October 13, 2009

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE KEWAUNEE POWER STATION LICENSE RENEWAL APPLICATION – AGING MANAGEMENT REVIEW RESULTS (TAC NO. MD9408)

Dear Mr. Heacock:

By letter dated August 12, 2008, Dominion Energy Kewaunee, Inc., submitted an application for renewal of operating license DPR-43 for the Kewaunee Power Station. The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing this application in accordance with the guidance in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." During its review, the staff has identified areas where additional information is needed to complete the review. The staff's requests for additional information are included in the enclosure. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with Mr. Paul Aitken, of your staff, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me by telephone at 301-415-4049 or by e-mail at Samuel.Hernandez@nrc.gov.

Sincerely,

/RA/

Samuel Hernández, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-305

Enclosure:
As stated

cc w/encl: See next page

October 13, 2009

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DATE	09/22/09	09/21/09	10/139	10/139

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Letter to David A. Heacock from Samuel Hernandez dated October 132009

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE KEWAUNEE POWER STATION LICENSE RENEWAL APPLICATION – AGING MANAGEMENT REVIEW RESULTS (TAC NO. MD9408)

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Kewaunee Power Station

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KEWAUNEE POWER STATION
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION
AGING MANAGEMENT REVIEW RESULTS

Request for Additional Information (RAI) 3.1.2.2.6-1 - Reactor Vessel Internals

Background/Issue:
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.

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.

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).

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.

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."

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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 Soceity 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.

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.

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.

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.

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.