



References:

1. Letter from Samuel Hernandez (NRC) to David A. Christian (DEK), "Request for Additional Information for the Review of the Kewaunee Power Station License Renewal Application – Scoping and Screening Methodology (TAC No. MD9408)," dated April 30, 2009. [ADAMS Accession No. ML091120199].

Attachment:

1. Response to the Request for Additional Information Regarding Scoping and Screening Methodology

Commitments made in this letter:

None.

cc:

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**ATTACHMENT 1**

**RESPONSE TO THE REQUEST FOR ADDITIONAL INFORMATION  
REGARDING SCOPING AND SCREENING METHODOLOGY**

**KEWAUNEE POWER STATION  
DOMINION ENERGY KEWAUNEE, INC.**

## **Request for Additional Information (RAI) 2.1-1**

### Background:

10 CFR 54.4(a)(2) requires that all nonsafety-related systems, structures, and components (SSCs) whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1)(i-iii) be included within the scope of license renewal.

LRA Section 2.1.1, "Introduction," states that scoping and screening were performed consistent with the guidelines presented in NEI 95-10 [the LRA discussed two clarifications concerning the application of NEI 95-10, neither of which were applicable to determining nonsafety-related SSCs within the scope of license renewal in accordance with 10 CFR 54.4(a)(2)].

LRA Section 2.1.3.6.1, "Spatially Oriented NS SSCs Not Directly Attached to SR SSCs," states, in part:

NS components containing or potentially containing moderate or low energy fluids (i.e.,  $\leq 200^{\circ}\text{F}$  or  $\leq 275$  psig) were also included in license renewal scope unless both 2(a) and 2(b) below applied:

- (a) The NS component could not directly leak or spray on SR components in the immediate area because one of the following conditions existed:
- The NS component was located in a room, cubicle, enclosure, tunnel, or enclosed corridor, which did not contain any SR mechanical or electrical components.
  - The NS component was located in an open space, but was separated from SR mechanical or electrical components by solid physical barriers such as walls, floors, ceilings and/or major plant equipment (e.g., the main condenser).
  - The NS component was located in an open space, was maintained at or near atmospheric pressure, and there were no SR mechanical or electrical components located within the collapse envelope of the NS component.
- (b) The fluid contents of the NS components could not flow from the area through doorways, grating, or floor penetrations, and then drain or drip on or flood SR mechanical or electrical components in adjacent areas, unless an analysis demonstrated that the SR components would not be adversely impacted.

### Issue:

The staff has determined that the concept of a "collapse envelope" is not addressed in NEI 95-10, Appendix F, as a basis for not including fluid filled non-safety related SSCs,

in the proximity of safety-related SSCs, within the scope of license renewal. In addition, during the NRC scoping and screening methodology audit performed March 10-13, 2009, the staff performed a walkdown of two nonsafety-related systems, in the proximity of safety-related SSCs, which were not included within the scope of license renewal based on the concept of the collapse envelope. The staff determined that in addition to the use concept of the collapse envelope there were additional mitigative features not discussed in the LRA (dikes and enclosures).

Request:

The staff requests that the applicant provide a discussion which states that an exception was taken to guidance of NEI 95-10 and provide the basis for the exception (the collapse envelope), for not including nonsafety-related SSCs, within the proximity of safety-related SSCs, within the scope of license renewal. The discussion should include a definition of collapse envelope and the rationale for the application of the collapse envelope as the basis to not include specific nonsafety-related SSCs within the scope of license renewal. In addition, discuss the use of any mitigative features used in conjunction with the collapse envelope and whether the mitigative features were included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2).

As part of your response, please address the extent of condition - the number and location of nonsafety-related SSCs, within the proximity of safety-related SSCs but not within the scope of license renewal in accordance with 10 CFR 54.4 (a)(2), based on the concept of a collapse envelope and any associated mitigative features. Indicate whether any associated mitigative features were included within the scope of license renewal.

List any additional SSCs which were included within the scope of license renewal as a result of your review performed in response to this RAI and list those structures and components for which aging management reviews were conducted. For each additional structure and component, describe the aging management programs, as applicable, to be credited for managing the identified aging effects.

**Dominion Response**

There were no exceptions taken to the guidance in NEI 95-10 related to scoping of non-safety-related (NS) systems, structures, and components (SSCs) within the proximity of safety-related (SR) SSCs.

The methodology used for scoping and screening of NS SSCs for the Kewaunee LRA is described in Section 2.1.3.6, "10 CFR 54.4(a)(2) Report." LRA Subsection 2.1.3.6.1, "Spatially-Oriented NS SSCs Not Directly Attached to SR SSCs," Item 2 describes the approach used for scoping NS components containing moderate or low energy fluids and is consistent with the guidance in NEI 95-10, Appendix F, Section 5.2.2.2.2, "Moderate/Low Energy Systems," which states, in entirety:

#### 5.2.2.2.2 Moderate/Low Energy Systems

*Moderate/low energy systems, without regard to seismic classification, have potential spatial interactions of spray or leakage. Operating experience has shown that physical impacts from pipe whip, falling pipes or jet impingement from moderate-low energy systems do not occur and do not need to be considered. Industry experience indicates that piping does not fall if its supports are intact with the exception of failures of high-energy piping caused by flow-accelerated corrosion. Section 5.2.2.3 requires aging management of support systems that precludes physical impacts from moderate and low energy pipes falling.*

*Non-safety moderate/low energy piping that has potential spatial interactions (spray or leakage) with vulnerable safety related equipment that is not protected from the effects of spray or leakage must be included within the scope of license renewal per 54.4(a)(2).*

*See Section 5.2.3 for definitions of vulnerable equipment.*

In order to implement this guidance, Dominion developed specific criteria to be applied during the scoping and screening process for NS moderate and low energy systems to determine whether a NS SSC was spatially oriented such that its failure could prevent the satisfactory accomplishment of a SR function of a SR SSC. As indicated in the third bullet of Item 2(a) of LRA Section 2.1.3.6.1, the criteria included the concept of a 'collapse envelope'. This 'collapse envelope' criterion was established to account for the potential leakage from tanks at atmospheric pressure that could project outward, due to the static head associated with the height of fluid in the tank, and potentially affect SR SSCs. Thus, consistent with NEI 95-10, Section 5.2.2.2.2, failure of these components could result in spray or leakage that could affect SR SSCs and, if so, must be included within the scope of license renewal. Therefore, the establishment of this 'collapse envelope' criterion is considered to be detailed methodology implementation, and is consistent with, rather than an exception to, NEI 95-10 guidance.

The 'collapse envelope' criterion was limited to tanks at atmospheric pressure and is defined as the area immediately below the tank, plus an area around the tank that would be created if the tank were to fall in any direction. Each tank was evaluated considering the range of leakage or spray that could result from a failure of the tank pressure boundary. The maximum outward leakage distance at any elevation along the tank wall would not exceed the height of the tank fluid contents at that elevation. If there were no SR components within the collapse envelope of the tank, and flooding in adjacent areas was not a concern, then the tank was determined not to be spatially-oriented near SR SSCs and was not included within the scope of license renewal. Mitigative features associated with the evaluation of these tanks, such as walls, floors, curbing, berms, sumps, and elevated equipment support pads, were included within the scope of license renewal when the feature was relied upon to prevent flooding or other interaction with SR SSCs.

An 'extent of condition' review identified the turbine oil reservoir and the chlorination tank (including the surrounding containment berm) as the only permanently installed tanks not included within the scope of license renewal based on the 'collapse envelope' criterion. The detailed scoping results for these tanks are discussed below. The review also identified that the 'collapse envelope' criterion had been incorrectly applied to the portable resin fill tank (as indicated by Note 1 on LRXK-100-36 at location A-11). This component is a portable operational tool which is used to fill demineralizers and is not permanently installed equipment. As such, the resin fill tank is correctly identified on LRXK-100-36 as not within the scope of license renewal.

### **Turbine Oil Reservoir**

The 14,000 gallon turbine oil reservoir shown on LRM-210, location D-9, supplies oil for the turbine and generator bearings and for other uses. The tank is located in the north end of the Turbine Building basement.

The turbine oil reservoir was not included within the scope of license renewal because the only SR equipment in the vicinity (i.e., piping for the turbine driven auxiliary feedwater pump) is not located within the collapse envelope of the tank, and would not be subjected to flooding even if the entire contents of the tank emptied onto the basement floor. In addition, any leakage from the tank is normally expected to be contained within a concrete berm that is located below the tank and which drains to the emergency turbine oil sump. The berm and the sump are within the scope of license renewal as an integral part of the Turbine Building and are included as part of the structural member "Structural Reinforced Concrete (slabs, beams, columns and walls)" in LRA Table 2.4.2-6, Turbine Building.

### **Chlorination Tank**

The 1000 gallon fiberglass chlorination tank shown on LRM-1274, location H-3, was installed to allow treatment of the Service Water System with sodium hypochlorite in order to combat fouling. The tank is located in the upper level of the Screenhouse. A fiberglass containment berm surrounds the chlorination tank and is capable of containing the entire contents of the chlorination tank.

The chlorination tank and the surrounding containment berm are not included within the scope of license renewal because there are no SR components within the collapse envelope of the tank. If the tank and berm both failed, the tank contents could not flow from the area and impact SR equipment in adjacent areas or areas below the tank. The steel curbing, concrete floor, and elevated equipment support pads that serve to protect safety-related equipment from flooding are included within the scope of license renewal as an integral part of the Screenhouse. The steel curbing that prevents water from flowing through floor penetrations is included in the structural member "Miscellaneous Steel [Embedded Steel-Exposed Steel Surfaces (shapes, plates, unistrut, etc.)]" and the concrete floor and elevated equipment support pads are included in the

structural member "Structural Reinforced Concrete (Foundation mat, walls, beams, columns, floor slabs, roof slab)" in LRA Table 2.4.2-11, Screenhouse.

No additional SSCs have been included within the scope of license renewal as a result of the review performed in response to this RAI.