Dominion Energy Kewaunee, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060

Dominion

November 13, 2009

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

Serial No.: 09-680
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 – AGING MANAGEMENT REVIEW RESULTS

By letter dated October 13, 2009 (Reference 1), the NRC provided a request for additional information regarding the aging management review results included in the license renewal application (LRA) for Kewaunee Power Station (KPS) (Reference 2). The NRC staff indicated that responses to each request for additional information (RAIs) are needed to complete the review of the KPS LRA. Attachment 1 to this letter provides the Dominion Energy Kewaunee Inc. (DEK) responses to each of the RAIs submitted by the NRC staff in Reference 1.

DEK letters dated August 6, 2009 (Reference 3) and August 17, 2009 (Reference 4) provided responses to NRC RAIs 2.3.3.18-1 and B2.1.14-3, respectively. DEK subsequently determined that clarifications to these RAI responses were needed. Additionally, the revised response to RAI B2.1.14-3 includes the addition of Exception 5 which was previously identified for removal in the original response. Attachment 2 to this letter provides the necessary clarifications and replaces the original responses to RAIs 2.3.3.18-1 and B2.1.14-3 in their entirety.

The on-site portion of the Region III License Renewal Inspection was conducted from August 17, 2009 through August 21, 2009 and August 31, 2009 through September 4, 2009. During this inspection, DEK indicated that two additional exceptions would be created for the Compressed Air Monitoring program. These exceptions are provided in Attachment 3.

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

Very truly yours,

William R. Matthews
Senior Vice President – Nuclear Operations

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and State aforesaid, today by William R. Matthews, who is Senior Vice President – Nuclear Operations of Dominion Energy Kewaunee, Inc. He has affirmed before me that he is duly authorized to execute and file the foregoing document on behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 13TH day of November, 2009.

My Commission Expires: May 31, 2010 Vicki L. Hull
Notary Public

VICKI L. HULL
Notary Public
Commonwealth of Virginia
140542
My Commission Expires May 31, 2010

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 October 13, 2009. [ADAMS Accession No. ML 092390063]
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 D. A. Christian (DEK) to NRC, "Response to Request for Additional Information for the Review of the Kewaunee Power Station License Renewal Application – Structures Scoping / Fire Protection," dated August 6, 2009. [ADAMS Accession No. ML092190757]
4. Letter from D. A. Christian (DEK) to NRC, "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]

Attachments:

1. Response to Request for Additional Information Regarding Aging Management Review Results
2. Revised Responses for RAIs 2.3.3.18-1 and B2.1.14-3
3. Additional Exceptions for Compressed Air Monitoring Program

Commitments made in this letter:

1. The Alloy 600 Inspections program in LRA Appendix A, USAR Supplement, Section A2.1.1, will be revised to change the Program Description consistent with the response to RAI B2.1.1. The revised Program Description is proposed to support approval of the renewed operating license, and may change during the NRC review period.
2. License Renewal Commitment 30, identified in LRA Table A6.0-1, will be revised consistent with the revised response to RAI B2.1.14-3 described in Attachment 3 to this letter. The revised commitment is proposed to support approval of the renewed operating license, and may change during the NRC review period.
3. Additional information will be added to LRA Appendix A, USAR Supplement, Sections A4.2.1 and A3.6, consistent with the response to RAI 4.2.1-1 regarding neutron fluence. The additional information is proposed to support approval of the renewed operating license, and may change during the NRC review period.

cc: U.S. Nuclear Regulatory Commission
Regional Administrator, Region III
2443 Warrenville Road
Suite 210
Lisle, IL 60532-4532

Mr. P. S. Tam, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint, Mail Stop O8-H4A
11555 Rockville Pike
Rockville, MD 20852-2738

Ms. V. Perin
Environmental Project Manager
U.S. Nuclear Regulatory Commission
Mail Stop O-11F1
Washington, DC 20555-0001

Mr. Q. S. Hernandez
License Renewal Project Manager
U.S. Nuclear Regulatory Commission
Mail Stop O-11F1
Washington, DC 20555-0001

NRC Senior Resident Inspector
Kewaunee Power Station
N490 Highway 42
Kewaunee, WI 54216

Public Service Commission of Wisconsin
Electric Division
P.O. Box 7854
Madison, WI 53707

David Hardtke
Chairman - Town of Carlton
E2334 Lakeshore Road
Kewaunee, WI 54216

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) 3.1.2.2.6-1 – Reactor Vessel Internals

Background:

License Renewal Application (LRA) Table 3.1.2-2 references Generic Aging Lessons Learned (GALL) Aging Management Review (AMR) Item IV.B2-9 and lists loss of fracture toughness due to neutron irradiation embrittlement and void swelling (an aging mechanism discussed in LRA Section 3.1.2.2.6) as one of the aging mechanisms affecting the following RV internals: head & vessel alignment pins, rod cluster control assembly (RCCA) guide tube bolts, RCCA guide tube support pins, upper core plate alignment pins, upper fuel alignment pins, upper support column bolts, upper support plate assembly, upper core plate, and hold-down spring. However, GALL Table IV.B2 (Item IV.B2-9 and other items relevant to these RV internals) does not consider the above-mentioned aging mechanism applicable to these RV internals.

Request:

Please indicate if the listing of aging mechanisms (loss of fracture toughness due to neutron irradiation embrittlement and void swelling) for the above mentioned RV internals was prompted by plant-specific experience or if this was due to a conservative approach.

DEK Response

The identification of loss of fracture toughness due to neutron irradiation embrittlement and void swelling for the head & vessel alignment pins, rod cluster control assembly (RCCA) guide tube bolts, RCCA guide tube support pins, upper core plate alignment pins, upper fuel alignment pins, upper support column bolts, upper support plate assembly, upper core plate, and hold-down spring was due to a conservative approach. There is no plant-specific operating experience that indicates these aging mechanisms are actually occurring for these components.

RAI 3.5.2.3-1

Background:

In LRA Table 3.0-1, Raw Water has been defined as water that has, "not been demineralized or chemically treated to any significant extent, and includes intake water from Lake Michigan." Also the raw water includes treated water that leaks from plant systems into floor drains and sumps. LRA Tables 3.5.2-1 through 3.5.2-14 include several line items with the environment listed as raw water. These items have been assigned Standard Note H, which states, "aging effect not in NUREG-1801 for this component, material and environment combination."

Issue:

Raw water chemistry may be such that it can cause degradation for concrete, steel, and other material.

Request:

1. *Explain the past and present raw water monitoring activities and discuss the results in terms of the aggressiveness of water.*
2. *If raw water is not monitored, what inspection/monitoring criteria of the Structures Monitoring Program are or will be followed to ensure that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation.*

DEK Response

1. Periodic monitoring of the raw intake water from Lake Michigan, which is a fresh water lake, is not presently being performed and has not been performed in the past. However, the analysis of lake water samples taken in 1971, 2004, and 2006, indicated average readings of 8.18 for pH, 8.94 ppm for chlorides, and 22.63 ppm for sulfates. Also, a 2004 analysis of water samples taken from the two deep potable water wells located on site indicated average readings of 7.5 for pH, 34 ppm for chlorides, and 640 ppm for sulfates. Based on the above results, intake water from Lake Michigan and potable well water are considered non-aggressive to concrete or steel.

   No past or present periodic monitoring activities have been performed for drains and sumps to identify chemicals considered aggressive to concrete or steel. However, water collected in floor drains and sumps is monitored for gamma, tritium, and suspended solids. Additionally, if a high sump level is detected in the Reactor Containment Vessel, the sump water may be tested for boron, conductivity, and pH to help determine the leakage source.

The sources of water that leak from plant systems into floor drains and sumps is either from Lake Michigan, potable wells, or treated water systems. These are all considered non-aggressive to concrete and steel. Consequently, the sumps are not periodically monitored for aggressive constituents. Additionally, identified leaks do not continue for the extensive period of time required for degradation of concrete, steel, and other material to occur.

2. The ground water chemistry for inaccessible below grade concrete is periodically monitored in accordance with the Structures Monitoring Program (SMP). However, as stated above, raw water is considered non-aggressive and is therefore not periodically monitored. Furthermore, all structures or structural members within the scope of license renewal that are exposed to a raw water environment are accessible for visual inspection and the applicable aging effects are managed by the SMP, regardless of the composition of the raw water. Therefore, the effects of aging for in-scope structures or structural members exposed to raw water will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation.

RAI 3.5.2.3-2

Background:

LRA Table 3.5.2-1 states that Structures Monitoring Program will be used for the aging management of the sumps inside the Reactor Containment Vessel. Also the applicant assigned industry Standard Note H which implies that the aging effect is not consistent with the GALL Report for this component, material, and environment combination.

Issue:

The environment is raw water which can be aggressive. The LRA does not have information about the raw water chemistry. According to the GALL Report, IWE is the applicable program for the Reactor Containment Vessel structures and components that form the containment pressure boundary. However; the applicant has credited Structures Monitoring Program for these items. Furthermore, the LRA Table items state corrosion as the aging effect of embedded steel and intended function to be SS (structural support).

Request:

1. *Explain the past and present raw water monitoring activities and discuss the results in terms of the aggressiveness of raw water.*
2. *In case raw water is aggressive, what inspection/monitoring criteria are or will be implemented in the Structures Monitoring Program to ensure that the effects of aging will be adequately managed so that the intended function(s) for concrete and embedded steel will be maintained consistent with the CLB for the period of extended operation.*
3. *Explain the justification for not including the containment sump in the IWE Program. Note that in the AMR line it is listed as PB (pressure boundary) and SS (structural support).*

DEK Response

1. The information requested by this RAI is provided in the response to RAI 3.5.2.3-1, Request 1, included in this attachment.

2. As discussed in the response to RAI 3.5.2.3-1, Request 1, raw water at Kewaunee is considered non-aggressive. All in-scope structures or structural members exposed to a raw water environment are accessible for visual inspection and the applicable aging effects are managed with the Structures Monitoring Program, regardless of the composition of the raw water. Therefore, the intended function(s) for concrete and embedded steel will be maintained consistent with the CLB for the period of extended operation.

3. Consistent with NUREG 1801, Section II, the IWE program is applicable to the Reactor Containment Vessel and its components such as penetrations, airlocks, and hatches, etc. The Structures Monitoring Program is used to monitor all the internal structures of the Reactor Containment Vessel including the sumps and common basemat. The pressure boundary function indicated in LRA Tables 2.4.1-1 and 3.5.2-1 for the Containment sump is considered a system function (water retention) and not a structural function. Specifically, the sump is not considered part of the Reactor Containment Vessel pressure boundary.

RAI 3.5.2.3-3

Background:

Standard Note H has been assigned to several line items in LRA Tables 3.5.2-2 to 3.5.2-14. Standard Note H indicates that the "aging effect not in NUREG-1801 for this component, material and environment combination." According to the LRA Tables, increase in porosity and permeability, loss of strength/leaching of calcium hydroxide of concrete are noted in the environment air-outdoor. In normal conditions, leaching can occur when water passes through the concrete.

Issue:

The phenomenon of leaching of concrete in air-outdoor is not clearly described in the LRA.

Request:

Please describe the structures where leaching of calcium hydroxide is occurring in the environment of air. Also explain the possible reason(s) for such leaching.

DEK Response

The 2007 Maintenance Rule Inspection results indicated minor leaching of concrete in an air-outdoor environment for the following structural members:

- The main auxiliary transformer north and south concrete bay walls
- The concrete masonry wall that forms the back bay wall of the reserve auxiliary transformer and Turbine Building exterior wall
- The Shield Building exterior concrete wall
- The Screenhouse forebay exterior concrete wall

In an air-outdoor environment, water from rain or melting snow that contains small concentrations of calcium ions can dissolve the calcium compounds found in concrete when it passes through cracks or inadequately prepared construction joints. Efflorescence, a surface phenomenon consisting of salt deposits that have been leached from concrete, can also occur in an air-outdoor environment. Although efflorescence is an aesthetic issue rather than a structural problem, it does indicate that leaching is occurring.

NUREG-1801 indicates that leaching of calcium hydroxide occurs only in a flowing water environment. Leaching does occur more readily when structures are subjected to flowing water, ponding, or hydraulic pressure, which can occur with water control structures such as the Intake, Screenhouse, and Discharge structures. Therefore, since DEK has conservatively included leaching of calcium hydroxide as an aging effect/mechanism in an air-outdoor environment, Standard Note H was applied to indicate that this aging effect is not in NUREG -1801 for this component, material and environment combination.

RAI B2.1.27-1

Background/Issue:

LRA Section B2.1.27, "Reactor Vessel Surveillance," states under Enhancement 1: "The Reactor Vessel Surveillance program will be enhanced to include the applicable limitations on operating conditions to which the surveillance capsules were exposed (e.g., neutron flux, spectrum, irradiation temperature, etc.)."

Request:

Please provide details regarding these applicable limitations. Further, demonstrate that with this Enhancement the Reactor Vessel Surveillance program meet the acceptance criteria 2, 3, and 6 that were listed in GALL Aging Management Program (AMP) XI.M31, "Reactor Vessel Surveillance."

DEK Response

Enhancement 1 to the Reactor Vessel Surveillance program, described in LRA Section B2.1.27, provides a program enhancement to ensure that future changes in plant operating parameters or neutron flux due to power uprates or other conditions are evaluated to ensure that the parameter values used to project the effects of embrittlement to the end of the period of extended operation remain bounding for actual plant conditions.

This Reactor Vessel Surveillance program enhancement will ensure that:

- Changes in plant parameters (e.g., operating temperature, neutron fluence) to which reactor vessel materials are exposed, are evaluated for the affect on the applicability of NRC Regulatory Guide 1.99, Revision 2, *Radiation Embrittlement of Reactor Vessel Materials*, Regulatory Position 1, as discussed in NUREG-1801, Section XI.M31, Item 2.
- Plant parameters (e.g., cold leg temperature, neutron fluence) remain within the bounds defined for the surveillance data used as input to the embrittlement evaluations, as discussed in NUREG-1801, Section XI.M31, Item 3.
- Reactor vessel exposure conditions (e.g., neutron flux, spectrum, irradiation temperature, etc.) are monitored to ensure that the actual exposure conditions remain consistent with those used to project the effects of embrittlement to the end of the period of extended operation, as discussed in NUREG-1801, Section XI.M31, Item 6.

RAI 4.2.2-1 – Reactor Vessel

Background/Issue:

The U.S. Nuclear Regulatory Commission's (NRC) reactor vessel integrity database (RVID) does not contain information for the extended beltline materials reported in the LRA.

Request:

Please discuss the procedures used to determine the chemistry data, initial reference temperature (RT_{NDT}), and margins for the extended beltline materials to demonstrate that there are consistent approaches for both beltline and extended beltline materials.

DEK Response

Chemistry data, initial reference temperature (RT_{NDT}), and margins for the extended beltline materials are provided in LRA Table 4.2-3, *RT_{PTS} Results for Kewaunee Power Station Beltline and Extended Beltline Region Materials at EOLR (52.1 EFPY).* These extended beltline material parameters were determined as described below.

Chemistry Data

In determining the copper (Cu) and nickel (Ni) weight percentages, the original Certification Material Test Reports (CMTRs) were reviewed to determine the measured values. In some cases, the CMTR may not have included a measured Cu or Ni weight percent. In those cases, the best-estimate value was determined based on the following guidance provided in Regulatory Guide 1.99, Revision 2, *Radiation Embrittlement of Reactor Vessel Materials*:

> *"If the best-estimate weight percent Cu and Ni values are not available, the upper limiting values given in the materials specifications to which the vessel was built may be used. If not available, conservative estimates (mean plus one standard deviation) based on generic data may be used if justification is provided. If there is no information available, 0.35 % copper and 1.0% nickel should be assumed."*

Between the CMTRs and the guidance from Regulatory Guide 1.99, Revision 2 provided above, best-estimate Cu and Ni weight percentages were determined for the extended beltline materials.

Initial Reference Temperature

The determination of fracture toughness of the ferritic materials used for reactor vessels is necessary to ensure that such components will behave in a non-brittle manner and that the probability of a rapidly propagating fracture will be minimized under operating, maintenance, and testing conditions and during anticipated operational occurrences. In most cases, the fracture toughness is characterized by its reference nil ductility temperature (RT_{NDT}).

The fracture toughness properties of the ferritic material in the reactor vessel pressure boundary were determined, as required by 10 CFR 50, Appendix G, in accordance with the requirements in subsection NB-2331 of Section III of the ASME Boiler and Pressure Vessel Code. The initial RT_{NDT} values were determined from drop-weight tests or Charpy test results in accordance with Branch Technical Position MTEB 5-2 ("Fracture Toughness Requirements") of the NRC Standard Review Plan (NUREG-0800), Section 5.3.2, Rev. 1 (1981), as summarized below:

- T_{NDT} shall be determined by means of drop-weight test.
- T_{NDT} is the RT_{NDT} if at T_{NDT} + 60°F, a Charpy test exhibits 50 ft-lbs of energy and 35 mils lateral expansion.
- If not, then the temperature when this occurs must be determined using the minimum data points from all the Charpy tests on that material. This temperature shall be known as $T_{50/35}$ and RT_{NDT} shall be $T_{50/35}$ – 60°F. This assumes the Charpy tests were in the weak (transverse/axial) orientation.
- If the Charpy tests are in the strong (longitudinal/tangential) orientation, then $T_{50/35}$ is equal to $T_{50/35(Long.)}$ + 20°F.
- RT_{NDT} is the higher of T_{NDT} versus ($T_{50/35}$ - 60°F).

For the E8018 weld material, where required materials test data were not available from the CMTR, generic values of RT_{NDT} were determined to be 10°F in accordance with NUREG-0800, Section 5.3.2, position 1.1(4).

<u>Margin</u>

Margin is added to account for uncertainties in the values of $RT_{NDT(U)}$, copper and nickel contents, fluence, and calculational procedures. Margin, M, was evaluated from the equation: $M = 2 * (\sigma_U^2 + \sigma_\Delta^2)^{1/2}$

σ_U is the standard deviation for $RT_{NDT(U)}$

σ_U = 0°F when $RT_{NDT(U)}$ is a measured value

σ_U = 17°F when $RT_{NDT(U)}$ is a generic value for most base metals and welds (or as justified by specific material statistical analyses)

σ_Δ is the standard deviation for RT_{NDT}

For plates and forgings:

σ_Δ = 17°F when surveillance capsule data are not used

σ_Δ = 8.5°F when surveillance capsule data are used

For welds:

σ_Δ = 28°F when surveillance capsule data are not used

σ_Δ = 14°F when surveillance capsule data are used

σ_{Δ} is not to exceed one half of ΔRT_{NDT}, where ΔRT_{NDT} is the mean value of the transition temperature shift (change in RT_{NDT}) due to irradiation.

In summary, the procedures that were applied to determine the properties for the extended beltline materials are consistent with those applied for determination of properties for the traditional beltline forgings.

RAI 3.3.2.2.14-1

Background:

LRA and Standard Review Plan (SRP) Sections 3.3.2.2.14 refer to LRA and SRP Tables 3.3.1- 35. These tables address the loss of material due to a cladding breach on stainless steel clad pump casings exposed to treated borated water. These tables recommend "further evaluation" on the part of the staff. The GALL Report recommends managing this aging process through the use of plant-specific aging management program. The applicant states that its charging pumps are neither centrifugal nor constructed from steel clad with stainless steel and that this item is, therefore, not applicable.

Issue:

In its review of LRA Table 3.3.1-35, the staff noted that it is quite common for plants to have interchangeable pumps for safety injection and normal charging. The staff also noted that it is quite common for some of these pumps to be centrifugal and some to be positive displacement. The staff further noted that LRA Section 3.2.2.2.6 implies that the safety injection pumps are centrifugal. Lastly the staff noted that if any of these pumps are stainless steel clad, this item should be considered.

Request:

Please confirm whether the safety injection pumps are stainless steel clad and whether any of these pumps are centrifugal. If these pumps are centrifugal and stainless steel clad, please confirm the issue of loss of material due to cladding breach is being managed or that it is not applicable to these pumps.

DEK Response

The Kewaunee safety injection pumps are stainless steel clad carbon steel centrifugal pumps manufactured by Sulzer-Bingham.

Based on NRC Information Notice 80-38, "Cracking in Charging Pump Casing Cladding," and other industry operating experience, loss of material due to a stainless steel cladding breach is associated with the manufacturing process of pumps supplied by the Pacific Pump Division of Dresser Industries. Based on a search of industry databases, there is no operating experience related to loss of material due to a cladding breach for centrifugal pumps manufactured by Sulzer-Bingham. Therefore, loss of material due to cladding breach was determined not to be applicable to the Kewaunee safety injection pumps.

The Kewaunee charging pumps and safety injection pumps are not interchangeable.

RAI 3.4.2.2.3-1

Background:

LRA and Standard Review Plan for Review of License Renewal Application for Nuclear Power Plants (SRP-LR) Sections 3.4.2.2.3 refer to LRA and SRP-LR Tables 3.4.1-8. These tables address the loss of material due to general, pitting, crevice and microbiology-influenced corrosion (MIC) as well as fouling on steel piping, piping components and piping elements exposed to raw water. These tables recommend "further evaluation" on the part of the staff. The GALL Report recommends managing this aging process through the use of a plant-specific AMP. The applicant states that components included in the definition of this table are isolated from raw water and that they were not evaluated for aging effects.

Issue:

In its review of LRA Table 3.4.1-8, the staff noted that the applicant stated that the auxiliary feed pump suction piping was not evaluated for aging. The staff also noted that the applicant describes a motor operated valve which is used to isolate the auxiliary feedwater system from the service water system (raw water). The staff further noted that the content of the piping downstream of the isolation valves is not disclosed. Based on the above, the staff believes that it is necessary to evaluate the entire auxiliary feedwater system for aging. The staff has no theoretical objections to including the evaluation of portions of the system as part of other AMR review items as long as the AMP cited is appropriate and as long as the applicant fully describes, as part of this AMR item, the item under which each component of the system will be evaluated.

Request:

Please confirm that the entire auxiliary feedwater system will be evaluated for aging and to modify this AMR item and other AMR items as appropriate to allow the staff to confirm that each portion of the auxiliary feedwater system is being evaluated through the use of appropriate AMP and AMR items.

DEK Response

The normal supply of water to the Auxiliary Feedwater System is the condensate storage tanks. The back-up supply of water to the Auxiliary Feedwater System is from the Service Water System. LRA Section 3.4.2.2.3 and license renewal drawing LRM-202-2 (at locations E-9 through E-12) identify that the back-up source of water is isolated from the Auxiliary Feedwater System by normally closed motor-operated valves (SW502, SW601A, and SW601B). Therefore, the Auxiliary Feedwater System was not evaluated for aging effects due to exposure to the Service Water System (raw water) environment. However, the entire Auxiliary Feedwater System (including the auxiliary feedwater pump suction piping downstream of the normally closed motor-operated valves) was evaluated for aging effects due to exposure to the condensate storage tank water supply (treated water – secondary) environment, as indicated for the component type "Pipe" in LRA Table 3.4.2-7.

RAI 3.2.2.5.1.-1

Background:

LRA and SRP-LR Sections 3.3.2.2.5.1 refer to LRA and SRP-LR Tables 3.3.1-11. These tables address hardening and loss of strength due to degradation of elastomers exposed to uncontrolled indoor air. 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 "External Surfaces Monitoring" (LRA B2.1.10). 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 3.3.1-11 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 3.3.1-11, the staff noted that the "External Surfaces Monitoring" AMP proposes to manage the aging of elastomeric materials through the use of visual inspections. The staff also noted that the aging effects being considered are hardening and loss of strength. Given that changes in material properties of elastomeric materials are not always accompanied by a change in appearance, the staff is unaware of how a visual inspection will detect the aging effects under consideration. The staff further noted that Table 3.3.1-11 includes both internal and external surfaces of elastomers. Finally, the staff noted that a search of Table 2 items in the LRA associated with Table 3.3.1-11 reveals only items associated with external surfaces. Given the nature of the components listed, it appears that most, if not all, of these items should have an additional item associated with their internal surface. The staff questions the apparent lack of these Table 2 items.

Request:

Please clarify how a visual inspection will detect changes in hardness and strength of elastomeric materials or to propose an alternate AMP which includes manual manipulation of the elastomeric material and to explain the apparent lack of AMR items in Table 3.3.1-11 associated with internal surfaces.

DEK Response

A visual inspection is not relied on alone to detect changes in hardness and strength of elastomeric materials. The External Surfaces Monitoring program will require performance of visual inspections and physical manipulation by plant personnel qualified to detect hardening and loss of strength of elastomeric materials as described in the response to RAI B2.1.10-1 in DEK letter dated August 17, 2009 (DEK Serial No. 09-469) [ADAMS Accession No. ML092320093].

As indicated in LRA Tables 3.3.2-10 through 3.3.2-17, “air-moist” and “air-indoor controlled” are the internal environments for elastomeric materials. Hardening and loss of strength/elastomers degradation was identified as an aging effect requiring management for elastomeric materials exposed to these internal environments. The Internal Surfaces Monitoring program within the Work Control Process program (described in DEK letter dated September 25, 2009 [ADAMS Accession No. ML092720184]) will manage the aging of elastomeric material internal surfaces and includes physical manipulation in addition to visual inspection.

RAI 3.3.2.3-1

Background:

LRA Tables 3.3.2-8 and 3.3.2-27 contain items which address the interior surfaces of elastomeric materials exposed to inert gas. The applicant proposes that there is no aging effect associated with this combination of material and environment and that no AMP is required. 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 these items, the staff noted that mechanisms other than the nature of the gas in contact with the interior surfaces of elastomeric materials (e.g., temperature and vibration) could cause aging of those materials. Based on the numerous causes for aging of elastomeric materials, the staff cannot conclude from the information provided that the components under consideration will not undergo aging.

Request:

Please include these components in an appropriate AMP or provide sufficient information to allow the staff to conclude that, under the circumstances being considered, no aging will occur.

DEK Response

The elastomers (hoses) shown in LRA Tables 3.3.2-8 and 3.3.2-27 are exposed to a gas-inert (nitrogen) environment internally and an air-indoor uncontrolled environment on the external surface. LRA Tables 3.3.2-8 and 3.3.2-27 identify that no aging effects were determined to be applicable to the internal surface of the hoses based on exposure to an inert gas. However, aging effects are applicable to the external surface of the hoses. Cracking and change in material properties due to thermal exposure were determined to be applicable aging effects for the external surfaces of these components. As indicated in the LRA tables, these aging effects will be managed by the Work Control Process program. As described in DEK letter dated September 25, 2009 [ADAMS Accession No. ML092720184], Attachment 2, page 5, physical manipulation and visual inspection techniques will be used to detect cracking and change in material properties of elastomeric materials.

RAI 3.3.2.3-2

Background:

LRA Tables 3.3.2-10 through 3.3.2-17 contain items which address changes in material properties and cracking of the exterior surfaces of elastomeric materials exposed to uncontrolled indoor air. The applicant proposes to manage this aging process through the use of its AMP, "External Surfaces Monitoring" (LRA B2.1.10). 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 these items, the staff noted that the proposed AMP utilizes visual inspection to identify aging. The staff also noted that identification of cracking in elastomers may be difficult using only visual inspection techniques. The staff further noted that changes in material properties such as hardness and elasticity cannot be reliably identified using only visual inspection techniques.

Request:

Please propose an AMP which includes visual inspection and manual manipulation of a sufficient number or area of elastomeric material at a sufficient inspection frequency to adequately detect cracking or changes in the material properties of those materials.

DEK Response

The External Surfaces Monitoring program performs visual inspections and physical manipulation by plant personnel qualified to detect changes in material properties and cracking of elastomeric materials, as described in the response to RAI B2.1.10-1 in DEK letter dated August 17, 2009 [ADAMS Accession No. ML092320093]. On a routine basis, and as part of the External Surfaces Monitoring program, Operations, Health Physics, and Engineering personnel conduct inspections of accessible component surfaces, including elastomeric materials, in normally accessed areas. Inspections of ventilation system components are performed at least once per refueling cycle.

The scope and frequency of inspections performed by the External Surfaces Monitoring program are sufficient to adequately detect cracking and changes in material properties of elastomeric materials in the ventilation systems.

RAI 3.5.2.3.2-1

Background:

LRA Table 3.5.2-2 contains items which address changes in material properties and cracking of the exterior surfaces of elastomeric materials exposed to uncontrolled indoor air. The applicant proposes to manage this aging process through the use of its AMP, "External Surfaces Monitoring" (LRA B2.1.10). 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 these items, the staff noted that the proposed AMP utilizes visual inspection to identify aging. The staff also noted that identification of cracking in elastomers may be difficult using only visual inspection techniques. The staff further noted that changes in material properties such as hardness and elasticity cannot be reliably identified using only visual inspection techniques.

Request:

Please propose an AMP which includes visual inspection and manual manipulation of a sufficient number or area of elastomeric material at a sufficient inspection frequency to adequately detect cracking or changes in the material properties of those materials.

DEK Response

The External Surfaces Monitoring program will perform visual inspections and physical manipulation by plant personnel qualified to detect cracking and changes in the material properties in elastomers, as described in the response to RAI B2.1.10-1 in DEK letter dated August 17, 2009 (DEK Serial No. 09-469) [ADAMS Accession No. ML092320093].

Penetration seals (flexible seals, bellows seals, plates seals) identified in LRA Table 3.5.2-2 are fire protection features. The aging of these penetration seals are managed by both the Fire Protection and External Surfaces Monitoring programs. The inspections performed by the Fire Protection program are consistent with the recommendations of NUREG-1801, Section XI.M26, for both the type and the frequency of inspection. All of the 10 CFR 50 Appendix R-related penetration seals, and 20% of the 10 CFR 50 Appendix A-related penetration seals, are inspected during each refueling outage.

The External Surfaces Monitoring program inspections are performed in conjunction with the Fire Protection program inspections such that the frequency of the inspections are sufficient to detect cracking or changes in material properties of the elastomers.

RAI 3.2.2.2.6-1

Background:

LRA and SRP Sections 3.2.2.2.6 refer to LRA and SRP Tables 3.2.1-12. These tables address loss of material due to erosion of stainless steel high pressure safety injection (charging) pump miniflow orifice exposed to treated borated water. Section 3.2.2.2.6 of the SRP refers to Licensee Event Report (LER) 50-275/94-023. This LER describes a situation in which centrifugal charging pumps had been used as normal charging pumps for a substantial period of time. During this period the miniflow recirculation orifices were enlarged through erosion. This enlargement could allow the flow through the pump to exceed technical specification limits. In the LRA, the applicant states that the centrifugal charging pumps are used as safety injection pumps and are not used as normal charging pumps. The applicant further states that the normal charging pumps are positive displacement pumps which do not have miniflow recirculation orifices.

Issue:

In its review of LRA Table 3.2.1-12 and LER 50-275/94-023, the staff noted that the applicant correctly identifies the issue under consideration as erosion of the miniflow orifices through prolonged use. The staff also noted that the applicant stated that it is currently not using the centrifugal pumps in a manner which would result in prolonged use. The staff further noted that one of the responses to the events of LER 50-275/94-023 was to switch from using the centrifugal pump to the positive displacement pump for normal injection. Based on the ability of the applicant to switch from using the centrifugal pump to the positive displacement pump for normal injection, the staff cannot conclude from the applicant's statement that the positive displacement pump is being used for normal injection that the centrifugal pump has not been used for that purpose in the past. Past use of the centrifugal pump for normal injection could indicate that greater than acceptable erosion has occurred or may occur with minimal additional use during the period of extended operation.

Request:

Please provide information concerning the interchanability of the safety injection pumps and the charging pumps. Additionally, please provide information concerning the operating history of the safety injection pumps so as to allow the staff to determine whether these pumps have been or will be operated for a sufficient period of time to cause erosion of the miniflow orifice.

DEK Response

The KPS charging pumps are positive displacement pumps and do not have a mini-flow orifice. The KPS safety injection pumps are centrifugal pumps and they are not interchangeable with the positive displacement charging pumps. In addition, the safety injection pumps are only operated for short periods of time during surveillance testing and filling of the Safety Injection accumulators. Therefore, the safety injection pumps mini-flow orifices are not subject to protracted conditions that would result in erosion.

RAI 3.3.2.3-3

Background:

LRA Tables 3.3.2-6, 3.3.2-8, 3.3.2-19 and 3.3.2-27 contain items which address the exterior surfaces of non metallic materials exposed to uncontrolled indoor air and the interior surfaces of non metallic materials exposed to raw water, dry air, lube oil, and inert gas. The applicant proposes that there is no aging effect associated with this combination of material and environment and that no aging management program is required. 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 these items, the staff noted that "non metallic material" is not defined in the GALL Report and that, in terms of license renewal, it has no meaning. The staff also noted that many polymeric materials are adversely affected by oxidizers (e.g. chlorine), ultraviolet light, and high temperatures. Based on the information provided, the staff cannot conclude that no aging effects will occur to the combination of materials and environments under consideration.

Request:

Given that the term "non metallic" is very broad, please identify the specific material under consideration. Additionally, please justify why this material is not subject to aging under the conditions being considered.

DEK Response

Discussion of Internal Aging Effects

The non-metallic components shown in LRA Table 3.3.2-6 (Service Water System) consist of valves, piping, and pumps. The non-metallic components are constructed from Polyvinyl Chloride (PCV) and Polyvinylidene Flouride (PVDF) materials. The components are associated with the Service Water Chlorination System and are exposed to sodium hypochlorite on the internal surfaces (identified as a raw water environment in Table 3.3.2-6). A review of recent industry and plant-specific operating experience has identified cracking resulting from exposure to sodium hypochlorite in the non-metallic piping associated with the Service Water Chlorination System. Therefore, cracking due to chemical oxidation is added as an aging effect for the internal surfaces of the non-metallic components in a raw water internal environment shown in LRA Table 3.3.2-6. The Internal Surfaces Monitoring program inspections performed by the Work Control Process program (described in DEK letter dated September 25, 2009 [ADAMS Accession No. ML092720184]) will manage this aging effect such that the component intended functions are maintained.

The non-metallic components shown in LRA Table 3.3.2-8 (Station and Instrument Air System), which have no aging effects assigned, consist of lubricators and oilers. The bowl associated with these components is a polycarbonate material. The internal surfaces of the components are exposed to lubricating oil and dried air. A review of plant and industry operating experience identified no evidence of polymer degradation due to exposure to dried air or lubricating oil. Therefore, no aging effects were applied to the internal surfaces of these components.

The non-metallic components shown in LRA Table 3.3.2-19 (Diesel Generator System) are filter housings in the diesel starting air system. The filter housing is a polycarbonate material. The internal surfaces of the components are exposed to dried air. A review of plant and industry operating experience identified no evidence of polymer degradation due to exposure to dried air. Therefore, no aging effects were applied to the internal surfaces of these filter housings.

The non-metallic component shown in LRA Table 3.3.2-27 (Miscellaneous Gas System) is flexible tubing used to connect a nitrogen bottle to an instrument air dryer. The tubing is polyethylene. The internal surface of the tubing is exposed to inert nitrogen gas. A review of plant and industry operating experience identified no evidence of polymer degradation due to exposure to inert gases. Therefore, no aging effects were applied to the internal surface of this component.

Discussion of External Aging Effects

Kewaunee is located in a rural area on the shore of Lake Michigan. As such, exposure to harsh chemicals (e.g., sulfur dioxide) in the atmosphere that could result from industry is not applicable to the external surfaces of the non-metallic components shown in LRA Tables 3.3.2-6, 3.3.2-8, 3.3.2-19 and 3.3.2-27. Additionally, these components are normally exposed to temperatures less than 95°F, which is well below the temperature rating of the non-metallic material. The external surfaces of the components were evaluated for reduced strength resulting from exposure to ozone and ultraviolet (UV) radiation. However, these components are not located near high voltage electrical equipment and are not exposed to direct sunlight. Although the non-metallic components are exposed to general area fluorescent lighting, a review of plant operating experience identified no evidence of polymer degradation as a result of exposure to limited UV radiation in indoor locations. Therefore, reduced strength due to exposure to ozone or UV radiation exposure was not identified as an applicable aging effect for these components.

Based on the above, no aging effects were identified that could adversely affect the external surfaces of the non-metallic components.

RAI 3.4.2.3.12-1

Background:

LRA Table 3.4.2-12 contains items which address the exterior surfaces of non metallic materials exposed to uncontrolled indoor air and the interior surfaces of non metallic materials exposed to treated water or steam. The applicant proposes that there is no aging effect associated with this combination of material and environment and that no aging management program is required. 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 these items, the staff noted that "non metallic material" is not defined in the GALL Report and that, in terms of license renewal, it has no meaning. The staff also noted that many polymeric materials are adversely affected by oxidizers (e.g. chlorine), ultraviolet light, and high temperatures. Based on the information provided, the staff cannot conclude that no aging effects will occur to the combination of materials and environments under consideration.

Request:

Given that the term "non metallic" is very broad, please identify the specific material under consideration. Additionally, please justify why this material is not subject to aging under the conditions being considered.

DEK Response

The non-metallic components shown in LRA Table 3.4.2-12, Secondary Sampling System, consist of filter housings, conductivity cell housings, and piping fabricated from polysulfone, polyethersulfone, and polyvinyl chloride (PVC), respectively. The components are associated with the analytical instrumentation panel (secondary sampling station) and are exposed to sample fluids from chemistry-controlled secondary plant systems on the internal surfaces and an air-indoor uncontrolled environment on the external surfaces.

Since the sample fluids are from chemistry-controlled secondary plant systems, the internal surfaces of the components are not exposed to significant levels of contaminants, such as chlorine. Additionally, these components are located downstream of the secondary sample coolers and are not exposed to elevated temperatures. Therefore, no aging effects were identified that could adversely affect the internal surfaces of these non-metallic components.

Kewaunee is located in a rural area on the shore of Lake Michigan. As such, exposure to harsh chemicals (e.g., sulfur dioxide) in the atmosphere that could result from local industry is not applicable to the external surfaces of these components. The external surfaces were evaluated for the potential for reduced strength resulting from exposure to ozone and ultraviolet (UV) radiation. However, these components are not located near high voltage electrical equipment and are not exposed to direct sunlight. Although these non-metallic components are exposed to general area fluorescent lighting, a review of plant operating experience identified no evidence of polymer degradation due to exposure to UV radiation from lighting sources. Therefore, reduced strength due to exposure to ozone or UV radiation exposure was not identified as an applicable affect. Based on the above, no aging effects were identified that could adversely affect the external surfaces of these non-metallic components.

RAI 3.5.2.3-6

Background:

LRA Tables 3.5.2-4, 3.5.2-12 and 3.5.2-14 contain items which address the exterior surfaces of non metallic materials exposed to uncontrolled indoor air and the interior surfaces of non metallic materials exposed to raw water. The applicant proposes that there is no aging effect associated with this combination of material and environment and that no aging management program is required. 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 these items, the staff noted that "non metallic material" is not defined in the GALL Report and that, in terms of license renewal, it has no meaning. The staff also noted that many polymeric materials are adversely affected by oxidizers (e.g. chlorine), ultraviolet light, and high temperatures. Based on the information provided, the staff cannot conclude that no aging effects will occur to the combination of materials and environments under consideration.

Request:

Given that the term "non metallic" is very broad, please identify the specific material under consideration. Additionally, please justify why this material is not subject to aging under the conditions being considered.

DEK Response

The non-metallic structural member shown in LRA Table 3.5.2-4, which has no aging effects assigned, consists of wood planking. The wood planking is exposed to an external air-indoor uncontrolled environment. The wood planking is protected from weather and is not located in a soil environment which could result in loss of material or change in material properties. A review of plant and industry operating experience identified no evidence of wood degradation due to exposure to an external air-indoor uncontrolled environment. Therefore, no aging effects are applied to this component.

The non-metallic structural member shown in LRA Table 3.5.2-12, which has no aging effects assigned, consists of traveling water screen covers. The traveling water screen covers are fiberglass material. The fiberglass covers are exposed to an external air-indoor uncontrolled environment and an internal raw water environment. The fiberglass covers do not experience ultraviolet radiation or ozone exposure or high voltage currents which could result in loss of strength. A review of plant and industry operating experience identified no evidence of fiberglass degradation due to exposure to an external air-indoor uncontrolled environment or an internal raw water environment. Therefore, no aging effects are applied to this component.

The non-metallic commodity group shown in LRA Table 3.5.2-14, which has no aging effects assigned, consists of fire boots. The fire boots are fiberglass material. The fiberglass boots are exposed to an external air-indoor uncontrolled environment. The fiberglass boots do not experience ultraviolet radiation or ozone exposure or high voltage currents which could result in loss of strength. A review of plant and industry operating experience identified no evidence of fiberglass degradation due to exposure to an external air-indoor uncontrolled environment. Therefore, no aging effects are applied to this component.

The non-metallic commodity group shown in LRA Table 3.5.2-14, which has no aging effects assigned, consists of insulation. The insulation is fabricated of calcium silicate, expanded silicate, and fiberglass material. The materials are exposed to an external air-indoor uncontrolled environment. These materials are not exposed to ultraviolet radiation or ozone exposure or high voltage currents, chemicals or temperatures which could result in loss of strength. A review of plant and industry operating experience identified no evidence of calcium silicate, expanded silicate, and fiberglass degradation due to exposure to an external air-indoor uncontrolled environment. Therefore, no aging effects are applied to this component.

RAI 4.2.1-1

Background:

The evaluation of neutron fluence is provided in LRA Section 4.2.1, "Neutron Fluence."

Issue/Request:

The LRA does not provide a USAR Supplement summary description of LRA Section 4.2.1 in LRA Appendix A, "Updated Safety Analysis Report Supplement." Please provide an USAR supplement summary description of the evaluation of neutron fluence for 52.1 effective full power years.

DEK Response

The following will be added to LRA Appendix A, USAR Supplement, Section A3.1:

> "The calculation of neutron fluence to which reactor vessel materials are exposed is an important input to the evaluation of reactor vessel neutron embrittlement and is governed by regulatory requirements. WCAP-16641 (Reference A3.6-6) provides the calculation of Kewaunee reactor vessel neutron fluence projections to EOLR (i.e., 60 year plant lifetime) based on 52.1 EFPY. Neutron exposure up to Cycle 27 was based upon actual plant operating history, including power uprate that occurred during Cycle 26. Neutron exposure projections beyond the end of Cycle 27 were based upon an operating scenario that consisted of a series of 18 month operating cycles followed by a 25 day refueling outage. The reactor was considered to be operating at full power for the entire 18 month cycle. This full power period coupled with the 25 day refueling outage resulted in a net capacity factor of 95.6% with a total operating time of 33.0 EFPY at EOL and 52.1 EFPY at EOLR. The neutron exposure projections were also based on the continued use of low neutron leakage fuel management.
>
> Kewaunee reactor vessel surveillance Capsule T was removed in 2004 (the fifth capsule removed from the reactor) and WCAP-16641 documents the results of the fluence evaluation for the specimens. The fluence calculations concluded that Capsule T surveillance specimens received a fluence of 5.62E+19 n/cm^2 (E>1.0 MeV) after irradiation to 24.6 EFPY and the peak reactor vessel clad/base metal interface fluence after 24.6 EFPY of plant operation was 2.60E+19 n/cm^2 (E>1.0 MeV). The Capsule T specimens have received a fluence equivalent to slightly greater than 52.1 EFPY. The maximum vessel exposures occur on the intermediate shell base material with all other vessel materials experiencing a lower neutron exposure. Certain materials in the extended beltline (inlet nozzles, inlet and outlet nozzle to upper shell welds, upper shell forging, and intermediate shell to upper shell girth weld) are projected to receive fluence greater than 1.0E+17 n/cm^2 during the 40 - 60 year operating period."

The following will be added to LRA Appendix A, USAR Supplement, Section A3.6:

"6. WCAP-16641, Revision 0, Analysis of Capsule T from the Dominion Energy Kewaunee Power Station Reactor Vessel Radiation Surveillance Program, Westinghouse Electric Company, LLC, October, 2006."

RAI 3.1.2.1.2-1

Background:

The AMP for managing the loss of fracture toughness due to thermal aging embrittlement of reactor coolant system Class 1 pump casing, and valve bodies and bonnets, constructed of cast authentic stainless steel (CASS) materials consists of the American Society of Mechanical Engineers (ASME) Section XI Inservice Inspection (ISI), Subsections IWB, IWC, and IWD program with an exception in that the Edition of the ASME Section XI Code is different than that of the GALL AMP XI.M12. In addition, the LRA states that the CASS Class 1 reactor coolant system loop piping has been evaluated for the effects of aging and found to be not susceptible to thermal aging embrittlement, therefore there is no requirement to manage the effects of thermal aging embrittlement of CASS reactor coolant loop piping for the period of extended operation.

Issue:

The assessment of the loss of fracture toughness due to thermal embrittlement is based on calculated ferrite levels using the Hull's equivalent factors. Other procedures for calculating ferrite content may result in a non-conservative estimation of the fracture toughness of the steel. The GALL Report states, "In the susceptibility screening method, ferrite content is calculated by using the Hull's equivalent factors (described in NUREG/CR-4513, Rev 1) or a method producing an equivalent level of accuracy (±6% deviation between measured and calculated values)."

Request:

Confirm whether the Hull's equivalent factors were used to determine the delta ferrite content of the CASS materials, and if they were not, verify that the method produced an equivalent level of accuracy.

DEK Response

Susceptibility screening for the cast austenitic stainless steel (CASS) reactor coolant loop piping was performed consistent with the letter from Christopher Grimes, Nuclear Regulatory Commission to Douglas Walters, Nuclear Energy Institute, License Renewal Issue No. 98-0030, "Thermal Aging Embrittlement of Cast Austenitic Stainless Steel Components," dated May 19, 2000 [ADAMS Accession No. ML003717179], with the exception that delta-ferrite content was determined using the method outlined in ASTM A800, "*Standard Practice for Steel Casting, Austenitic Alloy, Estimating Ferrite Content Thereof*," rather than the Hull's equivalent factors method identified in the letter.

In accordance with ASTM A800, estimation of ferrite content in the base metal of the reactor coolant loop piping was performed by analysis of the chemical composition of the castings. The ferrite content of the casting was estimated from the equation of the central line of the Schoefer diagram at the composition ratio of "chromium equivalent" (Cr_e) to "nickel equivalent" (Ni_e) determined from the formula in ASTM A800. The ASTM A800 Schoefer diagram method details, provided in Appendix X1 to the Standard, include a description of potential error associated with the estimation of ferrite content based on chemical composition. The probable error determined in the Standard is approximately +3.5% / -2.5% ferrite at ferrite content of 5%; +4.5% / -3.5% at 10% ferrite; +6% / -4.5% at 15% ferrite; and +8% / -5.5% at 20% ferrite content. As stated in the NRC License Renewal Issue No. 98-0030 letter dated May 19, 2000, the Hull's equivalent factors method produces results with +/- 6% ferrite potential error. The difference in potential error at higher levels of ferrite content between the Hull's equivalent factors method and the Schoefer diagram method provided in ASTM A800 is small, and the Schoefer diagram method used for estimating the ferrite content of the steel was considered to provide an acceptable level of accuracy.

RAI 3.1.2.1.3-1

Background:

The program for managing cracking due to stress corrosion cracking of austenitic stainless steel reactor coolant system components (AMR line item 3.1.1-68) consists of Primary Water Chemistry program whereas the program recommended in the GALL Report, for the same line items, consists of ASME Section XI Inservice Inspection (Subsections IWB, IWC, and IWD) and Primary Water Chemistry program. The LRA further states that the KPS program is consistent with the GALL AMP.

Issue:

In LRA Table 3.1.1, line item 3.1.1-68, the applicant stated that the cracking due to stress-corrosion cracking of austenitic stainless steel reactor coolant pump thermal barriers heat exchanger, pressurizer manway, and reactor coolant system thermal sleeves is managed by the Primary Water Chemistry program while stress-corrossion cracking (SCC) of stainless steel piping, fittings, pump casings, valve bodies, nozzles, etc. is managed by Primary Water Chemistry as well as ASME Section XI Inservice Inspection program. The applicant further stated that the KPS program is consistent with the GALL AMP. It is not clear how the applicant's program for stainless steel reactor coolant pump thermal barriers heat exchanger, pressurizer manway, and reactor coolant system thermal sleeves is consistent with the GALL AMP.

Request:

Explain how the applicant's program to manage cracking due to SCC is consistent with the programs recommended in the GALL Report. Also, describe how the effectiveness of the program is verified to ensure that cracking is not accruing and the structural and functional integrity of the components will be maintained during extended operation.

DEK Response

For the reactor coolant pump thermal barriers (heat exchanger) and the pressurizer manway (including stainless steel insert), the ASME Section XI Inservice Inspection program, Subsections IWB, IWC, and IWD, is added as an additional aging management program and will provide verification of the effectiveness of the Primary Water Chemistry program for management of cracking due to stress corrosion cracking. This change provides consistency with NUREG-1801 (Item 3.1.1-68).

For the non-pressure boundary thermal sleeves, the One-Time Inspection program within the Work Control Process program, as described in DEK letter dated September 25, 2009 (DEK Serial No. 09-597) [ADAMS Accession No. ML092720184], is added as an additional aging management program and will provide verification of the effectiveness of the Primary Water Chemistry program for management of cracking due to stress corrosion cracking. The One-Time Inspection program within the Work Control

Process program uses NDE techniques that have been determined to be effective for the identification of stress corrosion cracking in stainless steel. The inspections will verify that unacceptable degradation is not occurring for material and environment combinations that include stainless steel in primary treated water. Indications of degradation would result in an engineering review of the condition through the Corrective Action Program and could result in further corrective actions, such as an expansion of the inspection scope.

RAI 4.7.5-1

Background

Section 4.7.5 of the LRA describes the reactor coolant loop piping flaw tolerance evaluation to account for susceptibility of the CASS piping materials to thermal aging embrittlement. The applicant stated that an evaluation of the susceptibility of the loop piping to thermal aging and the potential for flaw growth in the piping due to reduced fracture toughness has been performed consistent with the recommendations of GALL AMP XI.M12.

Issue:

The applicant stated in LRA Section 4.7.5: "The limiting initial flaw depth for an aspect ratio of 6 is in the crossover leg (28% through-wall). The flaw tolerance evaluation concludes that flaw of this initial size would not grow to critical size (i.e., a size that could result in piping failure at design basis loading conditions, during an additional 30 years of service." Based on these results the applicant concluded that there is no requirement to manage the effects of thermal aging embrittlement of CASS reactor coolant loop piping for the period of extended operation. However, the applicant did not provide sufficient details regarding applied stresses in specific pipe sections, or cyclic crack growth rates, or bounding fracture toughness of thermally aged CASS, to verify the applicant's statement that the initial flaw will not grow to critical size or to check the critical flaw size. For example, the applicant indicated that the number of occurrences of design transients considered in the analysis were based on the revisions for Kewaunee 7.4% uprating and steam generator replacement, however, it is not clear whether the 7.4% uprating was considered in determining the design stresses for the evaluation. Also, although the applicant stated that that the loop piping was constructed of CF-8M steel with less than 25% delta ferrite, the applicant did not confirm that it did not contain niobium. Typically, niobium is not specified in CF-8M steel. The recommendations of XI.M12 are not applicable to niobium bearing steels. In addition, the applicant stated that an environmental factor of 2 was applied to the crack growth reference curves for austenitic stainless steel in air to account for the effect of pressurized water reactor (PWR) environment on growth rates. However, the applicant did not provide the basis for choosing an environmental factor of 2. Several recent studies have reported data showing that the fatigue crack growth rates can be enhanced appreciably in PWR primary coolant environment at low loading frequencies.

Request:

Provide the following information:

1. *Confirm that the loop piping material is not niobium bearing.*
2. *Confirm that the Kewaunee 7.4% uprating was considered in determining the design stresses for the flaw tolerance evaluation.*

3. *The details regarding flaw growth analyses, in particular, the technical basis for the choice of the environmental factor of 2 for fatigue crack growth rates in PWR environment.*

DEK Response

1. The reactor coolant loop piping was supplied in accordance with material specification American Society for Testing and Materials (ASTM) A351, Grade CF-8M. This specification does not require the addition of niobium (or columbium) for Grade CF-8M steel. Additionally, the chemical compositions for the loop piping heats were reviewed and there was no indication of niobium (or columbium) content.

2. The Kewaunee 7.4% uprating was considered in determining the design stresses for the flaw tolerance evaluation.

3. The flaw growth analyses associated with the reactor coolant loop piping flaw tolerance evaluation are based on methods described in the ASME Boiler and Pressure Vessel Code, Section XI, Subsection IWB-3640. The use of an environmental factor of 2 applied to the crack growth rate determined for austenitic stainless steel in air, to account for the effect of pressurized water reactor (PWR) environment, is based on the factor recommended for the PWR environment in, "*Evaluation of Flaws in Austenitic Steel Piping – Section XI Task Group for Piping Flaw Evaluation*," Transactions of ASME, Journal of Pressure Vessel Technology, Vol. 108, Aug. 1986, pp. 352-366.

RAI B2.1.1 (Alloy 600 Inspections)

Background/Issue:

This program is established to ensure that augmented ISI of all alloy 600 components and welds in the reactor coolant system at PWR-designed light water reactors will continue to be performed per the latest NRC requirements and guidance.

On September 10, 2008, in Volume 73 Number 176 of the Federal Register, the NRC published a final rule invoking several requirements to address this issue. The NRC mandated the use of ASME Code Case N-729-1, as conditioned by the NRC, to establish new requirements for long term inspection of reactor pressure vessel upper heads. This action, once implemented by a licensee, withdrew the requirements of the First Revised NRC Order EA-03-009, dated February 20, 2004, from that licensee. The NRC also mandated the use of ASME Code Case N-722, as conditioned by the NRC, to establish long term inspection requirements for the following components if they contain the primary water stress-corrosion cracking (PWSCC) susceptible materials designated Alloys 600/182/82;

Reactor Vessel

Reactor Pressure Vessel Bottom Mounted Nozzles
Hot Leg Nozzle-to-Pipe Connections
Cold Leg Nozzle-to-Pipe Connections
Instrument Connections

Steam Generators

Hot Leg Nozzle-to-Pipe Connections
Cold Leg Nozzle-to-Pipe Connections
Bottom Channel Head Drain Tube Penetration
Primary Side Hot Leg Instrumentation Connections
Primary Side Cold Leg Instrumentation Connections

Pressurizer

Heater Penetrations
Spray Nozzle-to-Pipe Connections
Safety and Relief Nozzle-to-Pipe Connections
Surge Nozzle-to-Pipe Connections
Instrument Connections
Drain Nozzle-to-Pipe Connections

Piping

Hot Leg Instrument Connections
Cold Leg Instrument Connections
Hot Leg Full Penetration Welds
Cold Leg Full Penetration Welds

On October 22, 2008, the NRC issued Regulatory Issue Summary 2008-25, which stated the regulatory approach for addressing PWSCC of dissimilar metal butt welds in PWR primary coolant system piping. This approach was established in conjunction with the mandated inspections of ASME Code Case N-722, as conditioned by the NRC. In 2005, an industry group, the Materials Reliability Program (MRP) issued industry mandated guidelines for the examination of dissimilar metal butt welds through a report designated MRP-139. Industry has been implementing this inspection guideline and mitigating welds to address PWSCC. The NRC staff has reviewed the MRP-139 guidelines and additional MRP interim guidance letters. The NRC staff believes that MRP-139 and the MRP interim guidance letters, with the exception of the reinspection interval for unmitigated pressurizer dissimilar metal butt welds that have been previously addressed by certain plant specific Confirmatory Action Letters, provide adequate protection of public health and safety for addressing PWSCC in butt welds for the near term pending incorporation by reference into 10 CFR 50.55a of an ASME Code Case containing comprehensive inspection requirements. The NRC staff is monitoring the industry's MRP-139 inspections and operating experience and will use this information to determine if any additional regulatory actions are necessary.

On January 26, 2009, ASME Boiler and Pressure Vessel Code published Code Case N-770, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities." It is the intention of the NRC to incorporate the requirements of ASME Code Case N-770 into 10 CFR 50.55a, as conditioned by the NRC, in the latest rulemaking activity to update 10 CFR 50.55a which is expected to be completed by December 2010.

Request:

Based on these actions, the NRC finds that the AMP requirements, to ensure effective augmented inservice inspections (ISI) of all alloy 600 based components and welds in the reactor coolant system at PWR-designed light water reactors, need to be updated to state compliance with current regulatory requirements of 10 CFR 50.55a.

DEK Response

LRA Section B2.1.1 identifies all of the Alloy 600 base metal and Alloy 82/182 dissimilar metal welds, and Alloy 690 base metal and Alloy 52/152 dissimilar metal welds, managed by the Alloy 600 Inspections program. The difference between the scope of the Alloy 600 Inspections program and the list of potential locations in RAI B2.1.1 Background/Issue is due to Kewaunee plant-specific design and materials differences.

The Alloy 600 Inspections program has been updated to be consistent with the regulatory and industry initiatives for managing PWSCC susceptible materials designated Alloys 600/182/82. The table below identifies the current inspection bases, in addition to the ASME Boiler and Pressure Vessel Code, Section XI, requirements, that are implemented for each of the locations included in the program.

Locations	Additional Inspection Bases
Reactor Vessel closure head penetrations (control rod drive mechanisms, reactor vessel level instrument system, and head vent) and associated J-groove welds	Code Case N-729-1
Reactor Vessel bottom head instrument tube penetrations and associated J-groove welds	Code Case N-722
Reactor Vessel safety injection nozzles buttering weld	MRP-139
Reactor Vessel core support guide lug/weld	None
Steam Generator primary nozzles safe end/buttering	Code Case N-722 MRP-139

As noted in RAI B2.1.1 Background/Issue, Code Case N-770 was not issued until January 2009. This code case has not yet been incorporated into the Alloy 600 Inspections program, but, as required, will be incorporated into the program once the code case has been incorporated into 10 CFR 50.55a.

The Alloy 600 Inspections program augmented inservice inspections of Alloy 600-based components and welds in the Reactor Coolant System have been updated to be in compliance with the current regulatory requirements of 10 CFR 50.55a.

The description of the Alloy 600 Inspections program in LRA Appendix A, USAR Supplement, Section A2.1.1 will be changed to:

"Program Description

The *Alloy 600 Inspections* program is a plant-specific program that consists of the applicable ten elements as described in Appendix A of NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." The program meets the NUREG-1801 expectation to have a plant-specific program for managing nickel alloy materials to comply with the applicable NRC publications and industry guidelines.

The *Alloy 600 Inspections* program manages the aging effects of primary water stress corrosion cracking in Alloy 600 base metal and Alloy 82/182 dissimilar metal welds and Alloy 690 base metal and Alloy 52/152 dissimilar metal welds. The program performs visual/bare metal, liquid penetrant, eddy current, and ultrasonic examinations to detect cracking of the in-scope components in accordance with the

ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD program, which is consistent with the regulatory requirements of 10 CFR 50.55a."

RAI 3.1.2.2.3.2.-1

Background:

The staff noted that LRA Table 3.1.2-1 subcomponents, "Primary Nozzles (and cladding)" and "Upper, Intermediate and Lower Shell (and cladding)," credit the Reactor Vessel Surveillance program for managing loss of fracture toughness aging effect on them. They represent GALL AMR Item IV.A2-17 for reactor pressure vessel (RPV) nozzles and GALL AMR Item IV.A2-24 for RPV shell, including beltline welds.

Issue/Request:

"Beltline welds," which are mentioned in GALL AMR Items IV.A2-17 and IV.A2-24 and SRP-LR Section 3.1.2.2.3.2, have not been specified explicitly as part of the LRA Table 3.1.2-1 subcomponents discussed above. Please resolve this discrepancy because regardless of the selected methodology (Charpy V-notch or Master Curve) for evaluation of material embrittlement, a Reactor Vessel Surveillance program is needed for managing loss of fracture toughness aging effect on relevant RPV materials, including welds.

DEK Response

The "Primary Nozzles (and cladding)" and "Upper, Intermediate and Lower Shell (and cladding)" components which credit the Reactor Vessel Surveillance program for managing the aging effect of loss of fracture toughness due to neutron irradiation embrittlement includes the associated component weld(s) as required by Appendix H to 10 CFR Part 50, "Reactor Vessel Material Surveillance Program Requirements."

ATTACHMENT 2

REVISED RESPONSES FOR RAIs 2.3.3.18-1 AND B2.1.14-3
(Replaces original responses in their entirety)

KEWAUNEE POWER STATION
DOMINION ENERGY KEWAUNEE, INC.

RAI 2.3.3.18-1

Background

For KPS, the staff reviewed the LRA; drawings; updated safety analysis report, Sections 7.7.5, 8.2.2, 9.6.1, and Table B.2-1; and the following fire protection current licensing basis documents listed in the KPS Operating License Condition 2.C(3):

Safety Evaluation Reports dated November 25, 1977, December 12, 1978, and supplement issued on February 13, 1981.

Issue

The staff has identified that fire protection systems and components discussed in the following sections have been excluded from the scope of license renewal and an AMR. These systems and components were not included in the license renewal boundaries and appear to have fire protection intended functions required for compliance with Title 10 of the Code of Federal Regulations (CFR) 50.48, "Fire protection," as stated in 10 CFR 54.4. Therefore, in order to complete our review, the staff requires responses to the following RAIs:

Request

The LRA drawing LRM-202-3 show fire hose connections at locations F9, F10, F11, G9, G10, and G11 as out of scope (i.e., not colored in brown). The staff requests that the applicant verify whether the above fire hose connections are in the scope of license renewal in accordance with 10 CFR 54.4(a) and subject to an AMR in accordance with 10 CFR 54.21(a)(1). If these hose connections are excluded from the scope of license renewal and not subject to an AMR, the staff requests that the applicant provide justification for the exclusion.

Original DEK Response

These non-safety-related fire hose connections shown at locations F-9, F-10, F-11, G-9, G-10, and G-11 on license renewal drawing LRM-202-3 are used only for non-fire purposes (e.g. station services) and do not perform a license renewal intended function. Additionally, these hose connections are not credited as seismic anchors and LR Notes 6 and 7 on license renewal drawing LRM-202-3 indicate why the service water lines associated with the hose connections are omitted from the scope of license renewal for spatial considerations under 10 CFR 54.4(a)(2).

Revised DEK Response

The hose connections shown at locations F-9, F-10, F-11, G-9, G-10, and G-11 on license renewal drawing LRM-202-3 are connections that can be used for general plant service. These hose connections are only used for non-fire purposes (e.g. station services) and do not perform a license renewal intended function. Additionally, these hose connections are not credited as seismic anchors and LR Notes 6 and 7 on license renewal drawing LRM-202-3 indicate why the service water lines associated with the hose connections are omitted from the scope of license renewal for spatial considerations under 10 CFR 54.4(a)(2).

Fire Hose Stations that are a part of the Service Water (SW) System, such as the one shown at location B-6 on license renewal drawing LRM-202-3, are designated as Fire Hose Stations and have been included within the scope of license renewal for 10 CFR 54.4(a)(3).

RAI B2.1.14-3

Background

In Exception #5 of LRA Section B2.1.14, the applicant states that KPS does not perform multi-level sampling of the fuel oil day tanks. Instead a one-gallon sample is taken from the bottom of the tank on a monthly basis to allow for a visual inspection for the presence of water and sediment.

Issue

The LRA did not provide the justification and the threshold/criteria that will be used for the visual inspection of the one-gallon samples taken from the day tanks on a monthly basis.

Request

- *Please provide a justification that a visual inspection of this sample is sufficient in-lieu of a laboratory analysis of the sample as described in ASTM D4057. Provide and justify the threshold/criteria that will be used for this visual inspection of the sample, clearly identifying when corrective actions will be taken. Clarify how a visual inspection is capable of quantifying the amount of water/sediment/particulates that is in the one-gallon sample of fuel oil.*
- *Clarify if there is some type of filter or filtration that exists between the respective fuel oil storage tank and fuel oil day tank that would limit the amount of contaminants entering the day tank.*
- *Clarify whether the sample that is taken from the fuel oil day tanks is a true bottom sample or is it taken from another type of configuration. If it is not a true bottom sample please clarify this other type of configuration and justify that there is not a need to remove the accumulated water/sediment/contamination from the tank bottom that is not flushed out during the monthly removal of the one-gallon sample.*

Original DEK Response

Laboratory testing of the emergency diesel generators (EDG) and technical support diesel (TSC) day tanks fuel oil will be performed consistent with the quarterly surveillance frequency for the fuel oil storage tanks and the acceptance criteria requirements specified in ASTM D4057. Multi-level testing of the day tanks is not warranted due to the relatively small volume of the day tanks and the high turnover of fuel oil due to periodic testing.

The sample points for the EDG and TSC day tanks tap off the supply lines to the diesels, so the samples are representative of what is being drawn or used by the diesel. The EDG fuel oil day tanks have a riser three inches from the bottom of the tank, while the TSC DG day tank provides for a true bottom sample. There is no type of filtration located between the respective fuel oil storage tanks and fuel oil day tanks.

As a result of this commitment for day tank sampling and laboratory analysis, the LRA Appendix B, Section B2.1.14 is supplemented by the removal of Exception 5.

As stated in the response to RAI B2.1.15-1, a one-time inspection will be performed on the fuel oil day tanks prior to the period of extended operation. The quarterly laboratory analysis combined with a confirmatory one-time inspection provides assurance that the effects of aging will be adequately managed through the period of extended operation.

The following commitment will be added to LRA Appendix A, USAR Supplement, Table A6.0-1:

Item	Commitment	Source	Schedule
30	Quarterly laboratory testing of the EDG and TSC DG day tank fuel oil samples will be performed. The testing and acceptance criteria will be consistent with that specified ASTM D4057	Fuel Oil Chemistry	Prior to the Period of Extended Operation

Revised DEK Response

Laboratory testing of fuel oil for water, sediment, and particulates will be performed on the emergency diesel generators (EDG) and technical support center (TSC) diesel generator day tanks, consistent with the quarterly surveillance frequency for the fuel oil storage tanks. The acceptance criteria for water and sediment will be consistent with the requirements specified in ASTM D975-06b. The acceptance criteria for particulates will be consistent with ASTM D6217. Multi-level testing of the day tanks is not warranted due to the relatively small volume of the day tanks and the high turnover of fuel oil due to periodic testing. The day tank volume and turnover rate are discussed in the DEK Response to RAI B2.1.14-2 provided by letter dated August 17, 2009 [ADAMS Accession No. ML092320093].

The sample points for the EDG and TSC day tanks tap off the supply lines to the diesels, so the samples are representative of what is being drawn or used by the diesel. The EDG fuel oil day tanks have a riser three inches from the bottom of the tank, while the TSC DG day tank provides for a true bottom sample. There is no filtration located between the respective fuel oil storage tanks and fuel oil day tanks.

As a result of this commitment for day tank sampling and laboratory analysis, Exception 5 of the LRA Section B2.1.14, Fuel Oil Chemistry, is replaced with the following:

"**Exception 5:** Diesel Generator Day Tank Fuel Oil Sampling

The Fuel Oil Chemistry program provides for monthly visual inspections and will be enhanced to provide for quarterly laboratory analysis of fuel oil samples obtained from the bottom of the day tanks in lieu of taking multilevel samples of the day tanks as recommended by NUREG-1801, Section X1.M30.

Justification

The Emergency Diesel Generators Fuel Oil Day Tanks and the Technical Support Center Diesel Generator Fuel Oil Day Tank are supplied by the diesel generator fuel oil storage tanks. Each day tank has an approximate one-gallon sample of fuel removed from the tank bottom each month to allow for visual inspection and quarterly analysis for the presence of water and sediment. Sampling at this location, where water and sediment would accumulate, provides for effective removal of contaminants from the day tank contents and ensures the quality of the fuel oil being supplied to the diesel generators. The relatively small volume of the day tanks and the high turnover of fuel oil support the justification for not needing to perform multilevel testing of the day tanks. In addition, multi-level samples are obtained from the fuel oil storage tanks and analyzed quarterly such that ingress of contaminants to the day tanks is not expected.

Therefore, the intent of NUREG-1801, Section XI.M30, that the quality of the fuel oil be monitored and maintained is met for the day tanks.

Program Elements Affected

- **Element 4: Detection of Aging Effects**

  The frequent sampling of the fuel oil day tanks, combined with the multi-level sampling of the diesel generator fuel oil storage tanks, ensures that water and sediment will not accumulate to a significant extent in the day tanks. Along with visual inspection and quarterly analysis of the fuel oil for contaminants, the one-gallon sample of fuel that is drained each month from the day tank effectively removes contaminants that may result in aging effects of concern, therefore meeting the intent of NUREG-1801, Section XI.M30."

As stated in the response to RAI B2.1.15-1 provided in letter dated August 17, 2009 [ADAMS Accession No. ML092320093], a one-time inspection will be performed on the fuel oil day tanks prior to the period of extended operation. The quarterly laboratory analysis combined with a confirmatory one-time inspection provides assurance that the effects of aging will be adequately managed through the period of extended operation.

The following commitment will be added to LRA Appendix A, USAR Supplement, Table A6.0-1:

Item	Commitment	Source	Schedule
30	Quarterly laboratory testing of fuel oil samples for water, sediment and particulates will be performed on the Emergency Diesel Generators and Technical Support Center Diesel Generator day tank. The testing acceptance criteria will be consistent with the requirements specified in ASTM D975-06b for water and sediment and ASTM D6217 for particulates.	Fuel Oil Chemistry	Prior to the Period of Extended Operation

ATTACHMENT 3

ADDITIONAL EXCEPTIONS FOR COMPRESSED AIR MONITORING PROGRAM

KEWAUNEE POWER STATION
DOMINION ENERGY KEWAUNEE, INC.

Compressed Air Monitoring Program Supplemental Information

During the NRC Region III License Renewal Inspection, it was identified that the two deviations from the NUREG-1801, Section XI.M24, "Compressed Air Monitoring" aging management program (AMP) identified in the basis document for the *Compressed Air Monitoring* program had not been included as exceptions in the LRA Section B2.1.9, Compressed Air Monitoring, program description.

To clarify these deviations, the following exceptions to the NUREG-1801, Section XI.M24 AMP are identified for the Compressed Air Monitoring program:

Exception 2: Compressed Air System Sampling Locations

The Station and Instrument Air System and the Emergency Diesel Generator air start subsystems are not sampled at various locations as recommended by NUREG-1801, Section XI.M24.

Justification

The sample point for the Station and Instrument Air System is downstream of the system dryer tower. The sample points for the Emergency Diesel Generator air start subsystems are downstream of the dryer for each subsystem.

Since the systems are normally pressurized, the only source for contaminates or moisture into the system would be via the respective compressors. Therefore, measuring the quality of the air as it enters the system provides an accurate representation of the quality of the air in the systems.

Program Elements Affected

- **Element 1: Scope of Program**
  Monitoring the compressed air as it enters the system provides an accurate representation of the quality of the air to ensure that the compressed air systems can perform their intended function.

Exception 3: Sampling Results Trending

The sample data for the Station and Instrument Air System and the Emergency Diesel Generator air start subsystems are not trended as recommended by NUREG-1801, Section XI.M24.

Justification

Specific chemistry control parameter limits have been established for the Station and Instrument Air System and the Emergency Diesel Generator air start subsystems. These limits were established based on ANSI/ISA-7.0.01-

1996 to support proper operation of the components supplied with compressed air. Measured chemistry parameters are compared to these control parameters and action is taken to restore the parameters within specification if out of specification conditions are identified.

Maintaining the compressed air system air quality in accordance with ANSI/ISA-7.0.01-1996 provides sufficient margin to ensure continued system function. Data trending of the control parameter results would not provide information useful for aging management. Chemistry procedures require that out of specification conditions are documented in the Corrective Action Program.

Program Elements Affected

- **Element 5: Monitoring and Trending**

  Maintaining the compressed air system air quality in accordance with ANSI/ISA-7.0.01-1996 ensures that the compressed air systems can perform their intended function.