



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

November 14, 2011

Mr. David A. Heacock
President and Chief Nuclear Officer
Dominion Energy Kewaunee, Inc.
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

**SUBJECT: KEWAUNEE POWER STATION – TRIENNIAL FIRE PROTECTION
INSPECTION REPORT 05000305/2011008(DRS)**

Dear Mr. Heacock:

On October 7, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed a triennial fire protection inspection at your Kewaunee Power Station. The enclosed inspection report documents the inspection results, which were discussed on October 7, 2011, with Mr. Stephen Scace, and other members of your staff.

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

Based on the results of this inspection, one NRC-identified finding of very low safety significance was identified. The finding involved a violation of NRC requirements. However, because of its very low safety significance, and because the issue was entered into your corrective action program, the NRC is treating this issue as a Non-Cited Violation (NCV) in accordance with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the subject or severity of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission – Region III,

D. Heacock

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2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Kewaunee Power Station.

In accordance with Title 10, Code of Federal Regulations (CFR), Part 50, Section 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

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

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

Enclosures: Inspection Report 05000305/2011008(DRS)
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ™

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 050000305

License No: DPR-43

Report No: 05000305/2011008(DRS)

Licensee: Dominion Energy Kewaunee, Inc.

Facility: Kewaunee Power Station

Location: Kewaunee, WI

Dates: September 7 - 9, 19 - 23, 2011, and October 3 - 7, 2011

Inspectors: George M. Hausman, Senior Reactor Inspector, Lead
Larry J. Jones, Reactor Inspector
Benny Jose, Senior Reactor Inspector
Nicholas A. Valos, Senior Reactor Analyst

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

Enclosure

SUMMARY OF FINDINGS

IR 05000305/2011008 (DRS); 09/07/2011 - 09/09/2011, 09/19/2011 - 09/23/2011, and 10/03/2011 - 10/07/2011; Kewaunee Power Station; Triennial Fire Protection Baseline Inspection.

This report covers an announced triennial fire protection baseline inspection. The inspection was conducted by Region III inspectors. One (Green) finding was identified by the inspectors. The finding was considered a Non-Cited Violation (NCV) of U.S. Nuclear Regulatory Commission (NRC) regulations. The significance of most findings is indicated by their color (Green, White, Yellow, or 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 cross-cutting aspects, if any, were determined using IMC 0310, "Components Within the Cross-Cutting Areas." The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Initiating Events

- Green. The inspectors identified a finding of very low safety significance and associated NCV of Title 10, Code of Federal Regulations (CFR) Part 50, Appendix B, Criterion III, "Design Control," for the failure to check the adequacy of design for flammable gas bottles installed and/or stored in fire areas and fire zones located within the auxiliary building and their impact on safe shutdown cables, safety-related cables and safety-related equipment. Specifically, the licensee failed to evaluate how a failure of the flammable gas bottles and a resulting fire or explosion at the installed and/or stored locations could impact nearby safety-related structures, systems, or components. The licensee entered this issue into their corrective action program to review the placement of the flammable gas bottles.

The inspectors determined that the finding was more than minor because the finding was associated with the Initiating Events cornerstone attribute of Protection against External Factors (Fire) and affected the cornerstone's objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The finding was of very low safety significance due to the low fire initiating frequency and the availability of remaining mitigating systems. This finding did not have a cross-cutting aspect because the finding was not representative of current performance. (Section 1R05.11b)

B. Licensee-Identified Violations

No violations of significance were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R05 Fire Protection (71111.05T)

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

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

The inspectors' evaluation focused on the design, operational status, and material condition of the reactor plant's fire protection program, post-fire safe shutdown systems and B.5.b mitigating strategies. The objectives of the inspection were to assess whether the licensee had implemented a fire protection program that: (1) provided adequate controls for combustibles and ignition sources inside the plant; (2) provided adequate fire detection and suppression capability; (3) maintained passive fire protection features in good material condition; (4) established adequate compensatory measures for out-of-service, degraded, or inoperable fire protection equipment, systems or features; (5) ensured that procedures, equipment, fire barriers, and systems exist so that the post-fire capability to safely shut down the plant was ensured; (6) included feasible and reliable operator manual actions when appropriate to achieve safe shutdown; and (7) identified fire protection issues at an appropriate threshold and ensured these issues were entered into the licensee's problem identification and resolution program.

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

The fire areas/zones and B.5.b mitigating strategies selected for review during this inspection are listed below and in Section 1R05.13. The fire areas/zones selected constitute three samples and the B.5.b mitigating strategies selected constitute four samples as defined by Inspection Procedure (IP) 71111.05T.

<u>Fire Area</u>	<u>Fire Zone</u>	<u>Description</u>
A (Alternate)	TU-92	1-B Emergency Diesel Generator (EDG)
D (Dedicated)	TU-95A	Dedicated Shutdown Panel Room
A (Alternate)	TU-95B	Safeguards Alley

.1 Protection of Safe Shutdown Capabilities

a. Inspection Scope

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

The inspectors ensured that applicable separation requirements of Section III.G of 10 CFR 50, Appendix R and the licensee's design and licensing bases were maintained for the credited safe shutdown equipment and their supporting power, control, and instrumentation cables. This review included an assessment of the adequacy of the selected systems for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring, and associated support system functions.

b. Findings

No findings of significance were identified.

.2 Passive Fire Protection

a. Inspection Scope

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

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

b. Findings

No findings of significance were identified.

.3 Active Fire Protection

a. Inspection Scope

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

b. Findings

No findings of significance were identified.

.4 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

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

b. Findings

No findings of significance were identified.

.5 Alternative Shutdown Capability

a. Inspection Scope

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

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

b. Findings

No findings of significance were identified.

.6 Circuit Analyses

a. Inspection Scope

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

The inspectors' review considered fire and cable attributes, potential undesirable consequences, and common power supply/bus concerns. Specific items included the credibility of the fire threat, cable insulation attributes, cable failure modes, and actuations resulting in flow diversion or loss of coolant events.

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

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

b. Findings

No findings of significance were identified.

.7 Communications

a. Inspection Scope

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

b. Findings

No findings of significance were identified.

.8 Emergency Lighting

a. Inspection Scope

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

b. Findings

No findings of significance were identified.

.9 Cold Shutdown Repairs

a. Inspection Scope

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

b. Findings

No findings of significance were identified.

.10 Compensatory Measures

a. Inspection Scope

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

b. Findings

No findings of significance were identified.

.11 Review and Documentation of Fire Protection Program Changes

a. Inspection Scope

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

b. Findings

Flammable Gas Bottles Installed and/or Stored in the Auxiliary Building

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to check the adequacy of design for flammable gas bottles installed and/or stored in fire areas and fire zones located within the auxiliary building and their impact on safe shutdown cables, safety-related cables and safety-related equipment. Specifically, the licensee failed to evaluate how a failure of the flammable gas bottles and a resulting fire or explosion at the installed and/or stored locations could impact nearby safety-related structures, systems, or components.

Description: In response to NUREG-0578, "TMI-2 [Three Mile Island Unit 2] Lessons Learned Task Force Report and Short Term Recommendations," Section 2.1.8.a and Appendix A, "Improved Post-Accident Sampling Capability," dated July 1979, and NUREG-0737, "Clarification of TMI Action Plan Requirements," Section II.B.3, "Post-Accident Sampling Capability," dated October 31, 1980, the licensee initiated a modification for post accident containment air monitoring. On March 4, 1980, the licensee approved Design Change Request (DCR) 844, "Addition of High Radiation Sample Room" and subsequently installed the DCR per the TMI Action Item II.B.3. As a result, the licensee installed three compressed hydrogen bottles, two compressed oxygen bottles, and associated equipment near the high radiation sampling room (HRSR) on the 586 foot elevation of the auxiliary building. The flammable gas bottles were located in the "Reactor Auxiliaries North Center" area of the Dedicated Fire Area's Fire Zone 23B. A fire hazards evaluation or safety evaluation for the flammable gas bottles was not found in the DCR. The flammable gas bottles' combustible quantities were added to the Kewaunee Power Station's Fire Protection Program Analysis (FPPA), Revision 2 in October 1986.

On September 7, 2011, during the inspectors' walkdown to identify the fire areas and fire zones to be inspected, additional flammable gas bottles were observed physically installed and/or stored in the auxiliary building. The licensee had installed three compressed methane bottles, two compressed acetylene bottles (one bottle in-use and one bottle stored), and associated equipment on the fan floor's 657 foot-6 inch elevation of the auxiliary building. The flammable gas bottles were located in the "Refueling Water Storage Tank Area" of the Alternate Fire Area's Fire Zone AX-23A. A fire hazards evaluation or safety evaluation for the flammable gas bottles was not found in the DCR.

During the inspectors' walkdowns, the inspectors noticed that the flammable gas bottles, at the different elevations, were within close proximity of safe shutdown cables and safety-related equipment (e.g., Technical Specification specified equipment) at each location. The inspectors raised concerns about the locations of the flammable gas bottles with respect to the safe shutdown cables, safety-related cables and safety-related equipment located within the fire areas and fire zones.

The flammable gas bottles present a fire and an explosion hazard. According to Table 2-7.1 of the Society of Fire Protection Engineers (SFPE) Handbook of Fire Protection Engineering (Fourth Edition) acetylene, hydrogen and methane have a lower flammability limit of 2.5, 4, and 5 percent, and an upper flammability limit of 100, 75, and 15 percent, respectively. This means that an acetylene mixture of between 2.5 and 100 percent, a hydrogen mixture of between 4 and 75 percent, and a methane mixture of between 5 and 15 percent will burn. One hydrogen bottle had a mixture of 50 percent hydrogen and 50 percent nitrogen, the second had a mixture of 9 percent hydrogen and 91 percent nitrogen, and the third bottle, although empty at the time of the inspectors' observation, had contained 2 percent hydrogen and 98 percent nitrogen, both of the acetylene bottles were 100 percent, and the three methane bottles had a mixture of 10 percent methane and 90 percent argon. Each of the hydrogen and methane bottles and one of the acetylene bottles had a regulator attached to the discharge. However, if a piece of equipment or some object were to hit the regulator it could fail, cause a spark, and ignite the flammable gas. A fire from one or more of the flammable gas bottles could damage safe shutdown cables and/or safety-related cables and an explosion could additionally damage other nearby safety-related equipment.

The approved fire protection program has three primary tiers that constitute defense-in-depth. These include preventing and minimizing the effects of fires, detecting and suppressing fires, and safe shutdown. Each of the three tiers has regulatory requirements needed for compliance with General Design Criterion 3. In addition, the impact to safe shutdown capability is not the only consideration when evaluating a plant change. The change must still satisfy the regulatory requirement of 10 CFR 50.48(a) by having a program satisfying Criterion 3 of 10 CFR Part 50, Appendix A. Criterion 3 specifies a program such that structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. A fire hazards evaluation or safety evaluation for the flammable gas bottles was not found in either of the DCRs. As a result, the inspectors concluded that the licensee failed to check the adequacy of the design for the flammable gas bottles installed and stored locations and their impact on safe shutdown cables, safety-related cables, and safety-related equipment. Specifically, the licensee failed to evaluate how a failure of the flammable gas bottles and a resulting fire or explosion at the installed and/or stored locations could impact the defense-in-depth strategies for the licensee's fire protection program.

The licensee entered this issue into their corrective action program as Condition Report (CR) 446453, "NRC Identifies Potential Issue for Flammable Gas Bottles Located in Aux Bldg," dated October 6, 2011, to review the placement of the flammable gas bottles.

Analysis: The inspectors determined that the failure to evaluate the impact of the flammable gas bottles' installed and/or stored locations near safe shutdown cables, safety-related cables and safety-related equipment was contrary to 10 CFR Part 50,

Appendix B, Criterion III, "Design Control," and was a performance deficiency. The inspectors determined that the finding was more than minor because the finding was associated with the Initiating Events cornerstone attribute of Protection against External Factors (Fire) and affected the cornerstone's objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the installed and/or stored locations of the flammable gas bottles could have resulted in damage to safe shutdown cables, safety-related cables, and safety-related equipment if the gas bottles were to ignite or explode. As a result, the licensee's fire protection program's defense-in-depth strategies for the affected fire areas and fire zones were degraded.

In accordance with Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," Attachment 0609.04, "Phase I - Initial Screening and Characterization of Findings," Table 3b the inspectors determined the finding degraded the fire protection defense-in-depth strategies. Therefore, screening under IMC 0609, Appendix F, "Fire Protection Significance Determination Process," was required. The inspectors determined that the finding impacted the Fire Prevention and Administrative Controls category.

Based on review of IMC 0609, Appendix F, Attachment 2, "Degradation Rating Guidance Specific to Various Fire Protection Program Elements," the inspectors determined the degradation rating to be high because of the flammable gases being more flammable than low flashpoint combustibles and there being a significant fire hazard associated with release of the gas. The Duration Factor was 1.0 based on the duration of the degradation being greater than 30 days per Table 1.4.1, "Duration Factors." An overall fire frequency of $7E-3$ per year was calculated for the flammable gas bottles based on information from IMC 0609, Appendix F, Attachment 4, "Fire Ignition Source Mapping Information: Fire Frequency, Counting Instructions, Applicable Fire Severity Characteristics, and Applicable Manual Fire Suppression Curves."

The conditional core damage probability (CCDP) from Table 2.1.1, "Total Unavailability Values for SSD [Safe Shutdown] Path Based Screening CCDP," included a screening value of $1E-2$, which was conservative. The Region III Senior Reactor Analyst used the Kewaunee Standard Plant Analysis Risk (SPAR) Model, Version 8.16, and Systems Analysis Programs for Hands-on Integrated Reliability Evaluations (SAPHIRE), Version 8.0.7.17 to calculate a CCDP of $1.1E-7$. The Senior Reactor Analyst assumed that a fire due to failure of the flammable gas bottles would result in a reactor trip. Based on the above CCDP and frequency values, the risk associated with this finding is very low (Green).

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

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, from March 4, 1980, through October 7, 2011, the licensee failed to check the adequacy of design for flammable gas bottles installed and/or stored in fire areas and fire zones located within the auxiliary building and their impact on safe

shutdown cables, safety-related cables and safety-related equipment. Specifically, the licensee failed to evaluate how a failure of the flammable gas bottles and a resulting fire or explosion at the installed and/or stored locations could impact nearby safety-related structures, systems, or components. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as CR 446453, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000305/2011008-01(DRS), Flammable Gas Bottles Installed and/or Stored in the Auxiliary Building).

.12 Control of Transient Combustibles and Ignition Sources

a. Inspection Scope

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

b. Findings

No findings of significance were identified.

.13 B.5.b Inspection Activities

a. Inspection Scope

The inspectors reviewed the licensee's preparedness to handle large fires or explosions by reviewing selected mitigating strategies. This review ensured that the licensee continued to meet the requirements of their B.5.b related license conditions and 10 CFR Part 50.54(hh)(2) by determining that:

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

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

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

NEI 06-12, Revision 2, Section	Licensee Strategy Table
2.2	Spent Fuel Pool (SFP) Makeup – Internal Strategy (Table A.2 1)
2.3.1	SFP Makeup – External Strategy (Table A.2-2)
2.3.2	SFP Spray – External Strategy (Table A.2-3)
3.4.4	Manually Depressurize SGs [Steam Generators] and Use Portable Pump (Table A.4-4)

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution (71152)

a. Inspection Scope

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

b. Findings

No findings of significance were identified.

4OA6 Management Meetings

Exit Meeting Summary

The inspectors presented the inspection results to Mr. Stephen Scace and to other members of the licensee staff on October 7, 2011. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

D. Allen, Senior Instructor Operations Training
E. Alsteen, Fire Marshall
S. Baldwin, Fire Training
B. Behrendt, Operations Supervisor
S. Boeing, Fire Protection (App. R Supplemental Support)
E. Brand, Fire Protection (App. R Supplemental Support)
T. Breene, Licensing Manager
E. Coen, PRA Engineer
C. Drescher, Design Engineer
C. Edwards, Maintenance Supervisor
J. Egdorf, Emergency Preparedness (B.5.b) Supervisor
M. Failey, Chemistry Supervisor
J. Gadzala, Licensing
R. Giese, Operations Senior Reactor Operator
J. Giesler, Primary Systems Supervisor
K. Gille, Procedures Supervisor
E. Gilson, Safety Supervisor
M. Haese, Licensing
D. Heling, Administrative Support
B. Herris, EP Manager
T. Hoy, Information Technology
B. Koehler, Engineering Program Supervisor
L. Leanna, Records Supervisor
J. Langan, Nuclear Oversight Manager
J. Martin, Liaison Engineer
B. O'Connell, Ventilation
T. Olson, Program Manager
R. Repshas, Regulatory Affairs
M. Rosseau, Electrical Design Supervisor
S. Salzsieder, Administrative Support
S. Scace, Site Vice-President
B. Schramm, Security Officer
M. Sievert, Engineer
C. Sly, Liaison Engineer
J. Stafford, Safety and Licensing Director
E. Streich, Electrical /Instrumentation and Control Supervisor
D. Tolete, Fire Protection Engineer
M. Townsend, Fire Protection Program Owner
D. Vorpahl, Balance of Plant Supervisor
S. Yuen, Director of Engineering

Nuclear Regulatory Commission

R. Krsek, Senior Resident Inspector
K. Barclay, Resident Inspector

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000305/2011008-01(DRS)	NCV	Flammable Gas Bottles Installed and/or Stored in the Auxiliary Building (Section 1R05.11b)
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Closed

05000305/2011008-01(DRS)	NCV	Flammable Gas Bottles Installed and/or Stored in the Auxiliary Building (Section 1R05.11b)
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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.

CALCULATIONS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
C10016, Pages 1 - 2, 25 - 27, 34, 78, & Figure G.3	Electrical Penetration Coordination Study	4
C10016, Attachment H, Pages 2 - 15 of 59	Kewaunee Power Station (KPS) Design and License Basis Summary for Containment Electrical Penetration Protection	4
C11714, Attachment A, Page A65 of A212	Medium and Low Voltage Protection and Coordination Plots MCC 1-43	February 23, 2007
C11714, Attachment A, Page A159 of A212	Medium and Low Voltage Protection and Coordination Plots MCC 1-43B	February 19, 2007
Calc. No. 180 Attachment 1, Sheet 13 of 65	Combustible Inventory Worksheet, Fire Zone / Area AX23A	0
Calc. No. 180 Attachment 1, Sheet 14 of 65	Combustible Inventory Worksheet, Fire Zone / Area AX23B	0
CHC1698	CO ₂ System for the EDG Rooms	May 4, 1999

CORRECTIVE ACTION PROGRAM DOCUMENTS (CRs) ISSUED DURING INSPECTION

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
441840	NRC Triennial Inspection Team Questions/Comments on B.5.b	September 7, 2011
441921	Acceptability of Glass Cleaning Solution Questioned	September 7, 2011
441922	B.5.b Truck Not Starting	September 7, 2011
443051	B.5.b Observations During NRC Triennial Fire Inspection	September 15, 2011
443986	Fire Protection Program Analysis for Zone AX-23A Acetylene Quantity Incorrect	September 21, 2011
444954	Are the Appendix R Response Time Critical Operator Actions Validated On a Periodic Basis?	September 27, 2011
446161	Appendix R FPPA EDG CO ₂ System Concentration Documentation Error	October 5, 2011
446453	NRC Identifies Potential Issue for Flammable Gas Bottles Located in Aux Bldg	October 6, 2011

CORRECTIVE ACTION PROGRAM DOCUMENTS (CRs) REVIEWED

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
119110	PRP-01 at the SCR Lobby Had an Outdated Revision	November 17, 2008
119304	Revise Fire Brigade Training Program Description to Include B.5.b Training	November 18, 2008
119459	PRP-01 Recommended Changes and Enhancements	November 19, 2008
119463	PRP-02 Recommended Changes and Enhancements	November 19, 2008
119468	B.5.b Inventory Checklist	November 19, 2008
119490	Ref. Godwin Pump Speed in PRP-01 for RWST and CST	November 19, 2008
119649	Vital Area Keys May Be Needed to Access Areas for PRP-01, 2, 3 Actions	November 20, 2008
119787	Emergency Key Ring for SAS	November 21, 2008
339133	Emergency Light RAB-9 Needs New Battery	June 23, 2009
362354	B.5.b Response Truck Readiness	December 17, 2009
384130	Replacement Batteries For Emergency Battery Lighting Fail PMT	June 10, 2010
407825	Simulator Emergency Light By EVA Panel Is Not Working	December 16, 2010
429328	B.5.b Pump PM Not Required to Flow Water	June 1,2011
432783	Breaker 14305 Failed to Open for PZR Heater Group D	June 30,2011
433367	Emergency Light RA01 Failed Its Retest	July 6, 2011

DRAWINGS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
36373	Damper	February 28, 1987
A-209	General Arrangement Reactor and Auxiliary Building Miscellaneous Floor Plan	AA
A-211	General Arrangement Auxiliary and Turbine Building Cross Section	M
A-511	Fire Zones Basement Floor Elev. 586'-0"	A
E-228	Circuit Diagram 480V SWGR - Normal Buses	AW
E-235	Circuit Diagram 480V SWGR.-Safeguard Buses	AL
E-240	Circuit Diagram 4160V & 480V Power Sources	AZ
E-262	Circuit Diagram 480V MCC 1-33A, 1-33B, 1-43A, 1-43B & 1-62G	W
E-297	Cable Tray System – Aux Bldg Bsmt Plan El. 586' – 0" Sheet 1	Y
E-301	Cable Tray System and Elec. Equip. Location – Aux Bldg El 626' – 0" & El 633' – 6"	BW
E-303	Cable Tray System – Aux Bldg – Plan - El. 642' – 3"	G
E-304	Cable Tray System – Aux Bldg – Plan - El. 657' – 6"	D

DRAWINGS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
E-334	Elec. Equip. Location Aux. Bldg. Mezz. Plan El. 606' - 0", Sheet 1	CG
E-416	Front View - Motor Control Center 1-35F, 1-45F, 1-5262, 1-33A, 1-33B, 1-43A, 1-62G, & 1-45G	AM
E-520	W/D-Penetrations A1, A2, A4, A5 Junct. Boxes JB1086, JB1087, JB1137, JB1138	F
E-536	Wiring Diagram - 480V SWGR. Bus 1-43 - Unit No. 2	J
E-600	Wiring Diagram - Motor Control Center - 1--33A, 1-33B, 1-43A, 1-43B, & 1-62G	K
E-621	External Connections - PRZR HTRS MCC 1--33A, 1-33B, 1-43A, 1-43B, & 1-62G	L
E-1043	Control Schematic 4160V Breaker 1-509	V
E-1872	Schematic Diagram Bus 5 Voltage Restoring	Z
E-1874	Schematic Diagram Bus 5 Voltage Control	X
E-2890	Front View - Motor Control Center 1-52B, 1-52F, 1-62B, Ext's 1-3852 & 1-62H	P
KW-3205-5	319 CLH Round Horiz. 3 hour Fire Damper; UL Classified	March 20, 1983
OPERM-205	Flow Diagram Feedwater System	BL
PEROM-208-2	Flow Diagram Fire Protection System	B
S-501	Turbine Building Foundation Plan	Q
S-508	Administration Building Foundation Plan & Floor Drains	R

EVALUATIONS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
-----	B.5.b Strategy Evaluations	1
ACE 018730	Circuit Breaker 14305BKR for Pressurizer Heater Group 1D Failed to Open on Demand	September 6, 2011
ECP 4.11	DCR No. 2522 pg. 7 of 7	July 21, 1993
FPEE No. 003	Fire Protection Engineering Evaluation For Manual Action Feasibility	1
FPEE No. 009	Exterior Wall Fire Ratings	0
FPEE No. 010	Turbine Building Structural Steel	0
FPEE No. 034	Allowable Cable Types	0
FPEE No. 037	Pressure Relief Blow Out Panel for DGR 252	0
FPEE No. 040	Diesel Generator Rooms Carbon Dioxide Suppression Systems	01
FPEE No. 052	Evaluation of Periodic Testing Requirements	0
FPEE No. 064	Evaluation of Door 8 Replacement with Non-Fire Rated water tight door	0
N80982	CBS Nuclear Services, Inc. Root Cause Report for Circuit Breaker Serial Number H-61981F-9	August 8, 2011

EVALUATIONS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
OEA No. 92-112	Inadequate Fire Suppression System Testing	January 31, 1994

MODIFICATIONS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
DCR 844	Addition of High Radiation Sample Room (Selected Pages)	March 4, 1980
DCR 2400	Relocation of Hot Chem Lab Bottles (Selected Pages)	May 20, 1991

PRE-FIRE PLANS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
PFP-17	Pre-Fire Plan for Charging Pump, Boric Acid Concentrate Pump and RHR Pump Pit Areas (AX-23B, AX-23D, AX-25 / Elevation 586')	April 25, 2007
PFP-19	Pre-Fire Plan for Condensate Storage and Rx Make-up Water Storage Room and Adjacent Areas (AX-22, AX-33, AX-39 / Elevation 606')	November 17, 2004
PFP-27	Pre-Fire Plan for Hot Chem Lab and Shield Building Filter Assembly Areas (AX-23A, AX-34, AX-36 / Elevation 642')	August 23, 2006
PFP-29	Pre-Fire Plan for Auxiliary Building and Turbine Building Fan Rooms (AX-23A, AX-36 / Elevation 657')	November 17, 2004

PROCEDURES

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
EPIP-AD-20	Response to a Security Threat	14
EPMPF-09.02-14	Site Relocation Facility (SRF) Communications Checklist	1
EPMPF-10.01-06	Emergency Equipment Quarterly Inventory	6
EPMPF-AD-07-10	ERO Event Notification	5
FPP-08-07	Control of Ignition Sources	12
FPP-08-11	Fire Brigade/Team Equipment Inspection	16
KW-PROC-000-GMP-240	ELV - 480V Air Circuit Breaker and MCC Electrical Maintenance	29 & 30
MA-KW-ECM-RHR-002	RHR-1B MOV RCS Pressure Interlock Bypass	1
MA-KW-ECM-RHR-003	RHR-2B MOV RCS Pressure Interlock Bypass	1
MA-KW-ECM-RHR-004	RHR Power Cable Restoration RHR Pump 1B Motor	1

PROCEDURES

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
MA-KW-ECM-RHR-005	RHR Power Cable Restoration RHR Pump 1B Fan Coil Unit	1
MA-KW-GIP-009	B.5.b Designated Equipment Storage and Maintenance	0
MA-KW-MPM-FP-001	Safeguards Alley Preaction Sprinkler System Testing	2
MA-KW-MPM-FP-007	Fire Hose Pressure Test	2
MA-KW-MPM-FP-021B	Inspection of Train B Fire Protection (FP) Dampers During Normal Plant Operation	3
MA-KW-MPM-FP-021C	Inspection of Fire Protection (FP) Dampers During Plant Shutdown	2
MA-KW-MPM-FP-030A	Inspection and Dry Test of CO2 System for Diesel Generator Room 1A	5
MA-KW-MPM-FP-040	Annual Preventive Maintenance of Godwin Dri-Prime Portable Pump and John Deere Diesel Engine	2
MA-KW-MPM-FP-041	2-Year Preventive Maintenance of Godwin Dri-Prime Portable Pump and John Deere Diesel Engine	2
MA-KW-MPM-FP-125	Operability Test of Group 5 Fire Protection Dampers during Plant Shutdown	2
OP-KW-AOP-FP-001	Abnormal Operating Procedure – Fire	5
OP-KW-AOP-FP-002	Abnormal Operating Procedure; Fire in Alternate Fire Zone	10
OP-KW-AOP-FP-003	Abnormal Operating Procedure; Fire in dedicated Fire Zone	8
OP-KW-NCL-MISC-001	Dedicated Shutdown System Periodic Checklist	7
OP-KW-ORT-SAE-001	Control Room/Dedicated Shutdown System Emergency Equipment Inventory	2
PMP-08-09	FP – Automatic Sprinkler Dry Test	18
PMP-08-22	FP-Operability Test of Fire Dampers (Fusible link style)	F
PMP-08-22	FP-Operability Test of Fire Dampers (Fusible link style)	G
PMP-41-06	LT-Big Beam Emergency Light Common Train Electrical Maintenance- Appendix R and Non Appendix R	23
PMP-41-06A	LT-Big Beam Emergency Light Train A Electrical Maintenance Appendix R and Non Appendix R	7
PMP-41-06B	LT-Big Beam Emergency Light Train B Electrical Maintenance, Appendix R and Non Appendix R	7
PRP-01	Recovery Plan for Catastrophic Event	12
PRP-02	Initial Response to Catastrophic Event	3

PROCEDURES

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
PRP-03	Initial Response to Catastrophic Event for Loss of Control Room and Control Room Personnel	5

REFERENCES

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
ARDD	Appendix R Design Description	7
EPM Report No. P1919-086-001	Identification and Evaluation of Communications Design Basis	July 2008
FBI-01-LP001	Lesson Plan: Fire Brigade Initial Training FBC-01	A
FPPA	Fire Protection Program Analysis	8
FPPP	Fire Protection Program Plan	9
LRC-10-LP304	Lesson Plan: Fire in a Dedicated/Alternate Fire Zone Cycle 10-03	B
LRC-11-SE406	Lesson Plan: B.5.b. Review LOR Cycle 11-04	A
NRC Memorandum	Summary of Public Meeting Held on March 15, 2011, to Discuss NRC Inspection Procedure 71111.05XT, "Fire Protection – NFPA 805 (Triennial)	March 22, 2011
Standard Handbook for Elect. Engineers, Figure 4-15	Fusing Current Time for Copper Conductors	12 Edition
TR-AA-210, Attachment 3	Kewaunee Fire Brigade FB-TP Training Program Description	6

VENDOR DOCUMENTS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
23-7127A	Cardox Pipe or Tank Break	December 21, 1972
54126	Purchase Order: Air Balance Inc.	July 8, 1983
AIRBA-0004	Fire/Seal Damper Model 319CL1T Horizontal only	0
AIRBA-0007	Air Balance Inc. Bendor Technical Manual	
ALLIS-0023 (42990-2)	Allis Chalmers Air Circuit Breaker Type LA-600 & LA-600F (Fused)	6
FL-16663	Cardox System Test	December 4, 1973
GENER-0032 (216-1)	7700 Line Motor Control Center	11
OKONI-0001 (XK-54154)	3/C No. 6 CU Okoguard, Okolow w/3 314CC Grd. Wires – Okolon G.S. Lox	0
SQUAR-0027 (34248-2)	480V Motor Control Centers	4

WORK ORDERS (WOs)

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
KW100272182	Fire Damper Visual Inspection	April 9, 2009

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Attachment

WORK ORDERS (WOs)

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
KW100274024	PM08; Fire Hose Pressure Test	November 24, 2009
KW100307617	PM08-825; Test Sprinkler System – Safeguards Alley	February 24, 2009
KW100489368	PM08-825; Test Sprinkler System – Safeguards Alley	March 11, 2010
KW100509694	Fire Damper Visual Inspection	November 23, 2010
KW100654037	PM08-825; Test Sprinkler System – Safeguards Alley	February 10, 2011
KW100729242	PM87-894; 6 Month Maintenance and Inventory	March 28, 2011
KW100730953	PM08-845; Perform Annual PMS-B.5.b Pump	June 10, 2011
KW100731904	PM08-846; Test Run-Pump Water from Lake Michigan-B.5.b Pump	June 10, 2011
EPMPF-10.01-06	Emergency Equipment Quarterly Inventory	June 6, 2011
FPP-08-11, Attachment A	Fire Brigade Equipment Checklist	June 23, 2011
WO-7-5288	Fire Damper Visual Inspection Sheet	July 5, 2007

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ATTN	Attention
CFR	Code of Federal Regulations
CCDP	Conditional Core Damage Probability
CR	Condition Report
DCR	Design Change Request
DPR	Demonstration Power Reactor
DRP	Division of Reactor Project
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
FPPA	Fire Protection Program Analysis
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
KPS	Kewaunee Power Station
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NFPA	National Fire Protection Association
NRC	U.S. Nuclear Regulatory Commission
NUREG	NRC Technical Report Designation
OA	Other Activities
PARS	Public Available Records System
RHR	Residual Heat Removal
SDP	Significance Determination Process
SER	Safety Evaluation Report
SFP	Spent Fuel Pool
SFPE	Society of Fire Protection Engineers
SG	Steam Generator
TMI	Three Mile Island
WO	Work Order

D. Heacock

-2-

2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Kewaunee Power Station.

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Sincerely,

/RA/

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

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Letter to Mr. David A. Heacock from Mr. Robert C. Daley dated November 14, 2011.

SUBJECT: KEWAUNEE POWER STATION TRIENNIAL FIRE PROTECTION INSPECTION
REPORT 05000305/2011008(DRS)

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