Progress Energy

JAN 17 2008

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U. S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

Subject: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400 / LICENSE NO. NPF-63

LICENSE RENEWAL APPLICATION - AMENDMENT 6 AND RESPONSES TO REQUESTS FOR ADDITIONAL INFORMATION RELATED TO AGING MANAGEMENT REVIEWS AND TIME-LIMITED AGING ANALYSES

References:
1. Letter from Cornelius J. Gannon to the U. S. Nuclear Regulatory Commission (Serial: HNP-06-136), "Application for Renewal of Operating License," dated November 14, 2006
2. Letter from Maurice Heath (NRC) to Robert J. Duncan II, "Requests for Additional Information for the Review of the Shearon Harris Nuclear Power Plant, Unit 1, License Renewal Application," dated January 7, 2008
3. Letter from Thomas J. Natale to the U. S. Nuclear Regulatory Commission (Serial: HNP-07-119), "License Renewal Application, Amendment 2: Changes Resulting from Responses to Site Audit Questions Regarding Time-Limited Aging Analyses," dated August 31, 2007

Ladies and Gentlemen:

On November 14, 2006, Carolina Power & Light Company, doing business as Progress Energy Carolinas, Inc., requested the renewal of the operating license for the Shearon Harris Nuclear Power Plant, Unit No. 1, also known as the Harris Nuclear Plant (HNP), to extend the term of its operating license an additional 20 years beyond the current expiration date.

By letter dated January 7, 2008, the Nuclear Regulatory Commission provided requests for additional information (RAIs) concerning the HNP License Renewal Application (LRA). The RAIs involve several aging management reviews from LRA Sections 3.2 and 3.4.

In addition, the NRC staff has asked for clarification of several audit questions regarding time-limited aging analyses (TLAAs) documented in LRA Chapter 4.0 as amended by CP&L letter to the NRC dated August 31, 2007. Responses to the RAIs and follow-up clarifications to the audit questions are enclosed.

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Based on the above, this letter contains three enclosures. Enclosure 1 provides the additional information requested by the NRC staff. Enclosure 2 is a table that identifies the changes to the LRA; the changes constitute Amendment 6 to the LRA. Enclosure 3 is the list of HNP regulatory commitments supporting License Renewal modified to reflect the information provided in the responses to the RAIs. (See Commitment #32.) Any other actions discussed should be considered intended or planned actions; they are included for informational purposes but are not considered to be regulatory commitments.

Please refer any questions regarding this submittal to Mr. Roger Stewart, Supervisor - License Renewal, at (843) 857-5375.

I declare, under penalty of perjury, that the foregoing is true and correct (Executed on JAN 17 2008).

Sincerely,

Thomas J. Natale
Manager - Support Services
Harris Nuclear Plant

TJN/mhf

Enclosures:

1. Responses to Requests for Additional Information dated January 7, 2008 and to Follow-Up Audit Questions on Time-Limited Aging Analyses
2. Amendment 6 Changes to the License Renewal Application
3. HNP License Renewal Commitments, Revision 3

cc:

Mr. P. B. O'Bryan (NRC Senior Resident Inspector, HNP)
Ms. B. O. Hall (Section Chief, N.C. DENR)
Mr. M. L. Heath (NRC License Renewal Project Manager, HNP)
Mr. V. M. McCree (NRC Acting Regional Administrator, Region II)
Ms. M. G. Vaaler (NRC Project Manager, HNP)

Responses to Requests for Additional Information dated January 7, 2008 and to Follow-Up Audit Questions on Time-Limited Aging Analyses

Background

On November 14, 2006, Carolina Power & Light Company (CP&L), doing business as Progress Energy Carolinas, Inc., requested the renewal of the operating license for the Shearon Harris Nuclear Power Plant, Unit No. 1, also known as the Harris Nuclear Plant (HNP), to extend the term of its operating license an additional 20 years beyond the current expiration date.

By letter dated January 7, 2008, the Nuclear Regulatory Commission provided requests for additional information (RAIs) concerning the HNP License Renewal Application (LRA). The RAIs involve several aging management reviews documented in LRA Sections 3.2 and 3.4. In addition, the NRC staff has asked for clarification of several audit questions regarding time-limited aging analyses (TLAAs) documented in LRA Chapter 4.0 as amended by CP&L letter to the NRC dated August 31, 2007. The requested information is provided below.

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NRC RAI 3.2-1

The staff has the following questions in regard to using the Water Chemistry Control Program and/or the One-Time Inspection Program to manage aging effects in the emergency safety feature components.

A. Provide your basis for referencing GALL Volume 2 AMR Item V.A-27 in lieu of AMR Item V.C-4 for stainless steel containment isolation piping and component that are exposed to treated water, as referenced in Table 3.2.2-1 of the LRA. In particular, provide your basis for why a One-Time Inspection Program should not be coupled to the Water Chemistry Program to manage loss of material due crevice corrosion and pitting corrosion in these components, as in recommended in AMR Item V.C-4 of the GALL Report, Volume 2.

B. Provide your basis for crediting a One-Time Inspection Program alone to manage loss of material due to pitting and crevice corrosion for emergency safety feature tank items referencing LRA item 3.2.1-7, and why the Water Chemistry Program is also not credited for these tanks, particularly when CP&L is relying on plant-specific chemistry procedures to sample and test the water inventory in these tanks.

C. Provide your basis why those Type 2 Table AMRs in LRA 3.2.2-1 and the AMR discussion in LRA Section 3.2.2.2.8.2 for steel containment isolation piping, piping components, and piping elements referencing LRA AMR Item 3.2.1-15 have not be aligned to GALL AMR Item V.C-6. Specifically provide your basis why your further evaluation basis for these AMRs have not credited both the One-Time Inspection Program and the Water Chemistry Program to manage loss of material due to general, pitting, and crevice corrosion in the surfaces of the containment isolation piping, piping components, and piping elements that are exposed to a treated water environment.

RAI 3.2-1 Response

Response to Part A

HNP methodology used the information in NUREG-1833, "Technical Bases for Revision to the License Renewal Guidance Documents," October 2005, as a basis for not requiring a One-Time Inspection. The material, environment, aging effect, and program (MEAP) for Item EP-41, states on page 62, for GALL (i.e., NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," Rev. 1, September 2005) systems in Chapters IV, V, VII and VIII the following:

Table II.A New AMR Line-items based on new 'MEAP' combinations relevant to Mechanical Systems ("A" for Auxiliary, "E" for Engineered Safety Features, "R" for Reactor Coolant, and "S" for Steam and Power Conversion)				
Structure and/or Component	**Material**	**Environment**	**Aging Effect / Mechanism**	**AMP**
Piping, piping components, piping elements, and tanks	Stainless steel	Treated borated water	Loss of material / pitting and crevice corrosion	Chapter XI.M2, "Water Chemistry," for PWR primary water

The last column of the table explains the technical basis for this line is as follows:

> An approved precedent exists for adding this material, environment, aging effect, and program combination in GALL Rev. 1. GALL Rev. 0 stated that "the effects of pitting and crevice corrosion (loss of material) on stainless steel are not significant in reactor coolant (i.e., treated borated water), and therefore are not included" as an aging effect that required management (i.e., an AMR line-item was not included in the GALL Report). This statement is true for PWRs in part because water chemistry program requirements minimize contaminates that could lead to a loss of material. The Staff has removed this statement from the GALL Report and has added this new AMR line-item in the GALL Rev. 1 Report for PWRs, which although no significant loss of material is expected, recognizes that applicants can manage loss of material in stainless steel in a treated borated water environment by virtue of their use of a water chemistry program which meets XI.M2.

The HNP methodology determined as illustrated by this GALL alignment that this aging management review (AMR) Item in Table 3.2.2-1 of the LRA represents the stainless steel containment isolation piping and component in the Containment Spray System. The containment isolation piping contains treated borated water from the Refueling Water Storage Tank (RWST). The chemistry of the RWST is controlled under the Water Chemistry aging management program (AMP) for primary coolant, and its control limits for chlorides, fluorides and sulfates in the RWST is subjected to same limits as the Reactor Coolant System for the reactor coolant when it is less than 250°F. Consequently, it has been determined that this MEAP item would apply.

Response to Part B

This question was asked previously during an NRC audit at HNP. See Response to Audit Question No: 3.2.1-07-SA-01 in HNP letter to NRC, Serial: HNP-07-112, dated August 20, 2007. This AMR line is referring to the external surface of the bottom of the RWST. LRA page 3.2-29 refers to the One-Time Inspection alone without the Water Chemistry Program as this is a Raw Water environment. Plant-Specific Note 214 is referenced in this AMR line item and it states on LRA page 3.2-44:

> This line item represents corrosion resulting from water seepage underneath the RWST. The tank area enclosure for the RWST does not drain automatically.

> Therefore standing rainwater may accumulate to levels above the tank pad elevation.

There is no chemistry control of contaminants in this environment. The radiochemistry controls discussed in LRA paragraph 3.2.2.3.5 is referring to radiochemical sampling of the entrapped rainwater to ensure there is no radiological contamination before the water is drained to the environment.

Response to Part C

There are no AMR Line Items in LRA 3.2.2-1 aligned to GALL AMR Item V.C-6 because there are no carbon steel containment isolation piping, piping components, and piping elements in the Containment Spray System. The only carbon steel piping components in the system are those described in Plant-Specific Note 213 and associated with the carbon steel piping, piping components and piping elements on page 3.2-28. Note 213 states on LRA page 3.2-44:

> This line item represents the internal surface of carbon steel nitrogen supply piping to the Containment Spray Additive Tank. A nitrogen blanket is maintained which prevents degradation during long-term storage. Although corrosion is not expected, a one-time inspection has been assigned to verify the aging effect is not occurring.

LRA Subsection 3.2.2.2.8.2 refers to the internal surfaces of carbon steel containment isolation valves in treated water. It does not credit any particular combination of AMPs. Subsection 3.2.2.2.8.2 states, "If loss of material due to pitting and crevice corrosion is applicable, an appropriate aging management program is credited." None of the Engineered Safety Features (ESF) systems contain containment isolation components with this material environment combination. Since the further evaluation discussion of Subsection 3.2.2.2.8.2 is not applicable to any AMR item in the ESF chapter, the question regarding a basis for selecting the Water Chemistry Program without a One Time inspection Program is moot.

NRC RAI 3.2-2

Provide your basis for concluding the emergency safety feature systems do not include stainless steel components that are exposed to or subject internal condensation (as stated in discussion columns of LRA item 3.2.1-8).

RAI 3.2-2 Response

Although, the ESF Systems contain components with a gas, vapor, and fluid interface where condensation is possible, this environment is not similar to the environment represented by AMR Line Item 3.2.1-8 in NUREG-1801. Secondly, HNP conservatively evaluated these components as stainless steel subjected to a treated water environment. Using the HNP methodology, the treated water is assumed to contain high levels of contaminants and oxygen. This evaluation would predict a bounding set of aging mechanisms requiring management.

The components in the Containment Spray System with a gas, vapor, and fluid interface are the RWST, which is vented to the atmosphere, and the Containment Spray Additive Tank, which contains a nitrogen overpressure. The components in the Passive Safety Injection System are the Cold Leg Accumulators, which contain a treated water environment pressurized with nitrogen.

Two of these components have an inert nitrogen atmosphere, and the RWST is a covered tank with vents that are designed to protect it from weather. The following summarizes the outdoor environment surrounding the HNP RWST as it relates to potential for corrosion of stainless steel. HNP is not near enough to any industrial facility or salt water environment such that weather or process system leakage would have the potential to concentrate contaminants. Surface contaminants would not be in large enough quantities for significant concentrations to occur. HNP has taken the position that, unless there is operating experience (OE) to the contrary; an evaluation that results in aging effects in these environments is not applicable. This position is consistent with GALL, the HNP methodology basis documentation, and Electric Power Research Institute (EPRI) Report 1002950, Rev. 1 (EPRI Structural Tools), Table 2-3. No site OE was identified that negated the use of this evaluation. Other than during refueling outages, the RWST liquid is not subject to large volume changes and concomitant exchanges of air. Therefore, the air remains essentially saturated and there is little if any cyclic wetting and drying in an atmosphere low in contaminants. Consequently, this would not provide an opportunity for concentration of contaminants. Based on this rationale, HNP concludes that the vented space is not subject to concentration of contaminants and would not predict aging effects requiring management. For these reasons, the Water Chemistry Program, which is used for the liquid filled portion of the tank, would provide a similar degree of protection from loss of material to the air filled portion.

The basis for AMR Line Item 3.2.1-8 in NUREG-1801 is provided below to compare and contrast that environment with the conditions described above.

GALL line 3.2-8 is associated with GALL Table 2 AMR line Items numbered V.A-26 and V.D1-29. The GALL Item Number for this MEAP combination is EP-53. Page 67 of NUREG-1833 describes the precedent for GALL Item Number EP-53 as:

> The basis for this new line-item is similar to AP-72. The addition of this item extends the MEAP combination for BWRs contained in E-14 to PWRs. A plant-specific aging management program will be evaluated to provide reasonable assurance that the component's intended functions will be maintained within the CLB for the period of extended operation.

NUREG-1833 and NUREG-1801, Rev. 0, April 2001, were reviewed for the bases behind EP-53, and it was determined that the related items in NUREG-1801 were E-14 and AP-81. The E-14 item environments were representative of a BWR "Moist Containment Atmosphere (air/nitrogen)," and the AP-81 environment is representative of that found in "Liquid Waste and Drains" at the Farley Nuclear Plant.

BWR containments contain a suppression pool, several large pieces of operating equipment (e.g. Recirculation Pumps, relief valves, and ventilation fans), a suppression pool, pipe insulation, dust and airborne contaminants from work activities during outages. The ventilation systems circulate the containment atmosphere throughout. HNP does not consider this environment or the environment in Liquid Waste and Drains components to be similar to the internal environments above the fluid level in the tanks listed in the Containment Spray and Passive Safety Injection Systems.

In summary, although, the Emergency Safety Feature Systems contain components with a gas, vapor, and fluid interface where condensation is possible, the HNP environment is not similar enough to the environment represented by AMR Line Item 3.2.1-8 in NUREG-1801. The saturated gas atmospheres above these tanks have been shown to be benign, but were nevertheless conservatively evaluated as a treated water environment.

NRC RAI 3.4-1

Provide your basis why a one-time examination is adequate to manage loss of material for the following piping, piping components, and piping elements in lieu of a inspection-based program that credits periodic inspections of the components:

- those in the steam generator chemical addition system whose inside surfaces are exposed to a treated water (inside) environment.

RAI 3.4-1 Response

This question has been asked previously during an NRC audit at HNP. The LRA has been amended to incorporate the response. Refer to LRA Amendment 1 submitted in HNP letter to NRC, Serial: HNP-07-112, dated August 20, 2007.

LRA Amendment 1 identified that the subject piping, piping components, and piping elements in a treated water (inside) environment will be managed by implementing the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program instead of the One-Time Inspection Program.

NRC RAI 3.4-2

The LRA credits the External Surfaces Monitoring Program to manage cracking and changes in material properties for the following elastomeric components:

- piping, piping components, and piping elements in the main steam system whose outside surfaces are exposed to an air - indoor (outside) environment.
- piping, piping components, and piping elements in the feedwater system whose outside surfaces are exposed to an air - indoor (outside) environment.

The "parameters monitored" program element in GALL AMP XI.M36, "External Surfaces Monitoring," does not mention that the program monitors for cracking or changes in material properties of elastomeric components. The GALL program only calls for simple visual examinations (VT-2 or VT-3) of the external surfaces of piping to look for leakage, loss of material due to corrosion, signs of corrosion in insulation materials, or degraded coatings. The visual examinations cannot be credited for cracking unless they are specified as enhanced VT-1 visual techniques. Nor can these visual examinations directly monitor for changes in the material properties of the elastomers. Some sort of analysis would have to be performed to define those material properties that could be affected by the air - indoor (outside) environment and an inspection method would need to be credited that is related back to the appropriate material property analysis and is capable of detecting and sizing a flaw or crack in the elastomeric materials prior to a component failure.

A. For these elastomeric components, identify all material properties that may be impacted by the exposure to the air indoor (outside) environment. Clarify whether an applicable material property analysis has been performed to demonstrate how these components will behave in the air - indoor (outside) environment through the period of extended operation and how the inspections credited in the External Surfaces Monitoring Program will be sufficient to manage applicable aging effects prior to a component failure, after taking into account the limiting material property or properties of the elastomeric materials. If an applicable material property analysis has not been performed to date, provide your basis why the inspections credited under the External Surfaces Monitoring Program are considered to be capable of managing aging (e.g., cracking or loss of material) and the changes in the impacted material properties without tying the inspection techniques to an applicable material property analysis for the properties that may be impacted during period of extended operation.

B. Justify how the External Surfaces Monitoring Program can be credited to manage cracking in these elastomeric components without crediting at least an enhanced VT-1 visual examination of elastomeric materials.

RAI 3.4-2 Response

A. The industry is familiar with aging effects and mechanisms applicable to elastomers as seen in NUREG-1801, which is based on many years of industry OE. NUREG-1801, Volume 2, states that elastomer degradation may include cracking, crazing, fatigue breakdown, abrasion, chemical attacks, and weathering. Elastomer hardening refers to the degradation in elastic properties of the elastomer. As noted in NUREG-1801, hardening and loss of strength can be induced by elevated temperature over about 95°F (35°C), and aging effects are subject to additional aging factors such as exposure to ozone, oxidation, and radiation. If the ambient temperature is less than about 95°F (35°C), then thermal aging may be considered not significant for elastomers and any resultant thermal aging of organic materials can be considered to be insignificant, over the 60-year period of interest.

   The EPRI Structural Tools examined industry failure data and NRC generic communications to determine if there are any additional aging effects that should be considered for elastomers. This review included searches of Institute of Nuclear Power Operations (INPO) Nuclear Plant Reliability Data System (NPRDS) databases, NRC Information Notices and Bulletins, and NRC Licensee Event Reports. The search was performed for rubber, neoprene, and silicone vibration isolators, sealants, and elastomers. Most of the industry experience failures related to these materials were associated with piping, penetration, and equipment sealants. The one reported failure associated with aging was the failure of a silicone sealant in the floor of a concrete containment building but did not address the cause of the sealant failure.

The HNP basis calculation "Material/Environment Aging Effect Tools for License Renewal" (HNP Tools calculation) identified the aging effects for elastomers as change in material properties due to various degradation mechanisms and cracking due to various degradation mechanisms. These aging effects for elastomers in hydraulic fluid are consistent with industry practice as detailed in the EPRI Structural Tools. HNP plant-specific OE did not identify any new or unique aging effects. The HNP Tools calculation predicts wear for elastomers if there is relative motion between surfaces not associated with a design deficiency. No OE was discovered to indicate that relative motion between surfaces had occurred, and so, wear was not predicted. Based on the above, no other aging effects were predicted.

B. Walkdowns by system engineers are an essential part of system monitoring and have been used through the years to identify degraded components. The HNP procedure for system walkdowns and observations is used by HNP system engineers and provides guidance for conducting system walkdowns. The procedure employs a system walkdown guideline for engineers to use during their periodic walkdowns and includes guidance to inspect components for brittle or cracking plastic, rubber, or elastomer components.

The external surface of the subject Main Steam System and Feedwater System components will be managed by the External Surfaces Monitoring Program using observations during periodic system walkdowns. A quarterly system walkdown frequency is typically established, with all components of the system observed at least once per operating cycle. It is noted that no age-related degradation of the subject elastomer components was found during the system OE review.

HNP evaluated the GALL External Surfaces Monitoring Program and determined that enhancement was needed to assure detection of degradation in elastomeric materials. License Renewal Commitment #18 requires the specific enhancements to be defined prior to the period of extended operation; therefore, the HNP inspection methods for elastomers were not to be selected until the implementation phase of the program. The enhancements to be implemented for the External Surfaces Monitoring Program at HNP will be incorporated into the inspection guidelines used for system walkdown and will include specific guidance for periodic inspections of elastomeric components.

Therefore, for the subject Main Steam System and Feedwater System components, inspection acceptance criteria will be determined prior to the period of extended operation. HNP will remain abreast of industry best practices for aging management of the piping, piping components, and piping elements made of elastomers in the Main Steam System and Feedwater System whose outside surfaces are exposed to an air - indoor (outside) environment. Prior to the period of extended operation, guidance will be developed, and the External Surfaces Monitoring Program will be enhanced accordingly.

Based on the above, the periodic inspections credited under the enhanced External Surfaces Monitoring Program will be capable of managing aging (e.g., cracking and/or changes in material properties) during the period of extended operation for the external surfaces of the subject Main Steam System and Feedwater System elastomeric hoses.

NRC RAI 3.4-3

The LRA credits the External Surfaces Monitoring Program to manage cracking and changes in material properties for the following thermoplastic (including PVC) components:

- those in the main steam system whose outside surfaces are exposed to a radiation (ultraviolet, outside) environment.
- those in the secondary sampling system whose outside surfaces are exposed to a radiation (ultraviolet, outside) environment.

The "parameters monitored" program element in GALL AMP XI.M36, "External Surfaces Monitoring," does not mention that the program monitors for cracking or changes in material properties of thermoplastic components. The GALL program only calls for simple visual examinations (VT-2 or VT-3) of the external surfaces of piping to look for leakage, loss of material due to corrosion, signs of corrosion in insulation materials, or degraded coatings. The visual examinations cannot be credited for cracking unless they are specified as enhanced VT-1 visual techniques. Nor can these visual examinations directly monitor for changes in the material properties of the thermoplastic materials. Some sort of analysis would have to be performed to define those material properties that could be affected by the radiation (ultraviolet) (outside) environment and an inspection method would need to be credited that is related back to the appropriate material property analysis and is capable of detecting and sizing a flaw or crack in the thermoplastic materials prior to a component failure.

A. For these thermoplastic components, identify all material properties that may be impacted by the exposure to the radiation (ultraviolet) (outside) environment. Clarify whether an applicable material property analysis has been performed to demonstrate how these components will behave in the radiation (ultraviolet) (outside) environment through the period of extended operation and how the inspections credited in the External Surfaces Monitoring Program will be sufficient to manage applicable aging effects prior to a component failure, after taking into account the limiting material property or properties of the thermoplastic materials. If an applicable material property analysis have not been performed to date, provide your basis why the inspections credited under the External Surfaces Monitoring Program are considered to be capable of managing aging (e.g., cracking or loss of material) and the changes in the impacted material properties without tying the inspection techniques to an applicable material property analysis for the properties that may be impacted during period of extended operation.

B. Justify how the External Surfaces Monitoring Program can be credited to manage cracking in these thermoplastic components without crediting at least an enhanced VT-1 visual examination of the thermoplastic materials.

RAI 3.4-3 Response

A. The referenced commodity in the Main Steam System whose outside surfaces are exposed to radiation in an indoor (Reactor Auxiliary Building) ultraviolet radiation environment represents thermoplastic breather caps associated with main steam power-operated relief valve (PORV) actuators as identified on LRA pages 3.4-44 and 3.4-76. These components are exposed to overhead fluorescent lighting.

The referenced commodity in the Secondary Sampling System whose outside surfaces are exposed to radiation in an indoor (Reactor Auxiliary Building) ultraviolet radiation environment represents thermoplastic tubing associated with sample station flow indicators as identified on LRA pages 3.4-72 and 3.4-77. These components are exposed to overhead fluorescent lighting.

The HNP Tools calculation identified the aging effects for thermoplastic (organic photosensitive polymers) in an ultraviolet radiation environment as change in material properties due to various degradation mechanisms and cracking due to various degradation mechanisms. These aging effects are consistent with industry practice as detailed in SAND96-0344, Table 4-8, which identifies the aging effects as cracking and discoloration.

B. Walkdowns by system engineers are an essential part of system monitoring and have been used through the years to identify degraded components. The HNP system walkdowns and observations procedure is used by HNP system engineers and provides guidance for conducting system walkdowns. This procedure employs a system walkdown guideline for engineers to use during their periodic walkdowns and includes guidance to inspect components for brittle or cracking plastic.

The external surface of the subject Main Steam System and Secondary Sampling System components will be managed by the External Surfaces Monitoring Program using observations during periodic system walkdowns. A quarterly system walkdown frequency is typically established, with all components of the system observed at least once per operating cycle.

HNP evaluated the GALL External Surfaces Monitoring Program and determined that enhancement was needed to assure detection of degradation in elastomer (and other non-metallics such as thermoplastic) materials. License Renewal Commitment #18 requires the specific enhancements to be defined prior to the period of extended operation; therefore, the HNP inspection methods for elastomers (and other non-metallics such as thermoplastic) were not to be selected until the implementation phase of the program. The enhancements to be implemented for the External Surfaces Monitoring Program at HNP will be incorporated into the inspection guidelines used for system walkdown and will include specific guidance for periodic inspections of these non-metallic components.

Therefore, for the subject Main Steam System and Secondary Sampling System components, inspection acceptance criteria will be determined prior to the period of extended operation. Acceptance may be based upon negligible visual degradation or manufacturer's recommendations, as appropriate. HNP will remain abreast of industry best practices for aging management of the piping, piping components, and piping elements made of thermoplastics in the Main Steam System and Secondary Sampling System whose outside surfaces are exposed to an air - indoor environment and subject to ultraviolet radiation. Prior to the period of extended operation, guidance will be developed and the External Surfaces Monitoring Program will be enhanced accordingly.

Based on the above, following enhancement, the periodic inspections credited under the External Surfaces Monitoring Program will be capable of managing aging (e.g., cracking and/or changes in material properties) during the period of extended operation for the external surfaces of the subject Main Steam System and Secondary Sampling System thermoplastic components.

NRC RAI 3.4-4

LRA Table 3.4.2-3 includes an AMR (annotated by Footnote F on LRA page 3.4-44) on exposure of thermoplastic piping, piping components, and piping elements in the main steam line to an oil or organic hydraulic fluid (inside) environment. In this AMR, CP&L concludes that there are not any aging effects requiring management. In his Textbook *Fundamental Principles of Polymetric Materials* (Copyright 1993, John Smiley and Sons), Dr. Stephen L. Rosen (Ph.D) discusses the principle of "like dissolves like" and identifies that polar solvents will dissolve polar polymetric materials and non-polar solvents will dissolve non-polar polymetric materials. Clarify what type of thermoplastic materials are used to define the commodity group in this AMR and what type of oils and hydraulic fluids are used to define the environmental conditions for this AMR. Clarify whether these thermoplastic materials are considered to be polar or non-polar polymetric materials and whether the oils and hydraullic fluids are considered to be polar or non-polar solvents. Consistent with these responses, provide your basis on whether or not loss of material from dissolving is considered to be an aging effect requiring management for the surfaces of the thermoplastic piping, piping components, and piping elements that are exposed to the oil or hydraulic fluid (inside) environment.

RAI 3.4-4 Response

LRA Table 3.4.2-3 identifies polyvinyl chloride (PVC) or thermoplastic piping, piping components, and piping elements in the main steam system. These components are breather caps for the hydraulic fluid system associated with the main steam system PORV actuators as detailed in Plant-Specific Note 405.

The breathers prevent water and contaminants from entering the hydraulic fluid reservoir as differential pressures occur through thermal expansion and contraction of the hydraulic fluid, or during the filling or emptying process. The breathers are subject to a hydraulic fluid mist. Breathers typically have the capability to extract water vapor from the air as it is drawn into the unit. Design pressure considerations are unnecessary since the breather is a vented component.

Before use at HNP, the materials chosen for the breathers are evaluated as compatible with their hydraulic fluid environment and to ensure that their failure would not degrade safety related equipment. It is expected that the breathers will be periodically changed in service. In addition, the hydraulic fluid is sampled periodically to verify moisture and particulate count are acceptable.

The HNP Tools calculation determined that the acceptability for use of thermoplastics within a hydraulic fluid environment is a design-driven criterion; and, once the appropriate material has been selected, there should be no applicable aging effects caused by the working fluid.

The PORV actuator hydraulic fluid is a phosphate ester. With over two decades of experience with phosphate esters, the hydraulic fluid industry has developed a complete summary of compatible materials of construction. Proper care in ordering components and replacement parts to be compatible with phosphate esters will result in start-up and operation without difficulty. Component manufacturers and suppliers have become quite familiar with the requirements of phosphate esters, and most compatible materials are readily available.

No age-related degradation of the breather caps for the hydraulic fluid system associated with the main steam system PORV actuators was found during the system OE review.

Based on the above, loss of material from dissolving is not considered to be an aging effect requiring management for the surfaces of the thermoplastic piping, piping components, and piping elements (breather caps) that are exposed to the hydraulic fluid (inside) environment.

NRC RAI 3.4-5

LRA Table 3.4.2-3 includes an AMR (annotated by Footnote J on LRA page 3.4-44) on exposure of elastomeric piping, piping components, and piping elements in the main steam line to an oil or organic hydraulic fluid (inside) environment. In this AMR, CP&L concludes that there are not any aging effects requiring management.

A. Clarify what type of elastomeric materials are used to define the commodity group in this AMR and what type of oils and hydraulic fluids are used to define the environmental conditions for this AMR. Clarify whether these elastomeric materials are considered to be polar or non-polar polymetric materials and whether the oils and hydraulic fluids are considered to be polar or non-polar solvents. Consistent with these responses, provide your basis on whether or not loss of material from dissolving is considered to be an aging effect requiring management for the surfaces of the elastomeric piping, piping components, and piping elements that are exposed to the oil or hydraulic fluid (inside) environment.

B. The "parameters monitored" program element in GALL AMP XI.M32, "One-Time Inspection," does not mention that the program monitors changes in material properties of elastomeric components. Define all material properties that may be impacted in the elastomeric materials under exposure to the oil or hydraulic fluid environment and whether an appropriate materials property analysis has been performed to define how the material properties will change and the elastomeric components will behave during the period of extended operation. If such an analysis has been performed, provide your basis why the One-Time Inspection Program is considered to be a valid program to manage the changes in material properties of the elastomeric piping, piping components, and piping elements, after taking into account the limiting material property or properties for the elastomeric materials. If an applicable material property analysis has not been performed to date, provide your basis why the One-Time Inspection Program is considered to be capable of managing the changes in the impacted material properties without defining an appropriate inspection technique that ties the inspection method back to an applicable material property analysis for the properties that may be impacted during period of extended operation.

C. Justify how the One-Time Inspection Program can be credited to manage cracking in these elastomeric components without crediting at least an enhanced VT-1 visual examination of the elastomeric materials.

RAI 3.4-5 Response

A. LRA Table 3.4.2-3 identifies elastomeric piping, piping components, and piping elements in the Main Steam System. These components are synthetic rubber hoses exposed to an internal environment of hydraulic fluid, and associated with the main steam system PORV actuators as detailed in Plant-Specific Note 404.

The industry is familiar with aging effects and mechanisms applicable to elastomers as seen in NUREG-1801, which is based on many years of industry OE. NUREG-1801, Volume 2, states that elastomer degradation may include cracking, crazing, fatigue breakdown, abrasion, chemical attacks, and weathering. Elastomer hardening refers to the degradation in elastic properties of the elastomer. As noted in NUREG-1801, hardening and loss of strength can be induced by elevated temperature over about 95°F (35°C), and aging effects are subject to additional aging factors such as exposure to ozone, oxidation, and radiation. If the ambient temperature is less than about 95°F (35°C), then thermal aging may be considered not significant for elastomers and any resultant thermal aging of organic materials can be considered to be insignificant, over the 60-year period of interest.

The EPRI Structural Tools examined industry failure data and NRC generic communications to determine if there are any additional aging effects that should be considered for elastomers. This review included searches of INPO NPRDS databases, NRC Information Notices and Bulletins, and NRC Licensee Event Reports. The search was performed for rubber, neoprene, and silicone vibration isolators, sealants, and elastomers. Most of the industry experience failures related to these materials were associated with piping, penetration, and equipment sealants. The one reported failure associated with aging was the failure of a silicone sealant in the floor of a concrete containment building but did not address the cause of the sealant failure.

The HNP Tools calculation identified the aging effects for elastomers as change in material properties due to various degradation mechanisms and cracking due to various degradation mechanisms. These aging effects for elastomers in hydraulic fluid are consistent with industry practice as detailed in the EPRI Structural Tools. HNP plant-specific OE did not identify any new or unique aging effects. The HNP Tools calculation predicts wear for elastomers if there is relative motion between surfaces not associated with a design deficiency. No OE was discovered to indicate that relative motion between surfaces had occurred, and so, wear was not predicted. Based on the above, no other aging effects were predicted.

The PORV actuator hydraulic fluid is a phosphate ester. With over two decades of experience with phosphate esters, the hydraulic fluid industry has developed a complete summary of compatible materials of construction. Proper care in ordering components and replacement parts to be compatible with phosphate esters will result in start-up and operation without difficulty. Component manufacturers and suppliers have become quite familiar with the requirements of phosphate esters, and most compatible materials are readily available. The hydraulic fluid is sampled periodically to verify moisture and particulate count are acceptable.

Based on the above, loss of material from dissolving is not considered to be an aging effect requiring management for the internal surfaces of the elastomeric piping, piping components, and piping elements (hoses) that are exposed to the hydraulic fluid (inside) environment.

B. No age-related degradation of PORV elastomer components was found during the system OE review and as also stated by the Lubricating Oil Analysis program manager at HNP. However, it is prudent to confirm that age-related degradation is not occurring. The internal surfaces of the hydraulic fluid hoses will be managed by the One Time Inspection AMP.

In addition to the generic inspections addressed in Section XI.M32 of NUREG-1801, the HNP One Time Inspection Program includes several plant-specific inspections to confirm the insignificance of a potential aging effect. For these components, it is considered that: 1) an aging effect is not expected to occur but the data is insufficient to rule it out with reasonable confidence, 2) an aging effect is expected to progress very slowly in the specified environment, but the local environment may be more adverse than that generally expected, or 3) the characteristics of the aging effect include a long incubation period. Unacceptable inspection findings are evaluated in accordance with the site Corrective Action process to determine the need for subsequent (including Periodic) inspections and for monitoring and trending the results. The HNP One Time Inspection AMP includes provisions for defining the type of inspection and acceptance criteria. Acceptance criteria may be based on construction code, manufacturer's recommendations, engineering evaluation, or detailed examination, as appropriate.

Based on the above, the HNP One Time Inspection AMP is considered appropriate to manage the elastomeric piping, piping components, and piping elements (synthetic rubber hoses) exposed to hydraulic fluid for the Main Steam System PORV actuators.

C. For the elastomers in a hydraulic fluid environment, inspection acceptance criteria will be determined prior to the period of extended operation. HNP will remain abreast of industry best practices for aging management of the piping, piping components, and piping elements (hoses) made of synthetic rubber for the hydraulic fluid system associated with the Main Steam System PORV actuators.

As stated above, the HNP One Time Inspection AMP includes provisions for defining the type of inspection and acceptance criteria. Acceptance criteria may be based on construction code, manufacturer's recommendations, engineering evaluation, or detailed examination, as appropriate.

Based on the above, the inspections credited under the One Time Inspection Program are considered capable of managing cracking during the period of extended operation for the main steam system elastomeric hoses that are exposed to the hydraulic fluid (inside) environment.

NRC RAI 3.4-6

LRA Table 3.4.2-6 includes an AMR (annotated by Footnote F on LRA page 3.4-54) on exposure of nickel-based alloy piping, piping components, and piping elements in the feedwater system under exposure to a treated water (inside) environment. In this AMR, CP&L identified that cracking due to thermal fatigue is an applicable aging effect requiring management (AERM) and credited the TLAA on metal fatigue to manage this aging effect. CP&L's TLAA on metal fatigue, as discussed and evaluated in Section 4.3 of the LRA, is predicated on preventing the initiation of a fatigue induced flaw, and thus cannot be used to manage a fatigue-induced flaw that is already postulated on already exists in the stated piping components. In addition, industry experience has demonstrated that nickel-based alloy materials in PWR designs are susceptible crack initiation and growth by stress corrosion cracking (SCC).

A. For the stated AMR on LRA page 3.4-54, clarify whether the AMR has postulated the occurrence of a fatigue-induced crack of the applicable nickel-based alloy piping, piping components, or piping elements or whether HNP has relevant operating experience fatigue-initiated cracking in the nickel-alloy piping components of the feedwater system. If so, justify the basis for crediting the TLAA on metal fatigue as the basis for managing fatigue induced cracking in these components.

B. Clarify whether cracking from SCC is an applicable AERM for these nickel-alloy piping components, and if so, whether fatigue-induced flaw growth of an SCC-initiated crack is an aging effect requiring management during the period of extended operation. If so, justify the basis for crediting the TLAA on metal fatigue as the basis for managing fatigue-induced crack growth of an SCC-initiated crack in these components.

RAI 3.4-6 Response

Response to Part A

The HNP AMR items do not postulate the occurrence of a fatigue-induced crack in the nickel base alloy component. Refer to HNP's Response Audit Question 3.1-FS-44 in HNP letter HNP-07-112, which describes this aspect of the HNP AMR methodology.

The evaluation of OE for the feedwater system did not identify any instance of thermal fatigue-initiated cracking in the nickel-based components at HNP.

Response to Part B

The HNP methodology did not predict cracking due to SCC for the nickel based alloys piping component in the Feedwater System. The environmental conditions in this section of the piping are below the threshold for which HNP would predict this aging effect or mechanism. Consequently, there is no need to justify using a TLAA for management of fatigue-induced flaw growth of an SCC-initiated crack, because the condition is not applicable.

NRC RAI 3.4-7

LRA Table 3.4.2-6 includes an AMR (annotated with Footnote J on LRA page 3.4-53) on elastomeric piping, piping components, and piping elements that are exposed to an air/gas (dry) (inside) environment. CP&L has used conformance with the guidelines of NEI Document No. NEI-95-10, Revision 6, as a basis for concluding that there are not any applicable aging effects for these elastomeric piping components. Conformance with the industry guidance in NEI 95-10, Revision 6, does not necessarily provide an sufficient technical basis to conclude that aging effects are not applicable to these elastomeric feedwater system components because this is not consistent with guidance in the GALL Report, Volume 2. In particular, GALL Report, Volume 2, Table IX.F, "Selected Definitions and Use of Terms for Describing and Standardizing AGING MECHANISMS," identifies that the following degradation mechanisms may be applicable to elastomeric materials, including rubbers: (1) cracking, (2) crazing, (3) fatigue breakdown, (4) abrasion, (5) chemical attacks, (6) weathering, and (&) elastomeric hardening. The staff is of the opinion that some of the aging effects identified in GALL Table IX.F for "elastomeric degradation" may be applicable to these elastomerics, particular if the dry air/gas environments are subject to a varied temperature range. Provide your basis for not crediting at least a One-Time Inspection to confirm that the aging effects for "elastomer degradation" in GALL Table IX.F are not applicable to these elastomeric piping components.

RAI 3.4-7 Response

Aging effects are applicable to the referenced elastomeric feedwater system components. The aging effects are cracking due to various degradation mechanisms and change in material properties due to various degradation mechanisms.

The piping, piping components, and piping elements made of elastomer in an air/gas (inside) environment identified on LRA page 3.4-53 are the same piping, piping components, and piping elements made of elastomer in an air-indoor (outside) environment identified on LRA page 3.4-53. Plant-Specific Note 411 applies to the line items and identifies they represent instrument air hoses in the Turbine Building. As noted, these components in the air-indoor environment have been assigned the aging effects of cracking and change material properties.

The aging effects for these elastomer hoses are driven by temperature (e.g., T > 95°F). It is likely that the external surface of the elastomer hoses will be at a higher temperature than the internal surface. It is reasonable to conclude that the aging effects on the external surface are representative of those on the internal surface. Consequently, aging management can be done by external examination. As such, LRA page 3.4-53 identifies aging effects on the outside surface of the piping, piping components, and piping elements made of elastomer in an air-indoor (outside) environment with the External Surfaces Monitoring AMP to manage the aging effects.

NRC RAI 3.4-8

LRA Table 3.4.2-10 and TLA Table 3.4.2-11 each include two AMRs (annotated with Footnote F on LRA page 3.4-67) on thermoplastic components in the condensate storage tank and in the secondary sampling system that are exposed to treated water (inside) and air/gas (wetted) (outside) environments. In these AMRs, CP&L does not identify any aging effects requiring management for the component/material/environment combinations and does not credit any AMPs for aging management. GALL Report, Volume 2, Table IX.F, "Selected Definitions and Use of Terms for Describing and Standardizing AGING MECHANISMS," identifies that thermoplastic materials may be subject to thermal degradation and/or thermoxidative degradation aging effects/mechanisms, including: (1) increased tensile strengths/hardening due to cross-linking, (2) loss of flexibility, (3) chain depolymeration, (4) crystallization, (5) decomposition/chemical reaction. The staff is of the opinion that some of the aging effects identified in GALL Table IX.F for "elastomeric degradation" may be applicable to these thermoplastic materials, particular if the environments are subject to a varied temperature range. Provide your basis for not crediting at least a One-Time Inspection on the inside and outside surfaces of the thermoplastic components in condensate storage tank and secondary sampling systems to confirm that the aging effects referenced in GALL Table IX.F for thermoplastic materials are not applicable to them.

RAI 3.4-8 Response

LRA Table 3.4.2-10, page 3.4-67, indicates that the Condensate Storage Tank (CST) contains a thermoplastic diaphragm located inside the CST. The diaphragm is exposed to a treated water environment on the water side and an air/gas wetted environment on the other side.

LRA Table 3.4.2-11, 3.4-72, identifies that the Secondary Sampling System contains thermoplastic piping components exposed to a treated water environment on the inside and an air/gas wetted environment on the outside. This thermoplastic tubing is associated with sampling water from the Condensate Storage Tank for levels of dissolved oxygen, pH, and conductivity. The thermoplastic tubing is located both in and near the CST sample sink located in the Unit 1 Tank Area/Building (indoor).

The HNP Tools calculation determined that the acceptability for use of thermoplastics within a treated water and air/gas environment is a design driven criteria; and, once the appropriate material has been selected, there should be no applicable aging effects caused by the working fluid. Thus, no aging effects were predicted.

The Condensate Storage Tank pressure is atmospheric and the temperature of the condensate in the CST is ambient for the Tank Area (not outdoor). The Secondary Sampling System sample tubing has been determined to be suitable for the temperature and pressure of the sample water. Thus, the CST diaphragm and sample tubing are not expected to be in environments subject to a significant change in temperature.

Based upon the above, the thermoplastic components in the Condensate Storage Tank and secondary sampling system are not predicted to have aging effects requiring management.

NRC RAI 3.4-9

The LRA aligns a number of Type 2 AMR items for steel steam generator system components, as provided in LRA Table 3.1.2-6, and an number of Type 2 AMR items for steel auxiliary system components, as provided in the LRA Tables designated as 3.3.2-X, to steam and power conversion system AMR Item 3.4.1-04 in the LRA, and has credited the One-Time Inspection Program and the Water Chemistry Program to manage loss of material due to general, pitting, and crevice corrosion in these components. Provide your basis for aligning these Type 2 steam generator system and auxiliary system AMR Items to LRA AMR Item 3.4.1-04, which is a steam and power conversion system AMR item, and justify why it is acceptable to credit to the One-Time Inspection Program and the Water Chemistry program to manage loss of material due to general, pitting, and crevice in these components in lieu of crediting an AMP that implements periodic inspections of the components.

RAI 3.4-9 Response

Basis for NUREG-1801 Alignments

The HNP AMR process is based on an evaluation of the MEAP of components subject to AMR. No restrictions are placed on alignment of AMR line items based on the specific system in which the component resides. Alignment to any section of NUREG-1801 was acceptable so long as the MEAP evaluation supports the alignment and aligned systems were judged to be of a similar type. Thus the HNP process allowed an auxiliary system component to be aligned to a steam and power conversion system NUREG-1801 line item, if applicable. The comparison evaluated each AMR line item by considering the component along with its MEAP. Below is an example explaining the comparison.

LRA Table 3.4.1 identifies Item Number 3.4.1-04 for steel piping components exposed to treated water and managed by the combination of the Water Chemistry Program and the One-Time Inspection Program.

Many AMR line items contributed to rollup Item Number 3.4.1-04. One of the contributors was a steel piping commodity (see LRA Table 3.4.2-6, page 3.4-52) in the Feedwater System treated water environment managed by the combination of the Water Chemistry Program and the One-Time Inspection Program. The Feedwater System is included in the Steam and Power Conversion systems.

Another contributor to LRA Table 3.4.1 rollup Item Number 3.4.1-04 was Steam Generator System steel instrument manifolds (see LRA Table 3.1.2-6, page 3.1-132) in a treated water environment managed by the combination of the Water Chemistry Program and the One-Time Inspection Program. Plant-Specific Note 106 states that the instrument manifolds are associated with the steam generator level instrumentation and the feedwater system. The Steam Generator System is included in the Reactor Vessel, Internals, and Reactor Coolant systems.

Based upon consideration of the components along with the MEAP, both AMR line items are similar, both were aligned to NUREG-1801 Volume 2 Item VIII.D1-8 and rolled up to Table 3.4.1 Item 3.4.1-04. In summary, alignments taken to NUREG-1801 line items were made based upon a consideration of a component's MEAP and similarity. Alignments between NUREG-1801 chapters were allowed by the HNP process based on the evaluations described above.

Acceptability of Crediting Water Chemistry and One-Time Inspection Programs

HNP based the approach of crediting the Water Chemistry Program with the One Time Inspection Program on NUREG-1801 recommendations, prior License Renewal Applications, NRC License Renewal Safety Evaluation Reports (SERs) accepting that position, and favorable site OE for systems which manage corrosion using treated water chemistry controls.

HNP manages the piping components exposed to treated water with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking and loss of material aging effects. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation. This approach is consistent with the many AMR line items in NUREG-1801 that rely on a program that controls the chemistry parameter in a system fluid, such as treated water, together with the One-Time Inspection Program which is used to verify the effectiveness of the chemistry control program in preventing the aging effect of concern. Refer to the list of chemistry control programs that rely on the One-Time Inspection Program for verification listed in Appendix A of NUREG-1833.

LRA AMR Item 3.4.1-04 in Table 3.4.1 refers to steel piping components exposed to treated water, subject to loss of material due to general, pitting, and crevice corrosion, and managed by a combination of the Water Chemistry Program and the One-Time Inspection Program. Table 3.4.1 addresses Steam and Power Conversion Systems.

NUREG-1801 Volume 2 Item VIII.D1-8 (S-10), for the Feedwater System, is a typical Steam and Power Conversion systems AMR line item for piping components exposed to treated water and subject to loss of material due to general, crevice and pitting corrosion. NUREG-1801 recommends related generic item S-10 be managed by a combination of the Water Chemistry Program and the One-Time Inspection Program.

Based upon this information, HNP considered it acceptable to credit the combination of the Water Chemistry Program and the One-Time Inspection Program to manage loss of material due to general, pitting, and crevice corrosion in the subject components in lieu of crediting an AMP that implements periodic inspections of the components.

NRC RAI 3.4-10

The staff has additional questions on why steel extraction steam system components have not been aligned to AMR Item 2 in the GALL Report, Volume 1, and whether there are any steel heat exchangers in the steam and power conversion system that align to AMR Item 3 in the GALL Report, Volume 1, Table 4.

A. LRA AMR Item 3.4.1-2 states that AMR Item 2 in Table 4 of the GALL Report, Volume 1, is not applicable to the HNP extraction steam system because the system is not within the scope of license renewal. Table VIII.C of the GALL Report, Volume 2, identifies that the extraction steam systems is a steam and power conversion system that may be within the scope of license renewal and recommends that the components in this system be subject to an AMR. Provide your basis why the extraction steam system is not within the scope of license renewal and why the extraction steam piping, piping components, and piping elements made from steel materials (i.e., carbon steel, low-alloy steel, or cast iron materials) would not be subject to the loss of material effect discussed in AMR Item 2 of GALL Report Volume 2, Table 4.

B. LRA AMR Item 3.4.1-3 states that AMR Item 3 in Table 4 of the GALL Report, Volume 1, which pertains to loss of material due to general pitting, and crevice corrosion in steel heat exchanger components in the condensate system and the steam generator blowdown system, is not applicable to HNP because the portions of these systems that are within the scope of license renewal do not include heat exchanger components. Clarify whether the condensate or steam generator blowdown systems included any steel heat exchangers that are within the scope of license renewal under the specific scoping criteria of 10 CFR 54.4(a)(2), and if so, to provide a basis why these heat exchangers would not be within the scope of AMR Item 3 in the GALL Report, Volume 1.

RAI 3.4-10 Response

A. As stated in LRA Section 2.1.1, "Scoping," Systems, Structures, and Components (SSCs) that satisfy the criteria of 10 CFR 54.4(a)(1), (2), or (3) are within the scope of License Renewal. LRA Table 2.2-1, License Renewal Scoping Results for Mechanical Systems, documents that the Extraction Steam System did not meet any of the scoping criteria and, thus, is not within the scope of License Renewal. Since the Extraction Steam System is not within the scope of License Renewal, the AMR line item in GALL for the system does not apply to HNP.

B. Neither the Condensate System nor the Steam Generator Blowdown System includes a steel heat exchanger that is within the scope of License Renewal under the specific scoping criteria of 10 CFR 54.4(a)(2) or any scoping criteria. This is indicated in the "Discussion" column of LRA Table 3.4.1, for line item 3.4.1-03.

NRC RAI 3.4-11

The LRA has aligned a number of the AMR items on cracking due stress corrosion cracking of stainless steel auxiliary system components, as provided in the Type 2 LRA Tables designated as 3.3.2-X (X being an integer defined in the LRA) to LRA AMR Item 3.4.1-14 and has credited the One-Time Inspection Program and the Water Chemistry Program to manage cracking due to stress corrosion cracking in these components. Provide your basis for aligning these Type 2 auxiliary system AMR items to LRA AMR Item 3.4.1-4, which is a steam and power conversion system AMR item, and justify why it is acceptable to credit to the One-Time Inspection Program and the Water Chemistry program to manage cracking due to stress corrosion cracking of stainless steel auxiliary system components in lieu of crediting an AMP that implements periodic inspections of the components.

RAI 3.4-11 Response

Basis for NUREG-1801 Alignments

The HNP AMR process is based on an evaluation of the MEAP of components subject to AMR. No restrictions are placed on alignment of AMR line items based on the specific system in which the component resides. Alignment to any section of NUREG-1801 was acceptable so long as the MEAP evaluation supports the alignment and aligned systems were judged to be of a similar type. Thus the HNP process allowed an auxiliary system component to be aligned to a steam and power conversion system NUREG-1801 line item, if applicable. The comparison evaluated each AMR line item by considering the component along with its MEAP. Below is an example explaining the comparison.

LRA Table 3.4.1 identifies Item Number 3.4.1-14 for stainless steel piping components exposed to treated water, subject to cracking due to SCC, and managed by the combination of the Water Chemistry Program and the One-Time Inspection Program.

Many AMR line items contributed to rollup Item Number 3.4.1-14. One of the contributors was a stainless steel piping component/commodity from LRA Table 3.4.2-3, on page 3.4-45, in the Main Steam System treated water environment, subject to SCC, and managed by the combination of the Water Chemistry Program and the One-Time Inspection Program. Note that the AMR line item is given a Standard Note A, since the component/commodity was considered the same as the NUREG-1801 Volume 2 item. The Main Steam System is included in the Steam and Power Conversion systems.

Another contributor to LRA Table 3.4.1 was a Primary Sampling System stainless steel piping commodity from LRA Table 3.3.2-4, on page 3.3-142, in a treated water environment, subject to SCC, and managed by the combination of the Water Chemistry Program and the One-Time Inspection Program. The Primary Sampling System is included in the Auxiliary systems. Note that the AMR line item is given a Standard Note C, since the component/commodity was not considered the same as the NUREG-1801 Volume 2 item.

Based upon consideration of the components similarity along with the MEAP, both were aligned to NUREG-1801 Volume 2 Item VIII.B1-5 and rolled up to Table 1 Item 3.4.1-14. In summary, alignments to NUREG-1801 line items were made based upon a consideration of the component's MEAP and similarity. Alignments between NUREG-1801 chapters were allowed by the HNP process based on the evaluations described above.

Acceptability of Crediting Water Chemistry and One-Time Inspection Programs

HNP based the use of the Water Chemistry and One Time Inspection Programs on NUREG-1801 recommendations, prior License Renewal Applications, NRC License Renewal SERs accepting that position, and favorable site OE for systems which manage corrosion using treated water chemistry controls.

HNP manages piping components exposed to treated water with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking and loss of material aging effects. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation. This approach is consistent with the many AMR line items in NUREG-1801 that rely on a program that controls the chemistry parameter in a system fluid, such as treated water, together with the One-Time Inspection Program which is used to verify the effectiveness of the chemistry control program in preventing the aging effect of concern. Refer to the list of chemistry control programs that rely on the One-Time Inspection Program for verification listed in Appendix A of NUREG-1833.

LRA AMR Item 3.4.1-14 in Table 3.4.1 refers to stainless steel piping components exposed to treated water, subject to SCC, and managed by a combination of the Water Chemistry Program and the One-Time Inspection Program. Table 3.4.1 addresses Steam and Power Conversion Systems.

NUREG-1801, Volume 2, Item VIII.B1-5 (SP-17), Main Steam System, is a typical Steam and Power Conversion Systems AMR line item for stainless steel piping components exposed to treated water and subject to SCC. NUREG-1801 recommends that related generic item SP-17 be managed by a combination of the Water Chemistry Program and the One-Time Inspection Program.

Based upon this information, HNP considered it acceptable to credit the combination of the Water Chemistry Program and the One-Time Inspection Program to manage cracking due to SCC in the subject components in lieu of crediting an AMP that implements periodic inspections of the components.

NRC RAI 3.4-12

The LRA has aligned the Type 2 AMR item on loss of material due to general, pitting, and crevice corrosion for the copper alloy piping, piping components, and piping elements in the boron thermal regeneration and demineralized water systems (i.e., auxiliary system components) to LRA AMR Item 3.4.1-15, which is a steam and power conversion system AMR. and the Type 2 AMRs on loss of material due to general, pitting, and crevice corrosion in the stainless steel piping, piping components, and piping elements in the demineralized water, radiation monitoring, radwaste sampling, and refueling systems (i.e., auxiliary system components), and the stainless steel steam generator instrument manifolds and valves and miscellaneous stainless steel non-pressure boundary components in the steam generator system to LRA AMR Item 3.4.1-16. The LRA credits the One-Time Inspection Program and the Water Chemistry Program to manage loss of material in these auxiliary system and steam generator system components. Provide your basis for aligning the Type 2 AMR items on loss of material of the copper alloy piping components in the boron thermal regeneration and demineralized water systems to LRA AMR 3.4-1-15, and the stainless steel piping components in the radiation monitoring, radwaste sampling, and refueling systems, and the stainless steel steam generator instrument manifolds and valves and miscellaneous stainless steel non-pressure boundary components in the steam generator system to LRA AMR Item 3.4.1-16. Provide your basis why it is acceptable for the applicant to credit the One-Time Inspection Program and the Water Chemistry Program to manage loss of material due to general, pitting, or crevice corrosion in these components in lieu of performing periodic inspections of the components.

RAI 3.4-12 Response

Basis for NUREG-1801 Alignments

The HNP AMR process is based on an evaluation of the MEAP of components subject to AMR. No restrictions are placed on alignment of AMR line items based on the specific system in which the component resides. Alignment to any section of NUREG-1801 was acceptable so long as the MEAP evaluation supports the alignment and aligned systems were judged to be of a similar type. Thus the HNP process allowed an auxiliary system component to be aligned to a steam and power conversion system NUREG-1801 line item, if applicable. The comparison evaluated each

AMR line item by considering the component along with its MEAP. Below are examples explaining the comparison.

1. LRA Table 3.4.1 identifies Item Number 3.4.1-16 for stainless steel piping components exposed to treated water, subject to loss of material due to crevice and pitting corrosion, and managed by the combination of the Water Chemistry Program and the One-Time Inspection Program.

   Many AMR line items contributed to rollup Item Number 3.4.1-16. One of the contributors was a stainless steel piping component/commodity from LRA Table 3.4.2-6, on page 3.4-54, in the Feedwater System treated water environment, subject to loss of material due to crevice and pitting corrosion, and managed by the combination of the Water Chemistry Program and the One-Time Inspection Program. Note that the AMR line item is given a Standard Note A, since the component/commodity was considered the same as the NUREG-1801 Volume 2 Item. The Feedwater System is included in the Steam and Power Conversion Systems.

   Similarly, on the secondary side, Steam Generator System components from LRA Table 3.1.2-6, on page 3.1-132, made of stainless steel are wetted internally by secondary side treated water (i.e., Feedwater) and alignment was taken to the Steam and Power Conversion systems based on the Feedwater environment.

   Another contributor to LRA Table 3.4.1 was a Demineralized Water System stainless steel piping commodity from LRA Table 3.3.2-36, on page 3.3-325, in a treated water environment, subject to loss of material due to crevice and pitting corrosion, and managed by the combination of the Water Chemistry Program and the One-Time Inspection Program. The Demineralized Water System is included in the Auxiliary systems. Note that the AMR line item is given a Standard Note C, since the component/commodity was not considered the same as the NUREG-1801 Volume 2 Item.

   As stated in LRA Table 3.4.1 Item Number 3.4.1-16, the Demineralized Water System, Radiation Monitoring System, Steam Generator System, Radwaste Sampling System, and Refueling System have been aligned to this item based on their MEAP.

2. LRA Table 3.4.1 identifies Item Number 3.4.1-15 for aluminum and copper alloy piping components exposed to treated water, subject to loss of material due to crevice and pitting corrosion, and managed by the combination of the Water Chemistry Program and the One-Time Inspection Program.

   Several AMR line items contributed to rollup Item Number 3.4.1-15. One contributor to LRA Table 3.4.1 Item Number 3.4.1-15 was a Demineralized Water System copper alloy piping commodity from LRA Table 3.3.2-36, on page 3.3-325, in a treated water environment, subject to loss of material due to crevice and pitting corrosion, and managed by the combination of the Water Chemistry Program and the One-Time Inspection Program. The Demineralized Water System is included in the Auxiliary systems. Note that the AMR line item is given a Standard Note C, since the component/commodity was not considered the same as the NUREG-1801 Volume 2 Item.

As stated in LRA Table 3.4.1 Item Number 3.4.1-15, the Steam and Power Conversion systems do not contain aluminum or copper alloy components exposed to treated water. However, the Boron Thermal Regeneration System and Demineralized Water System have been aligned to this item based on their MEAP.

In summary, alignments taken to NUREG-1801 Volume 2 line items were made based upon a consideration of the component's MEAP and similarity. Alignments between NUREG-1801 chapters were allowed by the HNP process based on the evaluations described above.

Acceptability of Crediting Water Chemistry and One-Time Inspection Programs

HNP based the use of the Water Chemistry and One Time Inspection Programs on NUREG-1801 recommendations, prior License Renewal Applications, NRC License Renewal SERs accepting that position, and favorable site OE for systems which manage corrosion using treated water chemistry controls.

HNP manages piping components exposed to treated water with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking and loss of material aging effects. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation. This approach is consistent with the many AMR line items in NUREG-1801 that rely on a program that controls the chemistry parameter in a system fluid, such as treated water, together with the One-Time Inspection Program which is used to verify the effectiveness of the chemistry control program in preventing the aging effect of concern. Refer to the list of chemistry control programs that rely on the One-Time Inspection Program for verification listed in Appendix A of NUREG-1833.

LRA AMR Item 3.4.1-16 in Table 3.4.1 refers to stainless steel piping components exposed to treated water, subject to loss of material due to crevice and pitting corrosion, and managed by a combination of the Water Chemistry Program and the One-Time Inspection Program. Table 3.4.1 addresses Steam and Power Conversion systems.

NUREG-1801 Volume 2 Item VIII.D1-4 (SP-16), Feedwater Systems, is a typical Steam and Power Conversion system AMR line item for stainless steel piping components exposed to treated water and subject to loss of material due to crevice and pitting corrosion. NUREG-1801 recommends related generic item SP-16 be managed by a combination of the Water Chemistry Program and the One-Time Inspection Program.

In addition, NUREG-1801 Volume 2 Item VIII.F-15 (SP-61), Steam Generator Blowdown System, is a typical Steam and Power Conversion system AMR line item for copper alloy components exposed to treated water and subject to loss of material due to crevice and pitting corrosion. NUREG-1801 recommends related generic item SP-61 be managed by a combination of the Water Chemistry Program and the One-Time Inspection Program.

Based upon the above discussion, HNP considered it acceptable to credit the combination of the Water Chemistry Program and the One-Time Inspection Program to manage loss of material due to crevice and pitting corrosion in the subject components in lieu of crediting an AMP that implements periodic inspections of the components.

NRC Audit Question LRA 4.3-2 (Follow-up)

In the discussion of the TLAA for reactor coolant pressure boundary piping, the LRA, as amended by letter HNP-07-119, states in Subsection 4.3.1.7 and Appendix A, Section A.1.2.2.7:

> Therefore, the effects of fatigue on the pressurizer will be managed for the period of extended operation.

Shouldn't it state that reactor coolant pressure boundary piping, rather than the pressurizer, will be managed for the period of extended operation?

Audit Question LRA 4.3-2 (Follow-up) Response

Yes, this is a typographical error. The last sentence in the Analysis Section of Subsection 4.3.1.7 will be revised to state:

> Therefore, the effects of fatigue on the reactor coolant pressure boundary piping will be managed for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(iii).

The last sentence in Appendix A, Subsection A.1.2.2.7 will be revised to state:

> Therefore, the effects of fatigue on the reactor coolant pressure boundary piping will be managed for the period of extended operation.

An amendment to the LRA is required.

NRC Audit Question LRA 4.3-12 (Follow-up)

In Letter HNP-07-119, Enclosure 2, Attachment 2, page 4 of 8 it states:

> The affected Class 2 and 3 piping is effectively an extension of the adjacent Class 1 piping. Therefore, the cycle count depends closely on reactor operating cycles.

Does HNP purport that the Class 2 and 3 piping experiences Class 1 design transients?

Audit Question LRA 4.3-12 (Follow-up) Response

No, it is the assessment of full temperature cycles that is related to reactor operating cycles.

As stated in the response to LRA 4.3-12:

> The basis for the use of a stress range reduction factor (f) equal to 1.0 was provided to the NRC in the response to NRC Question 210.67 (Draft SER Open Item No. 354) in HNP Letter Serial LAP-83-429, dated September 19, 1983. The response states:
>
>> The use of f = 1.0 is justified by the fact that the total number of full temperature cycles over 40 years during which the various system are expected to be in service is less than 7,000 cycles. This applies to *any* system on Shearon Harris Project.

NRC Audit Question LRA 4.3.3-1 (Follow-up)

Table 4.3-2 of the LRA as amended by letter HNP-09-119, Enclosure 2, Attachment 1, page 17 of 19 shows a design CUF of 0.909 for the pressurizer lower head. Enclosure 2, Attachment 1, page 19 of 19, Table 4.3-3 provides information on the 60-year environmentally adjusted CUF for the Pressurizer (Lower Head at Heater Penetration) and refers to Note 4 which shows a 40-year fatigue usage of 0.9. Please explain the apparent discrepancy.

Audit Question LRA 4.3.3-1 (Follow-up) Response

The CUF of 0.909 was generated as part of the Steam Generator Replacement/Power Uprate project. A reanalysis was performed by Westinghouse that evaluated the effects of steam generator replacement, the revised center of gravity of the steam generator, and the power uprate. The results of this analysis for this specific location were captured in an addendum to WCAP-15398, "Carolina Power and Light Harris Nuclear Plant Steam Generator Replacement/Uprating Analysis and Licensing Project NSSS Licensing Report" in Table 5.8-1. The 40-year CUF referenced in Note 4 of Table 4.3-3 is derived from a reanalysis performed by Westinghouse in WCAP-16376-P, "Evaluation of Pressurizer Insurge/Outsurge Transients for Harris Nuclear Plant." This WCAP was made available for review during the TLAA audits. A chronology of evaluations for NRC Bulletin 88-11, "Pressurizer Surge Line Thermal Stratification," was provided in the response to LRA 4.3-6.

NRC Audit Question LRA 4.3.3-4 (Follow-up)

Please clearly define which method is to be used for Section 4.3.3 (10 CFR 54.21(C)(i), (ii), or (iii) for each component:

- Reactor Vessel Shell and Lower Head
- Reactor Vessel Inlet and Outlet Nozzles

- Pressurizer Surge Line
- Charging Nozzle
- Safety Injection Nozzle
- Residual Heat Removal (RHR) System Class 1 Piping

Audit Question LRA 4.3.3-4 (Follow-up) Response

The following components are discussed in Section 4.3.3 of the LRA as amended by Letter HNP-07-119:

- Reactor Vessel Shell and Lower Head
- Reactor Vessel Inlet and Outlet Nozzles

Per the analysis in Section 4.3.1.1, "This 60-year fatigue usage bounds the maximum environmentally adjusted usage factor of 0.1740 for the Reactor Vessel Outlet Nozzles shown in Table 4.3-3. Therefore, the analysis has been projected to the period of extended operation using 10 CFR 54.21(c)(1) method (ii)."

- Pressurizer Surge Line
- Charging Nozzle
- Safety Injection Nozzle
- Residual Heat Removal (RHR) System Class 1 Piping

The piping locations are addressed in Section 4.3.1.7 where it states:

Since these values exceed the design limit of 1.0, an aging management program is required. The HNP Reactor Coolant Pressure Boundary Fatigue Monitoring Program will ensure that the design limit fatigue usage is not exceeded or that appropriate re-evaluation or corrective action is taken. Therefore, the effects of fatigue on the pressurizer will be managed for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(iii).

(Note that the word "pressurizer" in the last sentence above will be changed to "reactor coolant pressure boundary piping" in accordance with the response to a separate NRC question.)

NRC Audit Question LRA 4.3.3-5 (Follow-up)

Table 4.3-3 identified that Surge line, charging nozzle, and pressurizer with Note C : redefined transients used in the evaluation. Please clarify the redefined transients and provide the basis/documentation. Does design specification update the redefinition of the transients?

Audit Question LRA 4.3.3-5 (Follow-up) Response

Plant operating parameters representing a period of approximately five years were investigated for the purpose of validating the original design transients. The investigation examined both frequency and severity of the actual normal operating condition transients with respect to their design counterparts. In most cases it was concluded that the original design transients were conservative and bounding in both frequency and severity when compared to the actual operating conditions. However, in some cases the actual operations could not be judged as bounded by the original design. The effects of thermal stratification in the surge line and pressurizer are examples of conditions not considered in the original design. To address these differences, the original design transients were either modified and or redefined to reflect the actual observed transients. Transient frequencies were computed based on the observed conditions. This approach provides for greater agreement between the analyzed conditions and the actual operating conditions, thus providing a more reliable estimate of the total cumulative fatigue damage effects at the end of the operational life. The discussions below provide more details for each component where these measures were applied.

Part 1 – Redefined Transients for the Pressurizer Surge Line

The transients used for the Pressurizer Surge Line were developed by combining experimentally obtained data from temperature monitoring of the HNP PSL with a detailed analysis of 5.26 years of continuous plant data. The frequencies of the resulting transients were then compared to the original surge line evaluation that addressed NRC Bulletin 88-11 in WCAP-12962, "Structural Evaluation of the H. B. Robinson Unit 2 and Shearon Harris Pressurizer Surge Lines, Considering the Effects of Thermal Stratification." The projected 60-year frequencies were found to be greater than those considered in WCAP-12962 for certain pipe stratification conditions. As a result, the transients for future operations were redefined based on the actual observed conditions for both frequency and severity. The transients used for the surge hot leg nozzle were provided in WCAP-16353-P, Section 7.3, in Table 7-5. This provided surge line and hot leg nozzle stratification cycles at various levels of stratification ΔT. These represent the best-estimate transients based on evaluation of plant monitoring data. These best-estimate transients were used in the fatigue evaluation of the surge line hot leg nozzle in WCAP-16376-P.

Part 2 – Redefined Transients for the Pressurizer Lower Head and Surge Nozzle

WCAP-16376-P describes the transient development and fatigue evaluations for the surge nozzle and pressurizer lower head in Section 2. The transient inputs are described according to two operating periods: pre-Modified Operating Procedures (MOP) and post-MOP. For pre-MOP operation, the normalized surge line stratification and pressurizer insurge/outsurge (PZR I/O) events were presented in Table 2-1. These normalized distributions were then applied to the system ΔT distribution in Table 2-5 to obtain the transient cycles and ΔT for each heatup and cooldown event, such that the transient event ΔT is the normalized strength times the maximum system ΔT for the heatup or cooldown. The overall transient histories were created in this manner through an automated process for the fatigue evaluation. Examples of transient histories were shown in Figures 2-1 through 2-4.

For post-MOP operation, the transients were automatically calculated from actual plant data representing 5.26 years of operation. The automated process used system models to develop local transients and perform a stress and fatigue evaluation. The stress states determined from evaluation of this data were extrapolated to represent MOP operation through the license renewal period based on best-estimate heatup and cooldown cycles. This is discussed in Section 2.2 of WCAP-16376-P. As such, no detailed tables of transients were developed for the post-MOP period.

Part 3 – Redefined Transients for the Charging Nozzles

WCAP-16353-P describes the transient development and fatigue evaluations for charging nozzles. Review of the plant data showed that a majority of the larger delta-temperature transients experienced by the charging nozzle were during plant heatup and cooldown operations. Specifically, the charging system generally experienced large changes in flow when the RHR system was being brought online or taken offline. Therefore, some of the charging nozzle transients were redefined based on the observed conditions to better estimate the cumulative fatigue impacts of these transients. Charging system best estimate 60-year transients were given in Table 7-3 of WCAP-16353-P.

Note: WCAP-16376-P and WCAP-16353-P were made available to the reviewers during the various TLAA audits.

Does design specification update the redefinition of the transients?

No, the design specification has not been updated based on the analyses performed in support of the license renewal application.

<u>NRC Audit Question LRA 4.3.3-6 (Follow-up)</u>

The revised Table 4.3-2 removed Note 2. Please clarify. Table 4.3-3 identified component is surge line, is this location the same as identified in Table 4.3-2 which is RCL nozzle?

Audit Question LRA 4.3.3-6 (Follow-up) Response

Note 2 in the LRA submittal was added as a pointer to the revised evaluations performed to account for the effects of reactor water environment on fatigue for the piping. Since the amended application is structured differently, the note was obviated. Table 4.3-2 is now just a list of the CLB values of CUF for the listed components.

Table 4.3-3 represents the locations representative of NUREG/CR-6260, "Application of NUREG/CR-5999 Interim Design Curves to Selected Nuclear Power Plant Components," locations with the addition of the pressurizer lower head as discussed in LRA Section 4.3.3.

The LRA will be amended to incorporate into Section 4.3.3 a statement that the results and supporting information for the 60-year CUF values are provided on Table 4.3-3.

NRC Audit Question LRA 4.7-1 (Follow-up)

In various subsections of Section 4 of the LRA HNP has performed reevaluations of TLAAs and concluded that the analyses have been projected to the end of the period of extended operation and used disposition 10 CFR 54.21(c)(1)(ii). The staff contends that these reevaluations should be dispositioned as 10 CFR 54.21(c)(1)(i), the analyses remain valid for the period of extended operation. Please explain the rationale in choosing method (ii) over (i) based on the discussions provided in NUREG-1800.

Audit Question LRA 4.7-1 (Follow-up) Response

A review was performed and HNP agrees that in the following instances the disposition of the associated TLAA should be by 10 CFR 54.21(c)(1)(i) and not 10 CFR 54.21(c)(1)(ii):

- Subsections 4.3.2.1 and 4.3.2.2
- Subsection 4.7.1
- Subsections 4.7.2.1 through 4.7.2.6

An amendment to the LRA is required.

NRC Audit Question LRA 4.7.4-1 (Follow-up)

The LRA description of the resolution of the TLAA still refers to cycle projections. The analysis in Section 4.7.4 states:

> As discussed in Subsection 4.3.1, original fatigue design calculations assumed a large number of design transients, corresponding to relatively severe system dynamics over the original 40-year design life. Using the general approach described in Subsection 4.3.1, 60-year fatigue cycle projections have been made for License Renewal. Based on the 60-year cycle projections, the current design fatigue usage factors remained valid for 60 years of operations. Therefore, the current cumulative usage factors used for the postulation of break locations in Class 1 lines may be used for the 60-year operating term.
>
> Disposition: 10 CFR 54.21(c)(1)(i) – The analyses remain valid for the period of extended operation; and 10 CFR 54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

Since the use of projections has been removed from the discussions in Subsection 4.3.1 as amended by letter HNP-09-119, Enclosure 2, Attachment 1, please provide a revised analysis for Subsection 4.7.4.

Audit Question LRA 4.7.4-1 (Follow-up) Response

The analysis and disposition sections will be revised to state:

Analysis

Original fatigue design calculations assumed a large number of design transients, corresponding to relatively severe system dynamics over the original 40-year design life. The current design fatigue usage factors will remain valid during the period of extended operation as long as the number of design transients is not exceeded.

The HNP Fatigue Monitoring Program will identify when piping systems are approaching the original 40-year number of design transients. Prior to any piping system exceeding its original number of design transients, the pertinent design calculations for that system will be reviewed to determine if any additional locations should be designated as postulated high energy line breaks, under the original criteria of Section 3.6 of the FSAR. If other locations are determined to require consideration as postulated break locations, appropriate actions will be taken to address the new break locations.

Disposition: 10 CFR 54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

An amendment to the LRA is required.

Amendment 6 Changes to the License Renewal Application

<table>
<tr><th>Source of Change</th><th>License Renewal Application Amendment 6 Changes</th></tr>
<tr><td>Audit Question LRA 4.3-2 (Follow-up)</td><td>Change "pressurizer" to "reactor coolant pressure boundary piping" in the final sentence of the Analysis section of LRA Subsection 4.3.1.7 and in the final sentence of LRA Subsection A.1.2.2.7.</td></tr>
<tr><td>Audit Question LRA 4.3.3-6 (Follow-up)</td><td>Amend the LRA to add a paragraph to Section 4.3.3 to state:

The results and supporting information for the 60-year CUF values are provided on Table 4.3-3.</td></tr>
<tr><td>Audit Question LRA 4.7-1 (Follow-up)</td><td>Revise the analysis conclusions and the associated disposition statements for the following LRA Subsections to state that the current analyses remain valid for the period of extended operation or remains valid for 60 years, i.e., that 54.21(c)(1)(i) applies:

4.3.2.1 and A.1.2.2.8   4.7.2.1 and A.1.2.6.1   4.7.2.4 and A.1.2.6.4
4.3.2.2 and A.1.2.2.9   4.7.2.2 and A.1.2.6.2   4.7.2.5 and A.1.2.6.5
4.7.1 and A.1.2.5   4.7.2.3 and A.1.2.6.3   4.7.2.6 and A.1.2.6.6

In addition, make conforming changes to the following rows of LRA Table 4.1-1 to revise the methods used to comply with 10 CFR 54.21(c)(1) from 54.21(c)(1)(ii) to 54.21(c)(1)(i):

<table>
<tr><td colspan="2">Metal Fatigue</td><td>4.3</td></tr>
<tr><td>Implicit Fatigue Analysis (ASME Class 2, Class 3, and ANSI B31.1 Piping)</td><td>-</td><td>4.3.2</td></tr>
<tr><td>ASME Class 2 and 3 Piping</td><td>54.21(c)(1)(i)</td><td>4.3.2.1</td></tr>
<tr><td>ANSI B31.1 Piping</td><td>54.21(c)(1)(i)</td><td>4.3.2.2</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="2">Other Plant-Specific Time-Limited Aging Analyses</td><td>4.7</td></tr>
<tr><td>Turbine Rotor Missile Generation Analysis</td><td>54.21(c)(1)(i)</td><td>4.7.1</td></tr>
<tr><td>Crane Cyclic Analyses</td><td>-</td><td>4.7.2</td></tr>
<tr><td>Polar Crane</td><td>54.21(c)(1)(i)</td><td>4.7.2.1</td></tr>
<tr><td>Jib Cranes</td><td>54.21(c)(1)(i)</td><td>4.7.2.2</td></tr>
<tr><td>Reactor Cavity Manipulator Crane</td><td>54.21(c)(1)(i)</td><td>4.7.2.3</td></tr>
<tr><td>Fuel Cask Handling Crane</td><td>54.21(c)(1)(i)</td><td>4.7.2.4</td></tr>
<tr><td>Fuel Handling Bridge Crane</td><td>54.21(c)(1)(i)</td><td>4.7.2.5</td></tr>
<tr><td>Fuel Handling Building Auxiliary crane</td><td>54.21(c)(1)(i)</td><td>4.7.2.6</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Source of Change</th><th>License Renewal Application Amendment 6 Changes</th></tr>
<tr><td>Audit Question
LRA 4.7.4-1
(Follow-up)</td><td>Revise the Analysis and Disposition discussions of LRA Subsection 4.7.4 to read as follows:

Analysis

Original fatigue design calculations assumed a large number of design transients, corresponding to relatively severe system dynamics over the original 40-year design life. The current design fatigue usage factors will remain valid during the period of extended operation as long as the number of design transients is not exceeded.

The HNP Fatigue Monitoring Program will identify when piping systems are approaching the original 40-year number of design transients. Prior to any piping system exceeding its original number of design transients, the pertinent design calculations for that system will be reviewed to determine if any additional locations should be designated as postulated high energy line breaks, under the original criteria of Section 3.6 of the FSAR. If other locations are determined to require consideration as postulated break locations, appropriate actions will be taken to address the new break locations.

Disposition: 10 CFR 54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

Make a conforming change to LRA Table 4.1-1 to revise the method used to comply with 10 CFR 54.21(c)(1) for Subsection 4.7.4 to be 54.21(c)(1)(iii). Also, revise the final two paragraphs of LRA Subsection A.1.2.8 to read verbatim with the two paragraphs in the Analysis subsection of LRA 4.7.4 above.

In addition, revise enhancement (5) of LRA Subsection A.1.1.38 to read:

(5) address corrective actions, to be implemented through the Corrective Action Program, for components that have exceeded alarm limits, with options to include a revised fatigue analysis or repair or replacement of the component and for piping systems that have exceeded their cyclic alarm limit to require a review of the pertinent design calculations to determine if any additional locations should be designated as postulated high energy line breaks.

Revise LRA Subsection B.3.1 to address potential high energy line break locations by revising the following Enhancement in LRA Subsection B.3.1:
<u>Program Elements Affected</u>
• Corrective Actions
Enhance the program to address corrective actions if an analyzed component is determined to have exceeded the alarm limit, with options to revise the fatigue analysis, repair, or replace the component. Corrective actions, if required, will be implemented through the HNP Corrective Action Program. Enhance the program to address if a piping system is determined to have exceeded its cyclic alarm limit to require a review of the pertinent design calculations to determine if any additional locations should be designated as postulated high energy line breaks.

This changed enhancement impacts License Renewal Commitment #32.</td></tr>
</table>

HARRIS NUCLEAR PLANT LICENSE RENEWAL COMMITMENTS, REVISION 3				
ITEM NO.	COMMITMENT	FINAL SAFETY ANALYSIS REPORT (FSAR) SUPPLEMENT LOCATION	PROGRAM IMPLEMENTATION SCHEDULE	LICENSE RENEWAL APPLICATION (LRA) SOURCE
1	In accordance with the guidance of NUREG-1801, Rev. 1, regarding aging management of reactor vessel internals components, HNP will: (1) participate in the industry programs for investigating and managing aging effects on reactor internals (such as Westinghouse Owner's Group and Electric Power Research Institute materials programs), (2) evaluate and implement the results of the industry programs as applicable to the reactor internals, and (3) upon completion of these programs, but not less than 24 months before entering the period of extended operation, submit an inspection plan for reactor internals to the NRC for review and approval.	A.1.1	As stated in the commitment	Reactor Vessel Internals Aging Management Activities LRA Section A.1.1
2	In accordance with the guidance of NUREG-1801, Rev. 1, regarding aging management of nickel alloy and nickel-clad components susceptible to primary water stress corrosion cracking, HNP will comply with applicable NRC Orders and will implement : (1) applicable Bulletins and Generic Letters, and (2) staff-accepted industry guidelines.	A.1.1	As stated in the commitment	Primary Water Stress Corrosion Cracking of Nickel Alloys LRA Section A.1.1
3	Program inspections are performed as augmented inspections in the HNP Inservice Inspection (ISI) Program. The ISI Program administrative controls will be enhanced to specifically identify the requirements of NRC Order EA-03-009.	A.1.1.5	Prior to the period of extended operation	Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program LRA Section B.2.5
4	The Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program is a new program to be implemented.	A.1.1.6	Prior to the period of extended operation	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program LRA Section B.2.6

HARRIS NUCLEAR PLANT LICENSE RENEWAL COMMITMENTS, REVISION 3				
ITEM NO.	COMMITMENT	FINAL SAFETY ANALYSIS REPORT (FSAR) SUPPLEMENT LOCATION	PROGRAM IMPLEMENTATION SCHEDULE	LICENSE RENEWAL APPLICATION (LRA) SOURCE
5	The Program will be enhanced to provide a consolidated exclusion bases document (i.e., a FAC susceptibility analysis). The exclusion bases document will include an evaluation of the Steam Generator Feedwater Nozzles to determine their susceptibility to FAC.	A.1.1.7	Prior to the period of extended operation	The Flow-Accelerated Corrosion (FAC) Program LRA Section B.2.7
6	A precautionary note will be added to plant bolting guidelines to prohibit the use of molybdenum disulfide lubricants.	A.1.1.8	Prior to the period of extended operation	Bolting Integrity Program LRA Section B.2.8
7	The Program implementing procedure will be enhanced to include a description of the instructions for implementing corrective actions if tube plugs or secondary-side components (e.g., tube supports) are found to be degraded.	A.1.1.9	Prior to the period of extended operation	Steam Generator Tube Integrity Program LRA Section B.2.9
8	The Program will be enhanced to: 1) include measurements of actual boron areal density using in-situ techniques, 2) include neutron attenuation testing ("blackness testing"), to determine gap formation in Boraflex panels, and 3) include the use of the EPRI RACKLIFE predictive code or its equivalent.	A.1.1.12	Prior to the period of extended operation, unless an approved analysis exists that eliminates credit for the Boraflex in the BWR fuel racks	Boraflex Monitoring Program LRA Section B.2.12
9	The Program will be enhanced to: (1) include in the Program all cranes within the scope of License Renewal; (2) require the responsible engineer to be notified of unsatisfactory crane inspection results; (3) specify an annual inspection frequency for the Fuel Cask Handling Crane, Fuel Handling Bridge Crane, and Fuel handling Building Auxiliary Crane, and every refuel cycle for the Polar Crane, Jib Cranes, and Reactor Cavity Manipulator Crane, and (4) include a requirement to inspect for bent or damaged members, loose bolts/components, broken welds, abnormal wear of rails, and corrosion (other than minor surface corrosion) of steel members and connections.	A.1.1.13	Prior to the period of extended operation	Inspection of Overhead Heavy Load and Light Load Handling Systems Program LRA Section B.2.13; Response to Audit Question B.2.13-JW-01.

HARRIS NUCLEAR PLANT LICENSE RENEWAL COMMITMENTS, REVISION 3				
ITEM NO.	**COMMITMENT**	**FINAL SAFETY ANALYSIS REPORT (FSAR) SUPPLEMENT LOCATION**	**PROGRAM IMPLEMENTATION SCHEDULE**	**LICENSE RENEWAL APPLICATION (LRA) SOURCE**
10	The program will be enhanced to: (1) include inspection criteria as described in NUREG-1801 for penetration seals, (2) provide specific procedural guidance for inspecting fire barrier walls, ceilings and floors, (3) include a visual inspection of the diesel-driven fire pump fuel oil supply piping for signs of leakage, and (4) include minimum qualification requirements for inspectors performing inspections required by this Program.	A.1.1.14	Prior to the period of extended operation	Fire Protection Program LRA Section B.2.14
11	The Program will be revised to: (1) incorporate a requirement to perform one or a combination of the following two activities: (a) Perform non-intrusive baseline pipe thickness measurements at various locations, prior to the expiration of current license and trended through the period of extended operation. The plant-specific inspection intervals will be determined by engineering evaluation performed after each inspection of the fire protection piping to detect degradation prior to the loss of intended function, or (b) Perform flow testing meeting the general flow requirements (intent) of NFPA 25, and (2) either replace the sprinkler heads prior to reaching their 50-year service life or revise site procedures to perform field service testing, by a recognized testing laboratory, of representative samples from one or more sample areas.	A.1.1.15	Prior to the period of extended operation	Fire Water System Program LRA Section B.2.15 Commitment (1)(b) and the option of using a combination of (1)(a) and (1)(b) were added in the response to Audit Question B.2.15-PB-01

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12	Program administrative controls will be enhanced to: (1) add requirements to enter an item into the corrective action program whenever an administrative value or control limit for parameters relevant to this program are exceeded or water is drained from a fuel oil tank in the scope of this program; (2) establish administrative values for fuel oil chemistry parameters relating to corrosion; (3) require Diesel Fuel Oil System chemistry controls to include semiannual monitoring and trending of water and sediment and particulates from an appropriate sample point for the day tanks and semiannual monitoring and trending of biological growth in the main storage tanks; (4) require Security Power System fuel oil chemistry controls to include semiannual monitoring and trending of biological growth in the fuel oil in the buried storage tank and periodic inspecting of the internal surfaces of the buried storage tank and the aboveground day tank or require UT or other NDE of the tanks if inspection proves inadequate or indeterminate; (5) require Site Fire Protection System fuel oil chemistry controls for the Diesel Driven Fire Pump fuel oil storage tank to include quarterly monitoring and trending of particulates and semiannual monitoring and trending of biological growth, to check and remove water quarterly, to periodically inspect the tank or require UT or other NDE of the tank if inspection proves inadequate or indeterminate; and to revise chemistry sampling procedures to address positive results for biological growth including as one option the use of biocides; and (6) verify the condition of the Diesel Fuel Oil Storage Tank Building Tank Liners by means of bottom thickness measurements under the One Time Inspection Program. Day tank sampling for water, sediment, and particulates is considered to be confirmatory of components outside the main storage tanks, and its frequency may be adjusted based on site operating experience.	A.1.1.16	Prior to the period of extended operation	Fuel Oil Chemistry Program LRA Section B.2.16, Response to Audit Question B.2.16-MK-12.

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13	The Program will be enhanced to: (1) include a provision that tested and untested specimens from all capsules pulled from the reactor vessel must be kept in storage to permit future reconstitution use, and that the identity, traceability, and recovery of the capsule specimens shall be maintained throughout testing and storage, (2) include a provision that withdrawal of the next capsule (i.e., Capsule W) will occur during Refueling Outage 16, at which time the capsule fluence is projected to be equivalent to the 60-year maximum vessel fluence of 6.8×10^{19} n/cm^2 in accordance with ASTM E 185-82, (3) include a provision that analysis of Capsule W be used to evaluate neutron exposure for remaining Capsules Y and Z, as required by 10 CFR 50 Appendix H. The withdrawal schedule for one of the remaining capsules will be adjusted, based on the analysis of Capsule W, so that the capsule fluence will not exceed twice the 60-year maximum vessel fluence in accordance with ASTM E 185-82. The neutron exposure and withdrawal schedule for the last capsule will be optimized to provide meaningful metallurgical data. If the last capsule is projected to significantly exceed a meaningful fluence value, it will either be relocated to a lower flux position or withdrawn for possible testing or re-insertion. Capsules Y and Z and archived test specimens available for reconstitution will be available for the monitoring of neutron exposure if additional license renewals are sought, and (4) include a provision that, if future plant operations exceed the limitations in Section 1.3 of Regulatory Guide 1.99, Revision 2, or the applicable bounds, e.g., cold leg operating temperature and neutron fluence, as applied to the surveillance capsules, the impact of these plant operation changes on the extent of reactor vessel embrittlement will be evaluated, and the NRC will be notified.	A.1.1.17	Prior to the period of extended operation	Reactor Vessel Surveillance Program LRA Section B.2.17, RAI-B.2.17
14	The One-Time Inspection Program is a new program to be implemented.	A.1.1.18	Prior to the period of extended operation	One-Time Inspection Program LRA Section B.2.18

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15	The Selective Leaching of Materials Program is a new program to be implemented	A.1.1.19	Prior to the period of extended operation	Selective Leaching of Materials Program LRA Section B.2.19
16	The Buried Piping and Tanks Inspection Program is a new program to be implemented.	A.1.1.20	Prior to the period of extended operation	Buried Piping and Tanks Inspection Program LRA Section B.2.20
17	The One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program is a new program to be implemented.	A.1.1.21	Prior to the period of extended operation	One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program LRA Section B.2.21
18	The program will be enhanced to: (1) include a specific list of systems managed by the program for License Renewal, (2) provide specific guidance for insulated/jacketed pipe and piping components to identify signs of leakage and provide criteria for determining whether the insulation/jacket should be removed to inspect for corrosion, (3) provide inspection criteria for components not readily accessible during plant operations or refueling outages, (4) provide specific guidance for visual inspections of elastomers for cracking, chafing, or changes in material properties due to wear, and (5) incorporate a checklist for evaluating inspection findings, with qualified dispositions.	A.1.1.22	Prior to the period of extended operation	External Surfaces Monitoring Program LRA Section B.2.22
19	The Program will be enhanced: (1) to require an evaluation of historic plant-specific test data in order to ensure that conservative wear rates are used so that a loss of intended function will not occur, (2) to provide guidance for treatment of flux thimbles that could not be inspected due to restriction, defect or other reason, and (3) to require test results and evaluations be formally documented as QA records.	A.1.1.23	Prior to the period of extended operation	Flux Thimble Tube Inspection Program LRA Section B.2.23

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20	The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is a new program to be implemented.	A.1.1.24	Prior to the period of extended operation	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program LRA Section B.2.24
21	The Program will be enhanced as follows: (1) a review and revision of work documents and analysis requirements will be performed to ensure that the used oil from appropriate component types in the scope of License Renewal is analyzed to determine particle count and moisture, and if oil is not changed in accordance with the manufacturer's recommendation, then additional analyses for viscosity, neutralization number, and flash point will be performed. This activity will ensure that used oil is visually checked for water; and (2) the program administrative controls will be enhanced to include a requirement to perform ferrography or elemental analysis to identify wear particles or products of corrosion when particle count exceeds an established level or when considered appropriate.	A.1.1.25	Prior to the period of extended operation	Lubricating Oil Analysis Program LRA Section B.2.25
22	The Program implementing procedure will be enhanced to: (1) include additional recordable conditions, (2) include moisture barrier and applicable aging effects, (3) include pressure retaining bolting and aging effects, and (4) include a discussion of augmented examinations.	A.1.1.26	Prior to the period of extended operation	ASME Section XI, Subsection IWE Program LRA Section B.2.26
23	The Program will be enhanced to describe in the implementing procedures the evaluation and corrective actions to be taken when leakage rates do not meet their specified acceptance criteria.	A.1.1.29	Prior to the period of extended operation	10 CFR Part 50, Appendix J Program LRA Section B.2.29
24	Program administrative controls will be enhanced to identify the structures that have masonry walls in the scope of License Renewal.	A.1.1.30	Prior to the period of extended operation	Masonry Wall Program LRA Section B.2.30

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25	The Program implementing procedures will be enhanced to: (1) identify the License Renewal structures and systems that credit the program for aging management, (2) require notification of the responsible engineer when below-grade concrete is exposed so an inspection may be performed prior to backfilling, (3) require periodic groundwater chemistry monitoring including consideration for potential seasonal variations., (4) define the term "structures of a system" in the system walkdown procedure and specify the condition monitoring parameters that apply to "structures of a system," (5) include the corporate structures monitoring procedure as a reference in the plant implementing procedures and specify that forms from the corporate procedure be used for inspections, (6) identify additional civil/structural commodities and associated inspection attributes required for License Renewal, and (7) require inspection of inaccessible surfaces of reinforced concrete pipe when exposed by removal of backfill.	A.1.1.31	Prior to the period of extended operation	Structures Monitoring Program LRA Section B.2.31
26	The Program will be enhanced to: (1) require an evaluation of any concrete deficiencies in accordance with the acceptance criteria provided in the corporate inspection procedure, (2) require initiation of a Nuclear Condition Report (NCR) for degraded plant conditions and require, as a minimum, the initiation of an NCR for any condition that constitutes an "unacceptable" condition based on the acceptance criteria specified, and (3) require documentation of a visual inspection of the miscellaneous steel at the Main Dam and Spillway.	A.1.1.32	Prior to the period of extended operation	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program LRA Section B.2.32
27	The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program to be implemented.	A.1.1.33	Prior to the period of extended operation	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program LRA Section B.2.33

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28	The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program is a new program to be implemented.	A.1.1.34	Prior to the period of extended operation	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program LRA Section B.2.34
29	The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program to be implemented.	A.1.1.35	Prior to the period of extended operation	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program LRA Section B.2.35
30	The Metal Enclosed Bus Program is a new program to be implemented.	A.1.1.36	Prior to the period of extended operation	Metal Enclosed Bus Program LRA Section B.2.36
31	The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program to be implemented.	A.1.1.37	Prior to the period of extended operation	Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program LRA Section B.2.37

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32	The Program will be enhanced to: (1) expand the program scope to include an evaluation of selected RCPB components beyond the reactor pressure vessel (including auxiliary system components such as the pressurizer lower head, pressurizer surge line, and CVCS piping and heat exchanger), and to include the NUREG/CR-6260 locations analyzed for environmental effects, (2) provide preventive actions to include, prior to a monitored location exceeding a cumulative usage factor limit of 1.0, evaluation of operational changes to reduce the number or severity of future transients, (3) include a provision to utilize online fatigue analysis software for the periodic updating (not to exceed once every 18 months) of cumulative usage, (4) describe the acceptance criteria for maintaining fatigue usage below the design limit, and (5) address corrective actions, to be implemented through the Corrective Action Program, for components that have exceeded alarm limits, with options to include a revised fatigue analysis or repair or replacement of the component and for piping systems that have exceeded their cyclic alarm limit to require a review of the pertinent design calculations to determine if any additional locations should be designated as postulated high energy line breaks.	A.1.1.38	Prior to the period of extended operation	Reactor Coolant Pressure Boundary (RCPB) Fatigue Monitoring Program LRA Section B.3.1, Response to Audit Questions B.3.1-RH-01, B.3.1-RH-05, and 4.7.4-1 (Follow-up)
33	The Low Temperature Overpressure (LTOP) setpoint analysis will be recalculated following removal of one of the remaining surveillance capsules from the reactor vessel.	A.1.2.1.4	After capsule fast neutron exposure comparable to the end of the period of extended operation	TLAA – Low temperature Over-Pressure Limits LRA Section 4.2.5
34	The Oil-Filled Cable Testing Program is a new program to be implemented.	A.1.1.40	Prior to the period of extended operation	Oil-Filled Cable Testing Program LRA Section B.2.38, Response to Audit Question LRA-3.6.2-1-RM-02

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35	When the EPRI MRP methodology described in MRP-140, "Materials Reliability Program: Leak-Before-Break Evaluation for PWR Alloy 82/182 Welds," has been reviewed and approved by the NRC, HNP will review its plant-specific calculation for conformance to the endorsed approach.	A.1.2.2.11	As stated in the commitment	TLAA - Leak-Before-Break evaluation for Alloy 82/182 Welds LRA Section 4.3.4, Response to Audit Question LRA 4.3.4-1.