Nuclear Operating Company

South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

October 18, 2011
NOC-AE-11002737
10 CFR 54
STI: 32959151
File: G25

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

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

References:
1. STPNOC Letter dated October 25, 2010, from G. T. Powell to NRC Document Control Desk, "License Renewal Application," (NOC-AE-10002607) (ML103010257)
2. STPNOC Letter dated May 12, 2011, from G. T. Powell to NRC Document Control Desk, "Response to Request for Additional Information for the South Texas Project License Renewal Application" (NOC-AE-11002672) (ML11145A090)
3. STPNOC Letter dated August 9, 2011, from G. T. Powell to NRC Document Control Desk, "Response to Request for Additional Information for the Review of the South Texas Project License Renewal Application" (TAC Nos. ME4936 and ME4937) (NOC-AE-11002702) (ML11234A045)
4. STPNOC Letter dated August 23 2011, from G. T. Powell to NRC Document Control Desk, "Response to Requests for Additional Information for the South Texas Project License Renewal Application" (TAC Nos. ME4936 and ME4937) (NOC-AE-11002714) (ML11238A072)
5. STPNOC Letter dated October 10, 2011, from G. T. Powell to NRC Document Control Desk, "Response to Requests for Additional Information for the the South Texas Project License Renewal Application" (TAC Nos. ME4936 and ME4937) (NOC-AE-11002732)

By Reference 1, STP Nuclear Operating Company (STPNOC) submitted a License Renewal Application (LRA) for South Texas Project (STP) Units 1 and 2. This letter supplements responses to requests for information regarding the LRA. Changes to previous STPNOC responses to requests for additional information in References 2, 3 and 5 are provided in Enclosure 1. Changes to the LRA previously discussed in References 2, 3, 4 and 5 and in Enclosure 1 to this letter are provided in Enclosure 2.

A revised regulatory commitment to Table A4-1 of the LRA in provided in Enclosure 3. There are no other regulatory commitments in this letter.

A1H7
NRR

Should you have any questions regarding this letter, please contact either Arden Aldridge, STP License Renewal Project Lead, at (361) 972-8243 or Ken Taplett, STP License Renewal Project regulatory point-of-contact, at (361) 972-8416.

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

Executed on October 18, 2011
Date

G. T. Powell
Vice President,
Generation

KJT

Enclosures:

1. Supplemental Responses to RAIs
2. Changes to the STPNOC LRA
3. Revised Regulatory Commitments

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Enclosure 1

Supplemental Responses to RAI's

Supplemental Responses to RAI's

References: 1. STPNOC Letter dated May 12, 2011, from G. T. Powell to NRC Document Control Desk, "Response to Request for Additional Information for the South Texas Project License Renewal Application" (NOC-AE-11002672) (ML11145A090)
2. STPNOC Letter dated August 9, 2011, from G. T. Powell to NRC Document Control Desk, "Response to Request for Additional Information for the Review of the South Texas Project License Renewal Application" (TAC Nos. ME4936 and ME4937) (NOC-AE-11002702) (ML11234A045)
3. STPNOC Letter dated October 10, 2011, from G. T. Powell to NRC Document Control Desk, "Response to Requests for Additional Information for the the South Texas Project License Renewal Application" (TAC Nos. ME4936 and ME4937) (NOC-AE-11002732)

The following table lists the affected Request for Additional Information numbers from the referenced correspondence where the response has been supplemented with additional information. The supplement information is formatted in a "line-out" (i.e. text being deleted from the RAI response) and "line-in" (i.e. text being added to the RAI response) structure.

Referenced Letter	RAI Number	Reason for Change
1	4.3.2.11-3	Revise LRA Appendix B section B3.1 Corrective Actions (Element 7) to delete LBB wording
2	2.3.3.7-02	Revise LRA table 3.3.2-7 to include valves with copper alloy > 15 percent zinc in plant indoor air internal and external environments
2	2.3.3.22-02	LRA Table 3.1.2-2 will be revised to add the SIA intended function to the PRT.
3	B2.1.32-04	Response previously not provided

RAI 4.3.2.11-3 (Supplemental Response)

Note: The referenced letter inadvertently "lined-in/lined-out" more changes to the LRA Appendix B Section B3.1 Corrective Actions (Element 7) than should have been reflected as changes. For the "line-in/line-out" changes reflected on Page 27 of Enclosure 1 to the referenced letter, only item (3) was an addition to the LRA.

3) Review of fatigue crack growth and stability analyses support the leak before break exemptions and relief from the ASME Section XI flaw removal or inspection requirements to ensure that the analytical bases remain valid. Re-analysis of a fatigue crack growth analysis must be consistent with or reconciled to the originally submitted analysis and receive the same level of regulatory review as the original analysis.

Although not reflected in the referenced letter, item (1)(c) will be changed as follows and Item (1)(d) will be deleted from the LRA.

c) To ensure that the analytical bases ~~of the leak-before-break (LBB) fatigue crack propagation analysis and~~ of the high energy line break (HELB) locations are maintained.

~~d) To ensure that the analytical bases of a fatigue crack growth and stability analysis in support of relief from ASME Section XI flaw removal.~~

[Enclosure 2 to this letter provides the line-in and line-out changes to LRA Appendix B3.1.]

RAI 2.3.3.7-02 (Supplemental Response)

Relief valve PSV8571 on boundary drawings LR-STP-IA-8Q119F00048#1-1 and LR-STP-IA-8Q119F00048#2-1 (location E-5) were inadvertently not included in-scope of license renewal and are not highlighted on the boundary drawings. These valves should be in-scope for 10 CFR 54.4(a)(3).

Relief valve PSV8571 will be included in-scope and boundary drawings LR-STP-IA-8Q119F00048#1-1 and LR-STP-IA-8Q119F00048#2-1 (location E-5) will be updated to highlight these valves "green" for 10 CFR 54.4(a)(3).

During the review boundary drawing review relief valve PSV8571 was determined to utilize valve material with >15 percent zinc with an internal and external environment of plant indoor air.

LRA Table 3.3.2-7 will be revised to include additional AMR line items for a valve with >15 percent zinc with internal and external environments of plant indoor air.

[Enclosure 2 to this letter provides the line-in and line-out changes to LRA Table 3.3.2-7.]

RAI 2.3.3.22-02 (Supplemental Response)

Item 1

No change is made to previous response.

Item 2

The NSR portion of the SR/NSR interface on LR-STP-WL-5R309F05022#1at F-7 begins with the solid line next to the dashed valve FV3400. Continuing along the NSR portion of this piping, all branches are appropriately terminated with an equivalent anchor except two locations. These locations are C-8 (pipe 4"RC1041UD7) and B-2 (pipe 3"RC1034UD7), with piping continuing to the pressurizer relief tank (PRT) on boundary drawings LR-STP-RC-5R149F05004#1 & #2 (E-5). The PRT serves as an appropriate F.4.a base-mounted component. The PRT ~~and the associated piping are~~ is in-scope for license renewal for

spatial interaction, but structural integrity attached (SIA) was inadvertently omitted as an intended function. In addition, ~~but a~~ the terminal component symbol was inadvertently omitted at the PRT.

LRA Table 3.1.2-2 will be revised to add the SIA intended function to the PRT. Also, ~~B~~boundary drawings LR-STP-RC-5R149F05004#1 & #2 will be updated to add an F.4.a termination symbol (base-mounted component) to the PRT.

[Enclosure 2 to this letter provides the line-in and line-out to changes to LRA Table 3.1.2-2.]

RAI B2.1.32-04 (Supplemental Response)

Background:

In GALL AMP XI.S6, in program element 3 "parameters monitored or inspected" and program element 4, "detection of aging effects," notes that the structures monitoring program addresses detection of aging effects for inaccessible, below-grade concrete structural elements, and for plants with non-aggressive ground water/soil (pH > 5.5, chlorides < 500 ppm, and sulfates <1500 ppm), the program recommends: (a) evaluating the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to such inaccessible areas and (b) examining representative samples of the exposed portions of the below-grade concrete, when excavated for any reason. The GALL Report also notes that for plants with aggressive ground water/soil (pH < 5.5, chlorides > 500 ppm, or sulfates > 1500 ppm) and/or where the concrete structural elements have experienced degradation, a plant-specific AMP accounting for the extent of the degradation experienced should be implemented to manage the concrete aging during the period of extended operation.

Issue:

The LRA and element 3 of the LRA basis document state that plant procedures will be enhanced to monitor at least two groundwater samples every five years for pH, sulfates, and chlorides, but no results are provided to demonstrate that the groundwater is either aggressive or non-aggressive. Also in element 4 of the LRA basis documents for the Structures Monitoring Program and the Reg. Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program, no mention is made of opportunistic inspections of below-grade structures or a plant-specific program to address the below-grade structures if the ground water is aggressive. It is unclear to the staff how inaccessible concrete structures subjected to groundwater will be managed for aging.

Request:

1. Provide historical results, including seasonal variations, for groundwater chemistry (i.e., pH, sulfates, and chlorides) to demonstrate that the groundwater is either aggressive or non-aggressive.

2. If historical results indicate that the groundwater is considered to be non-aggressive, demonstrate that opportunistic inspections of exposed portions of the below-grade concrete,

when excavated for any reason, will be performed under both the Structures Monitoring Program and the Reg. Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program, or explain why the inspections are not needed.

3. If historical results indicate that the ground water is aggressive, or where accessible concrete structural elements have experienced degradation, identify the plant-specific program that will be used to manage aging of these structures, or explain why the existing programs are adequate.

STPNOC Response:

~~STPNOC will provide a response to this RAI by October 21, 2011 under a separate cover letter.~~

Samples taken from sample well B-1B in 1989 and 1990 indicate the STP site groundwater is non-aggressive. Chlorides and sulfates were measured at 120ppm/34ppm and 124ppm/32ppm respectively. (Reference letters ST-P2-HL-557 & ST-HS-HL-7472) Direct measurements of chloride and sulfate levels have not been routinely taken, therefore seasonal variances and current groundwater insights cannot be determined. Operating experience at STP has not identified any degradation of structures that would be attributable to aggressive groundwater.

To validate that groundwater remains non-aggressive, STP will analyze the site groundwater for pH, sulfates, and chlorides in samples taken at multiple locations around the site every three months for at least 24 consecutive months. This sampling plan will begin no later than September 2012.

Opportunistic inspections of exposed portions of the below-grade concrete, when excavated for any reason, will be performed using aging management program B2.1.32, Structures Monitoring Program. The Structures Monitoring Program includes water-control structures.

If the results of the 24-month groundwater sampling plan discussed in Part 1 in response to this RAI identifies that the ground water is aggressive or it is identified that accessible concrete structural elements have experienced degradation, an evaluation will be performed to determine the appropriate actions necessary to assure that the affected structures will continue to perform their intended function. These actions may include increased visual inspections or other examination techniques.

LRA Appendix B2.1.32, LRA Basis Document AMP XI.S6 (B2.1.32), Structures Monitoring program will be revised to include the following enhancements:

Groundwater samples will be taken at multiple locations around the site every three months for at least 24 consecutive months. The samples will be analyzed for pH, sulfates, and chlorides. This sampling plan will begin no later than September 2012.

1. Procedures will be enhanced to perform opportunistic inspections of exposed portions of the below-grade concrete, when excavated for any reason.

2. Procedures will be enhanced to require an evaluation should ground water be determined to be aggressive or inspections of accessible concrete structural elements identify degradation. The evaluation will be performed to determine the appropriate actions necessary to assure that the affected structures will continue to perform their

intended function. These actions may include increased visual inspections or other examination techniques.

The procedure enhancements will be added to revise Commitment 25 (B2.1-32) to LRA Table A4-1. The 24-month sampling plan enhancement will be added as new Commitment 37 (B2.1-32) to LRA Table A4-1.

[Enclosures 2 and 3 provide the mark-in/mark-out sections of the License Renewal Application.]

Enclosure 2

Changes to the STPNOC LRA

Changes to the STPNOC LRA

References:
1. STPNOC Letter dated August 9, 2011, from G. T. Powell to NRC Document Control Desk, "Response to Request for Additional Information for the Review of the South Texas Project License Renewal Application" (TAC Nos. ME4936 and ME4937) (NOC-AE-11002702) (ML11234A045)
2. STPNOC Letter dated August 23 2011, from G. T. Powell to NRC Document Control Desk, "Response to Requests for Additional Information for the South Texas Project License Renewal Application" (TAC Nos. ME4936 and ME4937) (NOC-AE-11002714) (ML11238A072)
3. STPNOC Letter dated October 10, 2011, from G. T. Powell to NRC Document Control Desk, "Response to Requests for Additional Information for the the South Texas Project License Renewal Application" (TAC Nos. ME4936 and ME4937) (NOC-AE-11002732)
4. STPNOC Letter dated May 12, 2011, from G. T. Powell to NRC Document Control Desk, "Response to Request for Additional Information for the South Texas Project License Renewal Application" (NOC-AE-11002672) (ML11145A090)

The following table lists the affected STPNOC LRA Sections and Tables and provides the reason for each change. The LRA changes following the table are formatted in a "line-out" (i.e. text being deleted from the LRA) and "line-in" (i.e. text being added to the LRA) structure.

Referenced Letter	RAI Number	Affected Section of LRA	Reason for Change
2	2.1-1	Section 2.1.2.1	LRA section 2.1.2.1 will be revised to include Quality Class 4 (QC-4) SSCs are within the scope of license renewal for 10 CFR 50.54(a)(1).
2	2.1-3	Table 2.3.3-1	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal.
1	2.3.3.8-06	Table 2.3.3-8	LRA Table 2.3.3-8 will be updated to add the housing of the pressure indicator.
1	2.3.3.20-05	Section 2.3.3.20	Section 2.3.3.20 will be revised to remove air dryers from the system description.
1	2.3.3.20-05	Table 2.3.3-20	LRA Table 2.3.3-20 will be revised to remove the component type "dryer".
2	2.1-3	Table 2.3.3-27	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal.

Referenced Letter	RAI Number	Affected Section of LRA	Reason for Change
2	2.1-3	Section 2.3.4.5	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal.
2	2.1-3	Table 2.3.4-5	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal.
1	2.3.3.22-02	Table 3.1.2-2	LRA Table 3.1.2-2 will be revised to add the SIA intended function to the PRT.
2	2.1-3	Section 3.3.2.1.1	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal.
2	2.1-3	Section 3.3.2.1.19	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal..
2	2.1-3	Section 3.3.2.1.27	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal..
2	2.1-3	Table 3.3.2-1	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal..
1	2.3.3.7-02	Table 3.3.2-7	LRA table 3.3.2-7 will be revised to include valves with copper alloy > 15 percent zinc in plant indoor air internal and external environments
1	2.3.3.8-06	Table 3.3.2-8	LRA Table 3.3.2-8 will be updated to add the housing of the pressure indicator..
2	2.1-3	Table 3.3.2-19	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal..
1	2.3.3.20-05	Table 3.3.2-20	LRA Table 3.3.2-20 will be revised to remove the component type “dryer”,
2	2.1-3	Table 3.3.2-22	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal..
2	2.1-3	Table 3.3.2-27	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal.

Referenced Letter	RAI Number	Affected Section of LRA	Reason for Change
1	2.3.4.1-02	Table 3.4.2-1	A new component line will be added for a "stainless steel filter with a lube oil internal environment and plant indoor air external environment" for the main steam system.
2	2.1-3	Table 3.4.2-5	LRA will be changed to include previously unidentified nonsafety-related SSC within the scope of license renewal.
3	B2.1.32-04	B2.1.32	To add enhancements to the Structures Monitoring Program
4	4.3.2.11-3	B3.1	Revise LRA Appendix B section B3.1 Corrective Actions (Element 7) to delete LBB wording

2.1.2.1 10 CFR 54.4(a)(1) – Safety-related

10 CFR 54.4(a)(1) requires that plant SSCs within the scope of license renewal include safety-related SSCs which are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49(b)(1)) to ensure the following functions:

(i) The integrity of the reactor coolant pressure boundary;

(ii) The capability to shutdown the reactor and maintain it in a safe shutdown condition; or,

(iii) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposure comparable to those referred to in 50.34(a)(1), 50.67(b)(2), or 100.11, as applicable.

STP Safety-related Classifications

Safety-related design classifications for systems, structures, and components are described in the UFSAR and in plant specification *Quality Classification of Structures, Systems and Components.* Safety-related classifications for components are documented on engineering drawings and in the master equipment database. The safety-related classification as described in these source documents was used to identify SSCs satisfying one or more of the criteria of 10 CFR 54.4(a)(1) and include them within the scope of license renewal.

STP-specific definitions for safety-related in UFSAR Section 3.2 are consistent with the definition of safety-related provided in 10 CFR 54.4(a)(1).

UFSAR Section 3.2.A states that certain structures, components, and systems of the nuclear plant are considered safety-related because they perform safety functions required to prevent or mitigate the consequences of abnormal operational transients or accidents. Safety-related plant structures, systems, and components are designed to withstand the effects of a Safe Shutdown Earthquake (SSE) and remain functional if they are necessary to assure:

1. The integrity of the reactor coolant pressure boundary (RCPB).

2. The capability to shut down the reactor and maintain it in a safe shutdown condition.

3. The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of 10 CFR 100.

UFSAR Section 3.2.B states that for nuclear steam supply system SSCs, Westinghouse Electric Corporation, in lieu of the requirements of RG 1.26 and 1.29, applies a rule that each component classified as safety class (SC) 1, 2, or 3 shall be qualified to remain functional in the event of the SSE except where exempted by meeting all of the following conditions. Portions of systems required to perform the same safety function required of any SC component, which is a part of that system shall be likewise qualified or granted exemption.

Provisions to be met for exemption are:

1. Failure would not directly cause a Condition III or IV event (as defined in UFSAR Reference 3.2.B-4).

2. There is no safety function to perform nor could failure prevent mitigation of the consequences of a Condition III or IV event.

3. Failure during or following any Condition II event would result in consequences no more severe than allowed for a Condition III event.

Quality group classification, safety class terminology is utilized for the classification of components and structures. This terminology correlates to the NRC Quality Group designations for water, steam, and radioactive waste-containing mechanical components as follows:

STP Classification	NRC RG 1.26
SC 1	Quality Group A
SC 2	Quality Group B
SC 3	Quality Group C
NNS	(Non-Nuclear Safety) Quality Group D

Combination Quality Classification Quality Class 4 is used to classify safety-related SSCs having different primary quality Class designations that do not fall within the specific definitions of Quality Class Groups 1, 2, and 3 for pressure-retaining components. Some examples are seismic Category I safety-related Structures; Class IE safety-related electrical equipment; and safety related materials and components not within the pressure boundary of a system as defined in NRC Regulatory Guide 1.26, *Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants.*

Components and structures with quality group classifications SC1, SC2, ~~and~~ SC3 and Combination Class Quality Class 4 (QC 4) are within the scope of license renewal for (a)(1).

Table 2.3.3-1

Table 2.3.3-1 Fuel Handling System

Component Type	Intended Function
Blank Flange	Pressure Boundary
Closure Bolting	Pressure Boundary
Crane	Structural Support
Elevator	Structural Support
Filter	Leakage Boundary (spatial)
Fuel Handling Equipment	Structural Support
Fuel Storage Racks	Structural Support
Load Test Fixture	Structural Support
Piping	Pressure Boundary Structural Support
Pump	Leakage Boundary (spatial)
Tank	Leakage Boundary (spatial)
Valve	Structural Integrity (attached) Leakage Boundary (spatial)

Table 2.3.3-8

Table 2.3.3-8 Primary Process Sampling System

Component Type	Intended Function
Heat Exchanger (PASS Spare Sample)	Leakage Boundary (spatial)
Indicator	Leakage Boundary (spatial)
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)

Section 2.3.3-20

2.3.3-20 Standby Diesel Generator and Auxiliaries

System Description

The purpose of the standby diesel generator system is to provide onsite standby electrical power for Class 1E loads in the event that the offsite power sources become unavailable.

The standby diesel generator system contains several subsystems. These include the diesel generator cooling water system, diesel generator starting system, diesel generator lubrication system, diesel generator combustion air intake and exhaust system.

Diesel Generator Cooling Water System

The purpose of the diesel generator cooling water system is to circulate sufficient quantities of cooling water to dissipate heat given off by the air coolers, governor oil and lube oil cooler, and engine water jackets, under full load conditions.

The system consists of engine driven jacket water pumps, electric jacket water pumps, jacket water heat exchanger, lube oil heat exchangers, governor oil heat exchanger, heaters, associated piping and valves.

Diesel Generator Starting System

The purpose of the diesel generator starting system is to start the diesel engine using compressed air. Each diesel generator is provided with two starting air systems.

The diesel starting system consists of ~~air dryers,~~ air accumulators, associated piping and valves.

Table 2.3.3-20

Table 2.3.3-20 Standby Diesel Generator and Auxiliaries Systems

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
~~Dryer~~	~~Structural Integrity (attached)~~
Expansion Joint	Pressure Boundary

Table 2.3.3-27

Table 2.3.3-27 Miscellaneous Systems In scope ONLY based on Criterion 10 CFR 54.4(a)(2)

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Structural Integrity (attached)
Demineralizer	Leakage Boundary (spatial)
Filter	Leakage Boundary (spatial)

Section 2.3.4.5

2.3.4.5 Steam Generator Blowdown System

License Renewal Boundary Drawings

The license renewal boundary drawings for the steam generator blowdown system are listed below:
LR-STP-AF-5S141F00024-1
LR-STP-FW-5S139F00063#1
LR-STP-PS-9Z329Z00047#1
LR-STP-SB-5S209F05057#1
LR-STP-SB-5S209F20001#1
LR-STP-SB-5S209F20002#1
LR-STP-AF-5S142F00024-1
LR-STP-SB-7S209F20003#1
LR-STP-FW-5S139F00063#2
LR-STP-PS-9Z329Z00047#2
LR-STP-SB-5S209F05057#2
LR-STP-SB-5S209F20001#2
LR-STP-SB-5S209F20002#2
LR-STP-SB-7S209F20003#2

Table 2.3.4-5

Table 2.3.4-5 - Steam Generator Blowdown System

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Demineralizer	Leakage Boundary (spatial)
Flow Element	Leakage Boundary (spatial) Structural Integrity (attached)

Table 3.1.2-2

Table 3.1.2-2 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Coolant System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Tank	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.C-1	3.2.1.31	B
Tank	LBS, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	IV.E-3	3.1.1.86	C
Tank	LBS, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.D1-30	3.2.1.49	E, 2
Tank	LBS, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.D1-31	3.2.1.48	E, 2
Tubing	LBS, PB, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	IV.E-3	3.1.1.86	A

Section 3.3.2.1.1

3.3.2.1.1 Fuel Handling System

Environment

The fuel handling system components are exposed to the following environments:

- Borated Water Leakage
- Demineralized Water
- Plant Indoor Air
- Treated Borated Water

Section 3.3.2.1.19

3.3.2.1.19 Chemical and Volume Control System

Materials

The materials of construction for the chemical and volume control system component types are:

- Aluminum
- Carbon Steel
- Cast Iron
- Copper Alloy
- Insulation Calcium Silicate
- Insulation Fiberglass
- Nickel Alloys
- Stainless Steel
- Stainless Steel Cast Austenitic
- Thermoplastics

Section 3.3.2.1.27

3.3.2.1.27 Miscellaneous Systems In-Scope ONLY based on Criterion 10 CFR 54.4(a)(2)

Materials

The materials of construction for the miscellaneous systems in scope ONLY based on Criterion 10 CFR 54.4(a)(2) component types are:

- Aluminum
- Carbon Steel
- Cast Iron
- Copper Alloy
- Copper Alloy (Aluminum > 8 percent)
- Copper Alloy (Zinc > 15 percent)
- Ductile Iron
- Glass
- Nickel-Alloys
- Polyvinyl Chloride (PVC)
- Stainless Steel
- Stainless Steel Cast Austenitic

Environment

The miscellaneous systems in scope ONLY based on Criterion 10 CFR 54.4(a)(2) component types are exposed to the following environments:

- Atmosphere/ Weather
- Borated Water Leakage
- Buried
- Closed-Cycle Cooling Water
- Demineralized Water
- Dry Gas
- Plant Indoor Air
- Potable Water
- Raw Water
- Secondary Water

- Sodium Hydroxide
- Treated Borated Water

Aging Effects Requiring Management

The following miscellaneous systems in-scope ONLY based on Criterion 10 CFR 54.4(a)(2) aging effects require management:

- Cracking
- Loss of material
- Loss of preload
- Wall thinning

Aging Management Programs

The following aging management programs manage the aging effects for the miscellaneous systems in scope ONLY based on Criterion 10 CFR 54.4(a)(2) component types:

- Bolting Integrity (B2.1.7)
- Buried Piping and Tanks Inspection (B2.1.18)
- Closed-Cycle Cooling Water System (B2.1.10)
- External Surfaces Monitoring Program (B2.1.20)
- Flow-Accelerated Corrosion (B2.1.6)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- One-Time Inspection (B2.1.16)
- Open-Cycle Cooling Water System (B2.1.9)
- Selective Leaching of Aluminum Bronze (B2.1.37)
- Selective Leaching of Materials (B2.1.17)
- Water Chemistry (B2.1.2)

Table 3.3.2-1

Table 3.3.2-1 Auxiliary Systems – Summary of Aging Management Evaluation – Fuel Handling System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Elevator	SS	Stainless Steel	Treated Borated Water (Ext)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.A2-1	3.3.1.91	E, 2
Filter	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	C
Filter	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Fuel Handling Equip	SS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B
Piping	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.A2-1	3.3.1.91	E, 2
Pump	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	A
Pump	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Tank	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	C
Tank	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	A
Valve	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J.15	3.3.1.94	A

Valve	SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A

Table 3.3.2-7

Table 3.3.2-7 Auxiliary Systems – Summary of Aging Management Evaluation – Compressed Air System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	PB, SIA	Copper Alloy	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-9	3.3.1.28	E
Valve	PB	Copper Alloy (>15% Zinc)	Plant Indoor Air (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	None	None	G, 3
Valve	PB	Copper Alloy (> 15% Zinc)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Valve	PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A

Table 3.3.2-8

Table 3.3.2-8 Auxiliary Systems – Summary of Aging Management Evaluation – Primary Process Sampling System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchanger (PASS Spare Sample)	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B
Indicator	LBS	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Indicator	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 1
Piping	LBS, PB, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A

Table 3.3.2-19

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
Valve	LBS	Stainless Steel	Zinc Acetate (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	None	None	G
Valve	LBS	Stainless Steel Cast Austenitic	Borated Water Leakage (ext)	None	None	VII.J-16	3.3.1.99	A
Valve	LBS	Stainless Steel Cast Austenitic	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-20	3.3.1.90	E, 2

Table 3.3.2-20

Table 3.3.2-20 Auxiliary Systems – Summary of Aging Management Evaluation – Standby Diesel Generator and Auxiliaries

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	Stainless Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	H, 1
~~Dryer~~	~~SIA~~	~~Stainless Steel~~	~~Dry Gas (Int)~~	~~None~~	~~None~~	~~VII.J-19~~	~~3.3.1.97~~	~~A~~
~~Dryer~~	~~SIA~~	~~Stainless Steel~~	~~Plant Indoor Air (Ext)~~	~~None~~	~~None~~	~~VII.J-15~~	~~3.3.1.94~~	~~A~~
Expansion Joint	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.H2-23	3.3.1.47	B

Table 3.3.2-22

Table 3.3.2-22 Auxiliary Systems – Summary of Aging Management Evaluation – Liquid Waste Processing System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping	LBS, SIA	Stainless Steel	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-15	3.3.1.79	E, 3
Piping	LBS	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	A
Piping	LBS	Stainless Steel	Sodium Hydroxide (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	None	None	G, 2
Pump	LBS, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Pump	LBS, SIA	Stainless Steel	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-15	3.3.1.79	E, 3
Pump	LBS	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	A

Table 3.3.2-27

Table 3.3.2-27 Auxiliary Systems – Summary of Aging Management Evaluation – Miscellaneous Systems in scope ONLY for Criterion 10 CFR 54.4(a)(2)

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, SIA	Stainless Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	H, 1
Demineralizer	LBS	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Demineralizer	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	A
Demineralizer	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Demineralizer	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-20	3.3.1.90	E,4
Filter	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Pump	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Pump	LBS	Stainless Steel	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-15	3.3.1.79	E, 4
Pump	LBS	Stainless Steel	Sodium Hydroxide (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	None	None	G, 2

Valve	LBS, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 7
Valve	LBS	Stainless Steel Cast Austenitic	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Valve	LBS	Stainless Steel Cast Austenitic	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	A
Valve	LBS	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	LBS	Stainless Steel Cast Austenitic	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-15	3.3.1.79	E, 4
Valve	LBS	Stainless Steel Cast Austenitic	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-20	3.3.1.90	E, 4

Table 3.4.2-1

Table 3.4.2-1 Steam and Power Conversion System – Summary of Aging Management Evaluation – Main Steam 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	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VIII.H-5	3.4.1.22	B
Filter	PB	Stainless Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VIII.A-9	3.4.1.19	D
Filter	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	C
Filter	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VIII.A-14	3.4.1.07	D

Table 3.4.2-5

Table 3.4.2-5 Steam and Power Conversion System – Summary of Aging Management Evaluation – Steam Generator Blowdown 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	Stainless Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	H, 1
Demineralizer	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Demineralizer	LBS	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-23	3.4.1.16	A
Flow Element	LBS, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Pump	LBS, SIA	Stainless Steel Cast Austenitic	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-23	3.4.1.16	A
Strainer	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	B
Strainer	LBS	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-25	3.4.1.04	A
Strainer	LBS, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Valve	LBS, SIA	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-23	3.4.1.16	A
Valve	LBS	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A

Valve	LBS	Stainless Steel Cast Austenitic	Secondary Water (Int)	Loss of Material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-23	3.4.1.16	A

B2.1.32 Structures Monitoring Program

Program Description

The Structures Monitoring Program (SMP) monitors the condition of structures and structural supports that are within the scope of license renewal to manage the following aging effects:

- Concrete cracking and spalling
- Cracking
- Cracking due to expansion
- Cracking, loss of bond, and loss of material (spalling, scaling)
- Cracks and distortion
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling)
- Increase in porosity and permeability, loss of strength
- Loss of material
- Loss of material (spalling, scaling) and cracking
- Loss of mechanical function
- Loss of sealing
- Reduction of concrete anchor capacity

The SMP implements the requirements of 10 CFR 50.65, *The Maintenance Rule*, consistent with guidance of NUMARC 93-01, *Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants*, Revision 2 and Regulatory Guide 1.160, *Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,* Revision 2.

The SMP provides inspection guidelines and walk-down checklists for structural steel, roof systems, reinforced concrete, masonry walls and metal siding. Electrical duct banks and manholes, valve pits, access vaults, and structural supports are inspected as part of the SMP. STP is committed to Regulatory Guide 1.127 and the scope of the SMP includes water-control structures. The scope of SMP also includes masonry walls. The SMP monitors settlement for each major structure utilizing geotechnical monitoring techniques, with benchmarks installed on major structures to allow for monitoring of heave and settlement movements during plant operation. The SMP will monitor groundwater, at least two samples every five years for pH, excessive chlorides and sulfates. STP does not take credit for any coatings to manage the aging of structural components, and coating degradation is used only as an indicator of the condition of underlying material.

NUREG-1801 Consistency

The Structures Monitoring Program is an existing program that, following enhancement, will be consistent with NUREG-1801, Section XI.S6, Structures Monitoring Program.

Exceptions to NUREG-1801

None

Enhancements

Prior to the period of extended operation, the following enhancements will be implemented in the following program elements:

Preventive Actions (Element 2)

For ASTM A325, ASTM F1852, and/or ASTM A490 structural bolts, plant procedures will be revised to specify the preventive actions for storage, protection and lubricants recommended in Section 2 of Research Council for Structural Connections publication "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

Parameters Monitored or Inspected (Element 3)

Groundwater samples will be taken at multiple locations around the site every three months for at least 24 consecutive months. The samples will analyze for pH, sulfates, and chlorides. This sampling plan will begin no later than September 2012.

Procedures will be enhanced to specify inspections of seismic gaps, caulking and sealants, duct banks and manholes, valve pits and access vaults, doors, electrical conduits, raceways, cable trays, electrical cabinets/enclosures and associated anchorage.

Procedures will be enhanced to monitor at least two groundwater samples every five years for pH, sulfates, and chloride concentrations. This sampling will follow the initial 24 month monitoring activity.

Procedures will be enhanced to require the performance of a periodic visual inspection of the spent fuel pool and transfer canal tell-tale drain lines for blockage every five years. The first inspection will be performed within the 5 years before entering the period of extended operation.

Detection of Aging Effects (Element 4)

Procedures will be enhanced to specify that the inspection frequency for structures within the scope of license renewal will be in accordance with ACI 349.3R, Table 6.1, which specifies:

- For below-grade structures and structures in controlled interior environment (except inside primary containment), all accessible areas of both units will be inspected every 10 years.
- For all other structures (including inside primary containment), all accessible areas of both units will be inspected every 5 years.

Procedures will be enhanced to specify inspector qualifications in accordance with ACI 349.3R-96.

Procedures will be enhanced to specify ACI 349.3R-96 and ACI 201.1R-68 as the bases for defining quantitative acceptance criteria.

Procedures will be enhanced to perform opportunistic inspections of exposed portions of the below-grade concrete, when excavated for any reason.

Procedures will be enhanced to require an evaluation should ground water be determined to be aggressive or inspections of accessible concrete structural elements identify degradation. The evaluation will be performed to determine the appropriate actions necessary to assure that the affected structures will continue to perform their intended function. These actions may include increased visual inspections or other examination techniques.

Operating Experience

The STP SMP began with a baseline walkdown inspection in 1997. The examination included a careful walkdown and visual examination of accessible areas in the scoped structures. All the structures were found to be acceptable with the exception of the Unit 1 fuel handling building, room 011, which had a significant water leak resulting in corrosion of structural steel columns. The columns were recoated in 1997. The area of the fuel handling building was classified as "acceptable with deficiencies" because the structure continued to function as designed, but was subject to periodic inspections to verify water level was being adequately controlled and structural coatings had been reapplied to control corrosion.

Subsequent Maintenance Rule structures inspections in 2002-03 concluded that all Maintenance Rule scoped structures were meeting their established (a)(2) performance criteria. The only aging related condition report noted an inundation problem in Unit 2 similar to the one that was found in the Unit 1 fuel handling building, room 011, during the baseline inspections. The problem persisted through 2004; and in 2005 gravity drains were installed similar to the ones installed in Unit 1.

At STP, all areas of degradation identified during the structures monitoring inspections are documented in condition reports and work orders issued prior to any loss of intended functions or invalidation of licensing basis. The STP Structures Monitoring Program Bernhoft, Sherry [Sherry.Bernhoft@luminant.com]operating experience information provides objective evidence to support the conclusion that the effects of aging will be managed adequately so that the intended functions will be maintained during the period of extended operation.

Conclusion

The continued implementation of the Structures Monitoring Program provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B3 TLAA SUPPORT ACTIVITIES

B3.1 METAL FATIGUE OF REACTOR COOLANT PRESSURE BOUNDARY

Program Description

The Metal Fatigue of Reactor Coolant Pressure Boundary program manages fatigue cracking caused by anticipated cyclic strains in metal components of the RCPB. The program ensures that actual plant experience remains bounded by the transients assumed in the design calculations, or that appropriate corrective actions maintain the design and licensing basis by other acceptable means.

The Metal Fatigue of Reactor Coolant Pressure Boundary program consists of cycle counting activities. The program will be enhanced to monitor and trend fatigue usage at selected locations in the reactor coolant pressure boundary. The program will be enhanced to include additional transients and locations identified by the evaluation of ASME Section III fatigue analyses, locations necessary to ensure accurate calculations of fatigue, and the NUREG/CR-6260 locations for a newer-vintage Westinghouse Plant. The supporting environmental life correction factor calculations were performed with NUREG/CR-6583 for carbon and low alloy steels and with NUREG/CR-5704 for austenitic stainless steels.

The Metal Fatigue of Reactor Coolant Pressure Boundary program tracks the occurrences of selected transients and will be enhanced to monitor the cumulative usage factors (CUFs) at selected locations using one of the following methods:

1) The Cycle Counting (CC) method does not periodically calculate CUF; however, transient event cycles affecting the location (e.g. plant heatup and plant cooldown) are counted to ensure that the numbers of transient events assumed by the design calculations are not exceeded.

2) The Cycle Based Fatigue (CBF) management method utilizes the CC results and stress intensity ranges generated with the ASME III methods that use six stress-tensors to perform periodic CUF calculations for a selected location. The fatigue accumulation is tracked to determine approach to the ASME allowable fatigue limit of 1.0.

The Metal Fatigue of Reactor Coolant Pressure Boundary program continuously monitors plant data, and maintains a record of the data collected. The collected data are analyzed to identify operational transients and events, calculate usage factors for selected monitored locations, and compare the calculated usage factors to allowable limits. Periodic review of the calculations ensures that usage factors will not exceed the allowable value of 1.0 without an appropriate evaluation and any further necessary actions. If a cycle count or CUF value increases to a program action limit, corrective actions will be initiated to evaluate the design limits and determine appropriate specific corrective actions. Action limits permit completion of corrective actions before an assumed number of events in a fatigue analysis is exceeded.

NUREG-1801 Consistency

The Metal Fatigue of Reactor Coolant Pressure Boundary program is an existing program that, following enhancement, will be consistent with NUREG-1801, Section X.M1, Metal Fatigue of Reactor Coolant Pressure Boundary.

Exceptions to NUREG-1801

None

Enhancements

Prior to the period of extended operation, the following enhancements will be implemented in the following program elements:

Scope of Program (Element 1) and Monitoring and Trending (Element 5)

Procedures will be enhanced to include locations identified by the evaluation of ASME Section III fatigue analyses, locations necessary to ensure accurate calculations of fatigue, and the NUREG/CR-6260 locations for a newer-vintage Westinghouse Plant.

Scope of the Program (Element 1), and Parameters Monitored or Inspected (Element 3)

Procedures will be enhanced to include additional transients that contribute significantly to fatigue usage identified by the evaluation of ASME Section III fatigue analyses.

Scope of the Program (Element 1)

Procedures will be enhanced to ensure the fatigue crack growth analyses, which support the leak-before-break analyses and ASME Section XI evaluations, remain valid by counting the transients used in the analyses.

Detection of Aging Effects (Element 4)

The procedures will be enhanced to 1) include additional transients necessary to ensure accurate calculations of fatigue, 2) fatigue usage monitoring at specified locations, and 3) specify the frequency and process of periodic reviews of the results of the monitored cycle count and CUF data at least once per fuel cycle. This review will compare the results against the corrective action limits to determine any approach to action limits and any necessary revisions to the fatigue analyses will be included in the corrective actions.

Preventive Actions (Element 2) and Acceptance Criteria (Element 6)

The procedures will be enhanced to include additional cycle count and fatigue usage action limits, which will invoke appropriate corrective actions if a component approaches a cycle count action limit or a fatigue usage action limit. Action limits permit completion of corrective actions before the design limits are exceeded. The acceptance criteria associated with the NUREG/CR-6260 sample locations for a newer vintage Westinghouse plant will account for environmental effects on fatigue.

Cycle Count Action Limits:

Cycle count action limits are selected to initiate corrective action when the cycle count for any of the critical thermal or pressure transients is projected to reach the design limit within the next three fuel cycles.

CUF Action Limits:

CUF action limits require corrective action when the calculated CUF for any monitored location is projected to reach 1.0 within the next three fuel cycles.

Corrective Actions (Element 7)

Procedures will be enhanced to include appropriate corrective actions to be invoked if a component approaches a cycle count or CUF action limit.

If a cycle count action limit is reached, acceptable corrective actions include:

1) Review of fatigue usage calculations:

   a) To identify the components and analyses affected by the transient in question.

   b) To determine whether the transient in question contributes significantly to CUF.

   c) To ensure that the analytical bases ~~of the leak-before-break (LBB) fatigue crack propagation analysis and~~ of the high energy line break (HELB) locations are maintained.

   d) ~~To ensure that the analytical bases of a fatigue crack growth and stability analysis in support of relief from ASME Section XI flaw removal.~~

2) Evaluation of remaining margins on CUF.

3) Review of fatigue crack growth and stability analyses support the leak before break exemptions and relief from the ASME Section XI flaw removal or inspection requirements to ensure that the analytical bases remain valid. Re-analysis of a fatigue crack growth analysis must be consistent with or reconciled to the originally submitted analysis and receive the same level of regulatory review as the original analysis.

4) Redefinition of the specified number of cycles (e.g., by reducing specified numbers of cycles for other transients and using the margin to increase the allowed number of cycles for the transient that is approaching its specified number of cycles).

5) Redefinition of the transient to remove conservatism in the pressure and temperature ranges.

Since the counting action limits are based on a somewhat-arbitrary cycle count that does not accurately indicate approach to the CUF = 1.0 fatigue limit, these preliminary actions are designed to determine how close the approach is to the 1.0 limit, and from those

determinations, set new action limits. If the CUF has approached 1.0 then further actions described below for cumulative fatigue usage action limits may be invoked.

If a CUF action limit is reached acceptable corrective actions include:

1) Determine whether the scope of the management program must be enlarged to include additional affected reactor coolant pressure boundary locations. This determination will ensure that other locations do not approach design limits without an appropriate action.

2) Enhance fatigue managing to confirm continued conformance to the code limit.

3) Repair the component.

4) Replace the component. If a limiting component is replaced, assess the effect on locations monitored by the program. If a limiting component is replaced, resetting its cumulative fatigue usage factor to zero, a component which was previously bounded by the replaced component will become the limiting component and may need to be monitored.

5) Perform a more rigorous analysis of the component to demonstrate that the design code limit will not be exceeded.

6) Modify plant operating practices to reduce the fatigue usage accumulation rate.

7) Perform a flaw tolerance evaluation and impose component specific inspections, under ASME Section XI Appendices A or C (or their successors), and obtain required approvals by the NRC.

Operating Experience

The STP industry operating experience program reviews industry experience, including experience that may affect fatigue management, to ensure that applicable experience is evaluated and incorporated in plant analyses and procedures. Any necessary evaluations are conducted under the plant corrective action program.

The Metal Fatigue of Reactor Coolant Pressure Boundary program was implemented in response to industry experience that indicated that the design basis set of transients used for fatigue analyses of the reactor coolant pressure boundary did not include some significant transients, and therefore might not be limiting for components affected by them. Examples:

Thermal stratification of pressurizer surge line piping:

In response to NRC Bulletin 88-11, Westinghouse performed a plant-specific evaluation of STP pressurizer surge lines. The surge line stratification analysis was based on STP design transients. It was concluded that thermal stratification does not affect the integrity of the pressurizer surge lines. STP responses to NRC Bulletin 88-1 1 describe the inspections, analyses, and procedural revisions made to ensure that thermal stratification does not affect the integrity of the pressurizer surge lines. In addition, the responses noted that fatigue analyses were updated to ensure compliance with applicable codes and license commitments.

Thermal fatigue cracking in normally-isolated piping:

In 1988, as identified in NRC Bulletin 88-08, there were several instances of thermal fatigue cracking in normally stagnant lines attached to reactor coolant system (RCS) piping. This issue

was addressed by utilities by conducting evaluations and monitoring to ensure that further leakage would not occur. STP performed a complete analysis of systems connected to the RCS. The review concluded that the potential for the described thermal conditions existed only in the normal charging, alternate charging, and auxiliary spray lines. However, these systems are separated and only hot water can leak through the charging and auxiliary spray lines, reducing the potential for thermal cycling.

Conclusion

The continued implementation of the Metal Fatigue of Reactor Coolant Pressure Boundary program provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

Enclosure 3

Revised Regulatory Commitments

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.

Table A4-1 License Renewal Commitments

Item #	Commitment	LRA Section	Implementation Schedule
25	Enhance the Structures Monitoring Program procedures to: • specify inspections of seismic gaps, caulking and sealants, duct banks and manholes, valve pits and access vaults, doors, electrical conduits, raceways, cable trays, electrical cabinets/enclosures and associated anchorage, • monitor at least two groundwater samples every five years for pH, sulfates, and chloride concentrations, • specify that the inspection frequency for structures within the scope of license renewal will be in accordance with ACI 349.3R, Table 6.1, which specifies: o For below-grade structures and structures in controlled interior environment (except inside primary containment), all accessible areas of both units will be inspected every 10 years. o For all other structures (including inside primary containment), all accessible areas of both units will be inspected every 5 years. • specify inspector qualifications in accordance with ACI 349.3R-96. • require the performance of a periodic visual inspection of the spent fuel pool and transfer canal tell-tale drain lines for blockage every five years. The first inspection will be performed within the 5 years before entering the prior of extended operation. • specify ACI 349.3R-96 and ACI 201.1R-68 as the basis for defining quantitative acceptance criteria, and	B2.1.32	Prior to the period of extended operation CR 10-23600-1

Table A4-1 License Renewal Commitments

Item #	Commitment	LRA Section	Implementation Schedule
	• specify the preventive actions for storage, protection and lubricants recommended in Section 2 of Research Council for Structural Connections publication "Specification for Structural Joints Using ASTM A325 or A490 Bolts" for ASTM A325, ASTM F1852 and/or ASTM 490 bolts. • Procedures will be enhanced to perform opportunistic inspections of exposed portions of the below-grade concrete, when excavated for any reason. • Procedures will be enhanced to require an evaluation should ground water be determined to be aggressive or inspections of accessible concrete structural elements identify degradation. The evaluation will be performed to determine the appropriate actions necessary to assure that the affected structures will continue to perform their intended function. These actions may include increased visual inspections or other examination techniques.		
37	Groundwater samples will be taken at multiple locations around the site every three months for at least 24 consecutive months. The samples will analyze for pH, sulfates, and chlorides. This sampling plan will begin no later than September 2012.	B2.1.32	September 2012 CR 11-20856-1