STP Nuclear Operating Company
South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

October 22, 2014
NOC-AE-14003180
10 CFR 54
File: G25

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
2014 Annual Update to the South Texas Project
License Renewal Application (TAC NOS. ME4936 and ME4937)

Reference: STPNOC Letter from G. T. Powell to NRC Document Control Desk, "License Renewal Application", dated October 25, 2010 (NOC-AE-10002607) (ML103010257)

By the referenced letter, STP Nuclear Operating Company (STPNOC) submitted an application to the Nuclear Regulatory Commission (NRC) for the renewal of Facility Operating Licenses NPF-76 and NPF-80, for South Texas Project (STP) Units 1 and 2, respectively. The application included the License Renewal Application (LRA), and the Applicant's Environmental Report – Operating License Renewal Stage. As required by 10 CFR 54.21(b), each year following submittal of the LRA, an amendment to the LRA must be submitted that identifies any change to the current licensing basis (CLB) that materially affects the contents of the LRA, including the Updated Final Safety Analysis Report (UFSAR) supplement.

This LRA update covers the period from September 1, 2013 through August 31, 2014. Enclosure 1 identifies STP LRA changes that are being made to: (1) reflect the CLB that materially affect the LRA; and (2) reflect completed enhancements and commitments. Changes to LRA pages described in Enclosure 1 are depicted as line-in/line-out pages provided in Enclosure 2.

License Renewal Application revised regulatory commitments are provided in Enclosure 2. There are no other regulatory commitments in this letter.

Should you have any questions regarding this letter, please contact Arden Aldridge, STP License Renewal Project Lead, at (361) 972-8243, or Rafael Gonzales, STP License Renewal Project regulatory point-of-contact, at (361) 972-4779.

STI: 33950846

A147
NRR

I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 22, 2014
Date

G. T. Powell

G. T. Powell
Site Vice President

rjg

Enclosures:
1. STPNOC License Renewal Application (LRA) Changes Reflected in 2014 Annual LRA Update
2. STP LRA Changes with Line-in/Line-out Annotations

cc:

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Enclosure 1

STPNOC License Renewal Application (LRA)

Changes Reflected in

2014 Annual LRA Update

STPNOC License Renewal Application (LRA)
Changes Reflected in 2013 Annual LRA Update

Following Changes Materially Affect the LRA	
Reason for Change	**Affected LRA Sections or Tables**
Revised Table 3.3.2-4, to reflect current information regarding items related to Auxiliary Systems – Summary of Aging Management Evaluation – Essential Cooling Water and ECW Screen Wash System.	Table 3.3.2-4
Revised Table 3.3.2-4, to reflect current information regarding items related to Auxiliary Systems – Summary of Aging Management Evaluation – Chemical and Volume Control System, i.e. the notes section.	Table 3.3.2-19
Revised Table 3.3.2-4, to reflect current information regarding items related to Containments, Structures, and Component Supports – Summary of Aging Management Evaluation – Supports	Table 3.5.2-11
Section 3.5.2.1.11 was revised to include Copper Alloy as a material used for the construction of support components.	3.5.2.1.11
This section was revised to capture minor administrative corrections, e.g. line out of "Primary Coolant System", from NOC-AE-14003078 Enclosure 2 pages 4 and 5.	4.3.2.11
This change lined out the following, "the pressurizer surge line, and the accumulator line", from the first paragraph of A3.2.1.11 from NOC-AE-14003078 Enclosure 2 page 6.	A3.2.1.11
This change updated Item 33, on Table A4-1, implementation schedule, to, "Continued into the period of extended operation", and Item 43 removal of seal cap enclosures from Unit 2 Safety Injection System Check Valve SI0010A. Items 44 and 46 have been updated to reflect completion of the respective commitments.	Table A4-1

Enclosure 2

STP LRA Changes with Line-in/Line-out Annotations

Table 3.3.2-4 Auxiliary Systems – Summary of Aging Management Evaluation – Essential Cooling Water and ECW Screen Wash System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	LBS, PB, SIA	Copper Alloy	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	F, 1
Closure Bolting	PB	Copper Alloy	Raw Water (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	F, 1
Closure Bolting	PB	Copper Alloy	Raw Water (Ext)	Loss of material	Open-Cycle Cooling Water System (B2.1.9))	VII.C1-9	3.3.1.81	B
Closure Bolting	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	H, 1
Piping	LBS, PB, SIA	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	B
Pump	PB	Copper Alloy	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Pump	PB	Copper Alloy	Raw Water (Ext)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-9	3.3.1.81	B
Pump	PB	Copper Alloy (Aluminum > 8%)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Pump	PB	Copper Alloy (Aluminum > 8%)	Raw Water (Ext)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-9	3.3.1.81	B
Pump	PB	Copper Alloy (Aluminum > 8%)	Raw Water (Ext)	Loss of material	Selective Leaching of Aluminum Bronze (B2.1.37)	VII.C1-10	3.3.1.84	E, 3
Pump	PB	Copper Alloy (Aluminum > 8%)	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-9	3.3.1.81	B
Pump	PB	Copper Alloy (Aluminum > 8%)	Raw Water (Int)	Loss of material	Selective Leaching of Aluminum Bronze (B2.1.37)	VII.C1-10	3.3.1.84	E, 3

Table 3.3.2-19 Auxiliary Systems – Summary of Aging Management Evaluation – Chemical and Volume Control System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Insulation	INS	Aluminum	Plant Indoor Air (Ext)	None	None	V.F-2	3.2.1.50	C
Insulation	INS	Insulation Calcium Silicate	Plant Indoor Air (Ext)	Reduced thermal insulation resistance due to moisture intrusion	External Surfaces Monitoring Program (B2.1.20)	None	None	H, 5
Insulation	INS	Insulation Fiberglass	Plant Indoor Air (Ext)	None	None	None	None	H, 5
Orifice	PB, TH	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A

Table 3.5.2-11 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation – Supports

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Supports Mech Equip Class 2 and 3	SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B4-1	3.5.1.40	A
Supports Mech Equip Class 2 and 3	SS	Concrete	Submerged (Structural) (Ext)	Increase in porosity and permeability, loss of strength	Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33)	III.A6-6	3.5.1.37	B
Supports Mech Equip Class 2 and 3	SS	Concrete	Submerged (Structural) (Ext)	Loss of material	Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33)	III.A6-7	3.5.1.45	B
Supports Mech Equip Class 2 and 3	SS	Copper Alloy	Submerged (Structural) (Ext)	Loss of material	ASME Section XI, Subsection IWF (B2.1.29)	None	None	J, 3
Supports Mech Equip Class 2 and 3	SS	Stainless Steel	Borated Water Leakage (Ext)	None	None	III.B1.2-8	3.5.1.59	A

Notes for Table 3.5.2-11:

Standard Notes:

A Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.
B Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.
E Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited or NUREG-1801 identifies a plant-specific aging management program.
H Aging effect not in NUREG-1801 for this component, material, and environment combination.
J Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant Specific Notes:

1. NUREG-1801 does not provide a line to evaluate stainless steel components outdoors under the ASME Section XI, Subsection IWF program (B2.1.29).
2. GALL Rev 1 does not identify Loss of Preload as an AERM for structural bolting. This line is consistent with GALL Rev 2, III.B1.1.TP-229.
3. NUREG-1801 does not provide a line to evaluate copper component support in a submerged environment. The ASME Section XI, Subsection IWF (B2.1.29) AMP manages the aging of the ECW pump column copper alloy supports when the pump is removed for maintenance.

3.5.2.1.11 Supports

Materials

The materials of construction for the supports component types are:

- Aluminum
- Carbon Steel
- Copper Alloy
- Concrete
- High Strength Low Alloy Steel (Bolting)
- Lubrite
- Stainless Steel

Environment

The supports component types are exposed to the following environments:

- Atmosphere/ Weather (Structural)
- Borated Water Leakage
- Plant Indoor Air (Structural)
- Submerged (Structural)

Aging Effects Requiring Management

The following supports aging effects require management:

- Cracking
- Increase in porosity and permeability, loss of strength
- Loss of material
- Loss of mechanical function
- Loss of preload
- Reduction in concrete anchor capacity

Aging Management Programs

The following aging management programs manage the aging effects for the supports component types:

- ASME Section XI, Subsection IWF (B2.1.29)
- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33)
- Structures Monitoring Program (B2.1.32)

4.3.2.11 Fatigue Crack Growth Assessments and Fracture Mechanics Stability Analyses for Leak-Before-Break (LBB) Elimination of Dynamic Effects of Primary Loop Piping Failures

Summary Description
A leak-before-break analysis eliminated the need to postulate longitudinal and circumferential breaks in the reactor coolant system primary loop piping, under a 10 CFR 50.12 exemption. Elimination of these breaks omitted the need to install pipe whip restraints in the primary loop and eliminated the requirement to design for dynamic (jet and whip) effects of primary loop breaks. The containment pressurization, emergency core cooling system, and environmental qualification large-break design bases were not affected.

NRC approval of the use of leak-before-break in the reactor coolant system primary loop piping was granted with STP SER, NUREG-0781, Supplement No. 2.

Analysis
The STP LBB analysis demonstrates that reactor coolant system primary loop pipe breaks are highly unlikely and need not be included in the design basis because flaws in reactor coolant system piping would have significant leaks for extended periods before developing into a large break. Such flaws would be detected by the reactor coolant pressure boundary leak detection system long before they become full size breaks.

Fatigue Crack Growth Analyses

~~Primary Coolant System~~

The final LBB submittal for STP included a fatigue crack growth assessment for a range of materials at a high stress location bounding the primary coolant system. The submittal concluded that the effects of low and high cycle fatigue on the integrity of primary piping are negligible.

Fracture Mechanics Evaluation
The STP leak-before-break analysis for the primary loop, includes a fracture mechanics evaluation which depends on the crack initiation energy integral, J_{IN}. The primary coolant loops at STP are SA 351 Grade CF8A cast stainless steel, which at PWR operating temperatures is subject to time-dependent thermal embrittlement reducing the J_{IN} integral.

Thermal embrittlement effects depend logarithmically on time (more rapid initially, approaching a saturation value over time). The Westinghouse LBB analysis for the primary loop cites a study which determined the effects of thermal aging on piping integrity for a material at thermal embrittlement saturation. The fracture mechanics evaluation considers the thermal embrittlement aging mechanism and is defined by the current operating term. Therefore the fracture mechanics evaluation is a TLAA.

Effects of Power Uprate and Steam Generator Replacement on the LBB Analysis

The Westinghouse power uprate report determined that power uprate had no effects on the LBB analysis for the primary loop piping, the pressurizer surge line, or the accumulator lines. (The pressurizer surge line and the accumulator lines are addressed in Section 4.3.2.10 in the discussion on the increase in the CUF for break consideration.) Westinghouse determined that the conclusions of the previous LBB analysis for the reactor coolant piping, pressurizer surge line, and accumulator lines remain valid after steam generator replacement.

Disposition: Validation, 10 CFR 54.21(c)(1)(i) and Aging Management, 10 CFR 54.21(c)(1)(iii)

Aging Management of the Fatigue Crack Growth Analysis

The LBB analysis found that fatigue crack growth effects will be negligible. The basis for evaluation of fatigue crack growth effects in the LBB analysis will remain unchanged so long as the number of transient occurrences remains below the number assumed for the analysis of fatigue crack growth effects.

The Metal Fatigue of the Reactor Coolant Pressure Boundary program described in Section 4.3.1 and B3.1 ensures that the numbers of transients remain below the number actually experienced during the period of extended operation remain below the assumed number; or that appropriate corrective actions maintain the design and licensing basis by other acceptable means. The effects of fatigue will therefore be managed for the period of extended operation. This TLAA is dispositioned in accordance with 10 CFR 54.21(c)(1)(iii). Continuation of the 10 CFR 50.12 LBB exemption is therefore justified for the period of extended operation.

Validation of the Fracture Mechanics Evaluation

The material fracture toughness properties selected for use in the LBB analysis are sufficiently embrittled that they bound the amount of thermal embrittlement that will occur in 60 years. Therefore this TLAA is valid for the period of extended operation and is dispositioned in accordance with 10 CFR 54.21(c)(1)(i).

A3.2.1.11 Fatigue Crack Growth Assessments and Fracture Mechanics Stability Analyses for Leak-Before-Break (LBB) Elimination of Dynamic Effects of Primary Loop Piping Failures

A leak-before-break analysis eliminated the need to postulate longitudinal and circumferential breaks in the reactor coolant system primary loop piping~~, the pressurizer surge line, and the accumulator line~~. Elimination of these breaks omitted the need to install pipe whip restraints in the primary loop and eliminated the requirement to design for dynamic (jet and whip) effects of primary loop breaks. The containment pressurization, emergency core cooling system, and environmental qualification large-break design bases were not affected.

Aging Management of the Fatigue Crack Growth Analysis

The final LBB submittal for STP included a fatigue crack growth assessment for a range of materials at a high stress locations bounding the primary coolant system._The LBB analysis found that fatigue crack growth effects will be negligible. The basis for evaluation of fatigue crack growth effects in the LBB analysis will remain unchanged so long as the number of transient occurrences remains below the number assumed for the analysis of fatigue crack growth effects.

The Metal Fatigue of Reactor Coolant Pressure Boundary program, described in Section A2.1, ensures that the numbers of transients actually experienced during the period of extended operation remain below the assumed number; or that appropriate corrective actions maintain the design and licensing basis by other acceptable means. The effects of fatigue will therefore be managed for the period of extended operation. This TLAA is dispositioned in accordance with 10 CFR 54.21(c)(1)(iii).

Validation of the Fracture Mechanics Evaluation

The STP leak-before-break analysis for the primary loop, includes a fracture mechanics evaluation which depends on the crack initiation energy integral, J_{IN}. The material fracture toughness properties selected for use in the LBB analysis are sufficiently embrittled that they bound the amount of thermal embrittlement that will occur in 60 years. Therefore this TLAA is valid for the period of extended operation and is dispositioned in accordance with 10 CFR 54.21(c)(1)(i).

A4 LICENSE RENEWAL COMMITMENTS

Table A4-1 identifies proposed actions committed to by STPNOC for STP Units 1 and 2 in its License Renewal Application. These and other actions are proposed regulatory commitments. This list will be revised, as necessary, in subsequent amendments to reflect changes resulting from NRC questions and STPNOC responses. STPNOC will utilize the STP commitment tracking system to track regulatory commitments. The Condition Report (CR) number in the Implementation Schedule column of the table is for *STPNOC tracking purposes and is not part of the amended LRA.*

LICENSE RENEWAL COMMITMENTS

Table A4-1 identifies proposed actions committed to by STPNOC for STP Units 1 and 2 in its License Renewal Application. These and other actions are proposed regulatory commitments. This list will be revised, as necessary, in subsequent amendments to reflect changes resulting from NRC questions and STPNOC responses. STPNOC will utilize the STP commitment tracking system to track regulatory commitments.

Table A4-1 License Renewal Commitments

Item #	Commitment	LRA Section	Implementation Schedule
33	Periodic inspection of a sample of transmission conductor connections for loose connections using thermography is currently performed as part of the preventive maintenance activities. The periodic thermography will continue into the period of extended operation.	3.6.2.2.3	~~Complete no later than six months prior to the period of extended operation Replacement to be complete no later than six months prior to the PEO or the end of the last refueling outage prior to the PEO, whichever occurs later.~~ Continued into the period of extended operation CR 10-23608
43	• The seal cap enclosures from Unit 2 Safety Injection System Check Valve SI0010A and from Unit 1 and Unit 2 Chemical Volume Control System Check Valves CV0001, CV0002, CV0004, and CV0005 will be permanently removed. After removal of the seal cap enclosures, the component bolting will be replaced or inspected for intergranular stress corrosion cracking.	B2.1.7	Unit 1 completed ~~2013 Refueling Outage (Unit 2)~~ Unit 2 completed CR 12-21155

44	Enhance the Selective Leaching of Aluminum Bronze procedure to update the structural integrity analyses, confirm load carrying capacity, and determine degree of dealloying as follows: • Perform volumetric examinations of leaking aluminum bronze components where the configuration supports this type of examination to conclude with reasonable assurance that cracks are not approaching a critical size. • Perform Profile Examinations (PE) on 100% of leaking components. The PE consists of non-destructive examination of the leaking component for the presence of any visual crack identifications (Inside/outside surfaces) and distractive examinations for microstructure, degree of dealloying, percent of dealloying through wall thickness and chemical composition (including aluminum content). When sufficient material is available for preparation of a test coupon, mechanical properties (ultimate strength, yield strength, and/or fracture toughness) will be obtained. • Perform pressure and bending tests (Analysis Confirmatory Tests (ACTs) on leaking components to obtain pressure and bending moment. • Require ACTs be performed on 100% of the leaking components until 3 confirmatory ACTs from 3 different component sizes have been tested. Following the 9 confirmatory ACTs then 20% of all removed leaking aluminum bronze components will have ACTs performed until the end of the Period of Extended Operation. Require at least two components be tested (PEs and ACTs) during the each 10-year interval. If at least two leaking components are not identified two years prior to the end of each 10 year testing interval, a risk-ranked approach based on those components most susceptible to degradation will be used to identify candidate components for removal testing. • Perform an engineering evaluation at the end of each PEs and ACTs testing interval to confirm the analytical methodology used to calculate the load carrying capacity and structural integrity of the leak components is conservative. • Update the analytical methodology used to demonstrate structural integrity used to demonstrate structural integrity as required confirming that the load carrying capacity of the aluminum bronze material remains adequate to support the intended function of the ECW system through the period of extended operation. • Trend the degree of dealloying and cracking by comparing examination results with previous examination results. Trend ultimate strength, yield strength, and/or fracture toughness results from the PE testing. • Upon completion of each test, incorporate new test data updating existing trend to evaluate impact on the acceptance criteria. • Specify the ASME Code Section XI structural factors for the normal/upset conditions (2.77) as well as the emergency and faulted conditions (1.39).	B2.1.37	~~July 31, 2014 (revised per NOC-AE-14003090)~~ Completed NOC-AE-43003135 CR 12-22150

	• Specify the acceptance criteria criterion for ultimate tensile strength and yield strength values of dealloyed aluminum bronze material is greater than or equal to 30 ksi. Specify the acceptance criterion for fracture toughness is 65 ksi in1/2 for nondealloyed aluminum bronze castings and at welded joints in the heat affected zones. • Initiate a corrective action document when the acceptance the criterion is not met. • Specify that upon discovery of visual evidence of through-wall dealloying, components are scheduled for replacement by the next outage. • Specify that when the ACTs does not confirm the structural integrity analyses, o The corrective action program as defined in 10 CFR Part 50 Appendix B will be followed to address emergent conditions to assure continued safe operation of the units. o That a Operational Decision-Making Issue (ODMI) detailing specific steps based on identified conditions will be developed. These steps include notifying the control room of the condition, initiating a condition report and performing field walkdowns to determine compensatory action.		
46	Leak rates that could occur upstream of any individual component supplied by the ECW system will be determined to validate the maximum size flaw for which piping can still perform its intended function. • A summary of the results of these leak rates will be provided to the NRC for review.	N/A	~~July 31, 2014 by this Letter NOC-AE-14003135~~ Completed Results submitted in NOC-AE-43003135 CR 12-27257