June 27, 2001

Mr. Alan P. Nelson
Nuclear Energy Institute
1776 I Street, NW., Suite 400
Washington, DC 20006-3708

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE NUCLEAR ENERGY INSTITUTE DEMONSTRATION PROJECT, PLANT X AND PLANT Y

Dear Mr. Nelson:

By letter dated May 24, 2001, Nuclear Energy Institute (NEI) submitted for the Nuclear Regulatory Commission's (NRC's) review a demonstration application using the Generic Aging Lessons Learned (GALL) report in a license renewal application. The NRC staff is reviewing the information contained in the demonstration application and has identified, in the enclosure, areas where additional information is needed to complete its safety review. As requested by NEI during the June 20, 2001 telephone conversation, Section 3.6 "Electrical and Instrumentation and Controls" of Plant Y has been withdrawn from the application.

Please provide by letter or electronic mail, your responses to the enclosed requests for additional information (RAIs) no later than July 13, 2001.

Sincerely,

/RA/
Christopher I. Grimes, Chief
License Renewal and Standardization Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Enclosure: As stated

cc w/encl: See next page

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RAIs FOR PLANT X
SECTION 3.4: STEAM AND POWER CONVERSION SYSTEMS

1. Table 3.4.2 of the LRA contains the results of the aging management review for component or aging effects that are not addressed in the GALL report. Table 3.4.2 indicates that stainless steel pipes, fittings, and valves in saturated steam are susceptible to cracking. However, the application indicates that all other materials and environment conditions specified in Table 3.4.2 are not susceptible to cracking. Identify the site operating experiences, including maintenance and inspection, that indicates these components are not susceptible to cracking.

2. Table 3.4.1 of the LRA indicates that the general corrosion of the external surfaces program is proposed for managing the aging effects associated with loss of material, cracking, and loss of preload in bolting. This program consists of a visual examination to detect external corrosion and fluid leakage.

A) Identify the ASME Class for the bolting in the SPCS within the scope of license renewal.

B) Identify the ASME Code inservice inspection requirements for the bolting in the SPCS within the scope of license renewal. Identify the inservice inspection program (i.e. extent, frequency and acceptance criteria) to detect cracking for non-ASME Code bolting within the scope of the program.

C) Identify the lubricants and sealants used for installing the bolting. Explain why these lubricants and sealant will not cause cracking in bolting.

D) Provide the basis that the general corrosion of the external surfaces program will adequately manage the aging effects of cracking and loss of preload for bolting.

3. Table 3.4.1 of the LRA indicates that the general corrosion of the external surfaces program is proposed for managing loss of material from atmospheric corrosion. This program consists of a visual examination to detect external corrosion and fluid leakage. Explain why the external surface of carbon steel components is not susceptible to boric acid corrosion. If the external surface of the carbon steel components is susceptible to boric acid corrosion, explain how the general corrosion of the external surfaces program is equivalent to the guidelines in Generic Letter 88-05 for detection of boric acid corrosion.

4. Tables 3.4-1 and 3.4-2 of the LRA indicate that there are carbon steel, stainless steel and copper alloys components in a water environment. Are these components connected within a water containing system that could result in loss of material from galvanic corrosion? If these components are susceptible to loss of material due to galvanic corrosion, identify the program that will manage the loss of material from galvanic corrosion.

5. The FSAR supplement for the flow accelerated corrosion (FAC) program indicates that the program relies primarily on monitoring and inspection of piping/components to preclude failure of high and low energy carbon steel piping. However, the FSAR supplement does not reference the basis for the program, which is EPRI guidelines in NSAC-202L-R2. Therefore, the FSAR supplement for the FAC Program should reference EPRI guidelines of NSAC-202L-R2.

6. Provide clarification for the statement in section 3.4 of the LRA that states, “Searches were conducted of industry experience. These reviews revealed no evidence of additional aging effects requiring management.” However, the applicant had not identified aging effects

requirement management (AERMs) before this statement. Please state/clarify as applicable, that the applicant for Plant X has reviewed plant-specific and industry wide operating experience and concluded that operating experience is bounded by the GALL report and that no additional operating experience has been identified. Provide information on any additional aging effects identified and how they would be managed for license renewal.

7. The FAC program as defined in Appendix B of the LRA applies only to the main steam, feedwater, and steam generator blowdown systems. However, page 3.4-2 of the application indicates that the scope of steam and power conversion (SPCS) system consists of main steam, extraction steam, main and auxiliary feedwater, condensate, and steam generator blowdown systems. The FAC program in Appendix B does not cover extraction steam, auxiliary feedwater and condensate system. Similarly, Table 3.4.1 infers that the main steam, extraction steam, and main and auxiliary feedwater systems, condensate system, steam generator blowdown and associated components are managed by the AMP, "General Corrosion of External Surfaces for License Renewal;" however, the AMP, "General Corrosion of External Surfaces for License Renewal," described in Appendix B of the LRA does not include all the systems cited in Table 3.4.1. Clarify systems addressed by the AMP, "General Corrosion of External Surfaces for License Renewal."

8. Are the carbon steel SPCS components (including stagnant lines, main actuation/isolation valves, etc.) exposed to a raw water environment due to standby conditions, actuation of the back-up systems, or testing? If so, provide operating experience and the AMP for the SPCS carbon steel components relating to the aging effects of loss of material due to microbiologically influenced, general, and pitting corrosion, and biofouling.

9. Since the preparation of the referenced GALL report (August 2000), the staff issued Information Notice (IN) 2001-09 on the FAC of the main feedwater system inside the containment. For components identified in the IN, has an inspection been performed for Plant X? If not, what inputs are used in CHECKWORKS for the subject components?

10. Are the blowdown heat exchangers, oil coolers, and condenser in the condensate system exposed to open cycle cooling water system? If so, explain why the heat exchangers, coolers, and condensers exposed to the open cycle cooling water system are not susceptible to buildup of deposit due to biofouling.

RAIs FOR PLANT X
SECTION 3.5: CONTAINMENT, STRUCTURES, AND COMPONENT SUPPORTS

1. Section 3.5.1.1 of the LRA addresses two (2) areas where the GALL report recommends further evaluation. LRA subparagraph 3.5.1.1.1 addresses further evaluation for detection of cracking due to cyclic loading and crack initiation and growth from SCC in containment penetration sleeves, bellows and dissimilar metal welds. The LRA states that Plant X utilizes carbon steel bellows and therefore there are no dissimilar metal welds. In the LRA it is not clear if any stainless steel penetration sleeves exist in Plant X. Does Plant X contain any stainless steel elements in this component group? Also describe the methodology for detection of cracking due to cyclic loading.

2. Section 3.5.1.2.1 of the LRA states that the concrete at Plant X is not exposed to aggressive river water or ground water. Provide the most recent testing results supporting the above statement and discuss pertinent technical basis supporting the assertion that the prevailing non-aggressive characteristics of Plant X river/ground water will remain essentially unchanged for the period of extended operation. The response should also include a discussion of the groundwater/river water chemistry monitoring program, including frequency and consideration of seasonal variations.

3. Section 3.5.1.1.2 of the LRA indicates that visual inspection of the seal between the containment floor and the containment steel liner can be used to effectively address aging in this area resulting from corrosion. If the seal is intact, no action would be required. If this seal were determined to be damaged, then appropriate portion of the liner would be accessed and inspected. What is the technical basis for concluding that if damage or degradation of this seal is not visible, then degradation of the containment liner has not occurred. In addition, cracks in concrete floor above the embedded steel liner are other potential paths for degradation of the containment liner. Describe the approach to managing this aging effect if cracks develop in the concrete floor.

4. Clarify what is intended to be covered in the demonstration project with respect to Section 3.5.1 of the LRA. This subsection is silent in the following four areas, when compared to SRP Table 3.5-1: (1) no reference to protective coatings, to mitigate loss of material due to corrosion of containment elements; (2) no reference to aging management of inaccessible areas of Class 1 structures; (3) no reference to aging management of masonry walls in Class 1 structures; and (4) no reference to aging management of high-strength low-alloy bolting for component supports. Provide an explanation why these are not applicable to Plant X or, if they are applicable, provide an aging management review (AMR) including a description of the credited aging management programs (AMPs).

5. In paragraph 3.5.1.2.2 of the LRA, the applicant states that “The structures at Plant X are supported on end-bearing steel piles driven to bedrock. Settlement and erosion of porous concrete subfoundation are not plausible aging mechanisms; therefore, aging management is not required.” Provide the following information for Plant X:

A) Does Plant X have a de-watering system?
B) Does Plant X have a porous concrete subfoundation?
C) Was Plant X required to monitor settlement of structure during the initial years of operation? If so, was relief to terminate settlement monitoring granted by the staff?

D) If there is an active settlement monitoring program at Plant X, describe the plant-specific foundation features that necessitate the continuation of this program.

6. Table 3.5.1 of the LRA for the turbine and auxiliary buildings does not address aging of inaccessible concrete components. Since the foundation for the auxiliary building is common to that of the containment, are inaccessible areas of the auxiliary building such as walls below grade and foundation addressed along with those of the containment? How will aging of inaccessible concrete and steel components for the turbine building (Class 1 structure) such as exterior walls below grade and the foundation be addressed?

7. Table 3.5.1 of the LRA states that "The information in the GALL report bounds Plant X for steel components." Does it also bound concrete components? If not, explain the basis. Also in the structure monitoring program (SMP) provided in Appendix B states that: "with identified enhancements, the SMP is consistent with the ten attributes identified in GALL report (August 2000 Draft) for SMP XI.S6." Explain what the "identified enhancements" are?

8. In Section 3.5.1.2.3 of the LRA related to "Elevated Temperatures", local temperature effects on concrete other than penetrations (i.e., steam pipe tunnel, shear/biological shield wall near reactors) were not discussed. Provide information to evaluate the applicability of temperature effects on the steam pipe tunnel and shear/biological shield wall near reactors.

9. The primary chemistry monitoring program description in the LRA indicates the exception that a one-time inspection requirement is not warranted. Discuss actual chemistry related degradation for primary components/item groupings that has been experienced at Plant X to support this basis for the exception.

10. Page 3.5.2 of the LRA states, based on review of site and industry operating experience, "These reviews revealed no evidence of additional aging effects requiring management." However, the applicant had not identified AERMs before this statement. Clarify the purpose of this statement (a similar RAI appears in section 3.4, item #6 of this enclosure).

11. Section 3.5 of the LRA begins with a brief description of the Plant X containment structure, containment internal structures, turbine building, and intake structure. However, no description of the auxiliary building/control room or of the component supports is provided. Provide a description of the auxiliary building/control room. Also, describe the supports included in this group along with a description of their features or environments.

12. Section 3.5.2 of the LRA describes "Components or Aging Effects that Are Not Addressed in the GALL Report" in general terms and does not include a discussion of AMPs. Table 3.5.2 identifies the specific components, material, environment, AERMs, and program/activity. The information provided is not sufficient for the staff to tie subsection 3.5.2 and Table 3.5.2 together and to evaluate the AMR for the identified components/aging effects. Provide a description of the components in the Table 3.5.2 and explain how they are related to the text.

13. Section 3.5.3 of the LRA is titled "Conclusion" and it lists five AMPs that are credited for managing aging. The conclusion does not address additional AMPs listed in LRA Table 3.5.1 to manage aging. Specifically, the inspection of water control structures, boric acid corrosion, and inservice inspection AMPs are credited in LRA Table 3.5.1, but are not listed in LRA

subsection 3.5.3. Clarify which AMPs evaluated in the GALL report are being relied on for license renewal for Plant X and provide corrections to LRA subsection 3.5.3 and LRA Table 3.5.1, as appropriate.

14. Clarify the intended coverage of "Components Group" in Table 3.5.1 of the LRA in the demonstration project. For example, it indicates for "Equipment hatch gasket," the information in the GALL report bounds Plant X. However, SRP Table 3.5-1 includes "Gaskets, seals, and moisture barriers." Are the other gaskets, seals, and moisture barriers outside of the demonstration project?

15. Paragraph 3.5.1.2.4 of the LRA does not contain a discussion on "reaction with aggregates" even though it is part of the subsection title. Provide the apparent missing information related to reaction with aggregates.

16. The FSAR revision provided in Appendix B of the LRA for the structures monitoring program is not sufficient because it only credits this program for managing the aging effects of loss of material and not other applicable aging effects. In addition, no FSAR revision was provided for the containment inservice inspection program. Submit an appropriate FSAR description for the structures monitoring program and the containment inservice inspection program.

RAIs FOR PLANT X
SECTION 3.6: ELECTRICAL AND INSTRUMENTATION AND CONTROLS

1. Section 3.6.2.1 of the LRA states that a one-time inspection will be performed prior to the end of the current license period to ensure that the duct banks in which non-EQ inaccessible medium-voltage cables are enclosed at Plant X remain effectively sealed. However, the electrical component inspection program described in Appendix B does not discuss this inspection of the duct banks, and does not appear to be consistent with section 3.6.2.1 of the LRA. Instead, the program described in Appendix B states that visual inspection of selected samples of the accessible portion of medium-voltage cables will be used to detect aging effects for non-EQ inaccessible medium voltage cables. Please provide clarification as to what the intended AMP for inaccessible medium-voltage cables will include.

RAIs FOR PLANT Y
SECTION 3.4: STEAM AND POWER CONVERSION SYSTEMS

1. Tables 3.4-1 and 3.4-2 of the LRA indicate an inconsistency in that cracking is identified as an aging effect for stainless steel components in treated water-secondary environment; but is not an aging effect for stainless steel components in treated water. Furthermore, Table 3.4-2 indicates that stainless steel components (standby steam generator feedwater pump suction) are located in an outdoor environment and are susceptible to cracking; but cracking is not an aging effect for buried piping. The table footnote indicates that plant experience has identified the potential for cracking in non-stress relieved heat affected zones of weld joints for the piping in an outdoor environment. Identify the plant-specific and industry experience, including maintenance and inspection, that supports the conclusion that cracking is not an aging effect in treated water and buried environments. The response should specifically discuss why cracking is not applicable to stainless steel in treated water and buried environments.

2. Tables 3.4-1 and 3.4-2 of the LRA indicate that cracking of stainless steel components will be managed by the secondary chemistry monitoring program alone. This program monitors water chemistry but does not identify cracking or monitor crack growth. Explain why inspections for cracking and monitoring of crack growth are not necessary.

3. The staff believes that verification of the effectiveness of the chemistry control program is necessary for loss of material due to general, crevice, and pitting corrosion for carbon steel piping and fittings, valve bodies and bonnets, pump casings, pump suction and discharge lines, and tanks in treated water. A one-time inspection is an acceptable method of verifying the effectiveness of chemistry monitoring programs for preventing the loss of material due to general, crevice, and pitting corrosion for carbon steel piping and fittings, valve bodies and bonnets, pump casings, pump suction and discharge lines in treated water. Identify the most susceptible locations within these components to general, crevice, and pitting corrosion. Also, identify how these components were determined to be not susceptible to loss of material.

4. Loss of material due to general corrosion and microbiologically-influenced corrosion (MIC) could occur in stainless steel and carbon steel shells, tubes, and tubesheets within the bearing oil coolers. Corrosion is an aging effect for components within the bearing oil coolers, if water is present. The LRA indicates that carbon steel components within the auxiliary feedwater pump containing lube oil are not subject to an aging effect requiring management. Since the bearing oil coolers and the auxiliary feedwater pumps lube oil components appear to have a similar environment, explain the basis for determining that auxiliary feedwater pumps lube oil components are not subject to loss of material due to corrosion resulting from water contamination of the auxiliary feedwater lube oil.

5. Industry operating experience indicates that bolting experiences cracking and loss of preload as aging effects. Provide the basis for the conclusion that the AMP for bolting at Plant Y need not manage the aging effects associated with cracking and loss of preload.

6. Tables 3.4-1 through 3.4-3 of the LRA indicate that the structure monitoring program is used to monitor the loss of material on the external surface of carbon steel and stainless steel components in an outdoor environment. The application indicates that the structures monitoring program is consistent with the ten attributes of the aging management program

XI.S6, specified in GALL (August 2000-Draft) Chapter XI. However, program XI.S6 in GALL is written for monitoring structures or structural components. The components identified in Tables 3.4-1 through 3.4-3 that identify the Structure Monitoring Program to manage aging effects are not structures. The components identified are tanks, pumps, valves, pipes, fittings, tubing, strainers (standby steam generator feedwater pump suction), orifices, steam traps, auxiliary feedwater pump lube oil cooler and cooler shells and channels. Provide the basis for the determination that the proposed program is consistent with the evaluation in the GALL as claimed.

7. Are the carbon steel SPCS components (including stagnant lines, main actuation/isolation valves, etc.) exposed to a raw water environment due to standby conditions, actuation of the back-up systems, or testing? If so, provide operating experience and the AMP for the SPCS carbon steel components relating to the aging effects of loss of material due to microbiologically influenced, general, and pitting corrosion, and biofouling.

8. Since the preparation of the referenced GALL report (August 2000), the staff issued Information Notice (IN) 2001-09 on the flow accelerated corrosion of the main feedwater system inside the containment. For the subject components, has an inspection been performed for Plant Y? If not, what inputs are used in CHECKWORKS for the subject components?

9. Table 3.4.2 of the LRA lists buried piping as a component subject to aging management for the standby steam generator feedwater pump suction and states there are no applicable aging effects and no AMP is required. Operating experience indicates that buried stainless steel and carbon steel components may degrade. Provide the basis for why there are no aging effects for buried stainless steel components. In addition, are there any buried carbon steel components within the scope of license renewal? If so, describe the applicable aging effects and provide an AMP for the buried carbon steel components. The field erected tanks internal inspection program description states that the presence of corrosion that could lead to loss of material will be determined by visual inspection of the accessible areas of the field erected tanks. The LRA further states that internal surfaces will be examined for evidence of flaking, blistering, peeling, discoloration, pitting, or excessive corrosion. Are there inaccessible areas in these tanks? If so, how would the inaccessible areas be inspected?

10. Industry operating experience demonstrates that the potential aging effects of loss of material, loss of preload, crack initiation and growth are applicable for bolting components in an atmospheric environment. It is unclear if the LRA adequately addresses the pertinent aging effects associated with bolting integrity for the SPCS. Does the aging effect, “loss of mechanical closure integrity,” include the potential aging effects of loss of material, loss of preload, crack initiation and growth? Tables 3.4-1 and 3.4-2 of the LRA list “Boric Acid Wastage Surveillance Program” (not available for staff review) as the AMP for managing these aging effects for the main steam and turbine generator, feedwater, blowdown, and chemical addition systems. Also, the LRA listed no AMP program as being required for AFW bolting in Table 3.4-3.

A) Identify the ASME Class for the bolting in the SPCS within the scope of license renewal.

B) Identify the ASME Code inservice inspection requirements for the bolting in the SPCS within the scope of license renewal. Identify the inservice inspection program (i.e. extent, frequency and acceptance criteria) to detect cracking for non-ASME Code bolting within the scope of license renewal.
C) Identify the lubricants and sealants used for installing the bolting. Explain why these lubricants and sealants will not cause cracking in bolting.
D) Describe the AMP that will manage the aging effects of cracking and loss of preload within the scope of license renewal.

11. Appendix B of the LRA, "Programs Descriptions and FSAR Sections Consistent with the GALL report," states that the flow accelerated corrosion program is applicable to the main steam, feedwater, and blowdown systems. Industry experience as noted in NRC GL 89-08, IN 81-28, IN 89-53, IN 91-18 indicates that FAC is also applicable to the auxiliary feedwater, condensate storage, and chemical addition systems. Explain why the LRA does not address the program as applicable to these systems and their associated carbon steel components (i.e. piping, pump casing, etc.). Similarly, the turbine generator system was described as part of the scope of section 3.4 of the LRA (page 5) but was not apparent in the text or tables of this section. Please provide the apparent missing information for the turbine generator system or explain the discrepancy.

12. Table 3.4-1 of the LRA does not include steam as a potential environment for the main steam and turbine generator systems. The staff would expect the main steam and turbine generator systems to be subject to a steam environment. Explain why steam is not the environment for these systems.

13. Table 3.4-2 of the LRA lists primary water chemistry as the AMP for the demineralized storage tank. The staff believes that the water in the tank is secondary water that is controlled by the secondary water chemistry program. Is the water in this tank primary or secondary water for Plant Y?

14. In Section 3.4.3 of the LRA, the generic NRC communications are listed that have been reviewed for operating experience related to SPCS. The list does not contain the following two information notices:

A) NRC Information Notice 91-18, Supplement 1, High-Energy Piping Failures Caused by Wall Thinning, December 18, 1991.
B) NRC Information Notice 97-84, Rupture in Extraction Steam Piping as a Result of Flow-Accelerated Corrosion, December 11, 1997.

Were these two documents included in the review? If so, address the impact of excluding these documents in the integrated plant assessment.

15. Table 3.4-3 of the LRA states that the auxiliary feedwater system is cast iron. The staff believes that cast iron may be subject to loss of material due to selective leaching. Provide the basis for concluding that loss of material due to selective leaching for AFW cast iron components is not an AERM.

16. External environments for which applicable aging effects have been identified in the plant Y LRA include the atmospheric air and leakage. The leakage environment is created when

fluids escape from their system boundaries (usually from bolted closures) and contact the external surfaces of adjacent components. The fluid in leakage environments of concern is typically borated, treated, or raw water. In the LRA, the only leakage environment identified is borated water leakage. Discuss the operating experience for leakage of treated or raw water onto plant components.

17. AMPs for the SPCS are summarized in Section 3.4.4 of the LRA. However, the first AMP on the list, auxiliary feedwater pump oil coolers inspection is not referred to in the corresponding AMR results tables (Table 3.4-1,3.4-2, or 3.4-3). Similarly, the primary water chemistry monitoring program which is referred to in Table 3.4-2, is not in the Section 3.4.4 list. Address these inconsistencies.

18. The applicant states that any follow-up inspection required will be based on the evaluation of the inspection results and will be documented in accordance with the corrective action program in accordance with 10 CFR 50, Appendix B. The AMP in Appendix B of the LRA does not explicitly commit to 10 CFR 50, Appendix B to address corrective action, confirmation process, and administrative control of nonsafety related components. Please indicate whether the AMP incorporates these elements. Also, are there any of the steam and power conversion system components within the scope of license renewal that are nonsafety related? If so, confirm that these nonsafety related components will be covered by a corrective action program consistent with 10 CFR 50 Appendix B?

19. For field erected tanks, are portions of the tanks in contact with the ground? Industry operating experience indicates that tanks in contact with the ground are subject to loss of material. If Plant Y tanks are in contact with the ground, address the basis for concluding they are not subject to loss of material.

RAIs FOR PLANT Y
SECTION 3.5: CONTAINMENT, STRUCTURES, AND COMPONENT SUPPORTS

1. Section 3.5 is titled Structures and Structural Components, subsection 3.5.1 is titled Containments, and subsection 3.5.1.1 is titled Containment Structure Concrete Components. The table entries for component/commodity group in Table 3.5-2, referenced by Section 3.5, covers additional concrete components (beyond containment) such as floor slabs, missile shields, equipment pads, etc. which are not addressed in subsection 3.5.1.1. As a result, it is not clear what structures and structural components are intended to be included in this demonstration (containment concrete components, steel components of containment, prestressing system components, containment internal structures, other building structures, masonry walls, etc.). Explain the intended scope of components in this demonstration and any inconsistency between the information provided in subsection 3.5.1.1 and Table 3.5-2. If the intended scope covers more than containment concrete components, then provide a review of the aging effects and the applicable AMPs. The introductory paragraphs of Section 3.5 discuss two (2) aging management programs credited for managing aging effects of inaccessible structural components. The two programs are the ASME Section XI, Subsection IWE inservice inspection (ISI) program and the structures monitoring program. The staff believes that a discussion of aging effects and associated aging management programs (AMPs) related to inaccessible areas should not be described in the introductory/lead in section.

2. The LRA Section 3.5 (third paragraph) lists several structural components which require aging management but are inaccessible for visual inspection. These include buried concrete, embedded steel, and structural components blocked by installed equipment or structures. It is not clear what structural components this paragraph addresses. For example, is the paragraph referring to containment concrete components, containment steel elements, prestressing systems, or containment internal structures? In addition, the LRA states that structural components inaccessible for inspection are managed by inspecting accessible structures with similar materials and environments for aging effects that may be indicative of aging effects for inaccessible structural components. From the information provided it is not apparent how visual inspection of accessible areas of concrete would be indicative of aging degradation of buried concrete surfaces and whether this approach is sufficient for embedded steel. Also, Section 3.5 of the LRA states that the programs credited for managing aging effects of inaccessible structural components are the ASME Section XI, Subsection IWE ISI Program and the Structures Monitoring Program. ASME Section XI, Subsection IWE does not apply to concrete components of containment. 10 CFR 50.55a clearly states that the ASME Section XI, Subsection IWL should be used for examination of concrete components of containments and also specifies additional provisions beyond the requirements of Subsection IWL.

Based on the above discussion, describe what structural components are included in the third paragraph of Section 3.5 regarding inaccessible structural components, and provide the justification of the approach presented in Section 3.5 for managing aging effects of structural components in inaccessible areas. This should include an explanation of aging management for inaccessible areas when conditions in accessible areas may not indicate the presence of or result in degradation to such inaccessible areas.

3. LRA subsection 3.5.1 lists the containment structure concrete components as containment dome, cylinder wall, floor, and foundation mat. Explain why the containment ring girder and buttresses are not listed.

4. LRA subsection 3.5.1.1.1, titled "Materials and Environment," states that "The codes and standards used for design and fabrication of the containment structure components are provided in Plant Y UFSAR subsections 5.1.2 and 5.1.6. These materials and the testing of these materials, are consistent with the GALL Report." This statement should be clarified because the GALL Report does not specify materials and testing of materials for the containment structure components. Explain the purpose and the meaning of the LRA statement.

5. LRA subsection 3.5.1.1.2 is titled "Aging Effects Requiring Management." It lists three (3) aging effects that are applicable to containment concrete components which require aging management. The LRA indicates that these AERMs, which are consistent with the GALL Report, apply to the concrete below groundwater elevation for the cylinder walls and foundation mat. From the information provided in subsection 3.5.1.1.2 in the LRA it cannot be determined why loss of material due to corrosion of embedded steel and cracking due to corrosion of embedded steel should be limited to locations below groundwater elevation and limited to cylinder walls and foundation mat. Provide the technical basis why these two AERMs should be limited to below groundwater elevation and limited to cylinder walls and foundation mat.

6. LRA subsection 3.5.1.1.2 also did not evaluate the loss of bond between the concrete and steel due to steel corrosion as an aging effect. If this aging effect is applicable, provide a description of an AMP. If not, provide the justification for concluding that this aging effect is not applicable.

7. LRA subsection 3.5.1.1.2 indicates that the aging effects of loss of material and cracking due to freeze-thaw based on the climate at the plant which is stated to be subtropical with long, warm summers accompanied by abundant rainfall and mild, dry winters with negligible freeze-thaw cycles are not applicable. This description is somewhat subjective (e.g., negligible freeze-thaw cycles) and prevents the staff from making a reasonable assurance finding. Provide quantitative information such as the weathering index for the site which would demonstrate that this aging effect is not applicable.

8. LRA subsection 3.5.1.1.2 indicates that the aging effect of change in material properties (increase in porosity and permeability) due to leaching of calcium hydroxide based on the statement "Plant Y concrete structures and concrete components are constructed of dense, well-cured concrete, with an amount of cement suitable for strength development, and achievement of a water-to-cement ratio that is characteristic of concrete having low permeability are not applicable. This is consistent with the guidance provided by the ACI...." The meaning of the word dense is not clear and should be defined. The reference to guidance provided in ACI should be expanded to identify which ACI codes and standards were used. Indicate whether the concrete components were constructed in accordance with the guidance provided in ACI 201.2R-77 which is one acceptable approach the staff has found exists to

assure adequate concrete characteristics. Alternatively, provide quantitative information which would demonstrate the concrete has the characteristics described above.

9. LRA subsection 3.5.1.1.2 indicates that the aging effects of expansion and cracking due to reaction with aggregates based on the use of non-reactive aggregates whose acceptability was established using industry standards and ASTM tests are not applicable. Indicate whether investigations, tests, and petrographic examinations of aggregates were performed in accordance with ASTM C295-54 or ASTM C227-50 to demonstrate that this aging effect is not applicable. If not, then provide the justification for concluding that this aging effect is not applicable.

10. LRA subsection 3.5.1.1.2 indicates that the aging effects of cracks, distortion, and increase in component stress level due to settlement on the basis that Plant Y concrete structures are founded on fossiliferous limestone bedrock with crushed fill are not applicable. The LRA states that this foundation material is suitable for foundations systems with no significant structural settlement expected. It is not clear whether the prior statement means that the concrete structures are founded on bedrock. If not, then explain why settlement is not an applicable aging effect.

11. LRA subsection 3.5.1.1.2 indicates that the aging effect of loss of strength and modulus due to elevated temperatures is not applicable on the basis that the hot piping penetrations were designed and constructed to maintain concrete components below the degradation threshold and localized temperature limits of the ACI standards without forced ventilation. The LRA also indicates that no other containment structure concrete components are exposed to elevated temperature. Provide the general temperature limit corresponding to the degradation threshold and localized temperature limit referred to in the above statement. Since the aging effects due to elevated temperatures probably would not be identified by visual inspection, except under extreme conditions, what data is available to demonstrate that the general and local temperatures during operation of the plant have not exceeded the specified temperature limits?

12. LRA subsection 3.5.1.1.3 describes a review of industry operating experience and plant specific operating experience. This review included a survey of Plant Y non-conformance reports, licensee event reports, and condition reports for any documented instances of containment structure concrete component aging and interviews with responsible engineering personnel. Based on these reviews, the LRA concludes that “no aging effects requiring management were identified from this review beyond those identified in subsection 3.5.1.1.2.” This conclusion does not appear to be consistent with some of the reference documents cited in subsection 3.5.1.1.3. As an example, NUREG-1522 has identified aging effects beyond those identified in subsection 3.5.1.1.2 where degradation has occurred and some of these areas would warrant aging management. In addition, no plant-specific operating experience with aging of concrete components has been described in the LRA. Therefore, describe instances of accessible and inaccessible concrete aging degradation observed at Plant Y even if they have been identified as “not requiring aging management.” The description of degradation occurrences should include results from the reviews of the non-conformance reports, licensee event reports, and condition reports as well as interviews with responsible engineering personnel.

13. LRA subsection 3.5.1.1.4 concludes that the aging effects requiring management for containment are adequately managed by the "Structures Monitoring Program." It also states that the "Structures Monitoring Program (which is described in Appendix B) is in agreement with the GALL report in that it is being modified to include a plant specific approach to inspections of inaccessible areas." As noted in the Structures Monitoring Program XI.S6 of the GALL report, it "...applies only to structures and structural components and applicable aging effects that are not addressed by the AMPs described in Sections XI.S1 thru XI.S4 and XI.S7; i.e., this AMP cannot be substituted for any of the five (5) specified AMPs." This means that the structures monitoring program cannot be substituted for the containment ISI program. However, the LRA credits the structures monitoring program for containment and this is inconsistent with the GALL report. Explain why the structures monitoring program is being credited for containment.

14. LRA Section 3.5 (introductory paragraph) utilizes the term "component and commodities" and Table 3.5-2 titled "Containments," uses the term component/commodity group for the heading of the first column. The entries in Table 3.5-2 under this table heading consist of various containment components and other structural components. Since the use of the term "commodity" is not clear, explain what is the definition and purpose of this term and how is it different than structural "component."

15. The structures monitoring program in the LRA, Appendix B, indicates that the program is credited for managing the effects of loss of material for selected structures within the scope of license renewal. It does not include the other aging effects (cracking and change in material properties) that have been identified in subsection 3.5.1.1.2. Explain the inconsistency between the structures monitoring program described in Appendix B and the aging effects described in subsection 3.5.1.1.2.

16. The structures monitoring program in Appendix B describes, under the heading operating experience, inspections that have been performed for the containment and other structures in 1996 and 1997, and in 1999 and 2000. The LRA states that no significant deterioration has been identified in the inspections performed. Describe instances of degradation observed during these two inspection periods for the containment structural components.

17. The structures monitoring program in Appendix B states that "With identified enhancements, the Structures Monitoring Program is consistent with the ten attributes identified in the NRC GALL report (August 2000 DRAFT) for Structures Monitoring Program XI.S6." Provide a description what is meant by "identified enhancements."

18. LRA Table 3.0-2 indicates that under external service environments borated water leaks can occur. If steel components are within the scope of the demonstration, then describe how this condition is being managed.

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