



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION III  
2443 WARRENVILLE ROAD, SUITE 210  
LISLE, IL 60532-4352

March 4, 2013

EA-12-266

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 – NRC INSPECTION REPORT  
05000305/2013007 PRELIMINARY WHITE FINDING; AND RESULTS  
OF NRC OFFICE OF INVESTIGATION REPORT NO. 3-012-010**

Dear Mr. Heacock:

This is in reference to an investigation conducted by the U.S. Nuclear Regulatory Commission's (NRC) Office of Investigations (OI). The purpose of the investigation was to determine whether a former fire brigade trainer at the Kewaunee Power Station willfully failed to conduct announced fire drills in accordance with your license condition and implementing procedure, and falsified fire drill evaluation/critique forms. Based on the results of its investigation, the NRC preliminarily determined that the trainer deliberately violated Kewaunee procedure requirements and falsified fire drill evaluation/critique forms. Furthermore, the NRC preliminarily determined that the trainer deliberately failed to conduct training sessions with five fire brigade members present. The OI investigation was completed on December 14, 2012, and a factual summary of the OI Investigation Report is enclosed in Enclosure 1. The results of the investigation and resulting inspection were discussed on February 14, 2013, with Mr. A. Jordan and other members of your staff.

Based on the results of the investigation and inspection, the inspection report (Enclosure 2) documents an NRC-identified finding that has been determined to be preliminarily White, a finding with low to moderate safety significance that may require additional NRC inspections. As described in Section 1R05 of the enclosed report, from at least August 2009 through November 2011, your Kewaunee fire brigade did not conduct quarterly announced drills, so that all members of the fire brigade had the opportunity to work as a team and test themselves in major areas of the plant, as required by your License Condition and the Fire Protection Program Plan. The failure to perform the required quarterly announced fire drills affected a fundamental aspect of the defense in depth of the Kewaunee fire protection program and potentially reduced the overall fire brigade effectiveness during that period of time. This technical issue represented a safety concern that you and your staff addressed when identified by the NRC inspectors in December 2011. This finding was assessed based on the best available information, using the

applicable significance determination process. The basis for the NRC's preliminary significance determination is described in the enclosed report.

In accordance with NRC Inspection Manual Chapter (IMC) 0609, we intend to complete our evaluation, using the best available information, and issue our final determination of safety significance of the finding within 90 days of the date of this letter. The SDP encourages an open dialogue between the NRC staff and the licensee; however, the dialogue should not impact the timeliness of the NRC's final determination.

In addition to the preliminary White finding, the NRC also identified two apparent willful violations associated with these issues, based on the results of the OI investigation. These apparent violations are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. The first apparent violation involves the apparent deliberate failure to perform quarterly announced fire brigade drills from at least August 2009 through December 2011. Your staff's actions were not in accordance with Kewaunee License Condition 2.C.(3) and the Kewaunee Fire Protection Program Plan, as implemented through Dominion Procedure SA-KW-FPP-010, "Fire Drills." Specifically, in lieu of the required announced quarterly drills, the trainer conducted table top training sessions that did not demonstrate the fire brigade's ability to work as a team and test themselves to respond to a simulated fire in major areas of the plant. In addition, four of these announced drills were conducted with less than the five brigade members present, as required by Dominion Procedure SA-KW-FPP-010, "Fire Drills."

The second apparent violation involves the falsification of the fire drill evaluation/critique forms from at least August 2009 through December 2011. Your staff's actions were not in accordance with Title 10 of the Code of Federal Regulations (10 CFR) 50.9(a), "Completeness and Accuracy of Information," which requires, in part, that information required by license conditions be maintained by the licensee and be complete and accurate in all material respects. Specifically, the trainer completed the required sections of fire drill evaluation/critique forms to indicate that announced quarterly fire drills had taken place, as required, when in fact table-top training sessions were conducted and the requirements of Dominion Procedure SA-KW-FPP-010 and its associated evaluation/critique forms were not met.

Before we make a final decision on this matter, we are providing you with the following opportunities: (1) respond to the NRC in writing for either or both the finding and the apparent violations, (2) attend a Regulatory Conference for only the finding where you can present to the NRC your perspective on the facts and assumptions the NRC used to arrive at the finding and assess its significance, (3) attend a Predecisional Enforcement Conference (PEC) to discuss only the apparent violations; or (4) request Alternative Dispute Resolution (ADR) for only the apparent violations. You may choose any appropriate option, including the option of not responding, for either the finding or each of the apparent violations.

If you decide to submit only a written response to the finding, such submittal should be sent to the NRC within 30 days of your receipt of this letter. If the response also addresses the apparent violations, it should be clearly marked as a "Response to Apparent Violations; EA-12-266," and should include: (1) the reason for the apparent violations, or, if contested, the basis for disputing the apparent violations; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further violations; and (4) the date when full compliance will be achieved. If an adequate response is not received within the

time specified or an extension of time has not been granted by the NRC, the NRC will proceed with its enforcement decision.

If you request a Regulatory Conference, it should be held within 30 days of the receipt of this letter and we encourage you to submit supporting documentation at least one week prior to the conference in an effort to make the conference more efficient and effective. If a Regulatory Conference is held, it would normally be open for public observation; and to announce the conference, a public meeting notice and press release will be issued. Because the conference would be open, we would only be able to discuss matters related to the significance of the finding and would not be able to discuss the apparent deliberate violations. If you also wish to have a PEC, two separate conferences could be scheduled for the same date, unless you provide evidence that the matters are so entwined that it is not possible to discuss the significance of the finding without also discussing the apparent deliberate violations.

If a PEC is held, the NRC will issue a press release to announce the time and date of the conference; however, it will be closed to public observation because the apparent violations are based on an NRC OI report that has not been publicly disclosed and pertains to whether an individual has committed wrongdoing. A PEC would also be held within 30 days, similar to a regulatory conference. If you choose to request a PEC, the conference will afford you the opportunity to provide your perspective on the apparent violations and any other information that you believe the NRC should take into consideration before making an enforcement decision. The topics discussed during the conference may include the following: (1) information to determine whether the violations occurred; (2) information to determine the significance of the violations; (3) information related to the identification of the violations; and (4) information related to any corrective actions taken or planned to be taken. In presenting your corrective actions, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violations.

You may also request ADR with the NRC in an attempt to resolve the willful apparent violations. The term ADR generally encompasses various techniques for resolving conflicts using a neutral third party. The technique that the NRC has decided to employ is mediation. Mediation is a voluntary, informal process in which a trained neutral (the "mediator") works with parties to help them reach resolution. If the parties agree to use ADR, they select a mutually agreeable neutral mediator who has no stake in the outcome and no power to make decisions. Mediation gives parties an opportunity to discuss issues, clear up misunderstandings, be creative, find areas of agreement, and reach a final resolution of the issues. Additional information concerning the NRC's program can be obtained at <http://www.nrc.gov/about-nrc/regulatory/enforcement/adr.html>. The Institute on Conflict Resolution (ICR) at Cornell University has agreed to facilitate the NRC's program as a neutral third party. Please contact ICR at 877-733-9415 within 10 days of the date of this letter if you are interested in pursuing resolution of this issue through ADR. The ADR mediation session is normally held within 30 to 45 days of receipt of the choice letter, dependent upon availability of a mediator. Note that the ADR process cannot be used to address the significance of the preliminary finding assessed through the SDP and that you must provide either a written response or request a Regulatory Conference if you wish to challenge the preliminary color of the finding.

If you decline to submit a written response or request a Regulatory Conference, you relinquish your right to appeal the final SDP determination; in that, by not doing either, you fail to meet the appeal requirements stated in the Prerequisite and Limitation Sections of Attachment 2 of NRC Inspection Manual Chapter 0609.

Please contact Kenneth Riemer at (630) 829-9628, and in writing, within 10 days from the issue date of this letter to notify the NRC of your intentions with respect to both the preliminary White finding and the apparent violations. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision. The final resolution of this matter will be conveyed in a separate correspondence.

If you disagree with the cross cutting aspect assigned to the finding in the attached report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III; and the NRC Resident Inspector at the Kewaunee Power Station.

Please be advised that the number and characterization of apparent violations and findings may change as a result of further NRC review. You will be advised by separate correspondence of the results of our deliberations on this matter.

In accordance with 10 CFR Section 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

If you have any questions concerning this matter, please contact Mr. Kenneth Riemer of my staff at (630) 829-9628.

Sincerely,

*/RA/*

Gary L. Shear, Acting Director  
Division of Reactor Projects

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

Enclosure 1: Factual Summary of NRC Investigation  
Enclosure 2: Inspection Report 05000305/2013007  
w/ Attachment: Supplemental Information

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/RA/

Gary L. Shear, Acting Director  
Division of Reactor Projects

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

Enclosure 1: Factual Summary of NRC Investigation  
Enclosure 2: Inspection Report 05000305/2013007  
w/ Attachment: Supplemental Information

cc w/ encl: Distribution via ListServ™

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<sup>1</sup> OE Concurrence provided via e-mail from G. Gulla on February 28, 2013

<sup>2</sup> OGC No Legal Objection provided via e-mail from G. Gulla on February 28, 2013

## Factual Summary of NRC Investigation

On January 3, 2012, the U.S. Nuclear Regulatory Commission's Office of Investigations (OI), Region III Field Office, initiated an investigation to determine whether the fire brigade trainer at the Kewaunee Power Station willfully failed to conduct announced fire drills in accordance with procedure, resulting in fire drill evaluation/critique forms being falsified. In addition, during the investigation, it was learned that the fire brigade trainer knowingly failed to conduct the fire drills with five fire brigade members present, as required by procedure. The investigation was completed on December 14, 2012, and was documented in OI Report No. 3-2012-010.

During the investigation, it was determined that when the fire brigade trainer was first employed at Kewaunee in approximately 2005 or 2006, the trainer was provided copies of the Fire Protection Program Plan (FPPP) and the procedure in effect at the time. The trainer acknowledged to the OI investigator that it was his responsibility to conduct the fire brigade drills according to plant procedures and commitments. The trainer further acknowledged that he had to follow the NRC's rules which he obtained from the FPPP and the procedure.

In 2009, the trainer was tasked with revising the fire brigade procedure to make it a fleet procedure. Therefore, the trainer was familiar with the contents of each document. The trainer was the person who conducted the drills, whether in the plant or as table-top exercises. The trainer informed the OI investigator that he was the person who was the controller, the observer, and the person playing the part of the control room as well as the person who completed the critique form.

The Kewaunee Fire Protection Plan stated, in part, that the fire brigade training program incorporated the guidance from paragraph IV.B.6(e) of NRC Branch Technical Position APSCP 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants." Paragraph IV.B.6(e) outlines the requirements for training of fire brigade members. Paragraph IV.B.6(e)(1), states that successful fire fighting required practice as brigades for the people who must utilize the equipment. Paragraph IV.B.6(e)(2), states that basic training is a necessary element in effective firefighting operation and that fire brigade members must operate as a team, in order to be effective.

Prior to August 19, 2009, the above information was provided in Kewaunee site procedure FPP 08-10, "Fire Drills." On August 19, 2009, the procedure was revised and entitled, SA KW-FPP-010, "Fire Drills." At this time, the definition of a drill was removed and much of the information from paragraph IV.B.6(e) of NRC Branch Technical Position APSCP 9.5-1 was relegated to a fire drill evaluation/critique form listed as Attachment A to the procedure. However, the procedure still contained the same fire drill scheduling requirements. It also added a requirement that the brigades must contain a minimum of five team members. On the evaluation/critique form, five items were listed as being required to be completed: "4. Did personnel respond to the correct location? (REQUIRED)"; "5. Were communications established with the Control Room? (REQUIRED)"; "6. Was protective gear worn properly? (Coats, boots, helmet, etc.)? (REQUIRED)"; "7. Were SCBA's used appropriately? (REQUIRED)"; and "23. Did Brigade Leader establish attack and back-up teams and brief teams prior to entry? (REQUIRED)."

The trainer acknowledged that he marked the critique forms as having satisfactorily completed required activities including: (1) the amount of time taken to respond to the location, (2) personnel responding to the correct location; (3) communications being established with the control room; (4) proper wearing of protective gear; (5) proper use of self-contained breathing apparatus; and (6) fire brigade leader establishing attack and back-up teams and briefing teams prior to entry. The trainer acknowledged that he did not annotate the forms to indicate the information was simulated and the activities weren't actually conducted. The fire brigade trainer also acknowledged conducting sessions with fewer than five people present, although that was a procedural requirement.

Fire brigade members interviewed by OI confirmed that they did announced drills as table-top exercises in a classroom. They also confirmed that they only saw an attendance sheet and were not shown the critique form that indicated that they performed activities satisfactorily on location while wearing protective gear and self-contained breathing apparatus. Additionally, keycard information obtained from the licensee supported that the announced drills were not conducted at the locations shown on the critique forms on the dates of the drills.

Consequently, the investigation substantiated that the fire brigade trainer deliberately failed to conduct announced fire drills in accordance with procedure, resulting in fire drill evaluation/critique forms being falsified. In addition, the investigation substantiated that the fire brigade trainer deliberately failed to conduct fire drills with five fire brigade members present, as required by procedure. This was contrary to the requirements of License Condition 2.C.(3), "Fire Protection," and Title 10 of the Code of Federal Regulations 50.9(a), "Completeness and Accuracy of Information."

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 05000305/2013007

Licensee: Dominion Energy Kewaunee, Inc,

Facility: Kewaunee Power Station

Location: Kewaunee, WI

Dates: January 3, 2012, through February 14, 2013

Inspectors: R. Krsek, Senior Resident Inspector  
M. Ziolkowski, Reactor Engineer  
D. Passehl, Senior Reactor Analyst

Approved by: Kenneth Riemer, Branch, Chief  
Branch 2  
Division of Reactor Projects



## SUMMARY OF FINDINGS

Inspection Report (IR) 05000305/2013007, 01/3/2012 – 02/14/2013; Kewaunee Power Station, Fire Protection.

This report covers circumstances behind the failure to conduct announced fire brigade drills in accordance with the Fire Protection Program Plan (FPPP). The NRC staff identified one finding, preliminarily determined to be White, or a finding of low-to-moderate safety significance. Additionally, the NRC identified two apparent violations (AV) which were processed through the traditional enforcement program because they involved willfulness. The significance of inspection findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated June 2, 2011. The cross-cutting aspect is determined using IMC 0310, "Components Within the Cross-Cutting Areas," dated October 28, 2011. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated January 28, 2013. 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.

The results of the investigation conducted by the NRC Office of Investigations are discussed in Enclosure 1, "Factual Summary of NRC Investigation."

### A. NRC-Identified and Self-Revealed Findings

#### **Cornerstone: Mitigating Systems**

- Preliminary White: The NRC staff identified a preliminary finding of low-to-moderate safety significance for the licensee's failure to implement and maintain in effect all provisions of the approved Fire Protection Program as described in the licensee's Fire Protection Program Plan, and as referenced in the Updated Safety Analysis Report. Specifically, from at least August 2009 through December 2011, the licensee failed to perform required quarterly announced fire drills in that the announced fire drills were instead conducted as training sessions. The licensee documented this issue in the corrective action program as condition report (CR) 0456865 and the licensee continued to perform causal evaluations to determine the cause of the issue and develop long-term corrective actions. In January 2012, as a result of an apparent cause evaluation (ACE), the licensee took remedial corrective actions to ensure fire brigade drills were performed as required. In addition, several other corrective actions were implemented as a result of the ACE conducted in 2012.

The finding was determined to be more than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," dated September 7, 2012, because the finding was associated with the Mitigating Systems Cornerstone attribute of Protection Against External Factors for Fire and adversely affected the cornerstone objective of ensuring the reliability and capability of the fire brigade to respond to initiating events to prevent undesirable consequences. Specifically, the fire brigade's ability to rapidly suppress fires and protect structures, systems and components, important to safety from potential fires that could prevent safe shutdown. The NRC staff determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," dated June 19, 2012. Because the finding involved the Fire Brigade, Table 3,

“SDP Appendix Router,” Section E.1, “Fire Protection,” directed NRC staff to use IMC 0609, Appendix A, “The Significance Determination Process (SDP) for Findings At-Power,” dated June 19, 2012. Exhibit 2, “Mitigating Systems Screening Questions,” Section D.1.a, “Fire Brigade,” was checked yes because the finding involved the Fire Brigade training and qualification requirements. Because none of the other questions in Section D were checked, the NRC staff continued to evaluate the finding using IMC 0609, Appendix M, “The Significance Determination Process Using Qualitative Criteria,” dated April 12, 2012. Based on the evaluation of the decision attributes contained in Appendix M, the NRC staff determined this finding to preliminarily have a low to moderate safety significance (White).

This finding has a cross-cutting aspect in the area of human performance, work practices, because the licensee failed to ensure supervisory and management oversight of work activities such that nuclear safety is supported (H.4(c)). This cross-cutting aspect coincides with the licensee’s conclusions in an apparent cause evaluation that determined that there was inadequate management/oversight of the fire drill program within the licensee’s organization, which directly contributed to the issue. (Section 1R05A)

- Apparent Violation (AV): As discussed in the factual summary in Enclosure 1, the NRC staff identified an AV that is being processed through the traditional enforcement process because it involves willfulness. The technical aspects of the AV were evaluated through the SDP as described in IMC 0612. The apparent violation involves License Condition 2.C.(3), “Fire Protection,” which requires, in part, that the licensee shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in the licensee’s Fire Protection Program Plan, and as referenced in the Updated Safety Analysis Report. Specifically, from at least August 2009 through December 2011, the licensee failed to perform the required quarterly announced fire drills in that the announced fire drills were instead conducted as training sessions. Furthermore, the licensee’s staff also failed to comply with a procedural requirement to have five members of a brigade team present during an announced drill, conducted as a training session, on four occasions. The AV is discussed in Enclosure 1 and in the Enforcement portion of Section 1R05A.
- Apparent Violation: In addition, and also as discussed in Enclosure 1, the NRC staff identified a second AV of Title 10 of the Code of Federal Regulations (10 CFR) 50.9(a), “Completeness and Accuracy of Information,” which requires, in part, that information required by license conditions to be maintained by the licensee to be complete and accurate in all material respects. This violation is being processed through traditional enforcement because it involves willfulness and it impacts the regulatory process. There were no technical aspects to this AV. Specifically, from at least August 2009 through December 2011, a member of the licensee’s staff completed fire drill evaluation/ critique forms, a quality assurance record, inaccurately. This information was determined to be material to the NRC. The AV is discussed in Enclosure 1 and in the Enforcement portion of Section 1R05A.

**B. Licensee-Identified Violations**

No violations were identified.

## REPORT DETAILS

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

#### 1R05 Fire Protection (71111.05)

##### .1 Annual Fire Protection Drill Observation (71111.05A)

##### a. Inspection Scope

In December 2011, during the inspection of the fire brigade annual fire drill, the NRC staff reviewed past fire drills and identified that from at least August 2009 to December 2011 only one fire drill was conducted in a safety-related area. The NRC staff also identified that some fire drills were conducted as training sessions and that the annual practical conducted offsite was considered a quarterly drill. The NRC staff required additional information to review and assess the licensee's current procedures and practices, as compared to the facility's license basis. Therefore, in NRC IR 05000305/2011005, the NRC staff opened unresolved item (URI) 05000305/2011005-01 because more information was required to determine if there was a performance deficiency. The NRC staff evaluated the licensee's fire brigade capability to meet requirements for training, dedicated size, and membership as required by the facility's license conditions and the licensee's Fire Protection Program Plan. In parallel to the inspection effort, an NRC investigation was conducted. The results of the investigation are discussed in Enclosure 1. The URI will be closed during a later inspection.

Documents reviewed are listed in the Attachment to this report.

These activities constituted a partial annual fire protection inspection sample as defined in IP 71111.05-05

##### b. Findings

Introduction: The NRC staff identified a preliminary finding of low-to-moderate safety significance and an apparent violation (AV) of License Condition 2.C.(3), "Fire Protection," which requires, in part, that the licensee shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in the licensee's FPPP, and as referenced in the Updated Safety Analysis Report. Specifically, from at least August 2009 through December 2011, the licensee failed to perform the required quarterly announced fire drills. In addition, the NRC staff identified an AV of Title 10 of the Code of Federal Regulations (10 CFR) 50.9(a), "Completeness and Accuracy of Information," which requires, in part, that information required by license conditions to be maintained by the licensee shall be complete and accurate in all material respects. Specifically, from at least August 2009 through December 2011, the licensee failed to ensure the completed quarterly announced fire drill evaluation/critique forms were complete and accurate in all material respects.

Description: In assessing the URI, the NRC staff interviewed current fire brigade members and reviewed the fire brigade drills conducted from August 2009 through December 2011. The NRC staff determined the majority of announced fire drills were conducted as table-top or training sessions, without fire brigade members dressing out in protective gear, communicating to the control room and responding to a simulated fire in the plant. In addition, the NRC staff determined that annual live fire training sessions, conducted offsite, were also credited as announced fire drills, when in fact, these activities were part of the training program. The NRC staff reviewed the FPPP and the original correspondence between the NRC and the licensee from 1977 through 1979 that established the fire protection program at Kewaunee Power Station (KPS). Finally, the NRC staff reviewed the licensing correspondence between the NRC and the licensee, as it related to the fire brigade from 1980 through December 2011, to further establish whether any changes were made to the licensing basis.

The NRC staff established the facility's current license basis based on the referenced information. Kewaunee Power Station License Condition 2.C.(3), "Fire Protection," requires, in part, that the licensee implement and maintain in effect all provisions of the approved Fire Protection Program as described in the licensee's FPPP, and as referenced in the Updated Safety Analysis Report. Section 9.0, "Training," of the Fire Protection Program Plan, Revisions 9 and 10, required, in part, that the KPS fire brigade training program incorporates the guidance of paragraph IV.B.6(e) of Branch Technical Position (BTP) APSCB 9.5-1, thus ensuring that the capability to fight potential fires is established and maintained. Paragraph IV.B.6(e) of BTP APSCB 9.5-1, dated May, 1, 1976, states, in part that: "In order for a fire brigade to operate effectively, it must operate as a team. Each member must know what his duties are. The fire brigade must be familiar with equipment location and operation, the layout of the plant during times when a particular area is filled with smoke, and contains insufficient lighting. Such training can only be accomplished by conducting drills several times a year (at least quarterly) so that all members of the fire brigade have had the opportunity to train as a team, testing itself in the major areas of the plant." Therefore, the NRC staff concluded quarterly fire brigade drills were required to be performed by the licensee. A review of the licensing correspondence from 1977 to 1979 revealed that the operations crews were required to conduct quarterly drills, with non-operations members participating in those quarterly drills when on-shift (the fire brigade consisted of two operators, a health physics technician and two security personnel for a total of five members).

The NRC staff established the following technical facts during the review of the fire brigade training conducted from August 2009 through December 2011:

- All fire brigade members participated in annual practical live fire training scenario offsite; however, this training was credited as both a quarterly drill and a quarterly training session;
- Unannounced, backshift drills were conducted in accordance with procedure SA-KW-FPP-010, "Fire Drills," and included the following drill scenarios: warehouse flammable materials storage room with a simulated fire caused by a paint thinner (2009); decontamination building with a simulated fire caused by paper in an office portion of the warehouse (2010); and, security and radiation protection break-rooms with a simulated fire caused by a pizza oven and microwave oven, respectively (2011). None of the scenario areas listed above included equipment important to safe shutdown of the plant;

- One announced drill was conducted in accordance with Procedure SA-KW-FPP-010, "Fire Drills," in the turbine driven auxiliary feedwater pump room for a simulated lubrication oil fire on June 29, 2010. This is the only drill conducted in accordance with procedure SA-KW-FPP-010 for a simulated fire in an area of the plant that included safe shutdown equipment for the time period reviewed; and
- For the time period reviewed, neither unannounced nor announced drills were performed in the auxiliary building, which contained safe shutdown equipment.

On December 20, 2011, the licensee initiated CR 0456865 to evaluate the fire drill requirements in response to NRC URI 05000305/2011005-01. The licensee conducted an apparent cause evaluation (ACE), which concluded that announced drills were conducted as training sessions, rather than drills, and that annual practical live fire training conducted offsite was accounted for as a quarterly drill, instead of a separate required training activity for fire brigade members. The licensee identified several issues that concluded: the Kewaunee Fire Department (KFD) was not involved in fire drills; previously identified Nuclear Electric Insurance Limited (NEIL) deficiencies were not tracked through the corrective action program; procedure SA-KW-FPP-010 lacked clarification on pertinent definitions and responsibilities; the licensee had conducted ineffective process and program monitoring through self assessments; and the licensee exhibited inadequate management/oversight of the FPPP. The licensee concluded in the ACE that there was inadequate management and oversight of the fire drill program within the KPS organization.

The licensee took corrective actions as a result of the ACE, which included, but were not limited to the following:

- Quarterly announced drills were performed as drills, in lieu of table-top or training sessions, starting in January 2012 and were also added to the station work schedule;
- An independent review of 2012 drill scenarios was conducted to ensure compliance with license requirements;
- Benchmarking trips were conducted with several utilities and NEIL in 2012;
- A drill was conducted with the KFD in 2012;
- Site familiarization tours were conducted with the KFD in 2012;
- Annual practical live fire training was no longer counted as a drill;
- In 2012 unannounced and announced drills were conducted in areas that contained safe shutdown equipment, the auxiliary building, and the turbine building;
- Fire drills were added to the observation program; and
- Procedure SA-KW-FPP-010 was revised to reflect the FPPP requirements.

The NRC staff evaluated the fire drill evaluation/critique forms prepared and maintained for the announced fire brigade drills performed from August 2009 through December 2011. Based on that review, the NRC identified that the fire drill evaluation/critique forms were not complete and accurate. Specifically, the fire drill evaluation/critique forms documented the successful completion of activities that were not demonstrated during the table-top training discussions.

A review of the 2012 fire brigade drill evaluation/critique forms revealed that none of the drills resulted in a fire brigade crew failure, and, in contrast to the evaluation/critique forms for previous years, areas for improvement were identified in the fire brigade drill critiques. The NRC staff did not identify any instances of incorrectly performed announced fire brigade drills in 2012.

Analysis: The NRC staff determined that the failure to conduct announced quarterly drills in accordance with the Fire Protection Program Plan was a performance deficiency warranting a significance evaluation. The finding was determined to be more than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," dated September 7, 2012, because the finding was associated with the Mitigating Systems Cornerstone attribute of Protection Against External Factors for Fire and adversely affected the cornerstone objective of ensuring the reliability and capability of the fire brigade to respond to initiating events to prevent undesirable consequences. Specifically, the fire brigade's ability to rapidly suppress fires and protect structures, systems and components, important to safety from potential fires that could prevent safe shutdown.

The NRC staff determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," dated June 19, 2012. Because the finding involved the Fire Brigade, Table 3, "SDP Appendix Router," Section E.1, "Fire Protection," directed the NRC staff to utilize IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012. Exhibit 2, "Mitigating Systems Screening Questions," Section D.1.a, "Fire Brigade," was checked yes because the finding involved the Fire Brigade training and qualification requirements. However, from as early as August 2009 through December 2011, the fire brigade did not demonstrate the ability to meet the required times for fire extinguishment of fire drill scenarios and the finding had the potential to significantly affect the ability of the fire brigades to respond to a fire. In addition, the finding did not involve understaffing of the fire brigade. Therefore, neither of these two items were checked as applicable to screen the item as Green. Because none of the other questions in Section D were checked, the NRC staff continued to evaluate the finding using IMC 0609 Appendix M, "The Significance Determination Process Using Qualitative Criteria," dated April 12, 2012. This Appendix provides deterministic guidance for assessing the significance of inspection findings.

Inspection Manual Chapter 0609, Appendix M, requires the NRC staff to evaluate different decision attributes when determining significance. The NRC staff determined the finding was bounded by both qualitative and quantitative information. When evaluating the qualitative data, the NRC staff determined from at least August 2009 through December 2011, the licensee failed to perform three of the four quarterly fire drills per year, in accordance with the license requirement, which resulted in the fire brigade not being qualified during this time period. The failure to perform the required drills potentially reduced the overall effectiveness of the licensee's fire brigade to successfully combat fires in safety-related, radiologically contaminated areas onsite, including risk significant areas during this time period. These failures were programmatic in nature, and occurred due to the lack of management oversight and involvement in fire brigade training activities, and a lack of questioning attitude on the part of KPS staff, when quarterly announced fire brigade drills ceased. From at least August 2009 through December 2011, only one in-plant fire drill was conducted per year and the areas where the drills took place were not in major areas of the plant that

contained safety-related equipment or in radiologically contaminated areas. The only exception to this during the time period was on June 29, 2010, when an announced drill was conducted in a safety-related area in conjunction with an emergency preparedness exercise and the drill was held in the turbine driven auxiliary feedwater pump room.

The NRC staff determined that the finding could be bounded using quantitative information. A Senior Risk Analyst (SRA) performed a worst case bounding evaluation utilizing best available quantitative data. The SRA determined that the quantitative risk attributable to the performance deficiency was uncertain because interpreting fire brigade response to the possible range of fires within the affected timeframe was uncertain. Further, the existing SDP for fire protection findings, IMC 0609, Appendix F, "Fire Protection Significance Determination Process," dated February 28, 2005, excluded findings associated with the performance of the on-site manual fire brigade or fire department. However, the SRA used the best available information and performed a bounding risk analysis which included insights from: Appendix F of IMC 0609; the Kewaunee 2004 Fire Analysis Report (used during the most recent NRC Triennial Fire Protection NRC IR No. 05000305/2011008, dated November 14, 2011, ADAMS Accession No. ML11319A244); and the 1994 Kewaunee Individual Plant Examination of External Events (IPEEE), dated June 28, 1994. The SRA determined that the licensee's methodology for assessing risk as documented in the Fire Analysis Report relied on a combination of the Fire Induced Vulnerability Evaluation (FIVE) method and a fire probabilistic risk assessment (PRA). The Fire Analysis's Report discussed possible fire-induced initiating events and resulting derivation of initiating event fire frequencies for various fire zones. The zonal fire frequencies were derived using simple event trees with the frequency of fire for the given zone, the failure probability of automatic suppression, and manual suppression efforts if automatic suppression fails. These factors were used to calculate a combined initiating event frequency by fire area.

In determining credit, if any, for manual suppression, the SRA evaluated the licensee comparison of fire brigade response times to fire damage times. Regarding fire brigade response times, section 4.8.4 of the IPEEE states, in part, that fire brigade response times were determined for anywhere in the auxiliary building, and anywhere in the turbine building (including the greenhouse) using fire brigade drills from 1988 to 1991. Response times were 6.0 minutes for anywhere in the turbine building and 6.4 minutes for anywhere in the auxiliary building. In Section 9.6.4 of the Fire Analysis Report, the licensee conservatively assumed that the fire damage occurred prior to the 6.4 minute response time in each of the fire areas examined that included manual suppression efforts. Therefore, the calculated fire initiating event frequencies in the Fire Analysis Report did not assume any credit for the fire brigade. In lieu of this, the SRA determined the effect of the fire brigade manual suppression in a bounding analysis. The Fire Analysis Report states that the total core damage frequency (CDF) due to fire is  $1.38E-4/\text{yr}$ . Of this, about 57% of the CDF, or  $7.87E-5/\text{yr}$ , involves sequences that include possible credit for manual suppression. The SRA assumed a bounding case of instantaneous fire damage such that no credit for manual suppression was possible. For the base case (i.e., without the performance deficiency), the SRA assumed that the fire brigade had at least one minute to suppress the fire prior to damage. In Attachment 8 of Appendix F, the guidance for fire non-suppression probability analysis includes a mean non-suppression probability formula:  $PNS_{\text{manual}} = \exp(-\lambda t)$ . Table A8.1 of that Attachment includes a mean rate constant of 0.069/min (i.e., the " $\lambda$ " term) for all fire events (e.g., electrical fires, hot work, transients, etc.) where " $t$ " is the fire duration time ( $\text{time}_{\text{damage}} - \text{time}_{\text{suppression}}$ ) in minutes. Applying the rate constant to the  $7.87E-5/\text{yr}$  CDF

results in an assumed base case value of  $7.33\text{E-}5/\text{yr}$ , when there was up to a minute to suppress the fire prior to damage. An upper bound to the  $\Delta\text{CDF}$  would then be  $7.87\text{E-}5/\text{yr} - 7.33\text{E-}5/\text{yr} = 5.4\text{E-}6/\text{yr}$ .

The NRC staff determined this finding potentially reduced the defense in depth of the Fire Protection Program. IMC 0609, Appendix F, "Fire Protection SDP," stated the fire protection defense in depth program elements were prevention of fires, rapid detection and suppression, and protection of structures, systems and components important to safety so that a fire that was not promptly extinguished by fire suppression activities would not prevent the safe shutdown of the plant. The failure to have a properly qualified fire brigade, through the use of fire drills that familiarize the fire brigade with combating fire scenarios in all areas of the plant and with outside entities assisting, potentially affects the last two defense in depth program elements for fire protection.

The NRC staff determined this finding potentially reduced the safety margin of the fire protection program from at least August 2009 to December 2011, when no fire drills were conducted in the auxiliary building and only one fire drill was conducted in a safety-related area.

The NRC staff determined the extent the performance deficiency did not affect other equipment and there were no failed or unavailable components that were degraded.

When evaluating the exposure time for this finding, the NRC staff determined quarterly announced drills were not being conducted in accordance with requirements from at least August 2009 until December 2011.

The likelihood that the licensee's recovery actions would successfully mitigate the performance deficiency was assessed during the significance determination of this finding. The NRC staff concluded that if the fire brigade was not successful at combating a real fire, the fire brigade had the ability to call out extra resources to the Kewaunee site, which included the KPS fire team. In addition, the fire brigade could always utilize the local fire department, who did visit the site about once per year to interface with the onsite fire brigade and demonstrate the ability to draw water from Lake Michigan with a fire truck. Although site familiarizations tours were not conducted during those annual visits from at least 2009 to 2011, if a real fire were to occur, the Kewaunee fire brigade would act as "shadows" for the Kewaunee Volunteer Fire Department and other fire departments called in through the mutual aid box alarm system. The Kewaunee fire brigade is made up of security force members, health physicists, and auxiliary operators, all of whom are familiar with the plant layout due to their routine daily duties.

The licensee was given credit for the training activities actually conducted in this timeframe. The most notable training activities included: unannounced, backshift fire drills were performed correctly; all fire brigade members participated in offsite live fire training sessions; and the training session table-tops provided fire brigade members with additional strategies for combating fires in plant areas. Additionally, since January 2012, the licensee conducted the required announced fire drills in all areas of the plant with no fire brigade drill failures.



Finally, the NRC staff evaluated additional qualitative circumstances associated with this finding. Specifically, the licensee's ACE concluded that there was inadequate management/oversight of the fire drill program within the organization. In addition, the licensee concluded that in 2008, when NEIL identified discrepancies with fire drills (paperwork discrepancies showing drills were satisfactory with less than five brigade members, and drill critique anomalies with 29 drills performed and no items rated as unsatisfactory or needing improvement, which appeared to be unrealistic to the NEIL auditors) and briefed licensee management, the licensee did not initiate a condition report to document, investigate, or determine the cause of the NEIL identified discrepancies.

Based on the evaluation of these decision attributes, the NRC staff determined this finding to preliminarily have a low to moderate safety significance (White).

This performance deficiency is associated with a finding that has been evaluated by the SDP and communicated with a preliminary SDP color reflective of the safety impact of the deficient licensee performance. The SDP, however, does not specifically consider willfulness or the regulatory process impact. Consequently, the NRC also evaluated the apparent violations using the NRC's traditional enforcement program to correctly reflect both the regulatory importance of the apparent violations and the safety significance of the finding.

This finding has a cross-cutting aspect in the area of human performance, work practices, because the licensee failed to ensure supervisory and management oversight of work activities such that nuclear safety is supported (H.4(c)). This cross-cutting aspect coincides with the licensee's conclusions in an apparent cause evaluation that determined that there was inadequate management and oversight of the fire drill program within the licensee's organization, which directly contributed to the issue.

Enforcement:

The licensee documented the low to moderate safety significance finding (FIN) in its corrective action program as CR 0456865 (FIN 05000305/2013007-01; Failure to Perform Fire Drills In Accordance With Fire Protection Program Plan).

Failure to Perform Fire Drills In Accordance With Fire Protection Program Plan

License Condition 2.C.(3), "Fire Protection," requires, in part, that the licensee shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in the licensee's FPPP, and as referenced in the Updated Safety Analysis Report. Section 9.0, "Training," of the Fire Protection Program Plan, Revisions 9 and 10, required, in part, that the KPS fire brigade training program incorporates the guidance of paragraph IV.B.6(e) of BTP APSCB 9.5-1, thus ensuring that the capability to fight potential fires is established and maintained. The requirements are defined via administrative control procedures and implemented via training procedures. Training Procedure SA-KW-FPP-010, Revision 0, "Fire Drills," Section 5.1, required, in part, that each active fire brigade and fire team member shall participate in a minimum of two fire drills per calendar year, and that each operations crew shall complete one drill each calendar quarter (announced or unannounced). This included one unannounced and one back shift drill. Training Procedure SA-KW-FPP-010 Revision 0, "Fire Drills,"

Section 6.1, required, in part, that a minimum of five qualified Fire Brigade members, including a qualified Fire Brigade Leader, respond to the Fire Drill.

An AV has been identified, in that, from at least August 19, 2009 to December 2011: (1) the fire brigade and fire team members did not participate in a minimum of two fire drills per calendar year and each operations crew did not complete one drill each calendar quarter; and (2) a procedural requirement to have five members of a brigade team present was not met during four announced drills conducted as a training sessions. Specifically, announced fire drills conducted in the third and fourth quarters of 2009, and calendar years 2010 and 2011 were implemented as training sessions rather than actual fire drills, with the exception of a June 29, 2010, announced drill. Additionally, the fire brigade drills incorrectly conducted as training sessions on September 19, 24, and 25, 2009, and on September 22, 2010, were conducted with less than the five qualified fire brigade members.

The licensee documented the AV in its corrective action program as CR 505529 (AV 05000305/2013007-02; Failure to Perform Fire Drills In Accordance With Fire Protection Program Plan).

#### Inaccurate and Incomplete Information Documented on Fire Brigade Drill Forms

Title 10 CFR 50.9(a), "Completeness and Accuracy of Information," requires, in part, that information required by license conditions to be maintained by the licensee shall be complete and accurate in all material respects. Title 10 CFR Criterion XVII, Part 50, Appendix B, Criterion XVII, "Quality Assurance Records," requires, in part, that sufficient records be maintained to furnish evidence of activities affecting quality. Records include closely-related data such as qualifications of personnel, procedures, and equipment. License Condition 2.C.(3), "Fire Protection," requires, in part, that the licensee shall implement and maintain in effect all provisions of the approved Fire Protection Program as described in the licensee's FPPP, and as referenced in the Updated Safety Analysis Report. Section 6.0, "Quality Assurance," of the Fire Protection Program Plan, Revisions 9 and 10, stated, in part, that the plant has committed to implement fire protection quality assurance criteria under the licensee's existing Quality Assurance Program, which is required under 10 CFR Part 50, Appendix B. Section 9.0, "Training," of the Fire Protection Program Plan, Revisions 9 and 10, required, in part, that the KPS [Kewaunee Power Station] fire brigade training program incorporates the guidance of paragraph IV.B.6(e) of BTP [Branch Technical Position] APSCB 9.5-1, thus ensuring that the capability to fight potential fires is established and maintained. The requirements, cited in the referenced paragraph, are defined via administrative control procedures and implemented via training procedures. Training Procedure SA-KW-FPP-010, "Fire Drills," Revision 0, Section 5.6, "Completing The Documentation," required, in part, that upon completion of each fire drill, Attachment A, Fire Drill Evaluation/Critique form, be completed and assembled for filing, and the original be shipped to the Quality Assurance Vault. Section 7.1, "Quality Assurance Records," stated that Attachment A, Fire Drill Evaluation/Critique Form is a Quality Assurance record.

An AV has been identified, in that, from at least August 19, 2009, to December 2011, the completed Fire Drill Evaluation/Critique Forms for announced fire drills, a Quality Assurance record required by License Condition 2.C(3) and Section 6.0 of the Fire Protection Program Plan, were not complete and accurate in all material respects. Specifically, the completed Fire Drill Evaluation/Critique Forms stated the following

parameters (1) On scene time; Location; (2) Did personnel respond to the correct location; (3) Were communications established with the Control Room; (4) Was protective gear worn properly; (5) Were self-contained breathing apparatus used properly; and (6) Did fire brigade leader establish attack and back-up teams and brief teams prior to entry. The information was not accurate because the individuals did not complete the activities described in the fire drill evaluation/critique form satisfactorily during an actual fire brigade drill. This information was material to the NRC because the completed fire drill evaluation/critique forms for announced fire drills indicated that the fire brigade members had completed the required announced drills to maintain their qualifications, when in fact, the drills had not actually occurred as stated.

The licensee documented the AV in its corrective action program as CR 505529 (AV 05000305/2013007-03; Inaccurate and Incomplete Information Documented on Fire Drill Evaluation/Critique Forms).

The corrective actions taken by the licensee were previously described in the Description section of this report.

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On February 14, 2013, the NRC staff presented the inspection results to Mr. A. Jordan and other members of the licensee staff. The licensee acknowledged the issues presented. The NRC staff confirmed that none of the potential report input discussed was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

A. Jordan, Site Vice President  
R. Simmons, Plant Manager  
S. Yuen, Decommissioning Director  
J. Stafford, Safety and Licensing Director  
T. Olson, Engineering Director (Acting)  
K. Morris, Security Manager  
R. Repshas, Licensing Manager  
A. Murphy, Safety Manager

#### Nuclear Regulatory Commission

K. Riemer, Branch Chief, Branch 2  
G. Shear, Acting Division Director  
S. Orth, Enforcement Officer

**LIST OF ITEMS OPENED, CLOSED AND DISCUSSED**

Opened

05000305/2013007-01	FIN	Failure to Perform Announced Fire Drills In Accordance With Fire Protection Program Plan (Section 1R05.1)
05000305/2013007-02	AV	Failure to Perform Announced Fire Drills In Accordance With Fire Protection Program Plan (Section 1R05.1)
05000305/2013007-03	AV	Inaccurate and Incomplete Information Documented on Fire Drill Evaluation/Critique Forms (Section 1R05.1)

Discussed

05000305/2011005-01	URI	Fire Brigade License Basis (Section 1R05.2)
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## LIST OF DOCUMENTS REVIEWED

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

### 1R05 Fire Protection

- Appendix A To Branch Technical Position APCS 9.5-1, "Guidelines For Fire protection For Nuclear Power Plants Docketed Prior To July 1, 1976" (August 23, 1976); February 24, 1977
- FPP-08-10; Fire Drills; Revision B
- KNI-364.1; Letter From A. Schwencer, Chief, NRC, To E. W. James, Senior Vice President, Wisconsin Public Service Corporation; Subject: Amendment No. 23 To Facility Operating License No. DPR-43 For The Kewaunee Nuclear Power Plant; December 12, 1978
- Letter From A. Schwencer, Chief, NRC, To E. W. James, Senior Vice President, Wisconsin Public Service Corporation; Subject: Kewaunee Nuclear Power Plant; February 14, 1978
- Letter From A. Schwencer, Chief, NRC, To E. W. James, Senior Vice President, Wisconsin Public Service Corporation; Subject: Kewaunee Nuclear Power Plant; August 19, 1977
- Letter From E. W. James, Senior Vice President, Wisconsin Public Service Corporation TO A. Schwencer, Chief, NRC; Subject: Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls & Quality Assurance; May 15, 1978
- Letter From E. W. James, Senior Vice President, Wisconsin Public Service Corporation TO A. Schwencer, Chief, NRC; Subject: Response To Request For Additional Information On Fire Protection; February 15, 1979
- OP-KW-AOP-FP-001; Abnormal Operating Procedure – Fire; System No. FP-08; Revision 6
- Record ID 12121978; Record Change Notice; Amendment No. 23 To Facility Operating License; Dated December 12, 1978
- SA-KW-FPP-010; Fire Drills; System No. 08; Revision 0
- Fire Brigade Drill Packages conducted from 2008 through 2011
- ACE 018992; Evaluate Fire Drill Requirements
- IMC 0609, Appendix F, Fire Protection Significance Determination Process, 2/28/2005
- Kewaunee Individual Plant Examination of External Events Report, 6/28/1994
- Kewaunee Fire Analysis Report, Section 9.0, 10/08/2004

## LIST OF ACRONYMS USED

ACE	Apparent Cause Evaluation
ADAMS	Agencywide Documents Access and Management System
ADR	Alternate Dispute Resolution
AV	Apparent Violation
BTP	Branch Technical Position
CDF	Core Damage Frequency
CR	Condition Report
FIVE	Fire Induced Vulnerability Evaluation
FPPP	Fire Protection Program Plan
ICR	Institute of Conflict Resolution
IMC	Inspection Manual Chapter
IPEEE	Individual Plant Examination of External Events
IR	Inspection Report
KFD	Kewaunee Fire Department
KPS	Kewaunee Power Station
NEIL	Nuclear Energy Insurance Limited
NRC	U.S. Nuclear Regulatory Commission
OI	Office of Investigations
PEC	Predecisional Enforcement Conference
PRA	Probabilistic Risk Assessment
SDP	Significance Determination Process
SRA	Senior Reactor Analyst
URI	Unresolved Item

Letter to D. Heacock from G. Shear dated March 4, 2013

SUBJECT: KEWAUNEE POWER STATION – NRC INSPECTION REPORT  
05000305/2013007 PRELIMINARY WHITE FINDING; AND RESULTS  
OF NRC OFFICE OF INVESTIGATION REPORT NO. 3-012-010

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