



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

June 15, 2012

Mr. D.W. Rencurrel, Senior Vice President
Technical Support and Oversight
STP Nuclear Operating Company
P.O. Box 289
Wadsworth, TX 77483

SUBJECT: REPORT REGARDING THE FOLLOW-UP AUDIT OF THE SELECTIVE
LEACHING OF ALUMINUM BRONZE AGING MANAGEMENT PROGRAM FOR
THE SOUTH TEXAS PROJECT, UNITS 1 AND 2, LICENSE RENEWAL
APPLICATION (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 for renewal of operating licenses NPF-76 and NPF-80 for South Texas Project (STP), Units 1 and 2. The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing this application in accordance with the guidance in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." On February 29, 2012, the staff completed a follow-up audit of the Selective Leaching of Aluminum Bronze aging management program. The audit report is enclosed.

If you have any questions, please contact me by telephone 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, Sr." with a stylized flourish at the end.

John W. Daily, Sr. 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

U.S. NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION, DIVISION OF LICENSE RENEWAL

Docket Nos: 050-00498, 050-00499

License Nos: NPF-76, NPF-80

Licensee: South Texas Nuclear Operating Company

Facility: South Texas Project, Units 1 and 2

Location: P.O. Box 289
Wadsworth, TX 77483

Date: February 29, 2012

Reviewers: J. Daily, Sr. Project Manager, Audit Team Leader, Division of License
Renewal (DLR)
R. Auluck, Branch Chief, DLR
D. Morey, Branch Chief, DLR
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J. Tsao, Sr. Materials Engineer, DE
J. Wise, Materials Engineer, DLR

Approved By: Rajender Auluck, Chief
Aging Management of Plant Systems Branch
Division of License Renewal

Dennis Morey, Chief
Projects Branch 1
Division of License Renewal

ENCLOSURE

Introduction. By letter dated October 25, 2010, STP Nuclear Operating Company (STPNOC or the applicant), submitted to the U.S. Nuclear Regulatory Commission (NRC or the staff) its application for renewal of Operating License Nos. NPF-76 and NPF-80 for South Texas Project (STP), Units 1 and 2, respectively. The applicant requested renewal of the operating licenses for an additional 20 years beyond the 40-year current license terms, which expire on August 20, 2027, for Unit 1 and December 15, 2028, for Unit 2.

Purpose. The staff from the Division of License Renewal conducted a one-day follow-up regulatory audit on February 29, 2012, to gain a better understanding of the applicant's plant-specific aging management program (AMP) B2.1.37, "Selective Leaching of Aluminum Bronze," and the associated bases, supporting documentation, and applicable aging management reviews (AMRs). The audit took place at a Nuclear Energy Institute office in Rockville, Maryland provided by the applicant.

Since the applicant's program is a plant-specific AMP, it is evaluated on an individual basis for all 10 program elements, along with any associated issues. While portions of this 10-element review had already been performed by the staff, this follow-up audit examined additional issues and documentation in order for the staff to complete its review.

Audit Activities. During its audit, the staff interviewed the applicant's staff and reviewed several areas of documentation provided by the applicant. The following topics were covered in detailed discussions with the applicant:

- Current programmatic aspects of managing selective leaching of aluminum bronze, operating experience, repair and replacement activities, inservice inspection results, and the current status of components fabricated from aluminum bronze alloys.
- Methodology, inputs, assumptions, and conclusions for the flaw calculations that demonstrate structural integrity of welded joints and large castings affected by selective leaching, emphasizing the following:
 - modeling of flaw dimensions and orientation, crack growth, and crack stability
 - how material properties were obtained
 - acceptance criteria in the applicant's calculations compared to ASME Code, Section III and Section XI requirements
- Metallurgical factors which appear to cause the observed selective leaching to be associated with weld heat affected zones, micrographs of heat affected zones, and review of selective leaching related to cracked areas of components.
- Common aging mechanisms impacting aluminum bronze throttle valve cracking and cavitation damage as described in STPNOC LER 499/2005-004
- Fracture mechanics analyses performed to verify structural integrity when leaks are identified
- Operating experience for aluminum bronze piping, defects, and component leaks
- Results and pictures from sectioned material specimens removed from the plant
- Aging management strategy for buried pipe welds where there could be multiple leak sites that have not yet been identified

- Current and proposed future inspection activities, particularly the adequacy of the number and timing of destructive examinations in relation to confirming degree of selective leaching prior to and during the period of extended operation

The table below lists the documents that were reviewed by the staff and were found relevant to the audit. These documents were provided by the applicant or were identified in the staff's search of the applicant's operating experience database.

Relevant Documents Reviewed

Document	Title	Revision / Date
1. STP-AMP-B2.1.37	Selective Leaching of Aluminum Bronze	
2. APTECH 8303381	Structural Integrity Analysis of Essential Cooling Water Lines (STP)	Revision 1, Final Draft, July 1983
3. AES-C-1630-2	Calculation of Critical Bending Stress for Flawed Pipe Welds in the ECW System	7/7/1992
4. ST-HL-AE-2748	Calculation (no title)	11/1/1988
5. AES-C-5862-1	Significance of Circumferential Crack in 30" Aluminum Bronze Pipe in ECW	7/25/2005
6. AES-C-1964-1	Calculation of Critical Bending Stress for Dealloyed Aluminum Bronze Castings in ECW System	1/21/1994
7. AES-C-1964-2	ECW Water Hammer Force Summary	12/13/1993
8. AES-C-1964-3	Significance of Water hammer Loads Relative to Seismic Loads in the ECW System	3/10/1995
9. AES-C-1964-4	Evaluation of 6-inch Flange Test	6/3/1994
10. AES-C-1964-5	Evaluation of the Significance of Dealloying and Subsurface Cracks on Flaw Evaluation Method	12/23/1994
11. AES-C-1964-6	Evaluation of Dealloying That Initiates at the Face of a Flange in the ECW Piping	2/20/1995
12. AES-C-1964-7	Leak Rate Analysis for a Circumferential Crack in 10-inch and 30-inch Underground ECW Piping	4/13/1995
13. RC 9890	Stress Summary for Large Bore ECW Piping (2-1/2" and Above)	5/20/1991

The staff identified several aspects of the AMP for which requests for additional information (RAIs) will be required before the staff can determine whether the program will manage aging adequately. Anticipated RAIs are associated with, but not necessarily limited to, the following issues:

1. Phase composition of actual specimens.
2. Whether the 30 ksi ultimate tensile strength (UTS) is valid for the currently in-service dealloyed components.
3. Comparison and contrasting of crack morphology as opposed to dealloying morphology.
4. How use of the UTS (stated in item 2, above) instead of flow stress in the limit load analysis results in a conservative output from the analysis.
5. Why some of the calculations do not appear to use a design factor.
6. Determining if dealloying was involved in the six instances associated with cavitation damage downstream of butterfly valves.
7. How an external visual examination validates assumptions on internal crack dimensions.
8. Why destructive testing results are not available for dealloying degradation that has occurred from at least the mid nineties through the current time-period.
9. Allowable localized leak rate in above ground piping does not appear to be addressed in the updated final safety analysis report
10. The lack of any proposed volumetric examination screening for potential cracks at susceptible locations.
11. Terminology discrepancies in relief requests.
12. Submission of essential cooling water system dealloying and weld crack data tables on the docket.
13. Whether an insufficient number of destructive examinations was proposed in the response to RAI B2.1.37-1.

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Sincerely,

/RA/

John W. Daily, Sr. Project Manager
Projects Branch 1
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Docket Nos. 50-498 and 50-499

Enclosure:
As stated

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*concurrence via email

OFFICE	PM:DLR/RPB1	LA:DLR/RPB2	BC:DLR/RAPB	BC:DLR/RPB1	PM:DLR/RPB1
NAME	JDaily	IKing*	RAuluck	DMorey	JDaily
DATE	6/14/12	6/13/12	6/14/12	6/15/12	6/15/12

OFFICIAL RECORD COPY

Letter to D.W. Rencurrel from John W. Daily dated June 15, 2012

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