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NUCLEAR REGULATORY COMMISSION
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September 22, 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 REVIEW, SET 3 (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, to renew operating licenses NPF-76 and NPF-80 for South Texas Project, Units 1 and 2, for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). 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
REQUESTS FOR ADDITIONAL INFORMATION
AGING MANAGEMENT REVIEW, SET 3
(TAC NOS. ME4936 AND ME4937)

**Selective Leaching (034)**

**RAI 3.3.2.3.7-1**

Background:

In license renewal application (LRA) Table 3.3.2-7, the applicant includes an aging management review (AMR) item for copper alloy greater than 15 percent zinc solenoid valve internally exposed to plant indoor air. The applicant stated that the component will be managed for loss of material using the Selective Leaching of Materials program. The AMR item lists generic note G and plant-specific note 3, indicating that this material exposed to plant indoor air is subject to wetting due to condensation, and thus is subject to loss of material due to selective leaching. The Generic Aging Lessons Learned (GALL) Report and the Metals Handbook Desk Edition (Second Edition, ASM International, 1998) both state that copper alloy greater than 15 percent zinc may be subject to stress corrosion cracking in solutions containing ammonia or ammonia-like compounds such as amines, provided sufficient tensile stresses are present.

Issue:

The staff does not have sufficient information regarding the control or use of ammonia or amines (e.g., cleaning solutions, chemicals, decay of insects) in the vicinity of the instrument air system (air intake) to determine if stress corrosion cracking should be an aging effect requiring aging management.

Request:

Describe what measures are taken to prevent or limit the presence of ammonia and amines in the instrument air system.

**Buried Piping (035)**

**RAI 3.3.2.3.4-1**

Background:

In LRA Table 3.3.2-4, the applicant includes an AMR item for copper alloy piping (greater than 8 percent aluminum) externally exposed to soil. The applicant stated that the component will be managed for loss of material using the Buried Piping and Tanks Inspection program. The AMR item lists generic note G, indicating that the environment is not in the GALL Report for the material and environment. The Metals Handbook states that copper alloy (greater than 8 percent aluminum) may be subject to stress corrosion cracking in solutions containing

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ammonia or ammonia-like compounds such as amines, provided sufficient tensile stresses are present.

Issue:

Table 2.2-1 of the Updated Final Safety Analysis Report states a chemical plant that previously used anhydrous ammonia is located 4.8 miles NNE of the South Texas Project (STP) site. The Environmental Report (ER) states that some of the STP site east of the main cooling reservoir is leased for cattle grazing. The ER also describes the land surrounding the plant as fairly flat and used for ranchland and farmland.

The plant procedure for implementing the Buried Piping and Tanks Inspection Program states that soil analysis data (i.e., pH, resistivity, redox potential, sulfide and sulfate ion concentration, chloride concentration, conductivity, and moisture content) should be collected during excavations to help assess the likelihood of pipe outside diameter corrosion. However, the procedure does not indicate if the soil analysis tests for the presence of ammonia or ammonia-like compounds.

The staff does not have sufficient information regarding the presence or absence of ammonia or ammonia-like compounds in the soil in and around the buried copper alloy (greater than 8 percent aluminum) piping such that stress corrosion cracking could be ruled out as a possible aging effect requiring aging management.

Request:

Describe what, if any, measures are taken to detect the presence or absence of ammonia in the soil near the buried piping of interest. If it is determined that there is a potential for ammonia or ammonia-like compounds to be present in the soil in the vicinity of the piping of interest, describe what measures will be taken to manage stress corrosion cracking of the buried copper alloy (greater than 8 percent aluminum) piping.

**Diesel Exhaust Piping – (078)**

**RAI 3.3.2.2.3.3-1**

Background:

LRA Table 3.3.2-21 includes stainless steel expansion joints exposed to diesel exhaust (internal) for the nonsafety-related diesel generator that are being managed for loss of material. For the corresponding material and environment, the GALL Report recommends managing for both loss of material and cracking due to stress corrosion cracking, and recommends using a plant-specific AMP.

Issue:

The stainless steel expansion joint exposed to diesel exhaust in LRA Table 3.3.2-21 is not being managed for stress corrosion cracking as recommended by the GALL Report.

Request:

Provide the basis for not managing the stainless steel expansion joint exposed to diesel exhaust in Table 3.3.2-21 for stress corrosion cracking or provide a suitable AMP that will manage this aging effect for this material and environment combination.

**Boric Acid Corrosion (010)**

**RAI 3.1.1.58-1**

Background:

In LRA Tables 3.1.2-1, 3.1.2-2, 3.1.2-3, and 3.1.2-4, the applicant stated that several steel component external surfaces exposed to borated water leakage are managed for loss of material by the Boric Acid Corrosion Program (LRA Section B2.1.4). These items are associated with LRA Table 3.1-1, item 3.1.1.58.

The updated staff guidance in SRP-LR, Revision 2, Table 3.1-1, item 48, states that steel external surfaces, including reactor vessel top head, bottom head, and reactor coolant pressure boundary piping or components adjacent to dissimilar metal welds exposed to air with borated water leakage, should be managed for loss of material due to boric acid corrosion by GALL AMPs XI.M10, "Boric Acid Corrosion" and XI.M11B, "Cracking of Nickel-Alloy Components and Loss of Material Due to Boric Acid-Induced Corrosion in Reactor Coolant Pressure Boundary Components."

The GALL AMP XI.M11B "scope of program" program element states that this program manages loss of material due to boric acid corrosion in steel components in the vicinity of nickel-alloy components, including, but not limited to, reactor vessel components, steam generator components, pressurizer components, and reactor coolant system piping. The program description states that inspection activities should be in accordance with 10 CFR 50.55a, including ASME Code Cases N-722-1 and N-729-1, and industry guidelines for inspection of primary system butt welds (e.g. MRP-139).

Issue:

The program description in LRA Section B2.1.4, "Boric Acid Corrosion," refers to inservice inspections in accordance to ASME Code Section XI; however, it is not clear to the staff whether the requirements in 10 CFR 50.55a, including Code Cases N-722-1 and N-729-1, and MRP-139, are incorporated in those inspections.

Request:

Clarify whether the inservice inspections in the Boric Acid Corrosion Program are in accordance with 10 CFR 50.55a, including ASME Code Cases N-722-1 and N-72901, and MRP-139. If not, provide information on what equivalent inspection activities will be used to manage loss of material due to boric acid corrosion of steel components in the vicinity of nickel-alloy reactor coolant pressure boundary components.

**RAI 3.3.1.88-1**

Background:

SRP-LR, Revision 1, Table 3.3-1, item 88 states that aluminum and copper alloy greater than 15 percent Zn piping, piping components, and piping elements exposed to air with borated water leakage should be managed for loss of material due to borated water leakage by GALL AMP XI.M10, "Boric Acid Corrosion." LRA Table 3.3.1, item 3.3.1.88 states that this item is not applicable because there are no in-scope aluminum or copper alloy greater than 15 percent Zn piping, piping components, or piping elements exposed to air with borated water leakage in the auxiliary systems.

LRA Section 3.3.2.1.19 states that the chemical and volume control system (CVCS), an auxiliary system, contains an environment of borated water leakage. The staff noted that in LRA Table 3.3.2-19, the AMR results for the CVCS includes an item for aluminum insulation; however, the only environment cited is plant indoor air (external).

Issue:

Given that borated water leakage is a recognized environment in the CVCS, it is not clear to the staff why the aluminum insulation in this system is not managed for loss of material due to boric acid corrosion.

Request:

Clarify whether the aluminum insulation in the chemical and volume control system may be exposed to borated water leakage. If so, state how loss of material due to boric acid corrosion will be managed.

**Reactor Head Closure Studs Program (003)**

**RAI B2.1.3-4**

Background:

SRP-LR, Revision 2, Table 3.0-1 addresses aging management programs used to manage the aging effects associated with various systems and the descriptions of the programs, which are acceptable for the UFSAR supplement. Specifically, SRP-LR, Revision 2, Table 3.0-1 addresses the UFSAR supplement description of GALL AMP XI.M3, "Reactor Head Closure Studs," by referring to the inservice inspections in conformance with the requirements of the ASME Code, Section XI, Subsection IWB, Table IWB-2500-1 and preventive measures to mitigate cracking. SRP-LR, Revision 2, Table 3.0-1 further states that the program also relies on recommendations to address reactor head stud bolting degradation as delineated in NUREG-1339 and NRC Regulatory Guide (RG) 1.65. NUREG-1339 and RG 1.65 indicate that molybdenum sulfide is a potential contributor to stress corrosion cracking (SCC). NUREG-1339 and RG 1.65 (Revision 1, April 2010) also include guidance for the yield strength levels of the bolting material resistant to SCC.

In comparison, LRA Section A1.3 provides the UFSAR supplement description for LRA Section B2.1.3, "Reactor Head Closure Studs Program." This LRA Section states that the applicant's program follows the preventive measures in RG 1.65. However, the UFSAR supplement described in LRA Section A1.3 does not include the statement that the applicant's program relies on recommendations to address reactor head stud bolting degradation as delineated in NUREG-1339 and NRC RG 1.65.

Issue:

In contrast with SRP-LR, Revision 2, Table 3.0-1, the applicant's UFSAR supplement for the Reactor Head Closure Studs Program (described in LRA Section A1.3) does not include the statement that the applicant's program relies on recommendations to address reactor head stud bolting degradation as delineated in NUREG-1339 and NRC RG 1.65. The licensing basis for this program for the period of extended operation may not be adequate if the applicant does not incorporate this information in its UFSAR supplement.

Request:

Revise the applicant's UFSAR supplement description for the Reactor Head Closure Studs Program to be consistent with the UFSAR supplement described in SRP-LR, Revision 2, Table 3.0-1, which incorporates recommendations in NUREG-1339 and NRC RG 1.65.

If the applicant has determined that a revision to the UFSAR supplement description is not necessary, justify why the omission of the information from the UFSAR supplement, regarding NUREG-1339 and NRC RG 1.65, is acceptable to provide an adequate licensing basis for this program for the period of extended operation.

September 22, 2011

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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

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Letter to G. T. Powell from John W. Daily dated September 22, 2011

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