From:	Galvin, Dennis
To:	Nic Boehmisch (nboehmisch@stpegs.com)
Cc:	Drew Richards (amrichards@stpegs.com)
Subject:	South Texas Project – Supplemental Information Request - Proposed Alternative to ASME Code Requirements for the Repair of Essential Cooling Water System Class 3 Buried Piping (EPID: L 2019-LLR-0096)
Date:	Monday, November 04, 2019 11:18:00 AM
Attachments:	STP RR CFRP Piping Repair Supplemental Request Draft To STP Transmittal L-2019-LLR-0096 2019-11-04.pdf

Mr. Boehmisch

By letter dated September 26, 2019 (Agencywide Documents Access and Management System Accession No. ML19274C393), STP Nuclear Operating Company (STPNOC, the licensee) submitted a proposed alternative to the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) at South Texas Project (STP) Units 1 and 2. The proposed alternative to ASME Code, Section XI, IWA-4000, applies a carbon fiber reinforced polymer (CFRP) system for the internal repair of buried Essential Cooling Water (ECW) piping.

Pursuant to Sections 50.55a(z)(1) and 50.55a(z)(2) of Title 10 of the Code of Federal Regulations (10 CFR), the applicant shall demonstrate that the proposed alternatives would provide an acceptable level of quality and safety, or that compliance with the specified requirements of Section 50.55a would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety.

The purpose of this email is to provide the DRAFT results of the NRC staff's acceptance review of this proposed alternative request. The acceptance review was performed to determine if there is sufficient technical information in scope and depth to allow the NRC staff to complete its detailed technical review. The acceptance review is also intended to identify whether the application has any readily apparent information insufficiencies in its characterization of the regulatory requirements or the licensing basis of the plant.

The NRC staff has reviewed your application and preliminarily concluded that the information delineated in the DRAFT request attached to this email is necessary to enable the staff to make an independent assessment regarding the acceptability of the proposed alternative in terms of regulatory requirements and the protection of public health and safety and the environment.

This DRAFT is being sent to in accordance with LIC-109, "Acceptance Review Procedures," to facilitate a conference call with the NRC staff. It is the staff's expectation that the conference call will occur as soon as possible, but no later than 5 days from the date of this email.

Please contact me with any questions.

Respectfully,

Dennis Galvin
Project Manager
U.S Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Operating Reactor Licensing

Licensing Project Branch 4
301-415-6256

Docket No. 50-498 and 50-499

DRAFT SUPPLEMENTAL INFORMATION NEEDED

PROPOSED ALTERNATIVE TO ASME SECTION XI REQUIREMENTS FOR

REPAIR/REPLACEMENT OF ESSENTIAL COOLING WATER CLASS 3

BURIED PIPING IN ACCORDANCE WITH 10 CFR 50.55a(z)(1)

STP NUCLEAR OPERATING COMPANY

SOUTH TEXAS PROJECT UNITS 1 AND 2

DOCKET NOS. 50-498 AND 50-499

By letter dated September 26, 2019 (Agencywide Documents Access and Management System Accession No. ML19274C393), STP Nuclear Operating Company (STPNOC, the licensee) submitted a proposed alternative to the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) at South Texas Project (STP) Units 1 and 2. The proposed alternative to ASME Code, Section XI, IWA-4000, applies a carbon fiber reinforced polymer (CFRP) system for the internal repair of buried Essential Cooling Water (ECW) piping.

1. American Society of Mechanical Engineers (ASME) Section XI, IWA-4221 (b) requires repair/replacement piping to meet the original Construction Code requirements for the ECW piping. However, the applicable Construction Code for STP does not provide the requirements for the design, fabrication, installation, examination and testing of CFRP in buried piping.

   The application identifies 12 separate lines to use CFRP (3 supply lines each for Units 1 and 2, and 3 return lines each for Units 1 and 2). Specific analyses or technical evaluations demonstrating structural integrity for these 12 separate lines using CFRP are missing in the submittal. Attachment C in Enclosure 5 of the application provides only a sample calculation. Thus, critical technical analysis information required for the NRC to draw a safety conclusion is missing.

   a. Provide a summary of design inputs to include loads, pressures, temperatures, geometrical inputs, length of repair, CFRP layers, thicknesses, bonding length used for the analysis and evaluations of these 12 lines.

   b. Provide a summary of the results of all analyses and evaluations to include circumferential design analysis, buckling evaluations, longitudinal design analysis, bond integrity at terminations for the applicable load combinations, corresponding allowable limits, and margins for all 12 of the repairs using CFRP.

   c. Provide the missing details for Sections E/S-7, H/S-10, and G/S-9 in the piping layout drawings in Enclosure 2, Attachments B1, B2, and B3.

   d. Provide an evaluation of the terminations of the repairs considering the effects from both sides (repair side and the other or non-repaired side). Also, describe whether any of the

repair terminations interface with piping not buried such as piping in valve pits, piping in buildings, or any other continuations.

e. Provide or include in the evaluations the effect of dissimilar thermal expansion of the repaired aluminum-bronze pipe and the CFRP material on the terminations.

2. The application includes an analysis methodology change from the ASME Code. ASME Codes and Standards for piping analysis are discussed in Title 10 of the *Code of Federal Regulations,* Part 50.55a. Piping analysis for safety-related class 3 piping in ASME Subsection ND does not utilize the Load and Resistance Factor Design (LRFD) method. The application describes using the LRFD methodology for buried aluminum-bronze buried piping in soil.

   a. Provide a discussion of the analysis method used in the original design for ASME safety-related class 3 ECW piping and any variances between the ASME ND Allowable Stress Methodology and the LRFD methodology.

   b. Provide a summary of the results of the piping analysis for one limiting case.