



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
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April 24, 2014

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: NRC INSPECTION REPORT NO. 05000305/2014001(DNMS) – KEWAUNEE
POWER STATION**

Dear Mr. Heacock:

On March 27, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed onsite inspection activities for January through March 2014, at the permanently shut down Kewaunee Power Station (KPS) in Kewaunee, Wisconsin. The purpose of the inspection was to determine whether decommissioning activities were conducted safely and in accordance with NRC requirements. The enclosed report presents the results of this inspection, which were discussed with Mr. J. Stafford and other members of your staff on March 27, 2014.

During the inspection period, the NRC inspectors reviewed the following aspects of onsite activities: organization, management and cost control at the site; safety reviews, design changes and modifications; self-assessments, audits and corrective actions; decommissioning performance; maintenance and surveillance; and spent fuel pool safety.

Additionally, the inspectors completed a follow-up assessment for a White finding and two associated violations related to station fire brigade drills. The NRC issued its Final Significance Determination and Notice of Violation for failure to properly conduct and document in-plant fire brigade drills on April 30, 2013 (Inspection Report No. 05000305/2013008). Our follow-up assessment utilized Inspection Procedure 92702, "Follow up on Traditional Enforcement Actions," supplemented by Inspection Procedure 95001, "Inspection for One or Two White Inputs in a Strategic Performance Area." The inspection was conducted to provide assurance that: (1) the root and contributing cause(s) of the issues were understood; (2) the extent of condition and extent of cause were identified; and (3) your corrective actions were sufficient to address the causes and prevent recurrence.

The inspection consisted of an examination of activities at the site as they relate to safety and compliance with the Commission's rules and regulations. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observation of work activities, and interviews with personnel.

D. Heacock

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Based on the results of this inspection, no violations of NRC requirements were identified. In particular, the inspectors determined that your root cause evaluation and readiness assessment for the fire brigade drill problems were conducted using systematic techniques and adequately identified the root and contributory causes of the performance issue and the associated violations. We concluded that your corrective actions were adequate to address the causes that were identified in your evaluation so as to prevent recurrence.

In accordance with Title 10 of the *Code of Federal Regulations* (CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC's 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's website at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

/RA/

Robert J. Orlikowski, Chief
Materials Control, ISFSI, and
Decommissioning Branch
Division of Nuclear Materials Safety

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

Enclosure:
Inspection Report No. 05000305/2014001(DNMS)

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U.S. NUCLEAR REGULATORY COMMISSION
REGION III

Docket No: 050-00305

License No: DPR-43

Report No: 05000305/2014001(DNMS)

Licensee: Dominion Energy Kewaunee, Inc., (DEK)

Facility: Kewaunee Power Station (KPS)

Location: Kewaunee, WI

Dates: January 1, 2014 through March 27, 2014

Inspectors: Rhex A. Edwards, Reactor Inspector (DNMS)
Wayne J. Slawinski, Senior Health Physicist (DNMS)

Approved by: Robert J. Orlikowski, Chief
Materials Control, ISFSI, and
Decommissioning Branch
Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

Kewaunee Power Station NRC Inspection Report 05000305/2014001

Kewaunee Power Station (KPS) operated at full power until May 7, 2013, when Kewaunee shutdown and permanently ceased power operation. On May 14, 2013, Kewaunee certified the permanent removal of fuel from the reactor vessel (NRC's Agencywide Documents Access and Management System (ADAMS) Accession No. ML13135A209). On May 31, 2013, the U.S. Nuclear Regulatory Commission (NRC) notified Kewaunee that the Operating Reactor Assessment Program had ceased and that implementation of the Decommissioning Power Reactor Inspection Program would begin on June 1, 2013 (ADAMS Accession No. ML13151A375).

Currently, the KPS is a permanently shut-down and defueled power reactor facility that was maintained in a Safe Storage of Spent Fuel (SAFSTOR) condition with spent fuel in wet storage and at an Independent Spent Fuel Storage Installation.

Self-Assessment, Auditing, and Corrective Action

- Issues were identified by the licensee at appropriate thresholds and entered into the corrective action program (CAP). Issues were screened and prioritized commensurate with safety significance. Licensee evaluations determined the significance of issues, and included appropriate remedial corrective actions. (Section 1.0)

Spent Fuel Pool Safety

- The licensee maintained spent fuel pool equipment (SFP) utilized to maintain SFP water level and cooling in a safe manner. (Section 2.0)

Maintenance and Surveillance

- Maintenance and surveillance for structures, systems, and components were adequate and resulted in the safe storage of spent fuel and proper operation of radiation monitoring and effluent control equipment. Workers followed work plans, surveillance procedures, and industrial safety protocols; and were aware of job controls specified in work instructions. (Section 3.0)

Decommissioning Performance and Status Review

- The inspectors determined that the licensee conducted decommissioning activities in accordance with the regulations and license requirements. The inspectors also verified that the licensee activities to transition to a SAFSTOR condition were in accordance with Technical Specifications (TS), the Updated Safety Analysis Report (USAR) and the Post Shutdown Decommissioning Activities Report (PSDAR). Finally, the inspectors conducted frequent plant tours to verify that the material condition of structures, systems, and components supported the safe storage of spent fuel and conduct of safe decommissioning. (Section 4.0)

Followup on Enforcement Actions

- The inspectors determined that the licensee's Root Cause Evaluation (RCE) in response to a White performance issue and two violations documented in previous communications dated March 4, 2013, and April 30, 2013, (NRC Inspection Reports No. 05000305/2013007 and No. 05000305/2013008) was conducted to a level of detail commensurate with the significance of the problem, and reached appropriate conclusions as to the root and contributing causes of the problems. The inspectors also determined that the licensee implemented appropriate corrective actions for each root and contributing cause, and that the corrective actions appeared to be prioritized commensurate with the safety significance of the issues. No other instance of the violations or the performance issue were identified; consequently, the violations are closed. (Section 5.0).

Report Details

Summary of Plant Activities

During the inspection period, the licensee took actions to place the unit in SAFSTOR conditions. Major onsite activities included implementation of the following: site organizational changes; preparation and submission of license amendments and regulatory exemptions; changes to the USAR following the docketing of the permanent cessation of operations and permanent removal of fuel from the reactor vessel in accordance with Title 10 of the *Code of Federal Regulations* (CFR) 50.82(a); reclassification of remaining onsite systems; implementation of system abandonment plans, which included isolation, draining, and abandonment of systems no longer in use; and the development and implementation of modifications to support placing the unit in a SAFSTOR condition.

1.0 Self-Assessments, Audits, and Corrective Actions (IP 40801)

1.1 Inspection Scope

The inspectors conducted document reviews and interviews with plant personnel to assess the licensee's performance as it related to the following areas:

- Administrative procedures prescribed actions for the identification, evaluation and resolution of problems;
- License procedures prescribed thresholds for the performance of self-assessments, audits, and surveillances;
- License management reviewed self-assessments, audits, and corrective actions to remain knowledgeable of plant performance;
- Self-assessments were conducted with technically qualified personnel and sufficient independence from the licensee;
- Issues or problems were identified and corrected in accordance with the licensee's CAP through a sampling of select issues; and
- Licensee management observed maintenance and surveillance activities, operations evolutions and training.

The inspectors reviewed CAP documents on a frequent basis to determine: if a sufficiently low threshold for problem identification existed; the quality of follow-up evaluations including extent-of-condition; if the licensee assigned timely and appropriate prioritization for issue resolution commensurate with the significance of the issue.

1.2 Observations and Findings

The inspectors determined that issues were identified by the licensee at an appropriate threshold within various functional areas of the site and entered into the CAP. Issues

were effectively screened, prioritized and evaluated commensurate with safety significance. The scope and depth of evaluations were adequate in that the evaluations reviewed addressed the significance of issues and assigned an appropriate course of remedial action.

No findings of significance were identified.

1.3 Conclusions

Issues were identified by the licensee at appropriate thresholds and entered into the CAP. Issues were screened and prioritized commensurate with safety significance. Licensee evaluations determined the significance of issues and included appropriate remedial corrective actions.

2.0 **Spent Fuel Pool Safety (IP 60801)**

2.1 Inspection Scope

The inspectors verified the safe wet storage of spent fuel in the auxiliary building. The review included: SFP siphon and drain-down protection; cold weather preparations; and SFP system operation and electrical power supply adequacy.

2.2 Observations and Findings

The inspectors performed walk downs of the SFP, accessible SFP cooling system piping, and areas of SFP makeup water piping to evaluate whether conditions existed that represented a siphon or drain path. Specifically, these walkdowns were performed before and after work on a planned maintenance activity to replace a Fuel Pool Cooling (FPC) check valve discussed in section 3.0 of this inspection report.

The inspectors also confirmed that the general housekeeping practices, foreign material exclusion, combustible material control, and SFP chemistry procedures adequately protect the integrity and cooling of the spent fuel.

The inspectors verified that redundant power supplies were available and capable of supporting spent fuel cooling should they be needed. The inspectors also reviewed SFP procedures and operational strategies and confirmed that no significant changes occurred since the plant permanently shutdown.

No findings of significance were identified.

2.3 Conclusions

The inspectors determined that the licensee was safely storing spent fuel in wet storage. Specifically, the SFP was adequately protected from a siphon or drain down event. The SFP cooling system electrical power supplies were reliable; and licensee SFP operational strategies were consistent with those used during reactor power operations.

3.0 MAINTENANCE AND SURVEILLANCE (IP 62801)

3.1 Inspection Scope

The inspectors conducted plant tours, interviews, and directly observed maintenance to evaluate the effectiveness of the licensee in maintaining structures, systems, and components important to the safe storage of spent fuel.

During walkdowns, the inspectors evaluated material condition and housekeeping, assessed area radiological conditions, radiological access control and associated posting/labeling, and reviewed the overall condition of systems, structures, and components that support decommissioning. Independent radiation measurements were periodically made by the inspectors in areas toured to determine if those areas were controlled properly and posted as prescribed in 10 CFR Part 20.

The inspectors also reviewed the maintenance history, work prioritization, and surveillance activities for the spent fuel pool cooling system. Specifically, the inspectors reviewed and observed the planned replacement of a fuel pool cooling check valve, FPC-11A. These activities included reviews of work plans, schedules, procedures, safety committee reviews, temporary modifications, and risk management plans.

3.2 Observations and Findings

The inspectors noted that throughout the inspection period housekeeping remained satisfactory.

The inspectors noted that the licensee appropriately prioritized corrective maintenance on the remaining systems required for permanent cessation of operations. The inspectors also verified that equipment, which remained available following the shutdown had the appropriate preventive maintenance schedules established with input from equipment vendors. Finally, the inspectors verified that when equipment issues occurred, the licensee staff implemented the appropriate troubleshooting procedures to identify and correct the equipment deficiency identified.

The inspectors reviewed and observed the planned replacement of a check valve in the FPC system. Specifically, FPC-11A was replaced and was a check valve in the spent fuel pool cooling system credited in the Kewaunee design basis to prevent a SFP drain down event. Following radiographic examination to satisfy in-service testing, the licensee determined the check valve was not fully closed. The condition existed prior to 2007 and the licensee initially intended to repair the valve. However, the repair effort was canceled which became the subject of a Severity Level IV Non-Cited Violation discussed in NRC Inspection Report Nos. 05000305/2013005 and 05000305/2013009. As discussed in the inspection report, the licensee developed new plans to repair the degraded valve. The inspectors reviewed the work order, procedures, and risk plans associated with the work prior to the repair. The work required isolating FPC-11A from the SFP. Since there were no isolations between FPC-11A and the SFP, the licensee secured SFP cooling and inserted a pipe plug into the end of the pipe in the SFP. With the pipe plug in place, a portion of the piping was drained to allow replacement of FPC-11A. The inspectors were onsite during the repair and observed adequate work practices and radiological controls during the replacement. Additionally, the site

developed adequate controls to restore SFP cooling had it been necessary and closely monitored SFP level and temperature.

No findings of significance were identified.

3.3 Conclusions

Plant material condition and housekeeping were adequate and had not adversely impacted safe decommissioning or transition to SAFSTOR. FPC-11A was safely replaced. Workers followed work plans, surveillance procedures, and industrial safety protocols and were aware of job controls specified in work instructions.

4.0 **Decommissioning Performance and Status Reviews (IP 71801)**

4.1 Inspection Scope

The inspectors conducted document reviews, observations, and interviews with plant personnel to assess the licensee's performance as it related to the following areas:

- Whether licensee activities were in accordance with license conditions and docketed commitments, as well as, within the bounds of the docketed post shutdown activity report;
- Operability and functionality of systems necessary for safe decommissioning was assessed through control room and plant walkdowns including the following systems: radioactive effluent monitoring, spent fuel pool cooling, level and temperature control, radiation protection monitors and alarms, equipment important to emergency preparedness, and equipment that provided normal and standby electrical power;
- Operator logs and data taking for normal facility operations, surveillances, maintenance and verification that data out of specification was appropriately dispositioned and resolved;
- Assessed ongoing in-plant work activities to ensure work activities were evaluated for risk in accordance with 10 CFR 50.65(a)(4), operational work risk assessments were performed, and operations shift turnovers appropriately communicated pertinent plant status;
- Verified appropriate plant staffing was maintained and that appropriate management oversight of licensee and supplemental activities were performed;
- Verified pre-job briefs were conducted for facility operations including maintenance, surveillance, operations, and decommissioning activities;
- Performed plant tours to assess field conditions and decommissioning abandonment activities;

- Observed in progress field work to verify activities were conducted in accordance with approved work instructions and workers were knowledgeable of tasks; and
- Plant material condition of structures, systems, and components was maintained at a high level to ensure safe storage of spent fuel.

4.2 Observations and Findings

The inspectors determined through the plant tours and activities observed that the licensee conducted activities in accordance with the regulatory requirements and plant procedures.

No findings of significance were identified.

4.3 Conclusions

The inspectors determined that the licensee conducted decommissioning activities in accordance with the regulations and license requirements. The inspectors also verified that the licensee activities to transition to a SAFSTOR condition were in accordance with TSs, the USAR and the PSDAR. Finally, the inspectors conducted plant tours to verify that the material condition of structures, systems and components supported the safe storage of spent fuel and conduct of safe decommissioning.

5.0 **Followup on Enforcement Actions (IP 92702)**

Historical Information

In late 2011, NRC inspectors identified potential issues with station fire brigade drills that were performed between 2009 and 2011. An Unresolved Item (URI 05000305/2011005-01) was opened to document potential performance deficiencies associated with those drills. In late 2012, an NRC Office of Investigations (OI) investigation concluded that a fire brigade trainer deliberately failed to conduct fire drills in accordance with procedure, and also falsified evaluation/critique forms. In April 2013, the NRC issued its final significance determination for a White finding and two violations associated with fire brigade drill performance along with a corresponding civil penalty. The action was not contested by the licensee and the penalty was paid. The details of the finding are documented in previous NRC communications (NRC Inspection Report No. 05000305/2013-007 and No. 05000305/2013008, issued March 4, 2013 and April 30, 2013, respectively).

On May 31, 2013, the NRC issued a letter describing the termination of the Reactor Oversight Process for Kewaunee Power Station and informed the licensee that the follow-up inspection for the fire brigade drill White finding would use Inspection Procedure (IP) 92702 instead of IP 95001.

By letter dated December 18, 2013, the licensee notified the NRC that it had completed an evaluation of the fire drill performance issues and had undertaken the steps necessary to assure that the cause was understood and corrective actions were of sufficient scope and breadth to address the issues and the violations. In preparation for

the NRC inspection, the licensee completed Root Cause Evaluation (RCE) 001095 (Revision 4), "Proposed NRC Violations Associated with Unresolved Item 2011005-01, Fire Brigade."

5.1 Inspection Scope

The inspectors performed a follow-up assessment of the White finding and the two violations associated with the aforementioned fire brigade drills. The inspection was conducted in accordance with IP 92702, "Followup on Traditional Enforcement Actions Including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternative Dispute Resolution Confirmatory Orders." The inspection was supplemented by the guidance in IP 95001, "Inspection for One or Two White Inputs in a Strategic Performance Area," because the licensee performed a root cause evaluation of the issues to meet the performance objectives of that procedure. The inspection objectives were to:

- Determine whether adequate corrective actions had been implemented for the enforcement action including violations;
- Determine whether the root and contributing causes of the enforcement action were identified, that their generic implications were addressed, and that the licensee's programs and practices were appropriately enhanced to prevent recurrence; and
- Provide assurance that: (1) the extent-of-condition and extent-of-cause of the risk-significant issue was identified and included an assessment of safety culture; and (2) corrective actions for the issue were sufficient to address the root causes and contributing causes to prevent recurrence.

The inspectors reviewed the licensee's RCE in addition to other assessments conducted to support the licensee's evaluation including a readiness review of the RCE. The inspectors interviewed various licensee personnel involved in the RCE, management personnel involved in or knowledgeable of the licensee's internal investigation of the issue and members of the station fire brigade and nuclear oversight staff. The interviews were conducted to understand the quality and rigor of the RCE as a means to determine whether the root and contributing causes were properly evaluated, and whether corrective actions taken were appropriate to address the causes and prevent recurrence.

5.2 Observations and Findings

a. Evaluation of Inspection Requirements - Problem Identification

Identification of Issue

The inspectors determined that the licensee's evaluation identified who (i.e., licensee, self-revealed, or NRC) and under what conditions the fire brigade drill issues were identified. Specifically the licensee acknowledged that questionable fire brigade drill practices were initially identified by the NRC and documented as a URI in December 2011. The URI prompted the licensee to issue Condition Report (CR) 0456865 and conduct an apparent cause evaluation (ACE 018992). The ACE concluded that

announced fire drills were conducted as training sessions rather than drills and that annual live fire training was inappropriately credited as a quarterly drill. The licensee's ACE identified several fire brigade drill related issues including deficiencies with implementing the corrective action program, effectiveness of the self-assessment program, and overall inadequate management oversight of the fire protection program. The failure of the licensee to identify this issue and its precursors were documented in the RCE. The inspectors agreed with the RCE determination that the NRC initially identified potential issues with fire brigade drills, which prompted the licensee to conduct an ACE and to investigate human performance problems.

Duration of Issue and Prior Opportunities to Identify

The inspectors determined that the licensee's evaluation documented how long the issue existed and whether there were prior opportunities for identification. Specifically the licensee's RCE determined that potential issues with fire brigade drills began to emerge in 2006, when quarterly drill critique forms showed that fire brigade participation fell short of procedure requirements. Fire drill related issues were further disclosed through Nuclear Electric Insurance Limited (NEIL) assessments in 2008 and 2010, which reported problems with drill critiques and with the number of brigade members involved. Despite these precursors, nuclear oversight department audits of the fire protection program conducted in 2010 and 2011, failed to identify problems with fire drills even though the drill procedure was reviewed as part of the audits. The licensee's RCE also disclosed that CAP documents were not generated to document precursor issues that could have led to earlier identification of the problem.

The licensee's RCE identified that several missed opportunities to identify the problems occurred over an extended period of time, in part, because internal assessment programs were inadequate. The inspectors concluded that the licensee's positive assessment results likely led to a false sense of security that contributed to the root cause.

The inspectors determined that the licensee's RCE was adequate with respect to identifying how long the issue existed and prior opportunities for identification.

Plant Specific Risk Consequences

The inspectors determined that the licensee's RCE assessed the plant specific risk consequences and compliance concerns associated with the issue. The licensee's RCE documented that from at least August 2009 through 2011, the Kewaunee Station had a potentially reduced defense-in-depth to fire protection. That assessment result aligned with the NRC's significance determination, as documented in Inspection Report No. 05000305/2013007. Both assessments concluded the fire drill problems affected a fundamental aspect of the defense in depth of the fire protection program and potentially reduced fire brigade effectiveness. The licensee's RCE found that the station fire brigade currently met required qualifications and that drills had been executed satisfactorily since 2012, meeting all drill criteria. The RCE documented that an individual's decision to conduct fire drills in a manner that was inconsistent with procedure without a robust process of licensee oversight resulted in the performance issue.

The inspectors concluded that the licensee appropriately documented the risk consequences and compliance concerns associated with the issue.

No findings of significance were identified.

b. Evaluation of Inspection Requirements - Root Cause, Extent-of-Condition, and Extent-of-Cause Evaluation

Evaluative Methods

The inspectors determined that the licensee's root cause evaluation applied various systematic methods in evaluating the performance issue in order to identify and validate root causes and contributing causes. Specifically, the licensee used the following systematic methods to complete RCE 001095:

- Comparative Analysis;
- Barrier Analysis;
- Task Analysis;
- Event and Causal Factor Chart; and
- Why Staircase.

Different methodologies were used to ensure the root and contributory causes aligned with those determined through alternate systematic means. Specifically, a barrier analysis was utilized by the licensee to determine what barriers failed, were weak or were missing. A task analysis was used to lay-out and explain the steps in the process of conducting fire drills. Also, a comparative timeline was applied to the performance issue to understand if any deltas were identified in the RCE. Organizational and programmatic issues were further developed with the use of an event and causal factor chart. Finally, a why staircase was used to confirm the causes of the performance issue.

The inspectors found that the licensee's RCE articulated the events that led to the issues in a logical manner, which allowed individual performance issues to be differentiated between programmatic and process related causes. The inspectors determined that the licensee evaluated the issues using systematic methodologies to identify root and contributing causes and devoted extensive effort to validate results through various methods.

Root Causes and Contributing Causes

The inspectors determined that the licensee's root cause evaluation was conducted to a level of detail commensurate with the significance of the problem. In particular, the licensee's RCE deployed various systematic methods to explore the potential causes and the contributors and to validate conclusions.

The RCE identified the root cause to be a lack of clear organizational management oversight of the fire protection program. The RCE identified two contributing causes: (1) less than adequate rigor in internal self-assessments and fleet oversight assessments which failed to identify performance gaps within the fire protection program; and (2) less than adequate rigor in the implementation of the licensee's procedure that governed the document change approval process.

The RCE correctly concluded that management oversight of the fire protection program was insufficient, as program oversight was left to those implementing the day-to-day activities without adequate checks and balances. For example, neither management nor supervisory oversight was sufficient to recognize that fire drills were conducted without the required number of fire brigade staff for several years. Moreover, fire protection program issues identified by external organizations were not documented in condition reports, in part, because management did not clearly articulate standards for follow-up. The RCE found that the program degraded over time unbeknownst to those ultimately responsible for its implementation.

The inspectors determined that the licensee's evaluation was comprehensive and of sufficient scope and depth to reach the proper conclusions. As a result, the inspectors found that the RCE was conducted to a level of detail commensurate with the significance of the problem and identified the root the contributing causes.

Prior Occurrences and Operating Experience

The inspectors determined that the licensee's root cause evaluation included consideration of prior occurrences of the problem and an assessment of prior operating experience.

The licensee's comparative timeline analysis identified that it had ample prior opportunity to identify flaws in the fire protection program dating back to 2006. The timeline was used to identify precursor issues in the fire drill program such as: (1) a lack of Kewaunee City Fire Department familiarization with the site or involvement in fire drills; (2) the elimination of important licensing basis information from the fire protection program and inappropriate reductions to the fire drill implementing procedure; (3) a lack of effective use of the CAP process to document deficiencies identified by an external assessment organization; and (4) crediting training activities as drills. The comparative timeline analysis, event and causal factor chart and why staircase all disclosed that prior opportunities existed to identify the performance issue.

Notwithstanding those prior opportunities, the licensee determined that the problems were not recognized until questioned by the NRC in late 2011. Consequently, the RCE concluded the performance issue was not a repeat event. Similarly, a review of external industry operating experience was performed as part of the RCE but did not identify any past issues of this problem in the industry.

Based on the licensee's evaluation and conclusions, the inspectors determined that the RCE included a consideration of prior occurrences of the problem and knowledge of prior operating experience.

Extent of Condition and Extent of Cause Evaluations

The inspectors determined that the licensee's RCE adequately addressed both extent-of-condition and extent-of-cause of the problem. The licensee's RCE evaluated the extent-of-condition associated with the failure to properly maintain and implement the provisions of the fire protection program related to fire brigade training and drill execution. Specifically, the licensee's extent-of-condition focused on fire protection program maintenance, drill integrity, training and fire brigade readiness. Additionally, the RCE examined the actions that led to the fire drill performance issues and assessed the degree that human performance issues may exist in other plant processes that rely on drills as a measure of readiness. The licensee found that drill deficiencies that directly led to the violations were caused by the isolated actions of one individual. That individual developed the drill scenarios, controlled the drills and critiqued them with minimal input from others. To assess whether this condition existed elsewhere, the licensee reviewed the performance of individuals involved in other programs that conduct drills and training exercises such as security and emergency preparedness staffs. That review did not disclose trustworthiness or integrity issues. Consequently, the licensee determined that similar human performance problems were not present in other program areas which employed drills to assess performance and demonstrate proficiency.

The licensee's RCE assessed the applicability of the root cause across different programmatic activities and departments that use drills and training exercises to assess readiness. Specifically, the licensee reviewed the organizational management oversight for security force-on-force drills and emergency plan drills, and concluded that the root cause was not prevalent in other programs or departments. The RCE determined that clear organizational management oversight existed in these other program areas.

Based on the licensee's evaluation and actions, the inspectors concluded that the licensee's RCE adequately addressed the extent-of-condition and the extent-of-cause of the issue.

Safety Culture Assessment

The inspectors determined that the licensee's RCE, extent-of-condition, and the extent-of-cause appropriately considered safety culture components. The inspectors reviewed the RCE and determined that the licensee had systematically considered various safety culture components associated with human performance, problem identification and resolution, and safety conscious work environment along with other relevant safety culture components. The licensee found that work practices and fundamental human performance problems directly contributed to the issue as a result of inadequate supervisory and management oversight. That conclusion was consistent with the NRC's assessment as documented in Inspection Report No. 05000305/2013-007. The licensee determined that oversight of work activities was inadequate since actions were seldom questioned nor were they verified to be performed in accordance with procedure.

The inspectors concluded that the safety culture aspects associated with the performance issue were appropriately considered in the licensee's RCE and included consideration whether a weakness in any safety culture component was a root or a

significant contributing cause of the issue. The inspectors' review of the event did not identify other potential weaknesses in safety culture components.

No findings of significance were identified.

c. Evaluation of Inspection Requirements - Corrective Actions

Corrective Action Assessment

In September 2013, a multi-person self-assessment team performed a readiness review of the RCE. The licensee's assessment team reviewed three objectives associated with the RCE, each which had several attributes. The team evaluated the RCE to determine whether:

- (1) The performance issue was properly characterized and identified;
- (2) An adequate level of effort was involved in the evaluation given its significance and included sufficient documentation to support conclusions;
- (3) Corrective actions addressed each root and contributing cause and included measures of success.

The inspectors noted that the licensee's readiness review challenged a number of issues documented in the RCE, and also identified flaws related to corrective actions. As a result, certain corrective actions were expanded while others were added.

A number of corrective actions drove management involvement in the fire protection program including measures to ensure the Facility Safety Review Committee was integrated into the procedural change approval process to the level warranted. Also, supervisory duties and responsibilities were incorporated into drill development, drill oversight and approval. Additionally, actions were taken to engage management and supervisory staff in drill observations and in the critique process.

The inspectors found that the licensee's corrective actions focused on a variety of issues associated with the root cause and the two contributing causes and centered on actions to drive management involvement, supervisory oversight and to improve the rigor of its self-assessments related to the fire protection program. However, while these corrective actions overall were properly targeted, the inspectors identified that corrective actions to prevent future missed opportunities focused on the training of assessment staff and not on potential flaws in the assessment process. Similarly, the inspectors questioned whether actions were needed to ensure that the corrective action program was utilized as intended to document fire protection issues at a sufficiently low threshold. In particular, the RCE revealed that condition reports historically were seldom generated for fire protection issues even when an external organization (i.e., NEIL) identified fire drill discrepancies in 2008, and a 2012 drill self-critique identified drill objectives that were not met. The licensee acknowledged the inspectors observations and generated CRs to capture both issues.

The inspectors determined that overall the licensee developed appropriate corrective actions for the root cause and for each contributing cause sufficient to prevent recurrence.

Prioritization and Completion of Corrective Actions

The inspectors determined that the licensee prioritized the corrective actions with appropriate consideration of the risk-significance and regulatory compliance. The licensee initiated CR 0456865 immediately following the identification of the potential performance issues, which the NRC documented as a URI in Inspection Report No. 2011-005. Soon thereafter, the licensee completed an ACE and implemented a number of corrective actions throughout 2012, beginning in January 2012. An internal investigation of individual actions and behaviors was also completed by the licensee in parallel with an NRC OI investigation. The licensee indicated that disciplinary actions were taken in accordance with its process. Other corrective actions were taken during the course of the licensee's RCE as were additional, timely actions following the conclusion of the RCE and subsequently to address the flaws identified by the licensee's readiness review.

The inspectors found that the licensee established a schedule for implementing and completing the corrective actions. As documented in the RCE, each corrective action identified an action, owner, and reasonable due date. All items were completed before the inspection commenced on March 24, 2014.

Based on the licensee's corrective action implementation, the inspectors concluded that the licensee adequately prioritized the corrective actions with consideration of the risk significance and regulatory compliance. The inspectors concluded that the licensee adequately established and implemented corrective actions in accordance with its schedule.

Corrective Action Effectiveness

The inspectors determined that the licensee developed measures of success for determining effectiveness of the corrective actions. The corrective actions were specific and measurable through quantitative and/or qualitative means.

The licensee's corrective actions to address the root and contributing causes were all completed in 2013, including an effectiveness review which was completed before its June 2014 due date. The licensee evaluated the effectiveness of corrective actions by comparison of work activities against the implementing procedure, through a process of interviews and record review, and by a review of the fire protection program plan. Interviews of fire protection personnel and brigade members were conducted during the effectiveness review as a means to identify potential issues with procedures or licensing requirements. The effectiveness review was vetted through the corrective action review board.

The inspectors concluded that the licensee had adequately established measures to validate the effectiveness of the corrective actions to prevent recurrence of the issue.

Response to Notice of Violation

The inspectors determined that the corrective actions taken adequately addressed the Notice of Violation (NOV) that prompted this inspection. The RCE addressed the two violations, the White performance issue and the OI Investigation results. The licensee's readiness review concluded and the inspectors concurred that corrective action taken by the station in response to the event addressed the NOV. Therefore, the finding (FIN 05000305/2013007-01) and violations (VIO 05000305/2013007-01; 05000305/2013007-02) are closed.

No findings of significance were identified.

5.3 Conclusions

The inspectors determined that the licensee's RCE was conducted to a level of detail commensurate with the significance of the problem, and reached reasonable conclusions as to the root and contributing causes of the event. The inspectors also determined that the licensee implemented appropriate corrective actions for each root and contributing cause, and that the corrective actions appeared to be prioritized commensurate with the safety significance of the issues. No other instance of the violations was identified.

6.0 Exit Meeting

The inspectors presented the results of the inspection to Mr. J. Stafford and other members of your staff at an onsite exit meeting on March 27, 2014. The licensee acknowledged the results presented and did not identify any of the information discussed as proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

A. Jordan, Site Vice President
S. Yuen, Plant Manager
T. Olson, Assistant Plant Manager
J. Stafford, Safety and Licensing Director
M. Hale, Radiation Protection Manager
J. Grau, Maintenance Manager
M. Aulik, Engineering Manager
J. Langon, Nuclear Oversight
S. Hills, Organizational Effectiveness
J. Arcand, Decommissioning
J. Steiner, Nuclear Security and Alarm Specialist
R. Harrell, Senior Safety Specialist
M. Haese, Licensing
R. Repshas, Licensing Supervisor
J. Gadzala, Licensing Engineer

INSPECTION PROCEDURES (IPs) USED

IP 40801 Self-Assessment, Auditing and Corrective Action at Permanently Shutdown Reactors
IP 60801 Spent Fuel Pool Safety at Permanently Shutdown Reactors
IP 62801 Maintenance and Surveillance at Permanently Shutdown Reactors
IP 71801 Decommissioning Performance and Status Reviews at Permanently Shutdown Plants
IP 92702 Followup on Traditional Enforcement Actions Including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternative Dispute Resolution Confirmatory Orders
IP 95001 Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area

ITEMS OPENED, CLOSED AND DICUSSED

<u>Closed</u>	<u>Type</u>	<u>Summary</u>
05000305/2013007-01	FIN	Failure to Perform Fire Drills in Accordance with Fire Protection Program Plan (Section 5.2)
05000305/2013007-01	VIO	Failure to Perform Fire Drills in Accordance with Fire Protection Program Plan (Section 5.2)
05000305/2013007-02	VIO	Inaccurate and Incomplete Information Documented on Fire Drill Evaluation/Critique Forms (Section 5.2)

PARTIAL 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 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.

- CR538443; Document 4th Quarter 2013 Ground Water Well Sampling Not Completed; January 30, 2014
- CR537754; Individual Received a Hot Particle on their Modesty Garment; January 22, 2014
- CR537732; O-Ring Found in FPC-11A Check Valve Removed on 1/22/14; January 22, 2014
- CR 543233; Question on CR Threshold for Fire Brigade Issues; March 27, 2014
- CR 543274; Revisit Contributing Cause Corrective Actions; March 17, 2014
- Temporary Modification 2011-11; Spent Fuel Pool Pipe Plug; Revision 0
- MA-KW-MCM-SFP-005; Installation and Removal of Inflatable Plugs for Spent Fuel Pool Isolation; Revision 0
- Risk Management plan; KW06-010101 Replacement of FPC-11A; January 22, 2014
- Root Cause Evaluation No. 001095; Proposed NRC Violations Associated with URI 2011005-01, Fire Brigade; Revision 4
- GNP 03.01.01; Directive, Implementing Document and Procedure Administrative Controls; Revision 55
- LI-KW-600; Facility Safety Review Committee; Revision 0
- SA-KW-FPP-010; Fire Drills; Revision 5
- NOD-GL-1 Attachment 4; Missed Opportunity Evaluation Form; June 3, 2013
- Fire Protection Training Effectiveness Reviews for Fire Brigade; July 1, 2013 and October 25, 2013
- PI-AA-200-2002, Attachment 1, Root Cause Evaluation Effectiveness Review No EFR000415 (undated)
- PI-AA-200-2002, Attachment 4, Apparent Cause Evaluation Effectiveness Review No. 018992 AC-1CA-1 and No. 018992 AC-1CA-2; March 18, 2013
- PI-AA-300; Cause Evaluation; Revision 6
- PI-AA-300-3001; Root Cause Evaluation; Revision 2
- Self-Assessment Report No. SAR 2466, 95001 Readiness Review for Fire Brigade
- Kewaunee Power Station Fire Protection Program Plan, Revision 12
- SY-AA-TR-201; Security Drill and Exercise; Revision 1
- EP-AA-400; Drill and Exercise Program; Revision 3
- Drill Number 2013-08; Fire Drill Evaluation Critique Form; March 13, 2013
- Drill Number 2013-17; Fire Drill Evaluation Critique Form; May 29, 2013
- Drill Number 2013-19; Fire Drill Evaluation Critique Form; August 8, 2013
- Drill Number 2013-25; Fire Drill Evaluation Critique Form; October 18, 2013
- Drill Number 2014-03; Fire Drill Evaluation Critique Form; March 14, 2014

LIST OF ACRONYMS USED

ACE Apparent Cause Evaluation

ADAMS	Agencywide Document Access and Management System
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
DEK	Dominion Energy Kewaunee
DNMS	Division of Nuclear Materials Safety
FPC	Fuel Pool Cooling
IP	Inspection Procedure
IR	Inspection Report
KPS	Kewaunee Power Station
NEIL	Nuclear Electric Insurance Limited
NOV	Notice of Violation
NRC	U.S. Nuclear Regulatory Commission
PSDAR	Post Shutdown Activities Report
RCE	Root Cause Evaluation
SAFSTOR	Safe Storage of Spent Fuel
SFP	Spent Fuel Pool
TS	Technical Specification
URI	Unresolved Item
USAR	Updated Safety Analysis Report

D. Heacock

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Based on the results of this inspection, no violations of NRC requirements were identified. In particular, the inspectors determined that your root cause evaluation and readiness assessment for the fire brigade drill problems were conducted using systematic techniques and adequately identified the root and contributory causes of the performance issue and the associated violations. We concluded that your corrective actions were adequate to address the causes that were identified in your evaluation so as to prevent recurrence.

In accordance with Title 10 of the *Code of Federal Regulations* (CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC's 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's website at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

/RA/

Robert J. Orlikowski, Chief
Materials Control, ISFSI, and
Decommissioning Branch
Division of Nuclear Materials Safety

Docket No: 50-305
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