

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

January 26, 2012
NOC-AE-12002789
10 CFR 54
STI: 33273341
File: G25

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Transmittal of Errata Associated with the
South Texas Project License Renewal Application (TAC Nos. ME4936 and ME4937)

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

By the referenced correspondence, STP Nuclear Operating Company (STPNOC) submitted a License Renewal Application (LRA) for South Texas Project (STP) Units 1 and 2. Subsequent to the application, STPNOC transmitted several letters responding to NRC requests for additional information that resulted in revision to the LRA. STPNOC reviewed these transmittals and identified some errors. This letter is submitted to correct the errors.

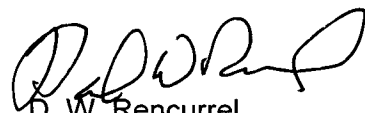
The enclosure to this letter provides the errata. Corrections to LRA are depicted in line-in/line-out pages in the enclosure.

There are no regulatory commitments provided in this letter.

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 1/26/2012
Date


D. W. Rencurrel
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KJT

Enclosure: Errata and Corrections to the STPNOC License Renewal Application

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Enclosure

Errata and Corrections to the STPNOC License Renewal Application

Reference	Affected LRA Section	Reason for Correction
NOC-AE-11002742 ML11335A131	Table 3.1.2-1	The Aging Effect Requiring Management for Component Type "RVI Neutron Shield Panel" is revised from "Reactor Coolant (Ext)" to "Cracking". The intention of the table revision was to indicate "cracking".
NOC-AE-11002742 ML11335A131	Table 3.3.2-2	The notes from the original LRA Table 3.3.2-1 were incorrectly transferred to the referenced letter Table 3.3.2-2. The correct notes from the original LRA Table 3.2.2-2 are reinserted and the note added in the referenced letter as note 3 is renumbered as note 5.
NOC-AE-11002742 ML11335A131	Table 3.3.2-19	Plant Specific Note "3" inserted originally in the referenced letter is renumbered to note "4". Two letters, NOC-AE-11002742 and NOC-AE-11002758 (ML11335A140), used the same note "3" when revising this table.
NOC-AE-11002742 ML11335A131	Table 3.3.2-21	"Table 1 Item" column for added component type "Flame Arrestor" is revised to "3.2.1.50" instead of "3.3.1.50" that was in the referenced letter.
NOC-AE-11002742 ML11335A131	Table 3.3.2-22	Table is revised to delete Plant Specific Note 2 that was not deleted with deletion of line item in NOC-AE-11002742. This is the only line item in the referenced letter that contains this note. As a result, Plant Specific Notes 3 and 4 are renumbered 2 and 3 respectively, and the Notes column for all affected line items in Table 3.3.2-22 are renumbered, where appropriate.
NOC-AE-11002750 ML11319A026	Table 3.4.2-6	Plant Specific Note "4" in the referenced letter is revised to note "5". Two letters, NOC-AE-11002750 and NOC-AE-11002758 (ML11335A140), used the same note "4".
NOC-AE-11002759 ML11334A047	Table 3.5.2-7	First line of Table for Component type "Concrete Elements" is "lined-in" as a new line item to the Table as it should have been indicated in the referenced letter.
NOC-AE-11002750 ML11319A026	Appendix A1.16	The words "non-destructive examination (NDE)" are reinserted in the Appendix. These words were intended to be depicted as revised wording and underlined. These words are consistent with the original LRA but were inadvertently not included in the previous change to this LRA Section (Ref: NOC-AE-11002681, ML11172A096).

Reference	Affected LRA Section	Reason for Correction
		<p>The word “environmental” is revised to “environment” and the word “effect” is added to improve understanding.</p> <p>The word “period” is depicted as revised wording and underlined. This wording was inadvertently changed to “interval” in the previous change to this LRA Section. The wording is changed back to “period” to match the original LRA.</p>
NOC-AE-11002758 ML11335A140	Appendix B2.1.17	<p>Under the “Program Description” section, the word “10” is changed back to “five”. The change to five years was made in a previous change (Ref: NOC-AE-11002750, ML11319A026) and there was no intention to change back to 10 years in NOC-AE-11002758.</p> <p>In addition, when the change was made in NOC-AE-11002750, Table A4-1 was not revised to reflect that the implementation schedule Item 12 is revised to “During the 5 years prior to the period of extended operation”.</p>
NOC-AE-11002759 ML11334A047	Appendix B3.1	<p>Under the “Program Description” section the title of RIS 2008-30 is reinserted. These words were inadvertently deleted.</p> <p>Under Item (3) of the “Corrective Actions (Element 7)” of the “Enhancement” section, the word “the” is revised to “of”. This editorial error occurred in an earlier change to this Appendix.</p> <p>The remainder of the program description is included. This description was inadvertently not included in NOC-AE-11002759. Although the description that was not included is not depicted as a change, it is the intention that whenever an aging management program is revised that the entire program description be included with the change.</p>
NOC-AE-11002750	Table A4-1, Item #12	Item 12 is revised to “During the 5 years prior to the period of extended operation” to be consistent with the change made to Appendix B2.1.17.
NOC-AE-11002772	Table A4-1, Item # 20	The redundant words “power cables” under the second bullet in the Commitment column are deleted.
NOC-AE-11002772	Table A4-1, Item # 25	The word “prior” to is corrected to “period” in the 6 th bullet in the Commitment column

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Lower Core Support-Energy Absorber Assembly	SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.B2-24	3.1.1.30	E, 5
RVI Neutron Shield Panel	SLD	Stainless Steel	Reactor Coolant (Ext)	Reactor Coolant (Ext) Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.B2-8	3.1.1.30	E, 5
RVI Radial Support Keys and Clevis Inserts	SS	Nickel Alloys	Reactor Coolant (Ext)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.B2-20	3.1.1.37	E, 7

Table 3.3.2-2 Auxiliary Systems – Summary of Aging Management Evaluation – Spent Fuel Pool Cooling and Cleanup System
(Continued)

Piping	DF, LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.A3-10	3.3.1.90	E, 3, 4
Piping	DF, LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	None	None	H, 3, 5
Pump	LBS, PB, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A

Notes for Table 3.3.2-2:

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
- C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.
- G Environment not in NUREG-1801 for this component and material.
- H Aging effect not in NUREG-1801 for this component, material and environment combination.

Plant Specific Notes:

- 1 Loss of preload is conservatively considered to be applicable for all closure bolting.
- 2 Reduction in heat transfer due to fouling is a potential aging effect/mechanism for stainless steel heat exchanger components in treated borated water. This non-NUREG-1801 line is based upon the component, material, aging effects and aging management program combination of NUREG-1801, line V.A-16.
- 3 The One-Time Inspection program (B2.1.16) verifies the effectiveness of the Water Chemistry program (B2.1.2) in managing the aging of stainless steel components exposed to treated borated water.
- 4 The Water Chemistry program (B2.1.2) and the One-Time Inspection program (B2.1.16) manage loss of material due to pitting and crevice corrosion and cracking due to stress corrosion cracking. The One-Time Inspection program (B2.1.16) includes selected components at susceptible locations.
- 5 Wall thinning due to erosion-corrosion is managed by the Flow-Accelerated Corrosion program (B2.1.6).

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
Heat Exchanger (CVCS Seal Water Return)	PB	Stainless Steel	Treated Borated Water (Ext)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 2
Heat Exchanger (CVCS Seal Water Return)	HT, PB	Stainless Steel	Treated Borated Water (Int)	Reduction of heat transfer	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	None	None	H, 34
Heat Exchanger (CVCS Seal Water Return)	HT, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-5	3.3.1.08	E, 2

Plant Specific Notes:

- 1 NUREG-1801 does not address the aging effect of nickel-alloys in borated water leakage. Nickel-alloys subject to an air with borated water leakage environment are similar to stainless steel in a borated water leakage environment and do not experience aging effects due to borated water leakage.
- 2 The Water Chemistry program (B2.1.2) and the One-Time Inspection program (B2.1.16) manage loss of material due to pitting and crevice corrosion and cracking due to stress corrosion cracking. The One-Time Inspection program (B2.1.16) includes selected components at susceptible locations.
- 3 Non-inhibited copper alloy > 15% zinc SSCs with surfaces exposed to ventilation atmosphere (internal) or plant indoor air (internal) are subject to wetting due to condensation and thus are subject to loss of material due to selective leaching.
- 4 The reduction of heat transfer aging effect is not identified in NUREG-1801 for this component, material, and environment combination. Reduction of heat transfer is not expected in heat exchangers with reactor coolant or treated borated water environments as long as water chemistry is maintained. Reduction of heat transfer is managed with Water Chemistry (B2.1.2) and One Time Inspection (B2.1.16).

Table 3.3.2-21 Auxiliary Systems – Summary of Aging Management Evaluation – Nonsafety-related Diesel Generators and Auxiliary Fuel Oil System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Flame Arrestor	PB	Aluminum	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-1	3.3.1.32	B
Flame Arrestor	PB	Aluminum	Plant Indoor Air (Ext)	None	None	V.F-2	3.3.1.50 3.2.1.50	A
Flame Arrestor	PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-10	3.3.1.20	D

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
Attemperator	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
Attemperator	LBS	Carbon Steel	Steam (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-16	3.4.1.02	A
Attemperator	LBS	Carbon Steel	Steam (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.A-17	3.4.1.29	B
Closure Bolting	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	IV.C2-8	3.1.1.52	B
Closure Bolting	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	PB, LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Closure Bolting	LBS	Stainless Steel	Borated Water Leakage (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	IV.C2-8	3.1.1.52	B
Closure Bolting	LBS, SIA	Stainless Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	H, 1
Filter	LBS, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Filter	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, 32

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Flow Element	LBS, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Flow Element	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
Flow Element	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Flow Element	LBS	Stainless Steel	Steam (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-10	3.4.1.39	E, 43
Flow Element	LBS	Stainless Steel	Steam (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-12	3.4.1.37	E, 43
Flow Element	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, 43
Flow Element	LBS, SIA	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, 43
Heat Exchanger (RCDT Heat Exchanger)	LBS, SIA	Carbon Steel	Borated Water Leakage	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (RCDT Heat Exchanger)	LBS, SIA	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-1	3.3.1.48	B
Heat Exchanger (RCDT Heat Exchanger)	LBS, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchanger (RCDT Heat Exchanger)	LBS, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Heat Exchanger (RCDT Heat Exchanger)	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, 43
Heat Exchanger (RCDT Heat Exchanger)	LBS, SIA	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, 43
Orifice	LBS, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Orifice	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
Orifice	LBS, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Orifice	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, 32
Orifice	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, 43
Orifice	LBS, SIA	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, 43
Piping	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-14	3.3.1.47	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping	LBS	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	A
Piping	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
Piping	LBS	Carbon Steel	Plant Indoor Air (Int)	Cumulative fatigue damage	Time-Limited Aging Analysis evaluated for the period of extended operation	VII.E1-18	3.3.1.02	A
Piping	LBS	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	V.A-19	3.2.1.32	B
Piping	LBS	Carbon Steel	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-19	3.3.1.76	E, 32
Piping	LBS	Carbon Steel	Secondary Water (Int)	Cumulative fatigue damage	Time-Limited Aging Analysis evaluated for the period of extended operation	VII.E1-16	3.3.1.02	A
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	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	A
Piping	LBS	Carbon Steel	Steam (Int)	Cumulative fatigue damage	Time-Limited Aging Analysis evaluated for the period of extended operation	VIII.B1-10	3.4.1.01	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping	LBS	Carbon Steel	Steam (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-16	3.4.1.02	A
Piping	LBS	Carbon Steel	Steam (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.A-17	3.4.1.29	B
Piping	LBS, PB, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Piping	LBS, SIA	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
Piping	PB, SIA, SS	Stainless Steel	Dry Gas (Int)	None	None	VII.J-19	3.3.1.97	A
Piping	LBS, PB, SIA, SS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Piping	LBS, SIA	Stainless Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	V.A-26	3.2.1.08	E
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, 32
Piping	LBS, PB, 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, 43
Piping	LBS, PB, SIA	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, 43
Piping	LBS	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping	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, 32
Pump	LBS	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	A
Pump	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
Pump	LBS	Cast Iron (Gray Cast Iron)	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	A
Pump	LBS	Cast Iron (Gray Cast Iron)	Demineralized Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.E1.14	3.3.1.85	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B
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, 32
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
Pump	LBS, SIA	Stainless Steel Cast Austenitic	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Pump	SIA	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Pump	SIA	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, <u>32</u>
Pump	LBS, SIA	Stainless Steel Cast Austenitic	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, <u>43</u>
Pump	LBS, SIA	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, <u>43</u>
Sample Vessel	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Sample Vessel	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, <u>32</u>
Sight Gauge	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
Sight Gauge	LBS	Carbon Steel	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-19	3.3.1.76	E, <u>32</u>
Sight Gauge	LBS	Glass	Demineralized Water (Int)	None	None	VII.J-13	3.3.1.93	A
Sight Gauge	LBS	Glass	Plant Indoor Air (Ext)	None	None	VII.J-8	3.3.1.93	A
Sight Gauge	LBS	Glass	Raw Water (Int)	None	None	VII.J-11	3.3.1.93	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Sight Gauge	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
Sight Gauge	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Strainer	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
Strainer	LBS	Carbon Steel	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-19	3.3.1.76	E, 32
Strainer	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
Strainer	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Tank	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Tank	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
Tank	LBS	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	V.A-19	3.2.1.32	B
Tank	LBS	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	A
Tank	LBS, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Tank	SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	C

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
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	A
Tank	LBS, SIA	Stainless Steel	Dry Gas (Int)	None	None	VII.J-19	3.3.1.97	A
Tank	LBS, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Tank	LBS, SIA	Stainless Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	V.A-26	3.2.1.08	E
Tank	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, 32
Tank	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, 43
Tank	LBS, SIA	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, 43
Thermowell	LBS, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Thermowell	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Thermowell	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, 32
Thermowell	LBS	Stainless Steel	Steam (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-10	3.4.1.39	E, 43

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Thermowell	LBS	Stainless Steel	Steam (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-12	3.4.1.37	E, 43
Thermowell	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, 43
Thermowell	LBS, SIA	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, 43
Tubing	LBS, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Tubing	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
Tubing	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Tubing	LBS	Stainless Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	V.A-26	3.2.1.08	E
Tubing	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, 32
Tubing	LBS	Stainless Steel	Steam (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-10	3.4.1.39	E, 43
Tubing	LBS	Stainless Steel	Steam (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-12	3.4.1.37	E, 43
Tubing	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, 43

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Tubing	LBS, SIA	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, 43
Valve	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-14	3.3.1.47	B
Valve	LBS	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	A
Valve	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
Valve	LBS	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	V.A-19	3.2.1.32	B
Valve	LBS	Carbon Steel	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-19	3.3.1.76	E, 32
Valve	LBS	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	A
Valve	LBS	Carbon Steel	Steam (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-16	3.4.1.02	A
Valve	LBS	Carbon Steel	Steam (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.A-17	3.4.1.29	B
Valve	LBS	Copper Alloy	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-5	3.4.1.15	A
Valve	LBS	Copper Alloy	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	LBS	Copper Alloy	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-9	3.3.1.81	E, 32
Valve	LBS	Copper Alloy	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-5	3.4.1.15	A
Valve	LBS, PB, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	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, PB, SIA	Stainless Steel	Dry Gas (Int)	None	None	VII.J-19	3.3.1.97	A
Valve	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	LBS, SIA	Stainless Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	V.A-26	3.2.1.08	E
Valve	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, 32
Valve	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
Valve	LBS	Stainless Steel	Steam (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-10	3.4.1.39	E, 43

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

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	Steam (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-12	3.4.1.37	E, 43
Valve	LBS, PB, 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, 43
Valve	LBS, PB, SIA	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, 43
Valve	LBS, PB, SIA	Stainless Steel Cast Austenitic	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Valve	LBS, SIA	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	LBS	Stainless Steel Cast Austenitic	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	V.A-26	3.2.1.08	E
Valve	LBS, SIA	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, 32
Valve	LBS, PB, SIA	Stainless Steel Cast Austenitic	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, 43
Valve	LBS, PB, SIA	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, 43

Notes for Table 3.3.2-22:

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.
- C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.
- G Environment not in NUREG-1801 for this component and material.
- H Aging effect not in NUREG-1801 for this component, material and environment combination.

Plant Specific Notes:

- 1 Loss of preload is conservatively considered to be applicable for all closure bolting.
- ~~2~~ ~~Operating experience does not suggest there is any aging effect, and the use of stainless steel up to 200°F and 50 weight-percent NaOH is common in industrial applications with no special consideration for aging. There is no NUREG-1801 line that covers NaOH environment.~~
- ~~3~~2 The component environment is miscellaneous radioactive waste drains that have been evaluated as a raw water environment. Loss of material on internal component surfaces exposed to a mixed waste water environment classified as raw water is managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22) instead of Open-Cycle Cooling Water System (B2.1.9).
- ~~4~~3 The Water Chemistry program (B2.1.2) and the One-Time Inspection program (B2.1.16) manage loss of material due to pitting and crevice corrosion and cracking due to stress corrosion cracking. The One-Time Inspection program (B2.1.16) includes selected components at susceptible locations.

Table 3.4.2-6 Steam and Power Conversion System – Summary of Aging Management Evaluation – Auxiliary Feedwater System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Tank	PB	Stainless Steel	Atmosphere/ Weather (Ext)	None	None	None	None	G
Tank	PB	Stainless Steel	Concrete (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G, 45
Tank	PB	Stainless Steel	Dry Gas (Int)	None	None	VIII.I-12	3.4.1.44	A

Plant Specific Notes:

- 1 Loss of preload is conservatively considered to be applicable for all closure bolting.
- 2 Non-inhibited copper alloy >15% zinc SSCs with surfaces exposed to ventilation atmosphere (internal) or plant indoor air (internal) are subject to wetting due to condensation and thus are subject to loss of material due to selective leaching.
- 3 The Water Chemistry program (B2.1.2) and the One-Time Inspection program (B2.1.16) manage loss of material due to pitting and crevice corrosion and cracking due to stress corrosion cracking. The One-Time Inspection program (B2.1.16) includes selected components at susceptible locations.
- 4 These items are assigned the environment of Atmosphere/ Weather (Internal). The items are vented or open to the outside atmosphere so the distinction between internal and external is not relevant for aging purposes. These stainless steel components are located outside with an uncontrolled external air environment and are not exposed to aggressive chemical species. The STP plant outdoor environment is not subject to industry air pollution or saline environment. Alternate wetting and drying has shown a tendency to "wash" the surface material rather than concentrate contaminants. Stainless steel does not experience any appreciable aging effects in this environment.
- 5 A visual inspection of the external surface of the bottom of tanks sitting directly on soil or concrete cannot be performed. A volumetric examination from the inside of the bottom of the tank is performed in lieu of an external inspection.

Table 3.5.2-7 *Containments, Structures, and Component Supports – Summary of Aging Management Evaluation – Electrical Foundations and Structures (Continued)*

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Concrete Elements	FLB, SH, SS	Concrete	Buried (Structural) (Ext)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)	Structures Monitoring Program (B2.1.32)	III.A.3-5	3.5.1.31	A
Concrete Elements	FB, MB, SH, SPB, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Cracking due to expansion	Structures Monitoring Program (B2.1.32)	III.A3-2	3.5.1.27	A
Concrete Elements	SH, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Cracking, loss of bond, and loss of material (spalling, scaling)	Structures Monitoring Program (B2.1.32)	III.A3-9	3.5.1.23	A

A1.16 One-Time Inspection

The One-Time Inspection program conducts one-time inspections of plant system piping and components to verify the effectiveness of the Water Chemistry program (A1.2), Fuel Oil Chemistry program (A1.14), and Lubricating Oil Analysis program (A1.23). The aging effects to be evaluated by the One-Time Inspection program are loss of material, cracking, and reduction of heat transfer. The One-Time Inspection program determines non-destructive examination (NDE) sample sizes based on the population of components in a group sharing the same material, environment and aging effects. For each population, a representative sample size of 20 percent of the population is selected up to a maximum of 25 components. The components making up the sample are those determined to be most susceptible to degradation based on a review of environment, condition and operating experience. The program will focus on bounding or lead components most susceptible to aging due to time in service and severity of operating conditions. Inspections will be performed using a variety of NDE methods, including visual, volumetric, and surface techniques by qualified inspectors. The program will not be used for component inspections with known age-related degradation mechanisms, or when the environment in the period of extended operation is not equivalent to that in the prior 40 years. The One-Time Inspection program specifies corrective actions if aging effects are found. The corrective action program may specify follow-up inspections for confirmation of aging effects at the same or different locations. If aging effects are detected, a plant-specific program will be developed for the material, environmental, and aging effect combination that produced the aging effects.

This new program will be implemented and completed within the 10 year interval period prior to the period of extended operation. Industry and plant-specific operating experience will be evaluated in the development and implementation of this program.

B2.1.17 Selective Leaching of Materials

Program Description

The Selective Leaching of Materials program manages the loss of material due to selective leaching for copper alloys with greater than 15 percent zinc and gray cast iron components exposed to treated water, raw water, and groundwater (buried) within the scope of license renewal.

The Selective Leaching of Materials program is a new program which includes a one-time inspection of a sample of components made from gray cast iron and copper alloys with greater than 15 percent zinc. Sample selection criteria will focus on bounding or lead components most susceptible to aging due to time in service, severity of operating conditions, and lowest design margin. The program procedure provides for visual and mechanical inspections for each system/material/environment combination and for follow-up engineering evaluation in the event that graphitization of gray cast iron or dezincification of copper alloys with greater than 15 percent zinc components is detected. Sample sizes for selective leaching are based on 20 percent of the material/environment group population to a maximum of 25 components. If buried gray cast iron valves are removed from the fire protection system, then at least one of them will be evaluated to determine the extent of selective leaching of the valve. The plant-specific Selective Leaching of Aluminum Bronze program (B2.1.37) covers aluminum bronze components. Inspection of buried components subject to selective leaching is covered in Buried Piping and Tanks Inspection (B2.1.18).

The Selective Leaching of Materials program will be implemented during the ~~40~~five years prior to the period of extended operation.

NUREG-1801 Consistency

The Selective Leaching of Materials program is a new program that, when implemented, will be consistent, with exception to NUREG-1801, Section XI.M33, Selective Leaching of Materials.

Exceptions to NUREG-1801

Program Elements Affected:

Scope of Program (Element 1)

NUREG-1801, Section XI.M33 states that the Selective Leaching of Materials program should include bronze or aluminum bronze components that may be exposed to a raw water, treated water, or groundwater environment. Aluminum bronze is not managed by the Selective Leaching of Materials program. STP currently has a plant specific Selective Leaching of Aluminum Bronze program (B2.1.37), which covers these aluminum bronze components.

Scope of Program (Element 1), Parameters Monitored or Inspected (Element 3), and Detection of Aging Effects (Element 4)

NUREG-1801, Section XI.M33 recommends hardness testing of sample components in addition to visual inspections. However, a qualitative determination of selective leaching is used in lieu of Brinell hardness testing for components within the scope of the STP Selective Leaching of Materials program. The exception involves the use of examinations, other than Brinell hardness testing, identified in NUREG-1801 to identify the presence of selective leaching of materials. The exception is justified; because (1) hardness testing may not be feasible for most

components due to form and configuration and (2) other mechanical means (e.g., scraping, or chipping) provide an equally valid means of identification.

Additionally, hardness testing only provides definitive results if baseline values are available for comparison purposes. Specific material contents for copper alloys may not be known and gray cast irons may not have published hardness numbers. Without specific numbers for comparison, hardness testing would yield unusable results. In lieu of hardness testing, visual and mechanical inspections will be performed on a sampling of components constructed of copper alloys with greater than 15 percent zinc and gray cast iron from various station system environments. Follow-up examinations or evaluations are performed on component material samples where indications of dezincification, de-alloying, or graphitization are visually detected and additional analysis, as part of the engineering evaluation, is required. The engineering evaluation may require confirmation with a metallurgical evaluation (which may include a microstructure examination).

NUREG 1801, Section XI.M33 requires visual inspection and hardness measurement of materials susceptible to selective leaching. This is consistent with the strategy in the Buried Piping and Tanks Inspection program (B2.1.18) for managing loss of material in buried fire protection piping.

Enhancements

None

Operating Experience

To date, there have been no reported cases of loss of material attributable to graphitization or dezincification.

Through-wall cracks have been identified in essential cooling water system piping initiated by pre-existing weld defects and propagated by a de-alloying phenomenon. The flaws evaluated appeared in welds with backing rings. STP has analyzed the effects of the cracking and found that the degradation is slow so that rapid or catastrophic failure is not a consideration and determined that the leakage can be detected before the flaw reaches a limiting size that would affect the intended function of the essential cooling water system. A monitoring and inspection program provides confidence in the ability to detect the leakage. In order to identify and evaluate future leaks, the accessible large bore piping welds with backing rings are visually inspected every six months for evidence of leakage. A walk down of the yard above buried essential cooling water system pipe is performed every six months for evidence of soil changes that may indicate pressure boundary leakage. The most susceptible components are cast aluminum bronze fittings (flanges and tees) with backing ring welds. A special VT-2 visual examination of the system is performed every six months to identify new de-alloying locations. An operability review and an NRC relief request are performed for all through-wall leaks in piping larger than one-inch in diameter. The long-term strategy for essential cooling water system piping de-alloying is to replace fittings when through-wall de-alloying is discovered. This strategy is acceptable based on the very slow degradation mechanism coupled with the preservation of structural integrity and is consistent with the EPRI Service Water Piping Guideline. These ongoing activities are detailed in the Selective Leaching of Aluminum Bronze program (B2.1.37) and are examples of where selective leaching was detected and plant procedures and inspection activities were implemented to ensure that the intended functions of the essential cooling water system are maintained.

As additional industry and plant-specific applicable operating experience becomes available, it will be evaluated and incorporated into the program through the STP condition reporting and operating experience programs.

Conclusion

The implementation of the Selective Leaching of Materials program will provide 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.

B3.1 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, consistent with RIS 2008-30, *Fatigue Analysis of Nuclear Power Plant Components* 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.

Monitoring and Trending (Element 5)

STP will perform a review of design basis ASME Class 1 component fatigue evaluations to determine whether the NUREG/CR-6260-based components that have been evaluated for the effects of the reactor coolant environment on fatigue usage are the limiting components for the STP configuration. If more limiting components are identified, the most limiting component will be evaluated for the effects of the reactor coolant environment on fatigue usage. If the limiting location consists of nickel alloy, the methodology for nickel alloy in NUREG/CR-6909 will be used to perform the environmentally-assisted fatigue calculation.

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 high energy line break (HELB) locations are maintained.

2) Evaluation of remaining margins on CUF.

3) Review of the fatigue crack growth and stability analyses which 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.

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) Repair the component.

2) 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.

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

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.

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
12	Implement the Selective Leaching of Materials program as described in LRA Section B2.1.17.	B2.1.17	During the 40 <u>five</u> years prior to the period of extended operation
20	<p>Enhance the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program procedures to:</p> <ul style="list-style-type: none"> • identify the cables, manholes, and trenches that are within the scope of the program, • require all in-scope non-EQ inaccessible medium and low voltage power cables (>400 volts) power cables exposed to significant moisture be tested at least once every six years with the first test being completed prior to period of extended operation, • require that the acceptance criteria be defined prior to each test for the specific type of test performed and the specific cable tested, • require an engineering evaluation that considers the age and operating environment of the cable be performed when the test acceptance criteria are not met. The engineering evaluation shall consider the significance of the test or inspection results, the operability of the component, the reportability of the event, the extent of the concern, the potential root causes for not meeting the test or inspection acceptance criteria, the corrective actions required, and the likelihood of recurrence. • inspect in-scope manholes and trenches based on plant-specific operating experience with water accumulation, • require inspections be conducted at least annually, • event-driven inspections of in-scope manholes will be performed as an on-demand activity based on actual plant experience, • perform direct observation that cables are not wetted or submerged, • remove collected water and verification of sump pump operability, • initiate a corrective action if wetted cables or inoperable sump pumps are found, 	B2.1.25	<p>Prior to the period of extended operation</p> <p>CR 10-23275-1</p>

Table A4-1 License Renewal Commitments

Item #	Commitment	LRA Section	Implementation Schedule
	<ul style="list-style-type: none"> inspect cables/splices and cable support structures if wetted cables are found, take corrective actions to keep cables dry, manhole inspection results are evaluated based on actual plant experience with the inspection frequency increased based on experience with water accumulation. testing of in-scope inaccessible medium and low voltage (>400 volts) power cables exposed to significant moisture using a test capable of detecting reduced insulation resistance, trend inspection and test results to provide additional information on the rate of cable insulation degradation, test frequency may be adjusted based on test results or operating experience, require that the acceptance criterion for manhole and trench be cables/splices and support structures is that they are not submerged or immersed in water, and require an extent of condition when an unacceptable condition or situation is identified. 		
25	<p>Enhance the Structures Monitoring Program procedures to:</p> <ul style="list-style-type: none"> include the switchyard control building into the scope of the Structures Monitoring Program, 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: <ul style="list-style-type: none"> 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. specify inspector qualifications in accordance with ACI 349.3R-96, require the performance of a periodic visual inspection of the accessible sections 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 period of extended operation, 	B2.1.32	<p>Prior to the period of extended operation</p> <p>CR 10-23600-1</p>

Table A4-1 License Renewal Commitments

Item #	Commitment	LRA Section	Implementation Schedule
	<ul style="list-style-type: none"> • specify ACI 349.3R-96 and ACI 201.1R-68 as the basis for defining quantitative acceptance criteria, and • 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. • specify that visual examinations will be augmented with volumetric examinations, in accordance with ASME Code Section XI, Table IVB-2500-1, Examination Category B-G-1, to detect SCC for 20 percent (25 bolts maximum) of high strength bolts greater than 1-inch nominal diameter and with an actual yield strength greater than or equal to 150 ksi. 		