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Dominion®

September 28, 2009

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Serial No.: 09-587
LR/DEA R0
Docket No.: 50-305
License No.: DPR-43

DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE KEWAUNEE POWER STATION LICENSE RENEWAL APPLICATION – VENTILATION SYSTEMS

By letter dated August 28, 2009 (Reference 1), the NRC requested additional information regarding the aging management review results and ventilation scoping included in the license renewal application (LRA) for Kewaunee Power Station (KPS) (Reference 2). The NRC staff indicated that responses to the requests for additional information (RAIs) are needed to complete the review of the KPS LRA. The attachment to this letter contains the responses to the RAIs.

Should you have any questions regarding this submittal, please contact Mr. Paul C. Aitken at (804) 273-2818.

Very truly yours,

Leslie N. Hartz
Vice President – Nuclear Support Services

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and State aforesaid, today by Leslie N. Hartz, who is Vice President – Nuclear Support Services of Dominion Energy Kewaunee, Inc. She has affirmed before me that she is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of her knowledge and belief.

Acknowledged before me this 28th day of September, 2009.

My Commission Expires: 4/30/13

Notary Public

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My Commission Expires Apr 30, 2013

References:

1. Letter from Samuel Hernandez (NRC) to David A. Heacock (DEK), "Request for Additional Information for the Review of the Kewaunee Power Station License Renewal Application – Aging Management Review Results (TAC No. MD9408)," dated August 28, 2009. [ADAMS Accession No. ML092120546]

2. Letter from D. A. Christian (DEK) to NRC, "Kewaunee Power Station Application for Renewed Operating License," dated August 12, 2008. [ADAMS Accession No. ML082341020]

Attachment:

1. Response to Request for Additional Information Regarding Aging Management Review Results

Commitments made in this letter:

1. None

cc:

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ATTACHMENT 1

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING AGING MANAGEMENT REVIEW RESULTS

KEWAUNEE POWER STATION
DOMINION ENERGY KEWAUNEE, INC.

Request for Additional Information (RAI) 3.5.2.2.1.2-1

Background:

In the license renewal application (LRA) Section 3.5.2.2.1.2, the applicant stated that no significant variations in building settlement have been observed. The applicant also stated that the Structures Monitoring Program is used to inspect for visual cracks and distortion. Also, settlement readings are taken every five years.

Issue:

The staff is unable to verify the applicant claims due to lack of supporting data and/or information in the LRA in the following areas:

- *What are the baseline and/or acceptable variances in building settlement?*
- *The latest of the settlement readings.*

Request:

The applicant is requested to provide the support data/information for the above items.

DEK Response

Building settlement readings are currently taken every five years at eight (A-H) detection points. Variations in readings greater than ± 0.050 inches/year are reported to the Engineering Group for review/evaluation. Also, if a seismic event is detected, a complete set of readings are taken and Engineering is notified of significant variations in readings of ± 0.100 inches.

Table 3.5.2.2.1.2-1 provided below indicates the latest gauge readings, recorded in August 2002 and November 2007, along with average settlement in inches/ year. As indicated in the table, the average settlement/year is not significant when compared to the acceptance criteria.

Table 3.5.2.2.1.2-1

Settlement Readings

Detection Point	Gauge Reading 2002	Gauge Reading 2007	Settlement 2002 to 2007 (5 Years) Inches	Average Settlement from 2002 to 2007 (5 Years) Inches/Year
A	2.519	2.467	0.052	0.010
B	2.022	2.002	0.020	0.004
C	1.328	1.308	0.020	0.004
D	1.938	1.902	0.036	0.007
E	0.549	0.511	0.038	0.008
F	1.432	1.370	0.062	0.012
G	0.951	0.986	-0.035	-0.007
H	1.006	0.971	0.035	0.007

RAI 3.5.2.2.1.4-1

Background:

In the LRA Section 3.5.2.2.1.4, the applicant stated that the reactor containment vessel is housed within the shield building. Also, concrete is designed in accordance with ACI 318-63 and ACI 201.2R-77 which provide a good quality, dense, well cured, and low permeability concrete.

Issue:

The staff is unable to verify the applicant claims due to lack of supporting data and/or information in the LRA in the following areas:

- *Air-entrained value or water-cement ratio*
- *Data for water chemical analysis*

Request:

The applicant is requested to provide the support data/information for the above items.

DEK Response

As indicated in LRA Section 3.5.2.2.2.2.1, the concrete mixes were designed with water-cement ratios that ranged between 0.41 to 0.52 and entrained air content between 3% to 7%.

The water used for mixing concrete in the batch plant was from deep wells located on site. The chemical analysis for well water samples taken during plant construction indicated a pH range of 7.40 to 7.70 and a chloride range of 35 to 39 ppm.

RAI 3.5.2.2.2.5-1

Background:

Standard Review Plan for Review of License Renewal Application for Nuclear Power Plants (SRP-LR) Section 3.5.2.2.2.5, which states that cracking due to stress corrosion cracking (SCC) and loss of material due to pitting and crevice corrosion could occur for Group 7 and 8 stainless steel tank liners exposed to standing water. The Generic Aging Lessons Learned (GALL) Report recommends further evaluation of plant-specific programs to manage these aging effects.

Issue:

For the GALL Aging Management Program (AMP) XI.M29, Aboveground Steel Tanks Program, the applicant stated that the aging management reviews (AMR) did not identify the need for this AMP. The staff is unable to verify the applicant claims due to lack of supporting information in the LRA in the following areas:

- *Are there any stainless steel tank liners exposed to standing water at Kewaunee Power Station (KPS)?*
- *If yes, then how it's being managed to the end of the period of extended operation?*

Request:

The applicant is requested to provide the support data/information for the above items.

DEK Response

There are no aboveground tanks with stainless steel liners exposed to standing water at Kewaunee.

NUREG-1801 AMP XI.M29, Aboveground Steel Tanks, is applicable to tanks exposed to an air-outdoor environment. The only tank within the scope of license renewal that is exposed to an air-outdoor environment is the radiator expansion tank for the Technical Support Center (TSC) diesel generator. As shown on license renewal drawing LRM-504 (location E-2), the radiator and the expansion tank are located on the roof of the TSC and the steel expansion tank is mounted on top of the radiator. Therefore, the bottom of the tank does not come into contact with the ground, concrete surfaces, or standing water.

RAI 3.5.2.2.2.6-1

Background:

LRA Section 3.5.2.2.2.6 states that the Structures Monitoring Program manages loss of material for steel structural components. For miscellaneous structural commodities the External Surfaces Monitoring and Fire Protection programs are used.

Issue:

NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," Revision 1, Generic Item T-30 recommends the Structures Monitoring Program to manage loss of material and general corrosion. The staff is unclear how the above mentioned programs meet or exceed the Structures Monitoring Program.

Request:

The staff requests that the applicant compare the above mentioned programs with the Structures Monitoring Program. Focus on how the programs will meet or exceed the requirements of the Structures Monitoring Program in relation to the aging effect "loss of material/general and pitting corrosion."

DEK Response

NUREG-1801, Generic Item T-30, recommends managing loss of material for certain steel structures and component supports with the Structures Monitoring Program. As indicated in LRA Section 3.5.2.2.2.6, loss of material for miscellaneous structural commodities such as junction, terminal, pull boxes, and doors is managed with the External Surfaces Monitoring program and the Fire Protection program instead of the Structures Monitoring program.

The Structures Monitoring Program, the External Surfaces Monitoring program, and the Fire Protection program all use visual inspections to manage loss of material for steel structural structures and component supports.

The Structures Monitoring Program requires visual examinations be performed at 5-year inspection intervals, while the Fire Protection program requires visual examinations every 18 months. The External Surfaces Monitoring program requires comprehensive visual inspections are performed as part of system walkdowns during both normal operation and refueling outages. The frequency of these walkdowns is based on system availability and history, but they are performed at least once during each refueling cycle or during other major maintenance outages as needed, consistent with the recommendations of NUREG-1801. The External Surfaces Monitoring Program

also credits the activities of operations, engineering, and health physics personnel to perform external surface inspections.

The External Surfaces Monitoring program and the Fire Protection program meet or exceed the requirements of the Structures Monitoring Program for managing the aging effect "loss of material/general and pitting corrosion" and are acceptable to manage the aging for miscellaneous structural commodities such as junction, terminal, pull boxes, and doors.

RAI 3.5.2.3-4

Background:

LRA Table 3.5.2-10 proposes to manage loss of material/erosion of steel pipe in raw water environment for the discharge tunnel through the use of applicant's "Structures Monitoring Program." The applicant states that that the GALL Report does not present an aging effect for this component, material, and environment combination and thus assigns Standard Note H.

Issue:

In its review of LRA Table 3.5.2-10, the staff finds that the GALL Report recommends that this material, environmental, and aging effect be managed through the use of the AMP, "Open Cycle Cooling Water System" (XI.M20). The staff also notes that Generic Letter (GL) 89-13 applies to this component.

Request:

Please propose a program to manage the aging of the components under consideration which is consistent with the AMP recommended by the GALL Report and which meets all plant commitments relating to GL 89-13. Otherwise, justify why the proposed program is sufficient.

DEK Response

As described in LRA Section 2.4.2.9, the Discharge Tunnel and Pipe, which discharges water from the condenser to the Discharge Structure, consists of a concrete tunnel, a steel pipe encased in concrete, and a reinforced concrete pipe. The Structures Monitoring Program, used to manage aging effects for the concrete tunnel and reinforced concrete pipe sections, utilizes a Preventive Maintenance Procedure (PMP) that requires divers to periodically inspect all three sections, including the steel pipe encased in concrete.

The steel intake pipe from the Intake Structure, located in Lake Michigan (raw water), to the Screenhouse, is evaluated with the Circulating Water System and is included in the component type "Pipe" in LRA Table 2.3.3-20. The associated aging management review results, provided in LRA Table 3.3.2-20, indicate that aging effects for the intake pipe are managed with the Open-Cycle Cooling Water System program. The Open-Cycle Cooling Water System program uses the same PMP as the Structures Monitoring Program, requiring divers to inspect the intake pipe from the Intake Structure to the Screenhouse. The PMP inspects for loss of material, zebra mussels, and other organic macro-fouling as discussed in Generic Letter 89-13.

Therefore, the Structures Monitoring Program is sufficient to manage the aging effects of the steel pipe in a raw water environment for the Discharge Tunnel and Pipe.

RAI 3.5.2.3-5

Background:

In LRA Table 3.5.2-14, the applicant proposes to use its External Surfaces Monitoring for Junction, Terminal, and Pull boxes to manage the aging effect of loss of material, pitting and crevice corrosion. For this AMR item the applicant has assigned the Standard Note E. GALL Report Vol. 1, Table 5, ID 50, recommends the program described in the GALL Report Section XI.S6, "Structures Monitoring Program" for managing the same aging effects.

Issue:

The applicant's External Surfaces Monitoring Program does not monitor inside of the components and also does not include stainless steel. Also, inspection frequency and sampling method for these components are not clear in the applicant's proposed program.

Request:

Justify the reason for using the External Surfaces Monitoring Program for managing the aging effect of loss of material, pitting and crevice corrosion of Junction, Terminal, and Pull boxes.

DEK Response

As discussed in the response to RAI 3.5.2.2.2.6-1 in this letter, use of the External Surfaces Monitoring program to manage the aging effect of loss of material for the junction, terminal, and pull boxes instead of the Structures Monitoring program is acceptable.

Additionally, by letter dated August 17, 2009, DEK responded to (Reference 4). In this response, DEK indicated that the Structures Monitoring Program and the External Surfaces Monitoring Program both manage the aging effect of loss of material of steel or stainless steel by visual inspection and indications of degradation are addressed through the Corrective Action Program. The Corrective Action Program evaluation will initiate further inspection, if needed, to determine the extent of the degradation including inside of the components consistent with NUREG-1801, Section XI.M36, External Surfaces Monitoring. The Scope of Program element allows managing the loss of material from internal surfaces, for situations in which material and environment combinations are the same for internal and external surfaces such that external surface condition is representative of internal surface condition.

RAI 3.5.2.2.2.2.1-1

Background:

LRA section 3.5.2.2.2.2.1 specified the entrained air content of KPS concrete is between 3% - 7% and the water-cement ratio is between 0.41 – 0.52.

Issue:

GALL Report Vol. 1, Table 5, ID 14, 26, and 35 recommend further evaluations of programs to manage loss of material due to freeze-thaw for concrete structures and elements. The GALL Report further states that evaluation is required for plants that are located in moderate to severe weathering conditions. Documented evidence to confirm that existing concrete has air content of 3%-6% and water-cement ratio 0.35-0.45 and subsequent inspections which do not exhibit degradation related to freeze-thaw, should be considered as part of the evaluation. As stated in the LRA, the amount of entrained air and water-cement ratio are outside the range discussed in the GALL Report. Also, the strength of the various concrete for category I structures is not found in the LRA.

Request:

1. *Provide the aging management actions that have been followed in the past and present to manage the aging effect i.e., loss of material (spalling, scaling) and cracking due to freezethaw.*
2. *What actions, other than opportunistic inspections, will be taken in the future to manage freeze-thaw in inaccessible regions?*
3. *If no additional action is required, provide justification in support of that conclusion.*

DEK Response

1. The Structures Monitoring Program (SMP) has been followed in the past and up to the present to inspect and manage for the aging effects of loss of material (spalling, scaling) and cracking of concrete due to freeze-thaw.

2. No additional actions will be performed in the future to manage freeze-thaw in inaccessible regions. The performance of opportunistic visual inspections of normally inaccessible below grade concrete when exposed, will continue in accordance with the SMP described in LRA Section B2.1-31.

3. The entrained air and water-cement ratio for the concrete installed at Kewaunee Power Station are just outside the range provided for freeze-thaw in NUREG-1801 for inaccessible areas. However, the concrete is designed to ACI standards and constructed of materials conforming to ACI and ASTM specifications at the time of

construction and to the recommendations as contained in the later guide of ACI 201.2R-77 for durable concrete. Adherence to these specifications and recommendations results in a dense concrete that is resistant to the effects of freeze-thaw.

Operating experience has shown that the ground at site tends to freeze and stay frozen through the winter and therefore, the below ground inaccessible concrete is not exposed to repeated cycles of freezing and thawing. Therefore, the inaccessible concrete will not experience damage or degradation, and the SMP, which includes opportunistic inspections, is an appropriate aging management program to manage degradation related to freeze-thaw in inaccessible areas.

RAI B2.1.5-5

Background:

In the KPS LRA, an AMR line item exists which references III.B1.1-4 of GALL which manages loss of material for reactor coolant pumps support: plates and structural shapes (columns, brackets, tie bars, etc.). However, no items could be found in the LRA which reference III.B1.1- 3 of the GALL Report, even though the two share the same component, material, and environment descriptions. The exclusion of Item III.B1.1-3 leads to the assumption that the associated aging effect, "Cracking due to Stress Corrosion Cracking" for the component, material, and environment combination is not experienced at KPS. Plant-Specific Note 1, which is listed with LRA AMR Item III.B1.1-4, states that cracking due to SCC is not an aging effect for this component since the bolt is hand tightened and is not under any stress.

Issue:

Although the staff agrees that bolted connections which are not under stress are not at risk of experiencing cracking due to SCC, the staff does not have sufficient information to determine whether there are indeed no stresses applied to the bolt. Residual stresses existent from fabrication, installation process, and operational effects may all contribute to a stress level which meets the threshold for possibility of cracking due to SCC to occur.

Request:

Please provide further justification and analyses on the stress levels experienced by these bolts by providing details on the bolt's purpose, hand tightening installation procedure, and consideration of residual stresses in the bolt.

DEK Response

The purpose of the high strength bolts included in the structural member "reactor coolant pumps support: plates and structural shapes (columns, brackets, tie bars, etc.)" in LRA Table 3.5.2-15 that reference NUREG-1801 Item III.B1.1-04 is to provide a connection between the top of the support columns and the pump support brackets. As described in LRA Section 2.4.5, USAR Section 5.9.2.18.5, and as shown on USAR Figure 5.9-11, the connection is by means of a high strength steel threaded rod (bolt) that is used to anchor the tie bars to the pump. These high strength bolts are 4¼-inches in diameter and a nut, which is hand tightened, is applied to each end of the bolt. The tie bars prevent whipping of the pump in the event of a pipe rupture and/or a seismic event. The details for the hand tightening installation, provided on a station drawing, indicate that "these bolts are to be hand tight (at each end) do not torque".

Note 1 of LRA Table 3.5.2-15 indicates that cracking due to stress corrosion cracking (SCC) is not an aging effect requiring management for the high strength bolts because they are hand tightened, not torqued, and are not under a sustained high tensile stress. However, additional research related to the residual stresses that could exist from the fabrication process of these high strength steel bolts did not provide definitive information to support the conclusion that cracking due to stress corrosion cracking could not occur. Therefore, it is concluded that cracking due to SCC is an aging effect requiring management and will be managed by the Bolting Integrity program using visual inspection.

Consequently, the LRA is supplemented to replace the following wording in LRA Appendix B, Section B2.1.5, Exceptions to NUREG-1801:

> The Bolting Integrity program takes no exceptions to the recommendations of NUREG-1801, Section XI.M18, "Bolting Integrity."

This above wording will be replaced with the following:

Exception 1: Use of Aging Detection Methods Different than in the NUREG-1801 Section XI.M18 Program

The program manages the aging effects of cracking, loss of material, and loss of preload for bolting/fasteners. The program detects cracking of high strength bolts using only visual inspections. The NUREG-1801, Section XI.M18 program relies on volumetric and visual examinations to detect aging of high strength bolts.

Justification

Periodic visual examinations are performed on the high strength bolting (threaded rods) used to anchor the tie bars to the reactor coolant pumps, and other structural applications not using high strength bolts. Performing visual inspections of high strength bolts in lieu of a volumetric examination is an exception to the discussion provided in NUREG-1801, XI.M18, Bolting Integrity. In order for stress corrosion cracking (SCC) to occur in a susceptible high strength bolting material, a sustained high tensile stress and a corrosive environment must be present. Visual examinations of the structural assemblies will detect corrosion or conditions indicative of a corrosive environment that could lead to stress corrosion cracking in potentially susceptible high strength bolting. Noted corrosion or corrosive environment indications will be documented in the Corrective Action Program and appropriate corrective actions initiated. Corrective action may include volumetric examination of affected bolts, hammer testing, or other actions appropriate for the condition. Therefore, visual examination, as described, will effectively manage the aging of installed high strength bolting to assure the bolts continue to perform their intended function.

Program Elements Affected

- Element 3: Parameters Monitored/Inspected

  The Bolting Integrity program relies on visual examination to detect aging of high strength bolts greater than 1-inch in diameter used in the NSSS component supports. The NUREG-1801, Section XI.M18 program relies on volumetric examinations in addition to visual examinations to inspect for cracking of high strength bolts greater than 1-inch in diameter used in the NSSS component supports.

- Element 4: Detection of Aging Effects

  The Bolting Integrity program relies on visual examination to detect aging of high strength bolts greater than 1-inch in diameter. The NUREG-1801, Section XI.M18 program relies on volumetric examinations in addition to visual examinations to detect aging of bolts greater than 1-inch in diameter.

RAI 3.4.2.3.1-1

Background:

Table 3.0-1, Service Environments, states that moisture and water pooling are not assumed in a hydraulic oil environment. In LRA Table 3.4.2-1, it states that components fabricated of copper alloy and stainless steel exposed to hydraulic oil (internal) does not have an aging effect requiring management.

Issue:

The applicant did not provide a basis for its statements that (1) moisture and water pooling are not assumed in a hydraulic oil environment and (2) copper alloy and stainless steel components exposed to hydraulic oil do not have an aging effect requiring management.

Request:

Please provide your basis for the statements made in the LRA pertaining to copper alloy and stainless steel components exposed to hydraulic oil (internal). Please provide any applicable reference sources to support these statements or provide an appropriate program to manage the effects of aging for these components exposed to hydraulic oil (internal).

DEK Response

The component types in LRA Table 3.4.2-1 in a Hydraulic oil environment are exposed to electro-hydraulic control (EHC) fluid. The statement that moisture and water pooling are not assumed in a hydraulic oil environment was based on a review of operating experience and discussions with station personnel. The OE review and discussions did not identify any evidence of corrosion occurring in components exposed to EHC fluid. Also, a review of monthly EHC fluid samples taken between May 2001 and May 2009 identified a limited number of instances where the water content exceeded the limit of 0.10% by volume. The highest water content recorded was 0.14%.

In order for corrosion to occur in a hydraulic oil environment, water contamination must be present along with separation/pooling of the water. The most likely component in the system to experience water pooling/separation would be the EHC reservoir. Therefore, for the component type "Reservoir (EHC)," the loss of material due to pitting and crevice corrosion of the stainless steel reservoir exposed to a hydraulic oil environment will be included as an applicable aging effect in LRA Table 3.4.2-1 and will be managed with the Lubricating Oil Analysis program. Additionally, the Work Control Process will be used to confirm the absence of aging.

RAI 3.3.2.3.10-1

Background:

In LRA Table 3.3.2-10, the LRA states that copper alloy tubing (which cite a Note H), which are exposed to air – indoor controlled (internal) do not have an aging effect requiring management; therefore an AMP is not applicable.

Issue:

The applicant did not provide the justification for determining these components are not subject to an aging effect requiring management when exposed to air-indoor controlled (internal). The staff is concerned the internal environment may contain contaminants and stagnant air which is not the same as freely circulating air-indoor controlled on the external surface.

Request:

Please describe in detail, the environmental conditions that exist in the internal environment in the component described above and how it compares to the external environment. Also please justify why these components do not experience an aging effect requiring management.

DEK Response

An air-indoor controlled (internal) environment was incorrectly listed in LRA Table 3.3.2-10 for the component type "Tubing." The correct environment of air-moist (internal) is identified in LRA Table 3.3.2-10 for the tubing and loss of material due to pitting and crevice corrosion is identified as an aging effect requiring management that will be managed by the Work Control Process program.

RAI 3.3.2.2.8-1

Background:

LRA and SRP-LR Sections 3.3.2.2.8 refer to LRA and SRP-LR Tables 3.3.1-19. These tables address the loss of material due to general, pitting, crevice, and microbiologically influenced corrosion (MIC) of steel (with or without coating or wrapping) piping, piping components, and piping elements exposed to soil. These tables recommend "further evaluation" on the part of the staff. Both the applicant and the GALL Report propose to manage this aging process through the use of the AMP, "Buried Piping and Tanks Inspection" (LRA B.1.3 and XI.M34).

The applicant proposes that the AMR items associated with Table 3.3.1-19 are either fully consistent with the GALL Report or are consistent in all respects except the component is different (Generic Note C).

Issue:

In its review of LRA Table 3.3.1-19, the staff noted that despite the fact that the component mentioned in Table 3.3.1-19 is "steel (with or without coating or wrapping)," the buried piping and tanks inspection program recommended by the GALL Report includes only steel pipe that has been coated or wrapped. Given that coatings or wrappings significantly reduce the corrosion of buried piping and given that the buried piping and tanks inspection program is not designed to manage the aging associated with bare steel piping, if bare steel piping exists a more comprehensive AMP will be required. The staff also noted that the application did not contain any AMR items associated with Table 3.3.1-19 for the open cycle cooling water system (GALL Report Volume 2 Table VII.C1-18). The staff questions the absence of piping associated with this table.

Request:

Please confirm that all buried steel piping is coated or wrapped or propose an AMP appropriate for bare steel piping. The staff also requests that the applicant confirm that the plant has no buried piping meeting the criteria of GALL Report Volume 2 Table VII.C1-18.

DEK Response

All buried steel piping within the scope of license renewal is coated and wrapped and is evaluated with the Circulating Water System. The Circulating Water System buried steel piping is included in the component type "Pipe" in LRA Table 2.3.3-20 and the associated aging management review results are provided in LRA Table 3.3.2-20. As indicated in LRA Table 3.3.2-20, the NUREG-1801, Volume 2 Reference for the buried

steel pipe (steel pipe in a soil environment) is VII.C3-09. The material, environment, aging effect, and aging management program for NUREG-1801, Item VII.C3-09 is identical to those for NUREG-1801, Item VII.C1-18.

NUREG-1801, Volume 2, Item VII.C1-18 is associated with the Open-Cycle Cooling Water System (Service Water System). Since there is no buried steel piping in the Service Water System, NUREG-1801, Item VII.C1-18 is not applicable.

RAI 3.3.2.2.10.7-1

Background:

LRA and SRP-LR Sections 3.3.2.2.10.7 refer to LRA and SRP-LR Tables 3.3.1-29. These tables address the loss of material due to pitting and crevice corrosion of stainless steel piping, piping components, and piping elements exposed to soil. These tables recommend "further evaluation" on the part of the staff. The applicant proposes to manage this aging process through the use of its AMP "Buried Piping and Tanks Inspection" (LRA B2.1.7). The GALL Report recommends that this aging process be managed through the use of a plant-specific AMP. The applicant proposes that the AMR items associated with Table 3.3.1-29 are consistent with the GALL Report in terms of material, environment, and aging effect but a different AMP is credited (Generic Note E).

Issue:

In its review of LRA Table 3.3.1-29, the staff noted that the "Buried Piping and Tanks Inspection" AMP contained in the GALL Report does not include stainless steel. The staff also noted that the corrosion characteristics of stainless steel differ from carbon steel sufficiently so some of the recommendations contained in the recommended AMP could be counterproductive for stainless steel, e.g., stainless steel relies on oxygen to maintain passivity so coating or wrapping stainless steel may be harmful. The staff further noted that the proposed AMP includes coated or wrapped stainless steel but does not mention uncoated stainless steel.

Request:

Please confirm whether the buried stainless steel piping is wrapped, coated, or bare and, if coated or wrapped, justify how the proposed AMP will adequately manage its aging.

DEK Response

The information requested in this RAI was provided in the response to RAI B2.1.7-1 in the letter dated August 17, 2009 (Reference 4).

RAI 3.3.2.3.20-1

Background:

LRA Table 3.3.2-20 contains items which address loss of material due to MIC of stainless steel piping, piping components and piping elements exposed to soil. The applicant proposes to manage this aging process through the use of its AMP, "Buried Piping and Tanks Inspection" (LRA B2.1.7). The applicant proposes that for the component, material and environment combination listed the aging effect being considered is not included in the GALL Report (Generic Note H).

Issue:

In its review of LRA Table 3.3.2-20, the staff noted that the "Buried Piping and Tanks Inspection" AMP contained in the GALL Report does not include stainless steel. The staff also noted that the corrosion characteristics of stainless steel differ from carbon steel sufficiently so some of the recommendations contained in the recommended AMP could be counterproductive for stainless steel, e.g., stainless steel relies on oxygen to maintain passivity so coating or wrapping stainless steel may be harmful. The staff further noted that the proposed AMP includes coated or wrapped stainless steel but does not mention uncoated stainless steel.

Request:

Please confirm whether the buried stainless steel piping is wrapped, coated, or bare and, if coated or wrapped, justify how the proposed AMP will adequately manage its aging.

DEK Response

The information requested in this RAI was provided in the response to RAI B2.1.7-1 in the letter dated August 17, 2009 (Reference 4).

RAI 3.2.2.2.3.1-1

Background:

LRA and SRP-LR Sections 3.2.2.2.3.1 refer to LRA and SRP-LR Tables 3.2.1-3. These tables address the loss of material due to pitting and crevice corrosion of stainless steel and aluminum piping, piping components, and piping elements exposed to treated water. These tables recommend "further evaluation" on the part of the staff. The GALL Report recommends managing this aging process through the use of the AMP "Water Chemistry" and "One-Time Inspection" (GALL Report Volume 2 Chapter XI.M2 and XI.M32). The applicant states that components included in the definition of this table have not been evaluated using this table but rather have been evaluated with the associated mechanical system.

Issue:

In its review of LRA Table 3.2.1-3, the staff noted that the GALL Report recommends the use of Water Chemistry and One-Time Inspection AMPs for components included in this table. The staff also noted that for some mechanical systems where stainless steel and aluminum components are exposed to treated water, the GALL Report only recommends the use of the Water Chemistry AMP. The staff concludes that if the proposed method of evaluation is followed, a high probability exists that AMPs will not be properly applied and that the management of aging of the components under consideration will not be properly addressed.

Request:

Please evaluate components meeting the definition of this table under the guidance of this table as opposed to including these components in their parent mechanical system for evaluation.

DEK Response

LRA Table 3.2.1, Item 3 is applicable to stainless steel containment isolation piping and components internal surfaces exposed to treated water and specifies that the aging effect of loss of material due to pitting and crevice corrosion be managed by Water Chemistry and One-Time Inspection programs.

As discussed in the response to RAI 2.3-4 in this attachment, LRA Section 3.2.2.2.3.1, and LRA Table 3.2.1, Item 3, containment isolation valves and associated connecting piping, are within the scope of license renewal, evaluated with their respective host systems, and included in the components types "Valves" and "Pipe." As such, the containment isolation valves and piping have been grouped and evaluated with the

other in-scope valves and piping for each system. Several NUREG-1801 items could be applicable to a group of pipe or valves that share the same material and environment since the pipe and valves are located in different systems.

However, a review of the aging management review results tables in LRA Section 3.0 indicates that loss of material due to pitting and crevice corrosion for stainless steel pipe and valves exposed to an internal treated water environment and that perform a containment isolation function are managed with a water chemistry program and the Work Control Process program. The Work Control Process program is consistent with the NUREG-1801, Section XI.M32, "One-Time Inspection" program as described in the letter dated September 25, 2009 (Reference 3).

Therefore, the loss of material due to pitting and crevice corrosion for stainless steel pipe and valves exposed to an internal treated water environment and that performs a containment isolation function, is being managed consistent with the requirements of NUREG-1801.

RAI 3.2.2.2.8.2-1

Background:

LRA and SRP-LR Sections 3.2.2.2.8.2 refer to LRA and SRP-LR Tables 3.2.1-15. These tables address the loss of material due to general, pitting and crevice corrosion on the internal surfaces of steel containment isolation piping, piping components and piping elements exposed to treated water. These tables recommend "further evaluation" on the part of the staff. The GALL Report recommends managing this aging process through the use of the AMP "Water Chemistry" and "One-Time Inspection" (GALL Report Volume 2 Chapter XI.M2 and XI.M32). The applicant states that components included in the definition of this table have not been evaluated using this table but rather have been evaluated with the associated mechanical system.

Issue:

In its review of LRA Table 3.2.1-15, the staff noted that the GALL Report recommends the use of Water Chemistry and One-Time Inspection AMPs for components included in this table. The staff also noted that for some mechanical systems where steel components are exposed to treated water, the GALL Report only recommends the use of the Water Chemistry AMP. The staff concludes that if the proposed method of evaluation is followed, a high probability exists that AMPs will not be properly applied and that the management of aging of the components under consideration will not be properly addressed.

Request:

Please evaluate components meeting the definition of this table under the guidance of this table as opposed to including these components in their parent mechanical system for evaluation.

DEK Response

Table 3.2.1, Item 15 is applicable to steel containment isolation piping and components internal surfaces exposed to treated water and specifies that the aging effect of loss of material due to pitting and crevice corrosion be managed by Water Chemistry and One-Time Inspection programs.

As discussed in the response to RAI 2.3-4 in this letter, LRA Section 3.2.2.2.8.2, and LRA Table 3.2.1, Item 15, containment isolation valves and associated connecting piping, are within the scope of license renewal, evaluated with their respective host systems, and included in the components types "Valves" and "Pipe." As such, the containment isolation valves and piping have been grouped and evaluated with the

other in-scope valves and piping for each system. Several NUREG-1801 items could be applicable to a group of pipe or valves that share the same material and environment since the pipe and valves are located in different systems.

However, a review of the aging management review results tables in LRA Section 3.0 indicates that loss of material due to pitting and crevice corrosion for steel pipe and valves exposed to an internal treated water environment and that perform a containment isolation function are managed with a water chemistry program and the Work Control Process program. The Work Control Process program is consistent with the NUREG-1801, Section XI.M32, "One-Time Inspection" program as described in the letter dated September 25, 2009 (Reference 3).

Therefore, the loss of material due to pitting and crevice corrosion for steel pipe and valves exposed to an internal treated water environment and that perform a containment isolation function is being managed consistent with the requirements of NUREG-1801.

RAI 3.1.2.2.14-1

Background:

LRA Section 3.1.2.2.14 addresses the wall thinning due to Flow-Accelerated Corrosion for steam generators' feedwater inlet ring and supports. The staff reviewed LRA 3.1.2.2.14 against the criteria of SRP-LR Section 3.1.2.2.14. In LRA Section 3.1.2.2.14, the applicant concludes that this item is not applicable to its steam generators. These components were redesigned and installed during the steam generator replacement project in 2001. It further stated that no AMP is necessary for these components.

Issue:

The staff reviewed LRA Section 3.1.2.2.14 and LRA Section B2.1.30, as well as Information Notice 91-19, "Steam Generator Feedwater Distribution Piping Damage." The IN documented operating experience of degradation in feedwater inlet ring and supports, and recommends modification and redesign of feedwater inlet ring and supports. The staff noted that the applicant identified causal factors described in IN 91-19. In LRA Section B2.1.30, the applicant provided description of some modifications in the upper steam generator. However, the staff found that more information is needed to understand why the aging effect of wall thinning due to flow-accelerated corrosion is not expected to occur.

Request:

Please provide further information about the new design and construction of the steam generators' feedwater inlet ring and supports explaining why the wall thinning due to flow accelerated corrosion is not expected. Please explain why no AMP is necessary, at least in order to verify whether the expectations about the absence of the flow-accelerated corrosion aging effect are met during the operating experience.

DEK Response

The new design and construction of the feedwater inlet ring for each of the steam generators utilized nickel-based alloys and chrome-moly alloys (A335 Grade P11 and A234 Grade WP11), which are not susceptible to flow-accelerated corrosion (FAC). Regarding the supports, the feedwater distribution system was analyzed as acceptable for thermal and seismic conditions, as documented in WCAP-15324, Volume 1, "Model 54F Replacement Steam Generator, Feedwater Nozzle and Thermal Sleeve Analysis," and Volume 2, "Model 54F Replacement Steam Generator, Modified Upper Assembly Stress Report, Feedring Seismic and Steam Line Break Analysis."

Based on the above, aging management for the loss of material due to FAC for the refurbished steam generator feedwater inlet ring and supports is not required.

RAI B2.1.30-14

Background:

LRA Table 3.1.1-72 addresses AMR items of cracking due to outer diameter stress corrosion cracking (ODSCC) and/or intergranular attack for nickel alloy steam generator tubes and sleeves exposed to secondary feedwater/steam. The staff reviewed LRA Table 3.1.1-72 against the criteria of SRP-LR Table 3.1.1-72. The GALL report differentiates the cracking due to intergranular attack (Item IV.D1-22) from the cracking due to ODSCC (Item IV.D1-23).

Issue:

In its review of LRA Table 3.1.1-72, the staff noted that the applicant did not credit the GALL Report AMR, Item IV.D1-23, in LRA Table 3.1.2-4 for cracking due to ODSCC as an aging effect/mechanism for nickel alloy steam generator tubes and sleeves exposed to secondary feedwater/steam. Only the cracking due to intergranular attack is addressed in the LRA. Based on the information provided, the staff would need further information in order to evaluate the sufficiency of the AMR proposed and the possible AMPs, which could arise.

Request:

Please clarify why the ODSCC is an aging effect that does not need to be managed for your steam generators. If not, please precise what AMP you are applying for addressing this aging effect.

DEK Response

NUREG-1801, Item IV.D1-23 for cracking due to ODSCC was incorrectly omitted from LRA Table 3.1.2-4, but is applicable to the component group "Tubes and Sleeves" exposed to a secondary feedwater / steam environment (treated water and/or steam-secondary) in LRA Table 3.1.2-4. As currently indicated in LRA Table 3.1.1, Item 72, cracking due to ODSCC and intergranular attack for nickel alloy steam generator tubes and sleeves exposed to secondary feedwater / steam is managed with the Secondary Water Chemistry program and the Steam Generator Tube Integrity program.

RAI B2.1.30-15

Background:

LRA Table 3.1.2-4 addresses AMR items of cracking due to SCC for nickel alloys components exposed to treated water and/or steam-secondary such as feedwater nozzle (and nickel alloy cladding), feedwater nozzle thermal sleeve and steam nozzle flow restrictor.

The staff reviewed LRA Table 3.1.1-74 against the criteria of SRP-LR Table 3.1.1-74. SRP-LR indicates that the cracking due to SCC should be managed by the Steam Generator Tube Integrity and Secondary Water Chemistry AMP for chrome plated steel, stainless steel, nickel alloy steam generator anti-vibration bars exposed to secondary feedwater/steam. The applicant proposed to extend this aging management designed for anti-vibration bars to other components of the steam generators, in relation with the material, the environment and the aging effect. For most components, the applicant assigns these two AMPs. However, for the three following components:

- *Feedwater nozzle (and nickel alloy cladding)*
- *Feedwater nozzle thermal sleeve*
- *Steam nozzle flow restrictor*

LRA Table 3.1.2-4 related to the steam generator does not mention the Steam Generator Tube Integrity AMP. For these three components, the applicant credited only the Secondary Water Chemistry AMP while it stated that these items are consistent with the GALL Report in all aspects except a different AMP is credited (Note E).

Issue:

In its review of LRA Table 3.1.1-74, the staff noted that for the three components listed above the applicant did not cover all the AMPs recommended by the GALL Report in the Item IV.D1-14. In LRA Table 3.1.1-74, the applicant stated that the aging effects identified for the anti-vibration bars are managed by the Steam Generator Tube Integrity program and/or the Secondary Water Chemistry program. The GALL AMP XI.M19 about steam generator tube integrity states that the scope of program is specific to steam generator tubes, plugs, sleeves and tubes supports. The staff agrees that the three previous components do not belong to the components described in the scope of the GALL AMP XI.M19. Nevertheless, the applicant did not explain when and why it applies only one program amongst the two recommended by the GALL Report whereas it stated in its LRA that the item 3.1.1-74 is consistent with the GALL Report.

Request:

Please verify whether you need a Steam Generator Tube Integrity AMP for the three steam generator secondary side components listed above in consistency with the GALL Report. Please also explain how the Item 3.1.1-74 of its LRA is consistent with the

GALL Report, especially when it credits only one program amongst the two recommended by the GALL Report.

DEK Response

As indicated in LRA Section B2.1.30, the Steam Generator Tube Integrity Program encompasses secondary-side components whose failure could prevent the steam generator from fulfilling its intended safety function. This includes the nickel alloy cladding of the feedwater nozzle, the feedwater nozzle thermal sleeve, and the steam nozzle flow restrictor. LRA Table 3.1.2-4 identifies the Secondary Water Chemistry Program as the aging management program used to manage stress corrosion cracking for these nickel alloy components in a treated water and/or steam-secondary environment. However, the Steam Generator Tube Integrity Program was incorrectly omitted from LRA Table 3.1.2-4 to manage stress corrosion cracking of these components, and LRA Table 3.1.1, Item 74, should have specified both programs for managing aging. The application of both programs for managing stress corrosion cracking for these nickel alloy components in a treated water and/or steam-secondary environment is consistent with NUREG-1800, Item 74 (Chapter 3, Table 3.1-1) and NUREG-1801, Item IV.D1-14 (Chapter IV).

RAI XI.S8 - Protective Coating Monitoring and Maintenance Program

Background/Issue:

This program in the licensee's application is cited as not applicable for aging management. However, NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," states that "Proper maintenance of protective coatings inside containment is essential to ensure operability of post-accident safety systems that rely on water recycled through the containment sump/drain system." Licensees should assure proper maintenance of the protective coatings in containment, such that they will not degrade and become a debris source that may challenge the emergency core cooling systems performance.

Request:

Describe, in detail, the Coatings Program at Kewaunee. How will the program ensure that there will be proper maintenance of the protective coatings inside containment, and ensure operability of post-accident safety systems that rely on water recycled through the containment sump/drain system in the extended period of operation? Also, describe the frequency and scope of the inspections, acceptance criteria, and the qualification of personnel who perform containment coatings inspections.

DEK Response

The Protective Coating program conforms to the requirements identified in Regulatory Guide 1.54, "*Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants*," dated June 1973, which endorses ANSI N101.4-1972, "*Quality Assurance for Protective Coatings Applied to Nuclear Facilities*," for Service Level I (design basis accident) conditions. The program, including inspections, incorporates guidance from ASTM D5144, *"Guide for the Use of Protective Coating Standards in Nuclear Power Plants"* and ASTM D5163, *"Standard Guide for Establishing Procedures to Monitor the Performance of Safety-Related Coatings in an Operating Nuclear Power Plant."*

The Protective Coating program that was implemented during the current license period ensures that the coatings, both inside and outside containment, are properly applied and maintained to provide corrosion control and aesthetics. Documents and information associated with the Protective Coating program include items such as implementing procedures, regulatory and commitment documents, industry documents, operating experience, current issues, program specific training requirements, and a program health report. Quarterly, the program health report provides a performance summary, describes trends and anomalies, regulatory compliance status, and effectiveness evaluations (performance indicators).

The Protective Coating program requires a containment coating condition assessment be performed during each refueling outage and a condition assessment report prepared to document the inspection findings. The containment coating condition assessment includes a visual inspection of protective coatings inside containment, evaluation of the material condition of the protective coatings, and identification of any required coating repairs. Preliminary prioritization of actions to address deficient coating conditions is included as part of the assessment report. Additionally, as part of the condition assessments, information on unqualified or degraded coatings is gathered, and the magnitude of the affected areas estimated.

The acceptance criteria for coatings evaluated during the assessment are based on the following industry guidance:

- ASTM D610, "*Evaluating Degree of Rusting of Painted Steel Surfaces.*"
- ASTM D714, "*Evaluating Degree of Blistering of Paints.*"
- ASTM D1186, "*Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coating Applied to a Ferrous Base.*"
- ASTM D1400, "*Nondestructive Measurement of Dry Film Thickness of Nonconductive Coating Applied to a Non-Ferrous Metal Base.*"
- ASTM D3359, "*Method for Measuring Adhesion by Tape,*" X-scribe pull-off tape test is used if destructive adhesion tests are performed. A rating of 3A is generally considered acceptable.

Personnel responsible for performing containment coatings inspections are qualified in accordance with approved station procedures. Inspection personnel are knowledgeable with the coating related installation specifications, procedures, and engineering standards, in addition to relevant industry standards, good practices, failure modes, and industry operating experience common to protective coatings. Additionally, the Protective Coating program provides administrative and technical requirements for qualification and re-qualification of protective coating applicators and surface preparation personnel for safety-related applications.

The requirements associated with GSI-191, "*Assessment of Debris Accumulation on PWR Sump Performance,*" and the corresponding commitments are identified in a station Topical Design Basis Document that includes the responses to NRC Generic Letter 2004-02, *"Potential Impact* of *Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors,"* and NRC Bulletin 2003-01, *Potential Impact of Debris Blockage on Emergency Sump Recirculation at PWRs.* As part of the Protective Coating Program, the containment coating condition assessment report is sent to the GSI-191 program owner to ensure commitments associated with the GSI-191 design and licensing bases are maintained.

Based on the information provided above, the Protective Coating program implemented during the current licensing period ensures that coatings inside Containment will be properly maintained during the period of extended operation and operability of post-

accident safety systems that rely on water recycled through the containment sump/drain system will not be affected by protective coatings in the containment.

RAI 4.7.4-1 – TLAA Reactor Vessel Underclad Cracking

Background/Issue:

LRA Section 4.7.4, "Reactor Vessel Underclad Cracking," states that the applicant compared the transients utilized in the WCAP-15338-A report, "A Review of Cracking Associated with Weld Deposited Cladding in Operating PWR Plants," with the Kewaunee operational transients and determined that the WCAP-15338-A transients bound the Kewaunee transients.

Request:

Please elaborate on this comparison using a couple of examples (transients) to substantiate the conclusion.

DEK Response

As described in LRA Section 4.7.4, the list of operational transients that were used as input to the evaluation of reactor vessel underclad cracking documented in WCAP-15388-1A, "*A Review of Cracking Associated with Weld Deposited Cladding in Operating PWR Plants*," is provided in Westinghouse Owner's Group (WOG) letter WOG-01-096, "*Transmittal of LR Phase 2 Program Generic Issues 1-7, Approved Responses (MUHP-6130)*," dated April 16, 2001. The assumed number of occurrences of the transients provided in the WOG letter were compared to the NSSS operational transients included in USAR Table 4.1-8, Reactor Coolant System Operating Transients, to determine whether the WCAP-15388-1A inputs were bounding for Kewaunee. As indicated in the examples below, the WCAP-15338-1A transients were determined to bound the Kewaunee transients.

- The number of Heatup and Cooldown transients used as input to the evaluation of reactor vessel underclad cracking in WCAP-15388-1A (200 each x 1.5 (for 60 years) = 300 occurrences each) was compared to the number of Heatup and Cooldown transients listed in USAR Table 4.1-8 (200 each) and determined to be bounding.
- The number of Loss of Power (blackout with natural circulation in the RCS) transient occurrences used as input to WCAP-15388-1A was 60 occurrences (40 x 1.5 (for 60 years) = 60 occurrences). This number bounds the 40 operating transient value listed in USAR Table 4.1-8 for Loss of Power (blackout with natural circulation in the RCS).

Therefore, the WCAP-15338-1A conclusions related to underclad cracking are applicable to the Kewaunee reactor vessel. Additionally, the transients listed in USAR Table 4.1-8 have been shown to be bounding for a 60-year plant lifetime as described in LRA Section 4.3.1.1, Component Design Transient Cycles.

Scoping Ventilation

Request for Additional Information (RAI) 2.3-2 (Sealants)

Background:

Section 54.21(a)(1) of 10 CFR requires applicants to identify and list all components subject to an AMR. The staff confirms inclusion of all components subject to AMR by reviewing the component types within the license renewal boundary.

Issue/Request:

For the following systems (Containment Vessel Internal Spray System, Control Room Air Conditioning System, Auxiliary Building Air Conditioning System, Auxiliary Building Special Ventilation and Steam Exclusion System, Auxiliary Building Ventilation System, Reactor Building Ventilation System, Turbine Building and Screenhouse Ventilation System, Shield Building Ventilation System, and Technical Support Center Ventilation System); clarify if components types including: duct sealants, wall sealants, pressure boundary sealants, and auxiliary building freight elevator seals interfacing with control room pressure boundary, are within the scope of license renewal in accordance with 10CFR 54.4(a), and subject to aging management review in accordance with 10 CFR 54.21(a)(1). If these component types are in the scope of license renewal, update the LRA by providing the applicable information in the appropriate LRA tables. If these component types are excluded from the scope of license renewal and not subject to an AMR, provide justification for the exclusion.

DEK Response

The Containment Vessel Internal Spray System, the ventilation systems mentioned above and other mechanical systems contain packing, gaskets, component seals, and O-rings that are typically used to ensure leak-proof seals when components are mechanically joined together. As indicated in LRA Section 2.1.5.7, Identification of Short-Lived Components and Consumables, these items are commonly found in components such as valves, pumps, heat exchangers, ventilation units, ducts, and piping segments. Based on ANSI B31.1 and the ASME B&PV Code Section III, these consumable items, including duct sealants, are not pressure-retaining parts. Therefore, they do not perform a license renewal intended function in accordance with 10 CFR 54.4(a) and are not within the scope of license renewal.

Structural sealants have been used where piping and ducting penetrate walls, floors and ceilings. Structural wall sealants help establish a pressure boundary for areas such as the Control Room Environmental Zone and the Auxiliary Building freight elevator seals interfacing with the control room. These sealants are within the scope of license renewal and included in the commodity group "Fire barrier Penetration seals

assemblies" in LRA Table 2.4.2-13 and the associated aging management review results are provided in LRA Table 3.5.2-14.

In addition, expansion joints and seismic gap materials are used as sealants and included in the commodity groups "Expansion Joint/Seismic gap material (fire rated walls)," and "Expansion Joint/Seismic gap sealant material (between adjacent buildings/structures)," in LRA Table 2.4.2-13. The associated aging management review results for these commodity groups are provided in LRA Table 3.5.2-14.

RAI 2.3-3 (Pumps)

Background:

Section 54.21(a)(1) of 10 CFR requires applicants to identify and list all components subject to an aging management review (AMR). The staff confirms inclusion of all components subject to AMR by reviewing the component types within the license renewal boundary.

Issue/Request:

For the following systems (Containment Vessel Internal Spray System, and Control Room Air Conditioning System); the term pump is used to describe the component types in their respective systems. Please clarify what specific component is required to meet the intended function and subject to aging management review. For example, a valve body meets the intended function of pressure boundary for the component valve, as described in Chapter 2 of the LRA.

DEK Response

Pump casings meet the intended function of pressure boundary for the component type "Pump" and are subject to aging management review.

RAI 2.3-4 (Containment Isolation)

Background:

Section 54.21(a)(1) of 10 CFR requires applicants to identify and list all components subject to an AMR. The staff confirms inclusion of all components subject to AMR by reviewing the component types within the license renewal boundary.

Issue/Request:

The staff could not find in the LRA a separate discussion about containment isolation, the staff is requesting that the applicant confirm that all components and any supporting systems that are meant for containment isolation are included in the scope of the LRA? Please confirm, with a brief description of how Dominion arrived to that conclusion.

DEK Response

Containment penetrations (including the personnel and emergency airlocks and equipment hatch, piping penetrations, electrical penetrations, heating and ventilation penetrations, and the fuel transfer tube penetration) are within the scope of license renewal and have been evaluated as part of the Reactor Containment Vessel in LRA Section 2.4.1.

Containment isolation valves and dampers, and the associated connecting piping or ducting are within the scope of license renewal and evaluated with their respective host systems. The system description for systems associated with containment isolation identifies that the system provides Reactor Containment Vessel pressure boundary integrity/isolation. The Containment isolation valves and dampers, and associated connecting piping or ducting that perform this function are highlighted on the system drawings and included in the screening results tables in LRA Section 2.3. The aging management review results for these components are provided in the aging management review result tables in LRA Section 3.0.

As an example, the system description for the Service Water (SW) System in LRA Section 2.3.3.6 identifies that the system "provides Reactor Containment Vessel pressure boundary integrity/isolation." Service Water System valves SW-6010 and SW6011 and the associated piping shown on license renewal drawing LRM-202-2 (locations B-3 & B-4) perform the Containment isolation function for Penetration #24, have been highlighted as being within the scope of license renewal for the SW System, and are included in the component types "Pipe" and "Valves" in LRA Table 2.3.3-6. The associated aging management review results are provided in LRA Table 3.3.2-6.

RAI 2.3-5 (Screens)

Background:

Section 54.21(a)(1) of 10 CFR requires applicants to identify and list all components subject to an AMR. The staff confirms inclusion of all components subject to AMR by reviewing the component types within the license renewal boundary.

Issue:

For the following systems (Containment Vessel Internal Spray System, Control Room Air Conditioning System, Auxiliary Building Air Conditioning System, Auxiliary Building Special Ventilation and Steam Exclusion System, Auxiliary Building Ventilation System, Reactor Building Ventilation System, Turbine Building and Screenhouse Ventilation System, Shield Building Ventilation System, and Technical Support Center Ventilation System); Screens to protect against any debris for air intake or air discharge, and emergency core cooling system pump suction strainers are not found listed in any of the tables for the above mentioned systems.

Request:

Clarify if components types screens and strainers, are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to aging management review in accordance with 10 CFR 54.21(a)(1). If these components are in the scope of license renewal, update the LRA by providing the applicable information in the appropriate LRA tables. If these components are excluded from the scope of license renewal and not subject to an AMR, provide justification for the exclusion.

DEK Response

The screens and strainers that perform an intended function for the systems identified above are within the scope of license renewal in accordance with 10 CFR 54.4(a) and subject to aging management review as described below.

- The screens for the Containment sump are within the scope of license renewal and have been evaluated with the Safety Injection System. The screens are highlighted on license renewal drawing LRXK-100-28 (location H-4.5) as being within the scope of license renewal and are included in the component type "Reactor Containment Vessel Sump Strainers" in LRA Table 2.3.2-2. The associated aging management review results are provided in LRA Table 3.2.2-2.
- The bird screens associated with the Administrative Building, Auxiliary Building, Technical Support Center, Shield Building (which encloses the Reactor Containment Vessel) and Screenhouse are within the scope of license renewal

and evaluated with the host structures and are included in the following LRA screening summary tables:

- Table 2.4.2-2, Administrative Building - "Air intake structures (walls, slabs, columns, spread footings, and birdscreen)" and "Air outlet structure (walls, slabs, louver housing, and grating)."
- Table 2.4.2-3, Auxiliary Building - "Missile hood and bird screen," "Exhaust Vent Stack, missile cover, and screen," and "Fixed louvers with bird screens." The structural member "Exhaust Vent Stack, missile cover and screen" is associated with the Auxiliary Building vent stack, which handles exhaust from the Auxiliary Building Air Conditioning System, the Auxiliary Building Ventilation System, the Auxiliary Building Special Ventilation and Steam Exclusion System, and the Control Room Air Conditioning System.
- Table 2.4.2-5, Technical Support Center - "Louvers and bird screens."
- Table 2.4.2-1, Shield Building - "Dome vent penetration sleeve and weather cap." As indicated in LRA Section 2.4.2.1, Shield Building, the weather cap is attached to the embedded sleeve with stainless steel wire mesh and straps. The wire mesh and straps are included as part of the weather cap.
- Table 2.4.2-11, Screenhouse - "Penthouse air intake covers." The Penthouse air intake covers include birdscreens, which are evaluated as part of the air intake covers.

- Protective screens which are an integral part of in-scope fan/blower housings have also been included in scope and are evaluated as part of the housings.

The exhaust fans for the Turbine Building and the associated protective screens do not perform a safety-related function, are not required to support the operation of a safety-related component, and are not credited for a regulated event under 10 CFR 54.4(a)(3). Therefore, they are not included within the scope of license renewal. Additionally, when the exhaust fans are not operating, the associated discharge dampers are closed.

RAI 2.3.2.1-1 (Containment Vessel Internal Spray System)

Background:

Section 54.21(a)(1) of 10 CFR requires applicants to identify and list all components subject to an AMR. The staff confirms inclusion of all components subject to AMR by reviewing the component types within the license renewal boundary.

Issue:

In LRA Drawing LRXK-100-131, it is not clear what components of the "Containment Vessel Internal Spray System" are in the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an aging management review in accordance with 10 CFR 54.21(a)(1).

Request:

Please clarify what components, if any, are within scope and indicate the quadrant information.

DEK Response

The two lines located upstream of valve RC-509 shown on license renewal drawing LRXK-100-131 (location E-4) are within the scope of license renewal per 10 CFR 54.4(a)(2) and are included in the component type "Pipe" in LRA Table 2.3.2-1, Containment Vessel Internal Spray. As indicated on license renewal drawing LRXK-100-131, these two lines are also shown on license renewal drawings LRM-217 (location A-7) and LRXK-100-29 (location A-12).

RAI 2.3.3.10-1 (Control Room Air Conditioning System)

Background:

The Kewaunee Power Station Control Room Air Conditioning System is described in LRA Section 2.3.3.10, Table 3.3.2-10, and on LRA Drawings LRM-588, LRM-606, LRM-603, and LRM-605-1.

Issue:

LRA Tables 2.3.3.10 and 3.3.2-10 do not contain some components that are highlighted on the system drawings. Specifically, LRA Tables 2.3.3.10 and 3.3.2-10 do not list the component types for control room post accident recirculation filter assembly housings and filter element housings.

Request:

Clarify whether these component types are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an aging management review in accordance with 10 CFR 54.21(a)(1). If these component types are in the scope of license renewal, update the LRA by providing the applicable information in the appropriate LRA tables. If these component types are excluded from the scope of license renewal and not subject to an AMR, provide justification for the exclusion.

DEK Response

The control room post accident (CRPA) recirculation filter assembly housings and filter element housings are within the scope of license renewal and are included in the component type "CRPA Recirculation Filter Assemblies" in LRA Table 2.3.3-10. The associated aging management review results are provided in LRA Table 3.3.2-10.

RAI 2.3.3.11-1 (Auxiliary Building Air Conditioning System)

Background:

The Kewaunee Power Station Auxiliary Building Air Conditioning System is described in LRA Section 2.3.3.11, Table 3.3.2-11, and on LRA Drawings LRM-601, LRM-604, and LRM-606.

Issue:

LRA Tables 2.3.3.11 and 3.3.2-11 do not contain some components that are highlighted on the system drawings. Specifically, LRA Tables 2.3.3.11 and 3.3.2-11 do not list the component types for condenser tube sheets, condenser tubes, filter element housings for auxiliary building supply vent units, spent fuel pool exhaust filter assembly housings, heating coils, cooling coils and tubing.

Request:

Clarify whether these component types are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an aging management review in accordance with 10 CFR 54.21(a)(1). If these component types are in the scope of license renewal, update the LRA by providing the applicable information in the appropriate LRA tables. If these component types are excluded from the scope of license renewal and not subject to an AMR, provide justification for the exclusion.

DEK Response

As indicated by the purple anchor symbol on license renewal drawing LRM-606 (location H-2), the Auxiliary Building Air Conditioning System condenser is within the scope of license renewal for 10 CFR 54.4(a)(2) because it is credited as a seismic anchor. The condenser tube sheets and tubes are not within the scope of license renewal because they are not required for the condenser to perform its intended function as a seismic anchor. However, the condenser shell and channel heads are required for the condenser to perform its intended function and are included in the component type "Condensers" in LRA Table 2.3.3-11. The associated aging management review results are provided in LRA Table 3.3.2-11.

The Spent Fuel Pool Exhaust Filter Assembly housings and the Auxiliary Building Air Supply Ventilation Units housings shown on license renewal drawing LRM-601, at locations A-8, B-10 and C-10 are included within the scope of license renewal and included in the component type "Filter Assemblies" in LRA Table 2.3.3-13. The associated aging management review results are provided in LRA Table 3.3.2-13. The heating coils associated with the Auxiliary Building Air Supply Ventilation Units are also within scope for the Auxiliary Building Ventilation System and are included within the

component type "Heating Coils" in LRA Table 2.3.3-13. The associated aging management review results are provided in LRA Table 3.3.2-13. There are no heating coils or cooling coils associated with the Spent Fuel Pool Exhaust Filter Assemblies.

The tubing associated with the Spent Fuel Pool Exhaust Filter Assemblies and the Auxiliary Building Air Supply Ventilation Units is within the scope of license renewal and included in the component type "Tubing" in LRA Table 2.3.3-13. The associated aging management review results are provided in LRA Table 3.3.2-13.

Additionally, for all the ventilation systems, the instrument air tubing for the air operated dampers is included within the scope of license renewal and evaluated with the Station and Instrument Air System discussed in LRA Section 2.3.3.8.

RAI 2.3.3.12-1 (Auxiliary Building Special Ventilation and Steam Exclusion System)

Background:

The Kewaunee Power Station Auxiliary Building Special Ventilation and Steam Exclusion System is described in LRA Section 2.3.3.12, LRA Table 3.3.2-12, and on LRA Drawings LRM-601, LRM-604, and LRM-606 and LRA Table 2.3.3-12.

Issue:

LRA Tables 2.3.3.12 and 3.3.2-12 do not contain some components that are highlighted on the system drawings. Specifically, LRA Tables 2.3.3.12 and 3.3.2-12 do not list the component types for filter element housings and zone special ventilation (SV) exhaust filter assembly housings.

Request:

Clarify whether these component types are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an aging management review in accordance with 10 CFR 54.21(a)(1). If these component types are in the scope of license renewal, update the LRA by providing the applicable information in the appropriate LRA tables. If these component types are excluded from the scope of license renewal and not subject to an AMR, provide justification for the exclusion.

DEK Response

The filter element housings are within the scope of license renewal and are included in the component type "Zone SV Exhaust Filter Assemblies" in LRA Table 2.3.3-12. The associated aging management review results are provided in LRA Table 3.3.2-12.

RAI 2.3.3.13-1 (Auxiliary Building Ventilation System)

Background:

The Kewaunee Power Station Auxiliary Building Ventilation System is described in LRA Section 2.3.3.13, LRA Table 3.3.2-13, and on LRA Drawings LRM-601, LRM-588, LRM-601, LRM-603, LRM-604, LRM-605-1, and LRM-606.

Issue:

LRA Tables 2.3.3.13 and 3.3.2-13 do not contain some components that are highlighted on the system drawings. Specifically, LRA Tables 2.3.3.13 and 3.3.2-13 do not list the component types for filter element housings.

Request:

Clarify whether these component types are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an aging management review in accordance with 10 CFR 54.21(a)(1). If these component types are in the scope of license renewal, update the LRA by providing the applicable information in the appropriate LRA tables. If these component types are excluded from the scope of license renewal and not subject to an AMR, provide justification for the exclusion.

DEK Response

The filter element housings for the Auxiliary Building Supply Air Ventilation Unit, the Spent Fuel Pool Exhaust Filter Assembly, and the Auxiliary Building Exhaust Filter Assembly are within the scope of license renewal and are included in the component type "Filter Assemblies" in LRA Table 2.3.3-13. The associated aging management review results are provided in LRA Table 3.3.2-13.

RAI 2.3.3.14-1 (Reactor Building Ventilation System)

Background:

LRA Section 2.3.3.14 - Reactor Building Ventilation System discusses the components that were considered in the scoping process of license renewal.

Issues/Requests:

- *Note 1 in LRA Drawing LRM-403 states that the Containment Air Hydrogen analyzers are active components. Provide a brief description of the function of the analyzers and the reasoning for not including them in AMR. Include in the description, the calibration gas connecting lines and the associated valves, with reasons for not adding them to the scope of LRA.*
- *Please explain the reasons for not including ductwork on the suction side of Containment Fan Coil Units 1A and 1D in the scope of LRA (Ref: LRA Drawing LRM-602).*
- *Please indicate the location of applicable components for "18/RBV Reactor Building Ventilation – Containment Purge & Ventilation" in LRA Drawing LRM-606, as noted in the legend of the same drawing.*
- *Clarify what part of a filter assembly meets the pressure boundary function.*

DEK Response

- The Containment Air Hydrogen analyzers that monitor the containment hydrogen concentration are Comsip Model K-111 hydrogen analyzers, which fulfill the requirements of Item II.F.1.6 of NUREG-0737. Note 1 on license renewal drawing LRM-403 is incorrect and should have indicated that the internal components of the Containment Air Hydrogen Analyzer panels are considered active and do not require aging management review. Additionally, Note 1 should have indicated that the Containment Air Hydrogen Analyzer panels are within the scope of license renewal and evaluated with Miscellaneous Structural Commodities. The Containment Air Hydrogen Analyzer panels are included in the commodity group "Panels and cabinets" in LRA Table 2.4.2-13 and the associated aging management review results are provided in LRA Table 3.5.2-14.

  The lines that supply calibration gases for the Hydrogen Analyzers were excluded from the scope of license renewal in accordance with the scoping and screening methodology that is consistent with NEI 95-10, Section 5.2.1.2, "Equipment Used to Establish Initial Conditions." NEI 95-10, Section 5.2.1.2, indicates that non-safety-related equipment required to maintain safety-related equipment within limits consistent with event assumptions is excluded from scope providing the non-safety-related equipment does not perform a function that meets the criteria of 10 CFR

54.4. In this instance, the calibration gas lines do not meet the criteria for 10 CFR 54.4(a)(1) since they are not safety related, 10 CFR 54.4(a)(2) relevant to spatial and seismic anchor considerations, or 10 CFR 54.4(a)(3) for a regulated event. Therefore, the lines that supply calibration gases for the Hydrogen Analyzers are not within the scope of license renewal.

- As indicated by the NOTES on license renewal drawing LRM-602 (location H-9), the dashed lines on the suction side of Containment Fan Coil Units 1A and 1D represent non-ducted air flow.
- The Containment Purge Exhaust Filter Assembly housing shown on license renewal drawing LRM-606 (location D-8) is within the scope of license renewal for 10 CFR 54.4(a)(2) and included in the component type "Filter Assemblies" in LRA Table 2.3.3-14, Reactor Building Ventilation. The Containment Purge Exhaust Filter Assembly is also shown on license renewal drawing LRM-602 (location D-3).
- The housings of the Reactor Building Ventilation System's filter assemblies meet the intended function of pressure boundary for the component type "Filter Assemblies" in LRA Table 2.3.3-14.

RAI 2.3.3.15-1 (Turbine Building and Screenhouse Ventilation System)

Background:

LRA Section 2.3.3.15- Turbine Building and Screenhouse Ventilation System discusses the components that were considered in the scoping process of license renewal.

Issues/Requests:

- *The description in Section 2.3.3-15 states that LRA Drawings LRM-215, LRM-602, LRM- 603, and LRM-604 apply to this system and the drawings also indicate a legend for "16/TAV Turbine Building and Screenhouse Ventilation." However, the staff could not find any components in these drawings that are applicable to this system. Please clarify?*
- *Temperature elements are listed in Table 2.3.3-15, where as, they are not listed in any other ventilation systems. Please clarify the reasons for including temperature elements for this system and for not including them elsewhere?*

DEK Response

- Fan Coil Units 1C and 1D on license renewal drawing LRM-215 (locations F-2 and H-1) are within the scope of license renewal for 10 CFR 54.4(a)(2) and are included in the component type "Fan Coil Units" in LRA Table 2.3.3-15.

  Damper TAV12 and the ducting to the left of the damper on license renewal drawing LRM-602 (location E-5) are within the scope of license renewal for 10 CFR 54.4(a)(1) and are included in the component types "Damper Housings" and "Ductwork" in LRA Table 2.3.3-15.

  Damper ADA-FD-1 on license renewal drawing LRM-603 (location C-1.5) is within the scope of license renewal for 10 CFR 54.4(a)(3) and is included in the component type "Damper Housings" in LRA Table 2.3.3-15. LR Note 1 on the drawing explains why the damper has been assigned to the Turbine Building and Screenhouse Ventilation System.

  License renewal drawing LRM-604 is incorrectly listed as a license renewal drawing for the Turbine Building and Screenhouse Ventilation System in LRA Section 2.3.3.15. The Turbine Building and Screenhouse Ventilation System is not included in the license renewal drawing legend on LRM-604.

- The component type "Temperature Elements" is included in the LRA screening results summary tables for the ventilation systems listed below:

  Table 2.3.3-10, Control Room Air Conditioning
  Table 2.3.3-11, Auxiliary Building Air Conditioning

Table 2.3.3-13, Auxiliary Building Ventilation
Table 2.3.3-15, Turbine Building and Screenhouse Ventilation

Temperature elements perform a pressure boundary function and are used to isolate dampers upon high temperature for protection of steam exclusion zones as described in USAR Section 10A.3.3.5. The temperature elements are within the scope of license renewal and are highlighted on license renewal drawings LRM-601 (locations F-3, B-3, B-5, D-6 & F-10), LRM-603 (locations F-2 & E-4), and LRM 604 (B-4 & A-9).

RAI 2.3.3.16-1 (Shield Building Ventilation System)

Background:

LRA Section 2.3.3.16- Shield Building Ventilation System discusses the components that were considered in the scoping process of license renewal.

Issues/Requests:

- *The components in Tables 2.3.3.16 and 3.3.2-16 should be identified in a manner where they reflect more specifically the components that is required to meet the intended functions and will go through an AMR. For example, shield building vent filter assembly is a term that is too general to reflect the intended function of pressure boundary. Clarify what part or parts of a filter assembly meet the pressure boundary function.*
- *Are the de-mister and electric heater included in the scope of LRA, if so, where are they reflected, and if not, why are they not included?*

DEK Response

The housing of the Shield Building Ventilation System filter assemblies meet the intended function of pressure boundary for the component type "Shield Building Vent Filter Assemblies" in LRA Table 2.3.3-16.

The demisters are within the scope of license renewal and are included in the component type "Filter Elements" in LRA Table 2.3.3-16.

The electric heaters are located internal to the filter assemblies and do not perform a license renewal intended function. Therefore, they are not within the scope of license renewal. Additionally, the heaters are no longer required to be operable because Technical Specification Amendment No. 201, issued by NRC letter dated December 30, 2008, removed the operability and surveillance requirements for the Shield Building Ventilation and Auxiliary Building Special Ventilation filter train heaters.

RAI 2.3.3.17-1 (Technical Support Center Ventilation System)

Background:

The Kewaunee Power Station Technical Support Center Ventilation System is described in LRA Section 2.3.3.17, LRA Table 3.3.2-17, and on LRA Drawing LRM-501.

Issue:

LRA Tables 2.3.3.17 and 3.3.2-17 do not contain some components that are highlighted on the system drawings. Specifically, LRA Tables 2.3.3.17 and 3.3.2-17 do not list the component types for battery room air compressor unit (ACU) cooling coils/fins, ACU compressor casings, and filter housings for filter elements.

Request:

Clarify whether these component types are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an aging management review in accordance with 10 CFR 54.21(a)(1). If these component types are in the scope of license renewal, update the LRA by providing the applicable information in the appropriate LRA tables. If these component types are excluded from the scope of license renewal and not subject to an AMR, provide justification for the exclusion.

DEK Response

The battery room air compressor unit (ACU) cooling coils/fins, ACU compressor casings, and filter housings for the filter elements are within the scope of license renewal and are included in the component type "Air Conditioning Units" and "Air Handling Units" in LRA Table 2.3.3-17. The aging management review results for these components are provided in LRA Table 3.3.2-17 as indicated below:

- The battery room ACU cooling coils/fins are included in the component type "Air Conditioning Units (Battery Room Cooling Coils/Fins)."
- The ACU compressor casing is included in the component type "Air Conditioning Units (Compressor)."
- The filter housings for the battery room ACU filter elements are included in the component type "Air Handling Units (Battery Room Housing)."

References

1. Letter from Samuel Hernandez (NRC) to David A. Heacock (DEK), "Request for Additional Information for the Review of the Kewaunee Power Station License Renewal Application – Aging Management Review Results (TAC No. MD9408)," dated August 28, 2009. [ADAMS Accession No. ML092120546]

2. Letter from D. A. Christian (DEK) to NRC, "Kewaunee Power Station Application for Renewed Operating License," dated August 12, 2008. [ADAMS Accession No. ML082341020]

3. Letter from Leslie N. Hartz (DEK) to NRC, "Dominion Energy Kewaunee, Inc., Kewaunee Power Station Supplemental Information for the Review of the Kewaunee Power Station License Renewal Application – Work Control Process Aging Management Program," dated September 25, 2009.

4. Letter from Stephen E. Scace (DEK) to NRC, "Dominion Energy Kewaunee, Inc., Kewaunee Power Station Response to Request for Additional Information for the Review of the Kewaunee Power Station License Renewal Application, Aging Management Programs," dated August 17, 2009 [ADAMS Accession No. ML092320093].