



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

July 26, 2012

Mr. D. W. Rencurrel
Chief Nuclear Officer
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 – ALUMINUM BRONZE, SET 23 (TAC NOS. ME4936 AND
ME4937)

Dear Mr. Rencurrel:

By letter dated October 25, 2010, STP Nuclear Operating Company (STPNOC or the applicant) 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 the staff requests that, prior to filling your response, you discuss the status of the issue and your planned response with the staff at a public meeting at the NRC Rockville, MD, offices.

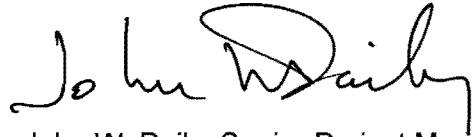
The staff notes in your letter dated May 31, 2012, that you committed (Commitment No. 44) to do the following: (a) conduct testing of existing components that have been recently removed from service in order to confirm the ultimate tensile strength and obtain dealloyed fracture toughness and yield strength data used in structural integrity analyses; (b) revise structural analyses as required; and (c) provide results of the tests and any revisions to your analyses to the staff for review. Irrespective of the timing of the responses to the parts of the current RAI, the staff believes that a complete evaluation of the Selective Leaching of Aluminum Bronze Program will not be possible until these test results and any revisions to your structural integrity analyses have been provided to the staff for review in accordance with Commitment No. 44. Accordingly, since RAI parts 1, 5, and 7 are significantly dependent on those results, the staff would find it acceptable if the schedule for responding to these three parts were deferred until the testing has been completed. The staff would find it very helpful if you were prepared to discuss your test plans and tentative schedule at the public meeting.

D.W. Rencurrel

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A mutually agreeable date for the response is within 30 days from the date of the public meeting, except as noted for parts 1, 5, and 7. If you have any questions, please contact me at 301-415-3873 or by e-mail at john.daily@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "John W. Daily". The signature is fluid and cursive, with a large loop for the "D" and a distinct "y" at the end.

John W. Daily, Senior Project Manager
Projects Branch 1
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,
REQUEST FOR ADDITIONAL INFORMATION
ALUMINUM BRONZE, SET 23
(TAC NOS. ME4936 AND ME4937)

RAI B2.1.37-4 (111)

Background

The May 31, 2012 response to RAI B2.1.37-3 lacked sufficient detail for the staff to complete its evaluation of the plant-specific Selective Leaching of Aluminum Bronze program. As a result, the staff has the following issues and requests for additional information.

Issue

1. It is understood that components with an external indication will be replaced at the first available opportunity; however, the staff has not been presented with sufficient information to conclude that when external leakage is identified, the applicant's external visual examinations and crack correlation methodology are sufficient to detect an internal crack in the dealloyed region and project its size. Cracks in a dealloyed region could result in a failure of the piping during a seismic event. An insufficient basis was provided for why the destructive examination of a limited number of samples provides a conservative correlation for estimating internal crack size. The staff accepts the positions that the internal dimensions of cracks can potentially be correlated to the sizes of external indications for various pipe wall thicknesses, and it may be possible to develop a valid correlation if an adequate number of samples are tested; however, the response did not address the potential for different heats of material (with varying extent of dealloying-susceptible phases) to respond differently to cracks.

The staff's question related to detection of cracks in the dealloyed region with ultrasonic testing (UT) techniques was not adequately addressed. In some instances, due to configuration, it may not be possible to perform volumetric examinations on all affected fittings; however, the staff believes that there must be some means provided in order to conclude with reasonable assurance that cracks are not approaching a critical size, beyond the currently proposed correlation. In addition, the staff acknowledges that there may be no qualified UT method to detect selective leaching; however licensees have used ultrasonic testing UT to detect selective leaching. Aspects to be considered should be:

- Using a volumetric process that provides reasonable crack sizing and, though not qualified per se, provides information on the extent of dealloying.
 - When components that leak cannot be volumetrically examined, destructively examining the component when it is removed in order to size any potential cracks. In conjunction, using trending data to project crack sizes in subsequent leaking components when volumetric methods cannot be utilized.
 - Using periodic volumetric examinations on risk-informed locations that are not leaking to develop a trend of the extent of cracking in the system.
2. Fracture toughness testing was not listed as an example of a parameter to be tested in the testing of the six samples discussed in Commitment No. 44 and those to be conducted starting 10 years prior to the period of extended operation and proceeding through the period of extended operation. In addition, the response to Part (i) of the RAI did not include trending of fracture toughness properties. Given that cracking has been observed in

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dealloyed specimens, the staff cannot conclude that the method of calculating critical bending stress is conservative without the test results including fracture toughness properties.

3. No detail was included on how the percentage of dealloying has been or will be determined. Given that past calculations have described the percentage of dealloying and evaluations of structural integrity have relied, in part, on this measurement, the staff needs to understand how the value was determined.
4. Since it is possible that the six samples from three recently removed aluminum bronze components which will be tested for chemical composition and mechanical properties may not be 100 percent dealloyed, the staff lacks sufficient information to understand how these results will be extrapolated to reflect the potential degree of degradation existing in the system.
5. Although the RAI response described the basis for the flaw size assumed in Appendix 9A of the updated final safety analysis report (UFSAR), it did not respond to the staff's question regarding the maximum tolerable flaw size. In order to respond to the staff's concern, the applicant needs to identify the maximum size flaw that would not proceed to failure or would only exhibit minor leakage until a transient occurred. Then, utilizing the transient inputs, the response needs to identify the maximum size leak path in the affected component. In addition, it is not apparent to the staff how leakage upstream of an individual component (e.g., diesel generator heat exchanger) has been addressed.
6. The staff does not find the response to RAI B2.1.37-3, Part (i), acceptable because fracture toughness and yield strength properties are not listed as being trended. In addition, given that the progression rate of dealloying could change with time, the staff believes that prevalence of dealloying should be trended in order to determine if more frequent samples should be obtained.
7. The staff does not find the response to RAI B2.1.37-3, Part (i), acceptable because given that the current analyses are based on a minimum 30 ksi ultimate tensile strength, the staff does not accept the position that an average value equal to or greater than 30 ksi is acceptable to demonstrate that the intended function of the susceptible components will be met. In addition, acceptance criteria for fracture toughness and yield strength values were not established.
8. A review of plant-specific operating experience associated with the essential cooling water system demonstrates that cavitation erosion is occurring in the system. The staff does not know if any of the cavitation erosion has occurred or could occur in the vicinity of dealloying. If cavitation erosion could occur in the vicinity of dealloyed material, the staff does not know how the potential change in the rate of erosion is accounted for in the intervals between inspections of the components.

Request

1. Provide bounding analyses that demonstrate that internal cracking could not grow to sufficient size to result in the failure of the component to perform its intended function(s) or propose a means to volumetrically size potential cracks associated with dealloying and commit to destructive examination of all components where volumetric examination is not possible when removed from service to develop a trend on crack size. Revise the program and UFSAR Supplement accordingly.

2. Revise LRA Sections A2.1.37 and B2.1.37 and Commitment Nos. 39 and 44 to state that fracture toughness properties will be obtained, or state the basis for why fracture toughness is not a critical parameter when analyzing cracked dealloyed components.
3. Describe how the percentage of dealloying is identified when testing specimens.
4. State how the testing results of the six samples from three recently removed aluminum bronze components will be extrapolated to reflect the potential degree of degradation existing in the system. In the response, consider the potential that the selected samples may not bound the potential worst-case percentages of dealloying.
5. For the flooding, reduction in flow, and water loss from the essential cooling pond analyses, state the basis for why the medium energy break size flaw stated in UFSAR Appendix 9A is larger than the maximum size flaw for which the piping can still perform its intended function. Given the maximum leak rate that could occur upstream of any individual component supplied by the essential cooling water system, state whether the affected component could still perform its intended function.
6. Revise the appropriate portions of the LRA to trend fracture toughness values, yield strength values, and the degree of dealloying in addition to ultimate tensile strength.
7. Provide acceptance criteria for the fracture toughness and yield strength values. Amend the applicable portions of the LRA to reflect that the acceptance criteria of ultimate tensile strength is a minimum of 30 ksi, or state the basis for why when only a minimum of 12 samples will be tested, utilizing an average value is acceptable.
8. State whether cavitation erosion in the essential cooling water system has or could occur in the vicinity of dealloying. If this is the case, state how the potential change in the rate of erosion is accounted for in the intervals between inspections of the components.

A mutually agreeable date for the response is within 30 days from the date of the public meeting, except as noted for parts 1, 5, and 7. 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
Projects Branch 1
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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DATE	7/24/12	7/26/12	7/26/12	7/26/12

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Letter to D. W. Rencurrel from John W. Daily dated July 26, 2012

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