or ceiling jets from a fire. As such, the team questioned whether spray heads would open, when necessary, to provide protection for the selected cable trays.

By letter dated April 26, 1978, the NRC stated the position that sprinkler protection covering both safety divisions should be provided in the service rooms at elevation 616 feet of the auxiliary building, i.e., the cable spreading area. By letter dated May 26, 1978, the licensee committed to install a suppression system for the safeguards trays. However, the team noted that description of the system to be installed varied within the May 26, 1978, letter. Specifically, on page 5 of the enclosure 1 to the letter, the licensee stated: "A wet pipe sprinkler system is being installed over the safeguards trays to prevent the loss of safeguard equipment in case of fire." Also, in specific response to the April 26, 1978, NRC letter stating sprinkler protection covering both safety divisions should be provided in the service rooms, the licensee provided the response that "this modification has been initiated" (item P17 on page 6 of enclosure 2 to the May 26, 1978, letter). The NRC subsequently approved the fire protection features for the area in the December 12, 1978, safety evaluation report based on the licensee's commitment to install a wet pipe sprinkler system to provide coverage of safety-related cable trays. Given that the majority of licensing correspondence, including the NRC safety evaluation report, referred to the suppression system as a wet-pipe sprinkler system rather than a spray system, the team questioned whether the suppression system, as designed and installed, was within the licensing basis.

The team identified a number of safeguards cable trays which were not covered by the installed suppression system, contrary to the licensee's commitment to provide coverage for the safeguards trays. Functions associated with safeguards cables for which coverage was not provided included:

- ability to isolate a steam generator blowdown valve from the control room;
- a control room heating, ventilation, and air-conditioning train;
- control for a residual heat removal pump pit fan coil unit fan;
- control for an auxiliary building basement fan coil fan;
- control for a battery room fan coil unit fan; and
- control for a turbine building fan coil unit.

The team reviewed the hydraulic calculations for the system and noted that the calculations were based upon a minimum of seven pounds per square inch (psi) pressure being required for the sprays nozzles. However, manufacturer's literature for the spray nozzles indicated that the spray nozzles were designed to work in a range of 20 psi to 60 psi. The licensee contacted the technical support staff of the spray nozzle manufacturer and was informed that the required spray pattern would not be developed under the lower pressure. As such, the team questioned the hydraulic functionality of the system. The licensee initiated a review under CAP 021980. In addition to the above concerns, the team identified one spray nozzle resting against a conduit (which the licensee entered into their corrective action program under CAP 021870) and another spray nozzle for which the spray pattern was partially obstructed by a conduit.

Due to the concerns identified above, the team questioned the acceptability of the installed suppression system for the cable spreading area. This is considered a URI pending further review of the specific concerns relating to (1) the potential for non-actuation of the closed spray nozzles given their distance from the ceiling; (2) the lack of coverage for a number of safe shutdown cables located within the cable spreading area; (3) the hydraulic functionality of the system; and (4) installation issues such as the spray nozzle resting against a conduit and the spray pattern of another spray nozzle being partially obstructed by a conduit. (URI 05000305/2004005-09).

.11 Compensatory Measures

a. Inspection Scope

The team 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 team 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

Issues relating to adequacy of compensatory measures were identified in Sections 1R05.10.b.1 and 1R05.10.b.3 of this report.

4. OTHER ACTIVITIES (OA)

4OA2 Identification and Resolution of Problems (71152)

a. Inspection Scope

The team 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 team reviewed selected samples of condition reports, work orders, design packages, and fire protection system non-conformance documents.

b. Findings

No findings of significance were identified.

4OA6 Meeting(s)

.1 Exit Meeting

On July 30, 2004, at the conclusion of inspection activities, the team presented the inspection results to Mr. T. Coutu and other members of licensee management at the KNPP. The licensee did not identify any material reviewed during the inspection as being proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee
L. Gerner, KNPP Licensing Supervisor
K. Hoops, KNPP Site Director
K. Peveler, KNPP Programs Engineering Manager
L. Armstrong, KNPP Engineering Director
S. Putman, KNPP Maintenance Manager
S. Baker, KNPP RP Manager
D. Geisen, KNPP Nuclear Oversight Manager
A. Bolyen, KNPP Nuclear Oversight QA Supervisor
J. Coleman, KNPP Emergency Preparedness Manager
R. Womack, NMC Fleet Program Engineering Manager
J. Lang, KNPP Principal Engineer
T. Coutu, Site Vice President
K. Davidson, KNPP Plant Manager
B. Koehler, KNPP Manager of Projects
J. Pollock, Design Engineering Manager
D. Lohman, Operations Manager
R. Pletz, Fire Protection Coordinator
E. Alsteen, Fire Protection Engineer
E. Coen, Site PRA Lead
R. Nicolai, Performance Assessment Manager
T. Breene, Plant and Systems Engineering Manager
W. Hunt, Training Manager
D. Will, Principal Electrical Engineer
T. Hanna, Engineering Program Supervisor

Nuclear Regulatory Commission
C. Pederson, Division Director, Division of Reactor Safety
R. Krsek, Kewuanee SRI

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000305/2004005-03	NCV	Failure to Repair the Deluge System Heat Detectors in a Timely Manner (1R05.10.b.1)
05000305/2004005-04	NCV	Failure to Maintain Acceptable (Quality Related) Pre-Fire Strategies (1R05.10.b.2)
05000305/2004005-05	NCV	Failure to Meet the Fire Protection Program Requirements for Hose Lengths to Maintain an Acceptable Water Pressure and Flow at Hose Stations (1R05.10.b.3)
05000305/2004005-06	NCV	Failure to Meet the NFPA Code Requirements for Extinguisher Placement (1R05.10.b.4)
05000305/2004005-07	NCV	Transient Combustibles Not Adequately Controlled Within Fire Area AX-32 (1R05.10.b.5(1))
05000305/2004005-08	NCV	Transient Combustibles Not Adequately Controlled Within Fire Area AX-24 (1R05.10.b.5(2))

Opened

05000305/2004005-01	URI	Actions to Address Electrical Coordination Concerns of 15 Appendix R Associated Circuits (1R05.3.b.1)
05000305/2004005-02	URI	Coordination Concerns with EDG 1A Fuses and Translation of Calculation Results into the Safe Shutdown Procedure (1R05.3.b.2)
05000305/2004005-09	URI	Acceptability of Cable Spreading Area Suppression System (1R05.10.b.6)

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 of 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.

Assessments

KSA-ENG-04-02; KNPP Fire Protection Program Self-Assessment; dated March 31, 2004

Calculations

C11015; Appendix R Associated Circuit Protection Device Review; dated October 15, 1999

C11015 Addendum A; Detailed Branch Circuit Review of Upstream and Downstream Molded Case circuit Breakers; dated June 3, 2004

C11015 Addendum B; Coordination of Fuses Requiring Replacement Capability with Upstream Breakers; dated June 25, 2004

Calculation/Evaluation No. C11605; Flow to Cable Tray Sprinklers; Revision 0

Calculation AX-32 Sprinkler; Cable Trays 1AT16S5; 1AT17S6; 1AT14S6; dated November 6 1978

Calculation AX-32 Sprinkler; Auxiliary Building Sprinkler; Cable Trays 1AT16S5; 1AT17S6; 1AT14S6; dated June 9, 1986

Corrective Action Documents

CAP 001276; Unauthorized Fire Penetrations; dated October 8, 2001

CAP 001402; Requirement for Barrier Impairment Permits Not in Procedures; dated September 28, 2001

CAP 003116; Over Pressurization of Fire Protection Piping; dated February 12, 2002

CAP 003829; Fire Barrier Impairment Requires Improved Efficiency; dated April 9, 2002

CAP 003981; Penetration Seal Found Degraded; dated April 23, 2002

CAP 008057; Barrier Impairment Process Not Followed; dated September 25, 2001

CAP 008107; Welding Without Observing Fire Protection Procedure Requirements; dated September 23, 2001

CAP 012529; Administrative Control of the KNPP Fire Protection Program Analysis Document; dated August 9, 2002

CAP 012675; Unsealed Penetrations Found in Appendix R Wall; dated August 22, 2002

CAP 012928; Storage of Propane Bottles; dated September 12, 2002

CAP 012983; Preventive Maintenance of STF Carbon Dioxide System Not in Compliance with National Fire Protection Association (NFPA); dated September 18, 2002

CAP 016339; Evaluate Anticipated Increase in Flow to Contracted Water Supply; dated June 14, 2004

CAP 017010; Flame and Heat Detectors Without PMPs for Testing and Inspection Purposes; dated June 23, 2003

CAP 017955; Additional Cable Routing Required for RCE-057; Revision 1 - Extent of Condition; dated September 6, 2003

CAP 018612; Weaknesses in Coordination Calculations Identified During Independent Review; dated October 24, 2003

CAP 018615; Identification of additional fire zone; dated October 24, 2003

CAP 020008; Unsatisfactory Drill Performance of a Fire Brigade During Drill 2004-02; dated February 16, 2004

CAP 020145; Fire Extinguisher Inspection Frequency in PMP-08-20 Does Not Meet NFPA-10; dated February 25, 2004

CAP 020396 (EWR 015573); Additional Evaluation Required for Fuses Coordination Issue from Self-Assessment; dated March 11, 2004

CAP 020597; Recommendations from Self-Assessment KSA-ENG-04-02; dated March 29, 2004

CAP 021410; Appendix R coordination Concerns Not Addressed Under CAP 018612; dated June 1, 2004

CAP 021915; Hydrogen and Propane Gas Line are not Identified in the Fire Strategies; dated July 21, 2004

CAP 021975; PMP-08-09 Test Data Sheets Unavailable; July 27, 2004

CAP 022002; An Administrative Discrepancy Revealed in the Fire Plan for Unlabeled Frames; dated July 28, 2004

CE007062; No Permit Issued for the Impairment of the Residual Heat Removal (RHR) Pit A & B Covers

OTH002452; Develop and Implement a KNPP Barrier Control Program; dated May 16, 2001

OTH014137; Additional Activities Related to the Barrier Control Program; dated October 29, 2003

Corrective Action Documents Initiated as a Result of Inspection

CAP 021822; Combustible Materials Were Found to be Stored Above the Detection and Sprinkler; dated July 12, 2004

CAP 021870; Sprinkler Head in AX-32 Protecting Cable Tray No. IAT16S5 Contacting Conduit; dated July 15, 2004

CAP 021838; Discrepancy Found in WPS Response Letter dated 5/26/78 to NRC RAI; dated July 13, 2004

CAP 021863; Portable Fire Extinguisher in AX-32 Not Rated for Class A Fires; dated July 15, 2004

CAP 021854; Error on Drawing E-497; dated July 15, 2004

CAP 021857; Error or Drawing E-649; dated July 15, 2004

CAP 021858; Cable 152BC83 Equipment Database STATUS Incorrect; dated July 15, 2004

CAP 021855; Cable 1S5C1640 Not in Equipment Database; dated July 15, 2004

CAP 021901; Lack of Warnings or Training for Actions Needed if a Loss of Fire Water Occurs; dated July 20, 2004

CAP 021859; Problem (1) Identified by NRC Concerning Operator Actions with a Fire in the Cable Spreading Area; dated July 15, 2004

CAP 021860; Problem (2) Identified by NRC Concerning Operator Actions for a Fire in the Cable Spreading Area; dated July 15, 2004

CAP 021915; Hydrogen and Propane Gas Lines Are Not Identified in the Fire Strategies; dated July 21, 2004

CAP 021931; Quantity of Ordinary Combustibles in Fire Zone AX-32; dated July 22, 2004

CAP 021877; Inter-discipline Review of Appendix R Procedures; dated July 16, 2004

CAP 021972; Charging Pump C Appendix R Master Diagram Discrepancy; dated July 27, 2004

CAP 021980; Insufficient Pressure Value Used in AX-32 Fire Protection Hydraulic Calculation; dated July 27, 2004

CAP 021945; Failure of Fire Pump B During SP-08-81

CAP 021990; Compensatory Measures for Fire Hose Stations is Inadequate

CAP 021999; Possible Discrepancy Between in the 50.59 Review of DCR 3393

CAP 022002; An Administrative Discrepancy Revealed in the Fire Plan for Unlabeled Frames

CAP 021989; Error in Appendix R Design Description Regarding RHR-1B Disconnect Position; dated July 28, 2004

CAP 021874; Improved Basis Required for Use of E-FP-08 Attachments; dated July 16, 2004

CAP 021853; Wood Planks Across Electrical Raceways Above Material Storage Area; dated July 15, 2004

CAP 021876; Evaluation of Suppression Adequacy in RPO Office Area; dated July 16, 2004

CAP 021883; Unattended Extension Cord Found Plugged in and Unattended; dated July 17, 2004

CAP 021884; Non-retardant Wood Used in Scaffolding; dated July 17, 2004

CAP 021885; Non-treated Wood Used in Scaffolding; dated July 17, 2004

CAP 021886; Fire Detector Found Covered with a Plastic Bag; dated July 17, 2004

CAP 021887; Control of Combustibles - Former I & C Shop (AX-32); dated July 17, 2004

CAP 021899; fire Damper AAC-FD10 Not Inspected per PMP 08-22; dated July 19, 2004

CAP 021910; Failure of SP-08-081, Fire Pump Test; dated July 21, 2004

CAP 021940; Further Evaluation of New Circuit Analysis Criteria per RIS-2004-003; dated July 22, 2004

CAP 021981; E-FP-08 Guidance to Use Appendix C; dated July 27, 2004

CAP 021975; PMP-08-09 Test Data sheets Unavailable in the QA Vault; dated July 27, 2004

CAP 021994; FPP-08-08 Control of Transient Combustible Materials Not Followed; dated July 28, 2004

CAP 021996; No Work Request Written on Door 449 Following PMP-08-19 Inspection;

dated July 28, 2004

CAP 021844; Improper Use of Wood in Construction of Work Control Center; dated July 14, 2004

CAP 022016; Question on D/G 1A 25 Amp Fuses F1 and F2 Replacement for Appendix R Fire Damage; dated July 29, 2004

CAP 022024; Improvements to FPEE 053 - Engineering Evaluations; dated July 29, 2004

CAP 022025; Violation of FPP-08-08, Control of Transient Combustible Materials; dated July 29, 2004

CAP 022027; Need to Review the Control of Transient Combustible Materials Program; dated July 29, 2004

CAP 022033; C11015 Addendum A Revision; dated July 30, 2004

CAP 022034; Compensatory Actions for Safeguards Alley Pre-Action System; dated July 30, 2004

CAP 022035; Revision to PMP 41-06 Required; dated July 30, 2004

CAP 022036; Potential Incorrect Corrective Action as Part of CA 14089; dated July 30, 2004

CAP 022037; Cigarette Remains in Cable Spreading Area; dated July 30, 2004

CAP 022615; Untimely Corrective Maintenance of Fire Detectors; dated September 8, 2004

Correspondence

NRC Letter to E. W. James from V. Stello; dated April 26, 1978

NRCNI-304; Response to Request for Additional Information and Staff Positions Concerning Fire Hazards Analysis; dated May 26, 1978

Drawings

A-395; Appendix "R" Shutdown Systems Reactor & Aux. Bldg. Bsmt Floor; Revision D

A-396; Appendix "R" Shutdown Systems Reactor & Aux. Bldg. Mezz. Floor; Revision L

A-397; Appendix "R" Shutdown Systems Reactor & Aux. Bld. Misc. Floors; Revision C

A-511; Fire Zones, Basement Floor Elev. 586’-0"; Revision A

A-512; Fire Zones, Mezzanine Floor Elev. 606’-0"; Revision B

A-513; Fire Zones; Elevation 616’-0"; Revision A

E-240; 4160V & 480V Power Sources; Revision AR/3445-1

E-258; 480V MCC 1-52A, 1-52-F, & 1-52B; Revision BS

E-259; 480V MCC 1-62D & 1-62E; Revision AW

E-260; 480V MCC 1-52C, 1-52E & 1-62C; Revision BK

E-261; 480V MCC 1-62A, 1-52D, 1-5262 & 1-62B; Revision AZ

E-2990; 480V MCC 1-52B, 1-52F, 1-62B Extensions & MCC 1-62H

E-3398; Appendix 'R' AC & DC Power Sources; Revision H

E-1586; Schematic Diagram - D/G A Shutdown, Governor Control and Auxiliary Relays; Revision AC

E-1584; Schematic Diagram - D/G A Excitation and Control; Revision AC

E-1588; Schematic Diagram - D/G B Shutdown, Governor Control and Auxiliary Relays

E-640; Wiring Diagram (W/D) - External Connections Batteries and Equipment; Revision AT

E-843; Wiring Diagram - DC Auxiliary and Emergency AC; Sheet 1; Revision CH

E-844; W/D - DC Auxiliary and Emergency AC; Sheet 2; Revision BW

E-845; W/D - DC Auxiliary and Emergency AC; Revision BD

E-3626; Circuit Diagram - Non-safeguards DC Auxiliary; Revision E

E-3627; W/D - Non-safeguards DC Auxiliary; Revision E

E-3113; Schematic Diagram - MCC 1--52B Motor 1-418; Revision H

E-3100; Wiring Diagram - Fuse Panel SD-100 ac Safeguard 5 Dist.; Revision AH

E-3165; W/D Dedicated Shutdown Panel SD-102; Revision L

E-2534; Instrumentation Wiring Diagram - Pressurizer Pressure Transmitter B

E-2831; Instrumentation Wiring Diagram - Compensated Steam Flow FT-474 and PT-478; Revision J

E-2541; Instrumentation Wiring Diagram - Pressurizer Level Cold Calibration Level Transmitter; Revision H

E-3326; Ext. Conn. Wiring Diagram - Dedicated Shutdown Analog Control Panel SD-103; Revision Q

E-3170; W/D Dedicated Shutdown Panel SD-102; Revision S

E-1043; Control Schematic - 4160V Breaker 1-509; Revision V

E-1035; Control Schematic - 4160V Breaker 1-501; Revision V

E-3192; Schematic Diagram - 480V Breaker 15203; Revision H

E-841; Wiring Diagram - Diesel Engine Control Panel D-1A; Revision AK

E-2536; Instrumentation Wiring Diagram - Pressurizer Pressure Transmitter D; Revision J

E-3175; Dedicated Shutdown Panel SD-102; Revision B

E-3666; Appendix R Dedicated Shutdown system Master Diagram (AFW, SI, RHR); Revision F

E-299; Cable Tray System - Auxiliary Building Mezzanine Plan Elevation 606’ 0"; Revision 0

E-3659; Appendix “R” Manual Action Emergency Lighting Paths; Revision D

E-3660; Appendix “R” Manual Action Emergency Lighting Paths; Revision F

E-3661; Appendix “R” Manual Action Emergency Lighting Paths; Revision E

E-3662; Appendix “R” Manual Action Emergency Lighting Paths; Revision D

E-3663; Appendix “R” Manual Action Emergency Lighting Paths; Revision B

629; Ventilation Auxiliary Building Elevation 626' 0"; December 24, 1970

630; Ventilation Auxiliary Building Elevation 606' 0"; Revision AD-1

237127A-E2444; Fire Detection System Reactor and Auxiliary Building Mezzanine Floor; Revision F

237127A-E2448; Fire Detection System Miscellaneous Plans; Revision F

237127A-E2446; Fire Detection System Reactor and Auxiliary Building Operating Floor; Revision D

M845; Composite Flow Diagram, Appendix "R" Safe Shutdown Systems; Revision C

M846; Composite Flow Diagram, Appendix "R" Safe Shutdown Systems; Revision C

OPERM-202-1; Flow Diagram Service Water System; dated March 15, 2002

OPERM-202-2; Flow Diagram Service Water System; dated June 25, 2002

OPERM-202-3; Flow Diagram Service Water System; dated February 18, 2003

OPERXK-100-36; Flow Diagram - Chemical and Volume Control System; Revision AX

XK204-2414; Storage Area Fire Prot. System, Revision A1

XK204-2415; Kewaunee Nuclear Power Plant Auxiliary Building Cable Table Tray Fire Protection; Revision A

XK-100-36; Flow Diagram - Chemical and Volume Control System; Revision AW

237127A-E3650; W/D-AC Distr. Cab. BRA-127, Term Cab TB2654 and TB2534 Transfer Switch BRA-115 and Isolation Cab. BRA-126; Revision C

237127A-E233; Circuit Diagram - DC Auxiliary and Emergency AC; Revision AQ

10-100449; Outline - UPS 5kVa SE 480 Vac, 105-140 Vdc, 120 Vac; Sheet 1; Revision 2

Engineering Analyses and Technical Evaluations

FPEE-052; Evaluation of Periodic Test Frequency Requirements; Revision 0

FPEE-049; Evaluation of Partial Area Suppression/Detection; Revision 0

FPEE-053; NFPA Code Compliance Evaluation in Risk Significant Areas; Revision 0

FPEE-002; Fire Zone System Summary; Revision 0

Industry Codes and Standards

NFPA 15; Water Spray Fixed Systems for Fire Protection; dated 1973

NFPA 72E; Automatic Fire Detectors; dated 1974

Licensing Basis Documents

Kewaunee Fire Protection Program Plan; Revision 5

Memorandum; NRCNI-304; Response to Request for Additional Information and Staff Positions Concerning Fire Hazards Analysis; dated May 26, 1978

Kewaunee Nuclear Power Plant Fire Protection Program Analysis; AX-32 Service Rooms; Revision 5

Kewaunee Nuclear Power Plant Fire Protection Program Analysis; AX-24 Fuel Handling Rooms; Revision 5

Fire Analysis; Section 9.0; dated June 16, 2004

Memorandum; Amendment No. 23 to Facility Operating License No. DPR-43 for KNPP (SER); dated December 12, 1978

Memorandum; NRCNI-304; Staff Positions Concerning Fire Hazards Analysis; dated May 26, 1978

Miscellaneous

KNPP Fire Protection Program Analysis; dated October 2003

KNPP Appendix R Design Description; Revision 4; dated October 2003

KNPP,Safety Evaluation Reports, dated December 12, 1978

FPEE-049; Fire Protection Engineering Evaluation of Partial Area Suppression/Detection; Attachment 2 (Fire Area A); Revision 2

Work Order 04-006837-000; Diesel Generator 1A; dated May 27, 2004

ARDD-2004-03; Fire Protection Program Document Change Request - Appendix R Description; Revision 4; dated February 5, 2004

ES-9010; Electrical Cable Installation and Separation Criteria - In Plant; dated May 6, 2004

Fire Watch Inspection List - Signed Tours for June 25, 2004 to July 1, 2004; July 1, 2004

List of Open Barrier Impairments; dated June 28, 2004

List of Open Transient Combustibles; dated June 28, 2004

Work Order No. 03-8180; PMP-08-19;FP- Inspection of Fire Doors; dated June 11, 2004

List of Open and Closed Fire Protection Work Orders (3 years); dated July 27, 2004

List of Open and Closed Engineering Work Requests (3 years); dated July 27, 2004

NFPA Code Number 20; Centrifugal Fire Pumps; 1976 Edition

NFPA Code Number 13; Sprinkler Systems; 1976 Edition

NFPA Code Number 15; Water Spray Fix Systems for Fire Protection; 1973 Edition

NFPA Code Number 10; Portable Fire Extinguishers; 1975 Edition

NFPA Code Number 14; Standpipe and Hose Systems; 1974 Edition

NFPA Code Number 72; Watchman, Alarm, and Supervisory Service; 1975 Edition

NFPA Code Number 12; Carbon Dioxide Extinguishing Systems; 1973 Edition

List of Appendix R, Appendix A and Insurance Doors; July 28, 2008

List of Categorization of Fire Zones by Safe Shutdown, Appendix R, Risk, and Exemption; dated July 28, 2004

Pyr-a-larm Flame Detectors; Application Data

Suprotex-Deluge Sprinkler System; Vendor Manual; March 1978

Directional Spray Nozzles, Automatic; Vendor Manual; September 1992

Modifications

DCR 3393; Safeguards Alley Fire Protection System; 10 CFR 50.59 Evaluation 03-07; dated February 21, 2003

Procedures and Completed Surveillances

E-FP-08; Emergency Operating Procedure - Fire; Revision AJ

E-FP-08; Emergency Operating Procedure - Fire; Revision AK

E-O-06; Fire in Alternate Fire Zone; Revision S

E-O-06; Fire in Alternate Fire Zone; Revision T

E-O-07; Fire in Dedicated Fire Zone, Revision T

FPP-08-08; FP - Control of Transient Combustible Materials; Revision D

PMP-08-20; FP - Portable Fire Extinguisher Inspection; Revision F

PMP-41-06; LT - Big Beam Emergency Light Electrical Maintenance - Appendix “R” and Non-Appendix “R” (QA-1); Revision J

PMP-08-15; Ionization Detector/Manual Pull Station Operational Test; dated December 23,

2003

PMP-08-15; Ionization Detector/Manual Pull Station Operational Test; dated March 4, 2004

RT-SAE-83; Control Room/Dedicated Shutdown System Emergency Equipment Inventory; Revision N

FPP-08-08; FP - Control of Transient Combustible Materials; Revision D

FPP-08-09; Barrier Control; Revision F

PMP-08-33; Penetration Fire Barrier Inspection; Revision F

PMP-08-19; FP - Inspection of Fire Doors; Revision J

PMP41-06; LT - Big Beam Emergency Light Electrical Maintenance - Appendix “R” and Non-Appendix “R”; Surveillances; April 3, 2003 to June 29, 2004

PMP-08-09; FP Automatic Sprinkler Dry Test; Revision K

N-RHR-34; Residual Heat Removal System Operation; Revisions AU, AS and AT

LIST OF ACRONYMS USED

AC or ac	Alternating Current
AF	Adjustment Factor
amp	Amperes
CA	Corrective Action
CAP	Corrective Action Program
CCDP	Conditional Core Damage Probability
CFAST	Consolidated Model of Fire Growth and Smoke Transport
CFR	Code of Federal Regulations
DC or dc	Direct Current
DF	Duration Factor
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
EWR	Engineering Work Request
F	Fire frequency
FDT^s	Fire Dynamics Tools
FP	Fire Protection
IMC	Inspection Manual Chapter
IR	Inspection Report
KNPP	Kewuanee Nuclear Power Plant
MCC	Motor Control Center
MCR	Main Control Room
MSIV	Main Steam Isolation Valve
NCV	Non-Cited Violation
NRC	United States Nuclear Regulatory Commission
NFPA	National Fire Protection Association
NMC	Nuclear Management Company
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
PNS	Probability of Non-Suppression
PORV	Power Operated Relief Valve
PSI	Pressure Square Inch
S/D	Schematic Diagram
SDP	Significance Determination Process
SER	Safety Evaluation Report
SF	Severity Factor
URI	Unresolved Item
Vac	Volts Alternating Current
Vdc	Volts Direct Current
W/D	Wiring Diagram
ΔCDF	Difference in Core Damage Frequency