December 14, 2009

Mr. David A. Heacock President and Chief Nuclear Officer Dominion Energy Kewaunee, Inc. Innsbrook Technical Center – 2SW 5000 Dominion Boulevard Glen Allen, VA 23060-6711

### SUBJECT: WORK CONTROL PROCESS AGING MANAGEMENT PROGRAM AUDIT REPORT REGARDING THE KEWAUNEE POWER STATION, LICENSE RENEWAL APPLICATION (TAC NO. MD9408)

Dear Mr. Heacock:

By letter dated August 12, 2008, Dominion Energy Kewaunee, Inc. (Dominion) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54), to renew the operating license for Kewaunee Power Station (KPS) for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). Dominion amended its application by letter dated September 25, 2009; the amendment included substantial changes to the information presented in the original application. In the amendment, Dominion indicated that the Work Control Process (WCP) aging management program (AMP) had been modified to make it consistent with the recommendations contained in the Generic Aging Lessons Learned (GALL) Report.

As a result of Dominion's statement about the WCP AMP being consistent with the GALL Report, the NRC staff conducted an audit to verify the claim of consistency made by the applicant. On October 20, 2009, an NRC team completed the audit of the WCP AMP. The audit report is enclosed.

If you have any questions, please contact Samuel Hernandez at 301-415-4049 or by e-mail at <u>Samuel.Hernandez@nrc.gov</u>.

Sincerely,

/RA/

Samuel Hernandez, Project Manager Projects Branch 1 Division of License Renewal Office of Nuclear Reactor Regulations

Docket No. 50-305

Enclosure: As stated

cc w/encl: See next page

Mr. David A. Heacock President and Chief Nuclear Officer Dominion Energy Kewaunee, Inc. Innsbrook Technical Center – 2SW 5000 Dominion Boulevard Glen Allen, VA 23060-6711

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| DATE   | 11/ /09     | 11/24/09    | 12/11/09    | 12/14/09                  |  |  |
|        |             |             |             |                           |  |  |

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Letter to David A. Heacock from Samuel Hernandez dated December 14, 2009

SUBJECT: WORK CONTROL PROCESS AMP AUDIT REPORT REGARDING THE KEWAUNEE POWER STATION, LICENSE RENEWAL APPLICATION (TAC NO. MD9408)

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# U.S. NUCLEAR REGULATORY COMMISSION

# OFFICE OF NUCLEAR REACTOR REGULATION - DIVISION OF LICENSE RENEWAL

Docket No: 050-305

License No: DPR-43

Licensee: Dominion Energy Kewaunee, Inc.

Facility: Kewaunee Power Station

Location: Kewaunee Power Station N490 Highway 42 Kewaunee, WI 54216

Dates: October 19-20, 2009

Reviewers: S. Hernandez, Project Manager, Division of License Renewal (DLR) A. Hiser, Senior Level Service, DLR D. Pelton, Branch Chief, DLR J. Medoff, Sr. Mechanical Engineer, DLR

### Introduction

A two-day audit was conducted by an U.S. Nuclear Regulatory Commission (NRC) team at Dominion Energy Kewaunee, Inc.'s (Dominion) Headquarters in Richmond, Virginia on October 19-20, 2009. The purpose of this audit was to examine the applicant's Work Control Process (WCP) Aging Management Program (AMP) documentation for the Kewaunee Power Station (KPS) and to verify the applicant's claim of consistency with the corresponding Generic Aging Lessons Learned (GALL) AMP. In its September 25, 2009, amendment letter, Dominion indicated that the WCP AMP had been revised to make sure it sure consistent with two GALL AMPs. The two GALL AMPs referenced by Dominion are: Section XI.M32, "One-Time Inspection," and Section XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components." Exceptions to the GALL AMP elements will be evaluated separately as part of the NRC staff's review of KPS license renewal application (LRA) and documented in the staff's Safety Evaluation Report (SER).

The Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (NUREG-1800) provides the staff guidance for reviewing a LRA. The Standard Review Plan allows an applicant to reference in its LRA the AMPs described in the GALL Report. By referencing the GALL AMPs, the applicant concludes that its AMPs correspond to those AMPs which are reviewed and approved in the GALL Report, and that no further staff review is required. If an applicant credits an AMP for being consistent with a GALL program, it is incumbent on the applicant to ensure that the plant program contains all of the elements of the referenced GALL program. The applicant's determination should be documented in an auditable form and maintained on-site.

During this audit, the staff audited program Elements 1-6, and program Element 10, (operating experience), of the WCP AMP, which the applicant claimed to be consistent with the GALL Report against the related elements of the associated AMP described in the GALL Report. Elements 7-9 which address corrective actions, confirmation process, and administrative controls were audited by another NRC project team during the Scoping and Screening Methodology audit and are evaluated separately.

In performing this audit, the staff examined the applicant's program bases documents and related references for the WCP AMP. The NRC project team also interviewed KPS representatives to obtain additional clarification related to the KPS WCP AMP. This report documents the staff activities during this audit.

## LRA AMP B2.1.32, Work Control Process

In the KPS LRA, the applicant identified that AMP B2.1.32 is an existing program plant-specific AMP for the LRA. In a letter dated September 25, 2009, the applicant amended the WCP to define the AMP as a new program that will be consistent with program element criteria in the GALL Report, as follows:

- For those AMR items in which the WCP is used to confirm the preventative or mitigative monitoring effectiveness of either the Primary Water Chemistry Program (LRA AMP B2.1.24), Secondary Water Chemistry Program (LRA AMP B2.1.28), Closed-Cycle Cooling Water Program (LRA AMP B2.1.8), Fuel Oil Program (LRA AMP B2.1.14), or Lubricating Oil Analysis Program (LRA AMP B2.1.17), consistent with the program element criteria in GALL AMP XI.M32, "One-Time Inspection," with an enhancement of the program.
- For the remaining AMR items in which the WCP will be used for aging management, consistent with the program element criteria in GALL AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," with exceptions and an enhancement of the program.

On September 19-20, 2009, the NRC performed a supplemental audit of the WCP in order to review the change in aging management approach for the program and to audit the degree of consistency of the WCP program elements with GALL AMPs XI.M32, "One-Time Inspection," and XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components." During its audit, the staff reviewed the applicant's on-site documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

| Document  | Title  | Revision / Date         |
|---|--|-------------------------|
| 1. Technical Report KLR-<br>1336                                      | License Renewal Project Aging Management Program: Work Control Process, Kewaunee Power Station   | Revision 3<br>9/24/2009 |
| 2. Nuclear Fleet Process<br>Description WM-AA-10                      | Work Management  |                         |
| 3. Nuclear Fleet<br>Administrative Procedure<br>WM-AA-100             | Work Management  |                         |
| 4. Nuclear Fleet Guidance<br>and Reference Document<br>WM-KW-100-1001 | Work Management Process  |                         |
| 5. Nuclear Fleet Guidance<br>and Reference Document<br>ER-AAPRS-1010  | Preventative Maintenance (PM) Basis Document   |                         |
| 6. KPS General Nuclear<br>Procedure GNP-08.07.01                      | Preventative Maintenance Optimization Program Instructions   |                         |
| 7. EPRI Report No.<br>TR-107514                                       | Age-Related Degradation Inspection Method and<br>Demonstration, In Behalf of Calvert Cliffs Nuclear Power Plant<br>License Renewal Application | April 1998              |

In comparing the seven program elements in the applicant's program, the staff verified that the program elements contained in AMP B2.1.32 are consistent with GALL AMP XI.M32 program elements, as supplemented by the following program element areas that need further clarification and that are discussed in the paragraphs that follow. The staff also verified that the program elements contained in AMP B2.1.32 are consistent with GALL AMP XI.M38 program elements, as supplemented by the following program element areas that need further clarification and that are discussed in the paragraphs that follow. The staff confirmed that the clarification and that are discussed in the paragraphs that follow. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.M32 and in GALL AMP XI.M38.

The staff noted that, at the time of the audit, the applicant's letter of September 25, 2009 updated the Updated Safety Analysis Report (USAR) supplement summary description for the WCP to reflect the change in the status of the program, making the program consistent with the guidance in GALL AMP XI.M32 "One-Time Inspection," when subjected to an enhancement and applied as a one-time condition verification program for water chemistry and oil analysis preventative monitoring programs, with the guidance GALL AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," with noted exceptions and when subject to an enhancement and applied as a periodic condition monitoring program. The staff also noted that the applicant's letter of September 25, 2009 updated the commitment for the WCP, as reflected in Commitment No. 25 of the LRA. The staff evaluates the acceptability of USAR supplement summary description for the WCP and LRA Commitment No. 25 in the SER.

# Additional Clarifications on the Degree of Consistency with the Program Elements in GALL AMP XI.M32, "One-Time Inspection"

### "Scope of Program":

The staff noted that, for the aging management review (AMR) item components or commodity groups in which the Primary Water Chemistry Program (LRA AMP B2.1.24), Secondary Water Chemistry Program (LRA AMP B2.1.28), Closed-Cycle Cooling Water Program (LRA AMP B2.1.8), Fuel Oil Program (LRA AMP B2.1.14), or Lubricating Oil Analysis Program (LRA AMP B2.1.17) is used as a preventative or mitigative monitoring AMP, the WCP is credited as the program that will implement a one-time inspection of the preventative or mitigative monitoring program in order to verify that either the aging effect of concern in the AMR item is not occurring, the aging effect of concern is progressing at a very slow rate; or the time to initiation of aging effect involves an extremely long incubation time.

The staff verified that, for these AMR item components or commodity groups, the applicant intent to use the WCP for this purpose conforms to the staff's aging management guidance in GALL AMP XI.M32 on when a one-time inspection basis can be applied as the program and process for aging management.

<u>"Detection of Aging Effects," "Monitoring and Trending," and "Acceptance Criteria"</u>: The staff noted that the inspection methods for managing loss of material, cracking and loss of heat transfer function inducing mechanisms were consistent with those listed in the inspection method table in GALL AMP XI.M32. As a result the staff noted that the inspection methods for the various aging effects and mechanisms managed by the program conformed to the condition monitoring methods recommended in GALL AMP XI.M32.

The staff also noted that, for one-time inspection purposes, the applicant is applying the WCP as a sampling based one-time condition monitoring program. The staff also noted applicant identifies that, for those AMR item components or commodity groups in which the Primary Water Chemistry Program (LRA AMP B2.1.24), Secondary Water Chemistry Program (LRA AMP B2.1.28), Closed-Cycle Cooling Water Program (LRA AMP B2.1.8), Fuel Oil Program (LRA AMP B2.1.14), or Lubricating Oil Analysis Program (LRA AMP B2.1.17) are used as a preventative or mitigative monitoring basis, and for which the WCP will be used to verify the program effectiveness of the specific preventative or mitigative monitoring program, the applicant states that the WCP will perform a one-time examination on a representative sample of the population of components as based on the premise that inspections of those areas with greater susceptibility to aging can be used to confirm performance in less susceptible areas without the need for further inspections, and on the basis that the specific lead inspection locations will be identified by considering the time in service of the components, the severity of operating conditions, and identifying those components with the lowest design margins.

The staff noted that the applicant's sampling basis is consistent with the sampling basis statement for one-time inspections, as given in the "detection of aging effects" program element in GALL AMP XI.M32. However, the staff also noted that the applicant's aging management basis for sampling did not clearly establish what the applicant's sampling basis would be because in the AMR items of the LRA, the AMP is credited with aging management of multiple material-environment-aging effect combinations, and because the applicant did not clearly establish whether the sampling basis would be on the conglomerate of material-environment-aging effect combinations and because the applicant did not clearly establish whether the sampling basis would be on the conglomerate of material-environment-aging effect combinations that the program manages or on a representative sample of components for each of the material-environment-aging effect combinations were needed on the type of conditions that would be used to factor in which component locations would be inspected under the program (e.g., loss of material due to corrosion could be expected to occur more readily in stagnant areas or creviced regions, etc.). The staff will consider issuing an request for additional information (RAI) to request additional information on the bases for these sampling based matters.

## <u>Additional Clarifications on the Degree of Consistency with the Program Elements in</u> <u>GALL AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting</u> <u>Components"</u>

# "Scope of Program and Parameters Monitored/Inspected":

The staff noted that, for the AMR item components or commodity groups in which the WCP was credited as a new periodic condition monitoring program, the applicant's basis document states that the WCP will perform visual examinations of the internal surfaces of components during scheduled maintenance or surveillance activities, and that additionally, the program will perform

inspections of the external surfaces of electrical box gaskets, the spent fuel gate seals and hoses, and reactor cavity seal ring. The staff verified that the applicant did identify the inclusion of additional materials, environments, and aging effects in the WCP as specific exceptions to the program elements in GALL AMP XI.38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components." The staff evaluates these exceptions in the SER.

### "Detection of Aging Effects":

The staff noted that the "detection of aging effects" element in GALL AMP XI.M38 states that the applicant should identify and justify the inspection technique used for detecting the aging effects of concern, and that, for examinations performed on metallic components for cracking by stress-corrosion cracking, the applicant indicated the visual inspection techniques would be enhanced VT-1 examinations. However, the inspectors noted that the applicant did not clarify which type of specific visual inspection techniques would be used to monitor for loss of material or for reduction of heat transfer capability by fouling. The staff will consider issuing an RAI to request clarification on the type of visual examination techniques that will be credited for loss of material and reduction of heat transfer inducing mechanisms.

The staff noted that the "detection of aging effects" element in GALL AMP XI.M38 states that the locations for inspection should be chosen to include conditions likely to exhibit the aging effects. The staff noted that the applicant states that the internal inspection locations are performed during normal SRs and PMs, that the locations will be selected based on component manufacturer recommendations and operating experience, and that a technical and plant-specific operating experience review will be performed on plant components and structures to pick locations likely to exhibit aging effects. However, the staff also noted that the applicant's aging management basis for sampling did not clearly establish what the applicant's sampling basis would be because in the AMR items of the LRA, the AMP is credited with aging management of multiple material-environment-aging effect combinations, and because the applicant did not clearly establish how the results of inspections performed on those components that receive periodic maintenance activities would be applied to those components that are not actually inspected under the program. The staff will consider issuing an RAI to request additional information on the bases for these sampling based matters.

### "Acceptance Criteria":

The staff noted that the "acceptance criteria" element in GALL AMP XI.M38 states, in part, that the acceptance criteria are established in the maintenance and surveillance procedures or other established plant procedures, and that, if the results are not acceptable, the corrective action program is implemented to assess the material condition and determine whether the component intended function is affected. The staff noted that the applicant's basis document states, in part, that acceptance criteria will be established in the preventative maintenance and periodic surveillance procedures of the license renewal trailer when the program is implemented and that the acceptance criterion is no unacceptable wear, corrosion, cracking, change in material properties (for materials and non-metallics) or significant fouling. The staff noted that the phrase "no unacceptable wear, corrosion, cracking, change in material s and non-metallics) or significant fouling" could be interpreted to mean either that no detected degradation would be allowed or that a certain amount of degradation would be allowed so long as the amount of degradation was within the bounds of the acceptance criteria established for

the new AMP. The staff will consider issuing an RAI to seek clarification on meaning of the terminology "no unacceptable wear, corrosion, cracking, change in material properties (for materials and non-metallics) or significant fouling."

### "Operating Experience":

The staff noted that the WCP is now defined as a new, GALL-based AMP that has yet to be implemented at the facility. The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

Thus, the WCP does not have any operating experience (OE) that has been detected through implementation of this program as a license renewal AMP for the facility. The staff noted however, that the applicant did provide three examples of OE that had been detected through implementation of the WCP in order to demonstrate that the AMP is capable of generating relevant OE for the facility and of detecting and correcting any aging effects that are detecting through implementation of this program. The staff evaluates the acceptability of the "operation experience" program element for the WCP in the SER.

#### **Kewaunee Power Station**

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