UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 15, 2011

Mr. G. T. Powell, Vice President
Technical Support and Oversight
STP Nuclear Operating Company
P.O. Box 289
Wadsworth, TX 77483

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE SOUTH TEXAS PROJECT, UNITS 1 AND 2 LICENSE RENEWAL APPLICATION – AGING MANAGEMENT PROGRAMS AUDIT, STRUCTURES/ELECTRICAL (TAC NOS. ME4936 AND ME4937)

Dear Mr. Powell:

By letter dated October 25, 2010, STP Nuclear Operating Company, submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 for review by the U.S. Nuclear Regulatory Commission (NRC or the staff), to renew operating licenses NPF-76 and NPF-80 for South Texas Project, Units 1 and 2. The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

These requests for additional information were discussed with Arden Aldridge, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-3873 or by e-mail at john.daily@nrc.gov.

Sincerely.

John W. Daily, Senior Project Manager
License Renewal Branch RPB1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Enclosure:
As stated

cc w/encl: Listserv

SOUTH TEXAS PROJECT, UNITS 1 AND 2
LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONALINFORMATION –
AGING MANAGEMENT PROGRAMS AUDIT,
STRUCTURES/ELECTRICAL

Note: In all cases unless otherwise noted, references to the generic aging lessons learned (GALL) Report, a GALL Aging Management Program (AMP), or the SRP-LR refer to the current approved revision, Revision 2.

RAI B2.1.32-01

Background:

The U.S. Nuclear Regulatory Commission (NRC or the staff) review has determined that if ASTM A325, ASTM F1852, and/or ASTM A490 bolts are used, the preventive actions as discussed in Section 2 of the Research Council for Structural Connections "Specification for Structural Joints Using ASTM A325 or A490 Bolts" should be followed. This recommendation is now captured in structural AMPs XI.S1, XI.S3, XI.S6, and XI.S7 of the GALL Report.

Issue:

The staff reviewed the structural AMPs in license renewal application (LRA) Sections B2.1.27, B2.1.29, B2.1.32, and B2.1.33, as well as the associated support documents, and found no discussion of the preventive actions recommended in "Specification for Structural Joints Using ASTM A325 or A490 Bolt."

Request:

If ASTM A325, ASTM F1852, and/or ASTM A490 bolts are used, explain how the preventive actions discussed in Section 2 of "Specification for Structural Joints Using ASTM A325 or A490 Bolts" are addressed, or why they are unnecessary. The response should address all structural bolting within the scope of license renewal.

RAI B2.1.32-02

Background:

Based on recent operating experience and recent NRC reviews, the staff has determined that structures within the scope of license renewal should be monitored on a frequency not to exceed five years. This current staff position is captured in GALL AMPs XI.S5 "Masonry Walls," and XI.S6, "Structures Monitoring Program."

ENCLOSURE

Issue:

Program element 4, "detection of aging effects," of the Structures Monitoring Program states that inspections are scheduled so that all accessible areas of both units are inspected every 10 years. Program element 4 of the Masonry Wall Program states that a total inspection of an equivalent unit is completed at a frequency of no more than five years. It is unclear to the staff that the inspection frequency meets the recommendations of the GALL Report.

Request:

Identify the structures and masonry walls that will be inspected with an inspection interval greater than 5 years, and include a technical justification for the longer interval. The justification should include the environments the structures are exposed to and a summary of past degradation. This issue applies to both the Structures Monitoring and the Masonry Wall Programs.

RAI B2.1.32-03

Background:

In GALL AMP XI.S6, ACI 349.3R-96 is noted to provide an acceptable basis for developing acceptance criteria for concrete structures. The GALL Report also states that applicants who are not committed to ACI 349.3R and elect to use plant-specific criteria for concrete structures should describe the criteria and provide a technical basis for deviations from those listed in ACI 349.3R.

Issue:

Element 6 of the LRA basis document states that the Structures Monitoring Program provides guidance for the determination of performance criteria for the SSCs included within the scope of the maintenance rule. Guidelines are used to establish the inspection attributes for SSCs monitored by the Structures Monitoring Program with classifications of acceptable, acceptable with degraded, and unacceptable used to classify levels of aging effects for each inspection attribute. It is unclear to the staff if ACI 349.3R-96 provides the basis to establish the STP aging classifications, or if some other basis is utilized and what criteria are used to categorize an SSC as having an acceptable, acceptable with degraded, and unacceptable classification of aging. This issue applies to all programs under the Structures Monitoring Program (i.e. RG 1.127 and Masonry Wall Programs).

Request:

1. Provide the quantitative acceptance criteria for the Structures Monitoring and the Inspection of Water-Control Structures Inspection Programs. If the concrete acceptance criteria deviate from those discussed in ACI 349.3R-96, provide technical justification for the differences.

2. If quantitative acceptance criteria will be added to the programs as an enhancement, provide plans and a schedule to conduct a baseline inspection with the quantitative acceptance criteria prior to the period of extended operation.

RAI B2.1.32-04

Background:

In GALL AMP XI.S6, in program element 3 "parameters monitored or inspected" and program element 4, "detection of aging effects," notes that the structures monitoring program addresses detection of aging effects for inaccessible, below-grade concrete structural elements, and for plants with non-aggressive ground water/soil (pH > 5.5, chlorides < 500 ppm, and sulfates <1500 ppm), the program recommends: (a) evaluating the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to such inaccessible areas and (b) examining representative samples of the exposed portions of the below-grade concrete, when excavated for any reason. The GALL Report also notes that for plants with aggressive ground water/soil (pH < 5.5, chlorides > 500 ppm, or sulfates > 1500 ppm) and/or where the concrete structural elements have experienced degradation, a plant-specific AMP accounting for the extent of the degradation experienced should be implemented to manage the concrete aging during the period of extended operation.

Issue:

The LRA and element 3 of the LRA basis document state that plant procedures will be enhanced to monitor at least two groundwater samples every five years for pH, sulfates, and chlorides, but no results are provided to demonstrate that the groundwater is either aggressive or non-aggressive. Also in element 4 of the LRA basis documents for the Structures Monitoring Program and the Reg. Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program, no mention is made of opportunistic inspections of below-grade structures or a plant-specific program to address the below-grade structures if the ground water is aggressive. It is unclear to the staff how inaccessible concrete structures subjected to groundwater will be managed for aging.

Request:

1. Provide historical results, including seasonal variations, for groundwater chemistry (i.e., pH, sulfates, and chlorides) to demonstrate that the groundwater is either aggressive or non-aggressive.
2. If historical results indicate that the groundwater is considered to be non-aggressive, demonstrate that opportunistic inspections of exposed portions of the below-grade concrete, when excavated for any reason, will be performed under both the Structures Monitoring Program and the Reg. Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program, or explain why the inspections are not needed.

3. If historical results indicate that the ground water is aggressive, or where accessible concrete structural elements have experienced degradation, identify the plant-specific program that will be used to manage aging of these structures, or explain why the existing programs are adequate.

RAI B2.1.32-05

Background:

In GALL AMP XI.S6, program elements 3 and 4 state that for each structure/aging effect combination the specific parameters monitored or inspected are selected to ensure that the aging degradation leading to loss of intended function will be detected and quantified before there is a loss of intended function.

Issue:

As a result of the field walk-down with the applicant's technical staff on June 14, 2011, the staff noticed that there was essentially no leakage from the spent fuel pool leak chase channels. Also during the walk-down visual examinations of the exterior wall of the spent fuel pool and the underside of the spent fuel pool indicated no signs of leakage or degradation of the reinforced concrete. The staff is uncertain if the absence of leakage from the leak chase channels is representative of no leakage occurring, or if the leak chase channels are clogged. If the channels are clogged, leakage could accumulate behind the liner and eventually migrate through the concrete, possibly causing degradation of the reinforced concrete.

Request:

1. Discuss any actions taken to ensure that the spent fuel pool leak chase drainage system remains free and clear.
2. Describe how it will be verified that the leak chase drainage system remains free and clear during the period of extended operation (e.g., boroscope inspections of leak chase channels). If the verification involves actively inspecting or clearing the system, provide the frequency of the action and a justification for the proposed frequency.

RAI B2.1.32-06

Background:

In GALL AMP XI.S6, program elements 3 and 4 state that for each structure/aging effect combination the specific parameters monitored or inspected are selected to ensure that the aging degradation leading to loss of intended function will be detected and quantified before there is a loss of intended function.

Issue:

As a result of the field walk-down with the applicant's technical staff on June 14, 2011, the staff noticed that in the area between the fuel handling building and the Unit 2 containment, water had accumulated to a depth of 6 ft. or 7 ft. The staff also noted that some indications of deposits were observed on the wall of the fuel handling building above the current water level. When asked, the applicant noted that there were no criteria related to when to remove the water and that the surfaces of the containment and the fuel handling building subjected to the standing water were not routinely inspected after the water had been removed. The staff is uncertain whether the standing water has resulted in concrete degradation or could lead to degradation during the period of extended operation.

Request:

1. Explain where the standing water between the fuel handling building and the Unit 2 containment is coming from and provide justification for this conclusion.
2. Discuss any actions taken to address the accumulation of standing water between the fuel handling building and the Unit 2 containment (e.g. increased visual inspections, crack mapping, etc.)
3. Provide any plans to develop criteria related to when the standing water is removed and how the surfaces exposed to the standing water will be managed for aging during the period of extended operation (e.g. visual inspections, crack mapping, core bores, etc.). Provide technical justification that these actions will be adequate to manage aging.
4. If similar conditions exist in Unit 1, provide the above information for both units and a discussion of any differences in the aging management approaches between the units.

RAI B2.1.32-07

Background:

In GALL AMP XI.S7, program elements 3 and 4 state that for each structure/aging effect combination the specific parameters monitored or inspected are selected to ensure that the aging degradation leading to loss of intended function will be detected and quantified before there is a loss of intended function. Element 4 also states that inspections should be conducted at an interval of no greater than 5 years.

Issue:

The LRA includes an enhancement to program element 4, "detection of aging effects," which states that the program will be enhanced to specify inspection at intervals not to exceed 5 years; however, it does not clearly state that concrete structures below the water-line will be inspected on this frequency.

Request:

1. Describe the procedure and acceptance criteria for visual inspections for below water ECW intake and discharge structures (e.g., drain the areas, utilize divers, etc.).
2. Provide the frequency of inspection for these structures. If the frequency does not meet the recommendations in the GALL Report, provide justification for the inspection frequency.

RAI B2.1.27-01

Background:

Based on operating experience and recent NRC reviews, the staff has determined that containment stainless steel penetration sleeves, dissimilar metal welds, bellows, and steel components that are subject to cyclic loading but have no current licensing basis fatigue analysis should be monitored for cracking through surface examinations. This current staff position is captured in GALL AMP XI.S1 "ASME [American Society of Mechanical Engineers Boiler and Pressure Vessel Code] Section XI, Subsection IWE," program element "detection of aging effects."

Issue:

LRA Section 4.6.2 states that all containment penetrations whose design is supported by a fatigue or cyclic load analysis are addressed as TLAAs. However, the LRA does not state whether or not there are additional containment penetrations exposed to cyclic loads which are not covered by the analysis.

Request:

Identify any containment stainless steel penetration sleeves, dissimilar metal welds, bellows, or steel components that are subject to cyclic loading but have no current licensing basis fatigue analysis. If there are components which meet these criteria, explain how they are monitored for cracking. If surface examinations are not used, justify why they are not needed.

RAI B2.1.27-02

Background:

ASME Code, IWE-1241 states that containment surface areas subject to accelerated degradation and aging require augmented inspection. The code goes on to list concrete-to-steel shell or liner interfaces as an example of one such area.

Issue:

During the audit, it was not clear to the staff whether or not the moisture barrier is considered an area requiring augmented examination per IWE-1241.

Request:

a. State whether or not the moisture barrier is identified as an area requiring augmented examination per IWE-1241 and whether or not augmented examinations are being performed on the area. If it is not identified as an area requiring augmented examination, provide the justification for why augmented examination is not needed.
b. Explain whether or not any degradation has been identified on the actual moisture barrier and if so how it was addressed.

RAI B2.1.28-1

Background:

GALL AMPXI.S2, "ASME Section XI, Subsection IWL," program element 3, "parameters monitored or inspected," recommends that concrete surfaces are to be examined for evidence of damage or degradation. During the STP Unit 2 walkdown, the following issues were noted by NRC staff on June 14, 2011:

1. Grease-stains on the south containment wall (between south containment wall and fuel handling building) at -13 feet floor elevation between penetrations M-14 and M-13, and adjacent to penetrations M12 and M11.
2. Accumulated grease in the tendon gallery at -36 feet floor elevation. It appeared that grease was leaking from the grease-cans of tendons 137, 136, 232, 212, 145, and 211.
3. Grease-stains in the tendon gallery ceiling around the grease-can for tendons 236, 237, and 238.

Issue:

Grease leaking from pre-stressing tendon anchorage cans and sheathing into concrete may degrade the structural integrity of containment concrete and the pre-stressing system over the long term during the period of extended operation.

Request:

Explain how the effect of degradation on the containment concrete, including on reinforcement and on pre-stressing tendons, will be adequately managed so that Units 1 and 2 containments intended functions are maintained consistent with the current licensing basis (CLB) during the period of extended operation, as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Part 54.21.(a)(3). The response should include the following:

1. Long term effect of grease leakage on the strength and durability of concrete.
2. Loss of corrosion protection of the pre-stressing tendons and anchorage components due to uncontrolled leakage of the grease from grease cans and tendon sheathings.
3. Long term effects on concrete-rebar bonding, if any. Provide discussion for applicable reinforcements supported by detailed containment structural drawings.

RAI B2.1.28-2

Background:

GALL AMPXI.S2, "ASME Section XI, Subsection IWL," program element 10, "operating experience," recommends that the applicant's AMP for concrete containments consider the degradation concerns described in the NRC's generic communications, including NRC Information Notice 99-10, "Degradation of Pre-stressing Tendon Systems in Pre-stressed Concrete Containments."

Issue:

It is not clear from the LRA if the effect of high temperature on the tendon pre-stressing forces, as described in Information Notice 99-10, has been considered by the applicant as a part of the AMP.

Request:

Explain how the effects of high temperature on the pre-stressing forces in tendons has been considered so that STP Units 1 and 2 containments' intended functions are maintained consistent with the CLB during the period of extended operation, as required by 10 CFR Part 54.21.(a)(3).

RAI B2.1.28-3

Background:

GALL AMPXI.S2, "ASME Section XI, Subsection IWL," program element 6, "acceptance criteria," refers to ACI 201.1R and ACI 349.3R to provide an acceptable basis for developing acceptance criteria for concrete structures. The GALL Report also states that "Quantitative acceptance criteria based on the Evaluation Criteria" provided in Chapter 5 of ACI 349.3R also be used to augment the quantitative assessment of the Responsible Engineer."

Issue:

During the audit, the NRC staff reviewed the implementing procedures used for concrete containment inspection. PSC procedure 8.4 "PSC Quality Surveillance Procedure, General Visual Examination of Concrete Containment," dated November 19, 2010, was used for the general inspection of exposed accessible exterior surface of the concrete containments during the 2010 inspection. ACI 349.3R is not referenced in the PSC's procedure. However,

Section 3.6 "Acceptance Criteria" of STP license renewal basis document for ASME Code, Section XI, Subsection IWL refers to ACI 201.1R and ACI 349.3R to establish the general structural condition of containment surface. It is unclear to the staff if the quantitative acceptance criteria of ACI 349.3R have been used to establish the general structural condition of containment surface.

Request:

1. Provide the quantitative acceptance criteria used for concrete containment inspection. If the concrete acceptance criteria deviate from those discussed in ACI 349.3R, provide technical justification for the differences.
2. If quantitative acceptance criteria will be added to the AMP as an enhancement, provide plans and a schedule to conduct a baseline inspection with the quantitative acceptance criteria prior to the period of extended operation.

RAI B2.1.29-1

Background:

GALL AMP XI.S3, program element 5, "monitoring and trending" states that examinations of component supports that reveal indications which exceed the acceptance standards and require corrective measure are extended to include additional examinations in accordance with IWF-2430.

Issue:

Upon review of plant-specific operating experience, the staff noted that during inservice inspection examination activities for a component support on the essential cooling water intake structure, excessive corrosion was found on the support baseplate and baseplate bolts. The licensee performed an engineering evaluation of the corroded support to determine whether the component was acceptable for continued service. The engineering evaluation determined that the component support still met the criteria for functionality in accordance with subsection IWF-3000. The licensee used the provisions of ASME code case N-491-2, Section IWF-2430 to justify that no successive or additional examinations would need to be conducted. However, the applicant chose to rework the component to arrest further corrosion. During a walkdown, the staff noticed that adjacent supports in the same area showed signs of excessive corrosion. The licensee created a Condition Record (CR) to repair the supports the staff identified as showing signs of degradation.

The staff is concerned that the applicant's approach of selectively reworking the support that did not meet the acceptance criteria of IWF-3400, and not extending the inspection to increase the number of supports to be inspected in accordance with IWF-2430, may not be effective in managing aging of the component supports during the period of extended operation. This is reflected by the as-found conditions of adjacent supports during the staff's walkdown and issuance of a CR. A component support included in the scope of inservice inspection (ISI), that is reworked to an as-new condition prior to meeting the threshold for expansion of the ISI scope

per the ASME Code, is no longer representative of adjacent component supports that show similar signs of aging but are not in the specific ISI inspection sample. During successive inspections as part of the ISI-IWF aging management program, the re-worked component support would be inspected but would no longer represent the aging effects of the surrounding supports with the same material/environment combination. The concern is that those surrounding supports could continue to age, possibly to the point of exceeding the acceptability criteria of IWF subsection 3000 but would not be re-worked since they would be outside the inspection sample that is subject to ASME code requirements.

Request:

Describe how a repair made to a component support outside of the ISI program criteria, resulting in an "as-new" ISI program sample component, without an expansion of ISI program sample population size, will be effective in managing aging of similar/adjacent components that are not included in the ISI program sample population.

RAI B3.3-2

Background

GALL AMP X.S1 states that plant-specific operating experience must be evaluated for relevancy to a licensee's aging management program, and appropriate actions be taken and documented. In addition, program element 3, "parameters monitored," of GALL AMP X.S1 recommends that containment tendon pre-stressing forces be monitored in accordance with Subsection IWL of Section XI of ASME Code, as incorporated by reference in 10 CFR 50.55a.

Issue:

Upon onsite review of the applicant's Inservice Surveillance of Containment Post-tensioning System Program basis documents, the staff noted that the applicant's procedure defines the acceptance criteria for an individual tendon as having a prestress force greater than 95 percent of predicted force. LRA Section B3.3 states that two of the 140 tendon lift-off tests did not meet acceptance criteria for the containment tendon prestress program. During its review, the staff noted the following:

1. LRA Section B3.3 states that one deficient tendon was found in year 1 in Unit 2 and the other was found in year 5 in Unit 1. However, program documentation reviewed on site indicated that the deficient tendons were both found in Unit 2.

2. According to IWL- 2421, "Sites With Multiple Plants," for the containment with the first Structural Integrity Test, all examinations required by IWL-2500 shall be performed at 1, 3, and 10 years and every 10 years thereafter. For each subsequent containment, all examinations required by IWL-2500 shall be performed at 1, 5, and 15 years and every 10 years thereafter.

3. Staff reviewed onsite documentation that stated that corrective actions in the form of additional tendon inspections were taken after the deficient tendons were found, but that these additional inspections were not done until after the year 10 surveillance inspection, even though the deficiencies were found in the year 1 and year 5 surveillance inspections. The LRA does not explain the corrective actions that were taken per the program procedure or any follow-up actions to resolve the issue.

Request:

1. Resolve the discrepancy between the LRA and the onsite program basis documents as to which Unit each of the deficient tendons were located.

2. Describe, from the first containment structural integrity test, the tendon surveillance intervals for both containments (Units 1 and 2), and address how these intervals are in accordance with IWL-2421 requirements for sites with multiple plants.

3. Regarding corrective actions:
   a. Describe what corrective actions were taken as a result of discovering conditions that did not meet acceptance criteria per program procedure. Explain how these corrective actions meet the requirements of IWL-3221.1.
   b. Provide information on when corrective actions were taken. If corrective actions were not performed during the surveillance interval for each of the identified deficient tendons, provide justification for delaying the implementation of the corrective actions.

RAI B3.3-3

Background:

GALL AMP X.S1 states that plant-specific operating experience must be evaluated for relevancy to a licensee's aging management program, and appropriate actions be taken and documented.

Issue:

Upon review of the applicant's inservice surveillance of containment post-tensioning system program review, the staff noted that the applicant's procedure sets a limit to the volume of grease voids that can exist in any one tendon. The license renewal application states that grease voids in excess of surveillance requirements were found during the Unit 1 year 3, 5, and 10 inspections, and Unit 2 year 3, 5, and 15 inspections. Although the LRA identifies a condition where inspected areas did not meet acceptance criteria, it does not go on to explain any corrective actions taken per the program procedure or any follow-up actions taken.

Request:

Provide information on what corrective actions were taken as a result of discovering conditions that did not meet acceptance criteria or justify why corrective actions were unnecessary.

RAI B2.1.30-1

Background:

10 CFR Part 50, Appendix J, states that containment isolation valves are subject to Type C tests. By letters dated July 13, 1999, as supplemented October 14 and 22, 1999, January 26 and August 31, 2000, and January 15, 18, 23, March 19, May 8 and 21, 2001, (hereinafter, the submittal, Adams accession number ML011430090), STPNOC requested an exemption from 10 CFR Part 50, Appendix J, Option B, Section III.B, "Type B and C Tests," for the life of each unit (STPNOC has 2 PWR units) to the extent that this regulation imposes Type C leakage rate testing on certain containment isolation valves. The scope of the exemption includes containment isolation valves categorized as low safety significant (LSS) or non-risk significant (NRS).

The staff also noted that 10 CFR 54.4(a)1, states "Plant systems, structures, and components within the scope of this part are safety-related systems, structures, and components which are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49 (b)(1)) to ensure the integrity of the reactor coolant pressure boundary; (and) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in § 50.34(a)(1), § 50.67(b)(2), or § 100.11 of this chapter, as applicable."

Issue:

The staff reviewed the LRA, including the AMR Tables line items, but was not clear whether the containment isolation valves and associated penetrations which are exempt from 10 CFR Part 50, Appendix J testing are within the scope of license renewal.

In addition, the staff noted that the Operating Experience Community database indicates that containment isolation valves could be damaged by operating conditions. In 2006, NRC issued IN 2006-15 alerting licensees of possible vibration induced degradations and failures of containment isolation valves. According to the applicant's letter to NRC, dated August 31, 2000 (ML37490010), the applicant stated that its alternate reliability strategy for these valves and penetrations includes corrective actions and periodic feedbacks. It is not clear to the staff, however, what action(s) the applicant has taken in regards to IN 2006-15.

Request:

1. Indicate whether the containment isolation valves and associated penetrations, for which the exemption for Type B and C 10 CFR Part 50, Appendix J Tests was granted, are within the scope of license renewal. If not, provide justification.

2. Describe if any modifications or changes have taken place on the LSS/NRS valves/penetrations, including (but not limited to) those in response to IN 2006-15. If so, how did these modifications or changes impact the aging management of the components? If any valves/penetrations that once were exempt, but now because of corrective or other actions/modifications, are subject to aging management as recommended, for example, by GALL Report XI.S4, "10 CFR Part 50, Appendix J" Program, explain how the applicant will manage aging effects for these during the period of extended operation.

3. Discuss whether or not the applicant's specific management program/controls (see STPNOC letter to NRC referenced in Request 1 above and UFSAR section 13.7) will ensure the functionality of the valves and integrity of penetrations are adequate to provide aging management (e.g. cracking, loss of material, loss of leak tightness and sealing) during the period of extended operation.

4. Indicate if any other components that have been exempted under 10 CFR 50.12(a)(2)(vi) are subject to 10 CFR 54.4. If so, explain how these components are dispositioned within the LRA.

RAI B2.1.30-2

Background:

By letter dated November 27, 2000, in accordance with the provisions of 10 CFR 50.55a(a)(3)(i), the applicant requested relief for Units 1 and 2 from ASME Code, Section XI, Article IWE-5000 requirements to perform VT-2 visual examinations in connection with system pressure testing following repairs or modifications of pressure retaining boundaries or replacement of Class MC and Class CC components. As an alternative to the VT-2 examination, the applicant proposed to rely on Type B and Type C testing conducted pursuant to 10 CFR Part 50, Appendix J, to detect leakage from pressure-retaining components as an acceptable level of quality and safety. In conjunction with the test, the applicant also proposed to perform a general visual examination of the accessible areas to further ensure the overall integrity of the repaired/replaced component(s). For deferred or not-performed tests, the applicant would perform a VT-1 or detailed visual examination test for repairs or replacements affecting the containment pressure boundary.

The NRC staff, pursuant to 10 CFR 50.55a(a)(3)(i), authorized the proposed alternative for the remainder of the term of the current operating licenses for South Texas Units 1 and 2, because it provided an acceptable level of quality and safety for protecting the containment pressure boundary integrity.

Issue:

The current operating licenses for South Texas Units 1 and 2 expire in 2027 and 2028 respectively. In the original granting of the relief, there was no discussion or approval of the relief for the period of extended operation. The staff therefore is unclear how the applicant plans to provide an acceptable level of quality and safety for the protection of the containment pressure boundary integrity during the PEO.

Request:

Please state your plan of action to satisfy ASME Code requirements under Article IWE-5000 of Section XI, for VT-2 visual examinations in connection with the system pressure testing following repairs or modifications of pressure retaining boundaries or replacement of Class MC and Class CC components.

RAI B2.1.24-1

Background:

GALL AMP XI.E1 states that an adverse localized environment exists based on the most limiting condition for temperature, radiation, or moisture for the insulation material of cables or connections. It further states that adverse localized environments can be identified through the use of an integrated approach, such as reviews of EQ zone maps that show radiation levels and temperature for various plant areas, consultations with plant staff who are cognizant of plant conditions, utilization of infrared thermography to identify hot spots on a real-time basis, and the review of relevant plant-specific and industry operating experience.

Issue:

In LRA Section B2.1.24, the applicant states that Non-EQ cables, connections and terminal blocks within the scope of license renewal in accessible areas within adverse localized environments are inspected. However, the applicant has not provided its methodology for identification of adverse localized environments.

Request:

Provide your methodology for identification of adverse localized environments.

RAI B2.1.25-1

Background:

NUREG-1801, Rev. 1, "Generic Aging Lessons Learned," (the GALL Report) addresses inaccessible medium voltage cables in Aging Management Program (AMP) XI.E3, "Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements." The purpose of this program is to provide reasonable assurance that the

intended functions of inaccessible medium voltage cables (2 kV to 35 kV), that are not subject to environmental qualification requirements of 10 CFR 50.49 and are exposed to adverse localized environments caused by moisture while energized, will be maintained consistent with the current licensing basis. The scope of the program applies to inaccessible (in conduits, cable trenches, cable troughs, duct banks, underground vaults or direct buried installations) medium-voltage cables within the scope of license renewal that are subject to significant moisture simultaneously with significant voltage (energized 25% of the time).

The application of AMP XI.E3 to medium voltage cables was based on the operating experience available at the time Revision 1 of the GALL Report was developed. However, industry operating experience subsequent to GALL Report Revision 1 indicates that the presence of water or moisture can be a contributing factor in inaccessible power cable failures at lower service voltages (400 V to 2 kV). Applicable operating experience was identified in licensee responses to Generic Letter (GL) 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients," which included failures of power cable operating at service voltages of less than 2 kV where water was considered a contributing factor. The staff also noted that the significant voltage screening criterion (subject to system voltage for more than energized 25% of the time) was not applicable for all the inaccessible power cable failures noted.

Industry operating experience provided by NRC licensees in response to GL 2007-01 has shown: (a) that there is an increasing trend of cable failures with length in service, (b) that the presence of water/moisture or submerged conditions appears to be the predominant factor contributing to cable failure. The staff has determined, based on the review of the cable failure data, that an annual inspection of manholes and a cable test frequency of at least every 6 years (with evaluation of inspection results to determine the need for an increased inspection frequency) is a conservative approach to ensuring the operability of power cables and, therefore, should be considered. The use of test and inspection results in the determination of the need for adjustment of test and inspection frequencies should also be considered.

In addition, industry operating experience subsequent to GALL Report Revision 1 has shown that some NRC licensees may experience cable manhole water intrusion events, such as flooding or heavy rain, that subjects cables within the scope of program for GALL Report XI.E3 to significant moisture. The staff has determined that event driven inspections of cable manholes, in addition to a 1 year periodic inspection frequency, is a conservative approach and, therefore, should be considered.

This information has been incorporated into the GALL Report, Revision 2, AMP XI.E3.

Issue:

The applicant's Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program does not address the above staff guidance and recommendations as incorporated into GALL Report AMP XI.E3, Revision 2. Reference TR-11ST, "Electrical Components Aging Evaluation License Topical Report," Revision 0, OPGP04ZE0007, "License Renewal Electrical Aging Management," STP-AMP-B2.1.25, "Inaccessible Medium Voltage Cables Not Subject 10 CFR 50.49 EQ Requirements – B2.1.25 NUREG 1801 Program XI.E3," Revision 3.

Request:

1. Provide a summary of your evaluation of recently identified industry operating experience and plant-specific operating experience concerning inaccessible low voltage power cable failures within the scope of license renewal (not subject to 10 CFR 50.49 environmental qualification requirements), and how this operating experience applies to the need for additional aging management activities at your plant for such cables.

2. Explain how you will manage the effects of aging on inaccessible low voltage power cables within the scope of license renewal; with consideration of recently identified industry operating experience and plant-specific operating experience. The discussion should include assessment of your Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program description, program elements (i.e., "scope of program," preventive actions," parameters monitored/ inspected," "detection of aging effects," "monitoring and trending," acceptance criteria, and "corrective actions"), FSAR summary description and applicable license renewal commitment to demonstrate reasonable assurance that the intended functions of inaccessible low voltage power cables subject to adverse localized environments will be maintained consistent with the current licensing basis through the period of extended operation. Specifically, the assessment should address the program described in GALL AMP XI.E3, Revision 2 including the following:

   - The deletion of the "exposure to significant voltage" criterion (defined as subject to system voltage for more than 25 percent of the time).
   - Increased scope to include 400V to 2kV inaccessible power cables.
   - Revised frequency of inspections for water collection in manholes to at least annually.
   - Revised frequency of testing of in-scope inaccessible power cables (400V to 35kV) for degradation of cable insulation to at least once every 6 years.
   - Incorporated event-driven inspections (e.g., as a result of heavy rain or flood).
   - Cable test results and manhole inspection results are evaluated to determine the need for more frequent testing and inspections.
   - Corrective actions are taken and an engineering evaluation is performed when the test or inspection acceptance criteria are not met. Actions are taken to keep the cable dry and to assess cable degradation.

1. Explain how the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program, FSAR supplement, and commitment, incorporate recent industry and plant-specific operating experience for both inaccessible low and medium voltage power cables.

RAI B2.1.25-2

Background:

The GALL Report, Revision 2, states that periodic actions are taken to prevent inaccessible cables from being exposed to significant moisture, such as identifying and inspecting in-scope accessible cable conduit ends and cable manholes for water collection, and draining the water, as needed.

The GALL Report, Revision 2, further states that the inspection frequency for water collection is established and performed based on plant-specific operating experience with cable wetting or submergence in manholes (i.e., the inspection is performed periodically based on water accumulation over time and on event-driven occurrences, such as heavy rain or flooding). The periodic inspection should occur at least annually. The inspection should include direct observation that cables are not wetted or submerged, that cables/splices and cable support structures are intact, and that dewatering/drainage systems (i.e., sump pumps) and associated alarms operate properly. In addition, operation of dewatering devices should be inspected and operation verified prior to any known or predicted heavy rain or flooding events. If water is found during inspection (i.e., cable exposed to significant moisture), corrective actions are taken to keep the cable dry and to assess cable degradation.

Issue:

STP Procedure 0PGP04ZE0007, Section 5.2.2, - states in part, "Appendix B, 'Manholes Subject to Moisture Intrusion Containing In-Scope Medium Voltage Cables' lists all manholes subject to inspection for water collection that contain in-scope medium voltage cable." It is not clear from Appendix B of 0PGP04ZE0007 that all in-scope manholes are subject to inspection for water intrusion.

Request:

It is not clear from OPGP04ZE0007 whether the Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program includes all in-scope manholes and that all in-scope manholes are subject to inspection for water collection. Explain why OPGP04ZE0007 appears to limit the in-scope manholes only to manholes subject to water intrusion.

RAI B2.1.25-3

Background:

The GALL Report, Revision 2, states that periodic actions are taken to prevent inaccessible cables from being exposed to significant moisture, such as identifying and inspecting in-scope accessible cable conduit ends and cable manholes for water collection, and draining the water, as needed.

The GALL Report, Revision 2, further states if water is found during inspection (i.e., cable exposed to significant moisture), corrective actions are taken to keep the cable dry and to assess cable degradation.

STP procedure 0PGP04ZE0007, Section 5.2.4, "Solar Powered Sump Pump System," Section 5.2.4.2.1 states that if any of the manhole sump pumps are found not to be operating, do the following:

- Initiate a condition report
- Increase sump pump inspection frequency

Section 5.2.5, "Inspection for Water Collection in Manholes not Equipped With Sump Pumps," Section 5.2.5.2 states that if any of the manholes are found to contain water that would result in wetted in-scope cable, the following actions are to be performed:

- If any cables are submerged, initiate a condition report
- Pump Manhole below level of lowest in-scope cable
- Investigate the source of water intrusion
- Increase manhole inspection frequency based on past experience with water accumulation in the manhole

LRA B2.1.25, "Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements," states under enhancements for preventive actions that the enhancement requires any manholes containing water be pumped dry, the source of water investigated and the inspection frequency increased based on past experience.

Basis document B2.1.25, "Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 EQ Requirements," Section 3.2.2 states, in part, "Any sump pumps found inoperable, accumulated water, if any, is removed and the inspection frequency increased based on past experience." For manholes not equipped with sump pumps Section 3.2.2 states, "Manholes found containing water are pumped dry, the source of water investigated, and the inspection frequency increased based on past experience."

Issue:

1. Basis document B2.1.25, LRA Section B2.1.25, and procedure 0PGP04ZE0007 provide inconsistent guidance with respect to corrective actions to remove accumulated water from in-scope manholes.

2. Basis document B2.1.25, LRA Section B2.1.25, and procedure 0PGP04ZE0007 are inconsistent in documenting submerged cables during inspection and the corrective action to be taken (such as initiating a condition report).

Request:

Reconcile LRA B2.1.25, basis document B2.1.25, and plant procedures including draft procedure 0PGP04ZE0007, "License Renewal Electrical Aging Management," such that consistent inspection activities are used to identify in-scope cable submergence, accumulated water removal, and appropriate corrective actions are taken to keep in-scope cable dry and to assess cable degradation.

B.2.1.26-1

Background:

GALL AMP XI.E4 under Element 4 (Detection of Aging Effects), states that a sample of accessible bolted connections is inspected for increased resistance of connection by using thermography or by measuring connection resistance using a micro-ohmmeter. Twenty percent of the population with a maximum sample of 25 constitutes a representative sample size. Otherwise, a technical justification of the methodology and sample size used for selecting components should be included as part of the AMP's site documentation. The GALL AMP further states that if an unacceptable condition or situation is identified in the selected sample, a determination is made as to whether the same condition or situation is applicable to other connections not tested. In the South Texas Project (STP) Aging Program Evaluation Report for Metal Enclosed Bus (MEB) B2.1.26, STP-AMP-B2.1.26 under same element states that a sample of non-segregated phase bus accessible bolted connections in each bus section shall be inspected for evidence of overheating using thermography.

Issue:

The applicant has not identified a sample size of bolted connections nor developed the technical basis for selecting samples of bolted connections in each MEB section.

Request:

Discuss how sample selection approach under program elements 4 in AMP B2.1.26 is consistent with those in GALL AMP XI.E4.

B.2.1.26-2

Background:

In the STP basis document, STP-AMP-B2.1.26-Rev 2, the applicant stated that a sample of the MEB accessible bolted connections in each bus section shall be inspected using thermography for evidence of overheating. The applicant also stated that acceptable criteria will be based on a temperature rise above the reference temperature, where the reference temperature will be the ambient temperature or the baseline temperature data from the same type of connections being tested. The inspections are performed on all accessible bus sections while the bus is energized. In general, windows are installed on the MEB for thermography inspections.

Issue:

The metal enclosed cover may mask the heat created by loosening of bus connections and the temperature differences between bus connections which may not be detected if windows are not installed on MEBs.

Request:

Discuss how the MEB connection inspections at STP are effective in detecting loosening of bus connections using external thermography measurements.

RAI B2.1.26-3

Background:

The "detection of aging effects" program element of GALL AMP XI.E4 states that a sample of accessible bolted connection will be checked for loose connections. In basis document STP-AMP-B2.1.26-Rev 2, the applicant only requires a sample of the non-segregated phase bus bolted connections to be inspected; the report was silent on the inspection of iso-phase bus connections.

Issue:

Iso-phase bus connections could be loose due to ohmic heating and could cause iso-phase bus failure.

Request:

Explain why iso-phase bus connections are not included in the scope of AMP B2.1.26.

B2.1.36-1

Background:

In the program basis document STP-AMP-B2.1.36-Rev 2, under the "parameters monitored or inspected" program element, the applicant stated that the infrared thermography testing is being performed to identify loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation. The document also states that connections associated with cables within the scope of license renewal are splices (butt or bolted), crimp-type ring lugs, connectors, and terminal blocks as described in the program description in GALL AMP XI.E6.

Issue:

The NRC staff believes that loosening of cable connections may also occur in different types of connections and may not be limited to only bolted connections.

Request:

Provide technical justification of why only bolted connections are considered in the inspection sample criteria.

B2.1.36-2

Background:

In "parameters monitored/inspected" program element of the basis document STP-AMP-B2.1.36-Rev 2, the applicant stated that the technical basis for sample selection will be documented. GALL AMP XI.E6 Rev. 2 recommends that twenty percent of the population with a maximum sample of 25 constitute a representative. Otherwise a technical justification of the methodology and sample size used for selecting components for one-time test should be included as part of the AMP's site documentation.

Issue:

It is not clear to the staff that the "parameters monitored or inspected" program element is consistent with those in GALL Report because the applicant has not developed the technical basis and/or the criteria for sample selection technique.

Request:

Provide the technical basis for the sample size selection.

RAI B3.2-1

Background:

GALL Report AMP XI.E2 manages the aging of electrical cables and connections used in circuits with sensitive, high voltage, low-level current signals, installed in adverse localized environments caused by temperature, radiation, or moisture, such as radiation monitoring instrumentation and nuclear instrumentation.

Issue:

The applicant stated that it will not use GALL AMP XI.E2 to manage the aging of electrical cables and connections used in circuits with sensitive, high voltage, low-level current signals because instrumentation electrical cables and connections which would normally be included in GALL AMP XI.E2 are in scope of LRA AMP B3.2, "Environmental Qualification (EQ) of Electrical Component Program."

Request:

Identify the cables and connections used in circuits with sensitive, high voltage, low-level current signals that are within the scope of LRA AMP B3.2.

RAI 4.7.1-1

Background:

LRA Section 4.7.1 states that the estimated number of significant lifts per refueling outage for each machine is estimated from the UFSAR Section 9.1.4.2.2 description of refueling operations. A factor of 1.5 is used to account for non-refueling lifts. LRA Section 4.7.1 further states that based on an 18-month refuel cycle, approximately 27 refuel cycles are expected over a 40-year plant design life, or about 40 refuel cycles in a 60-year plant design life.

Issue:

LRA table 4.7-1 shows that the estimated maximum number of significant crane lifts for the cask handling overhead crane is 420 for a 40-year design life and 740 for a 60-year design life. The table indicates that the calculation uses 10 refuels for the 40-year calculation and 20 refuels for the 60-year calculation; however, no explanation of why these numbers were used instead of the 27 and 40 refuel cycles as described in LRA Section 4.7.1. It is unclear to the staff how the estimated maximum number of significant crane lifts were calculated for the cask handling overhead crane and why the calculation is based on a different number of refuels than that described in LRA Section 4.7.1.

Request:

1. Provide the basis for the estimated maximum number of significant crane lifts for the cask handling overhead crane for both a 40 and 60-year design life.

2. Explain why the number of refuels used in the calculation differs from the 27 refuel cycles expected over a 40-year design life, and the 40 refuel cycles expected over a 60-year design life, based on an 18-month refuel cycle.

RAI 4.7.1-2

Background:

LRA Section 4.7.1 states that the estimated number of significant lifts per refueling outage for each machine is estimated from the UFSAR Section 9.1.4.2.2 description of refueling operations. A factor of 1.5 is used to account for non-refueling lifts. LRA Section 4.7.1 further states that based on an 18-month refuel cycle, approximately 27 refuel cycles are expected over a 40-year plant design life, or about 40 refuel cycles in a 60-year plant design life.

Issue:

LRA table 4.7-1 shows that the estimated maximum number of significant crane lifts for the containment polar crane is 2,411 for a 40-year design life and 3,542 for a 60-year design life. Based on an 18 month refuel cycle, and an estimated 54 lifts per refuel, the staff is unclear how the estimated maximum number of significant crane lifts was calculated for the containment polar crane.

Request:

Provide the calculation for the estimated maximum number of significant crane lifts for the containment polar crane for both a 40 and 60-year design life.

August 15, 2011

Mr. G. T. Powell, Vice President
Technical Support and Oversight
STP Nuclear Operating Company
P.O. Box 289
Wadsworth, TX 77483

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE SOUTH TEXAS PROJECT, UNITS 1 AND 2 LICENSE RENEWAL APPLICATION – AGING MANAGEMENT PROGRAMS AUDIT, STRUCTURES/ELECTRICAL (TAC NOS. ME4936 AND ME4937)

Dear Mr. Powell:

By letter dated October 25, 2010, STP Nuclear Operating Company, submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 for review by the U.S. Nuclear Regulatory Commission (NRC or the staff), to renew operating licenses NPF-76 and NPF-80 for South Texas Project, Units 1 and 2. The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

These requests for additional information were discussed with Arden Aldridge, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-3873 or by e-mail at john.daily@nrc.gov.

Sincerely,

/RA/

John W. Daily, Senior Project Manager
License Renewal Branch RPB1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Enclosure:
As stated

cc w/encl: Listserv

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ADAMS Accession No.: ML11214A005 *concurrence via e-mail

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NAME	SFigueroa	JDaily	DMorey	SFigueroa	JDaily
DATE	08/02/2011	08/8/2011	08/11/2011	08/10/2011	08/15/2011

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Letter to G.T. Powell from John W. Daily dated August 15, 2011

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE SOUTH TEXAS PROJECT, UNITS 1 AND 2 LICENSE RENEWAL APPLICATION – AGING MANAGEMENT PROGRAMS AUDIT, STRUCTURES/ELECTRICAL (TAC NOS. ME4936 AND ME4937)

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