Nuclear Operating Company

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

November 21, 2011
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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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11555 Rockville Pike
Rockville, MD 20852-2746

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Response to Requests for Additional Information (Set 5) for 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. NRC letter dated October 11, 2011, "Requests for Additional Information for the Review of the South Texas Project, Units 1 and 2 License Renewal Application – Aging Management Review, Set 5 (TAC Nos. ME4936 and ME4937)" (ML112440201)

By Reference 1, STP Nuclear Operating Company (STPNOC) submitted a License Renewal Application (LRA) for South Texas Project (STP) Units 1 and 2. By Reference 2, the NRC staff requests additional information for review of the STP LRA. STPNOC's response to the request for additional information is provided in Enclosure 1 to this letter. Changes to LRA pages described in Enclosure 1 are depicted in line-in/line-out pages provided in Enclosure 2.

Revised regulatory commitments are contained in Table A4-1 in Enclosure 3 to this letter. There are no other regulatory commitments 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 11/21/2011
Date

D. W. Rencurrel
Senior Vice President,
Technical Support & Oversight

PLW

Enclosure:
1. STPNOC Response to Requests for Additional Information
2. STP LRA Changes with line-in/line-out annotations
3. Revised Regulatory Commitments

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NRR

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Enclosure 1

STPNOC Response to Requests for Additional Information

Set 5

STPNOC Response to Requests for Additional Information

SOUTH TEXAS PROJECT, UNITS 1 AND 2
REQUESTS FOR ADDITIONAL INFORMATION -
AGING MANAGEMENT REVIEW SET 5
(TAC NOS. ME4936 AND ME4937)

Metal Fatigue (035)
RAI B3.1-1a (Follow-up)

Background:

In its response to Request for Additional Information (RAI) B3.1-1 dated September 15, 2011, STP Nuclear Operating Company (STPNOC or the applicant) stated that corrective actions will include repair of the component, replacement of the component, or a more rigorous analysis of the component. The applicant also stated that License Renewal Application (LRA) Appendix B3.1 and Table A4-1 Commitment No. 30 will be revised to clarify the corrective actions to be invoked.

Issue:

The applicant did not revise the Updated Final Safety Analysis Report (UFSAR) Supplement in LRA Section A2.1 reflecting the aforementioned corrective actions. The applicant also did not provide the revised LRA Appendix B3.1 and Table A4-1 Commitment No. 30 indicating the changes. The U.S. Nuclear Regulatory Commission (NRC or the staff) cannot determine the acceptability of the changes without reviewing the proposed revision.

Request:

- Revise LRA Section A2.1 to describe the corrective actions to be invoked if a component approaches a cycle counting action limit and a fatigue usage action limit. Or justify that the UFSAR supplement in LRA Section A2.1 provides sufficient information that the corrective actions include repair of the component, replacement of the component, or a more rigorous analysis for the component.

- Provide the proposed revision of LRA Appendix B3.1 and Table A4-1 Commitment No. 30 consistent with the changes discussed in the response to RAI B3.1-1.

STPNOC Response:

- LRA Section A2.1 will be revised to describe the corrective actions to be invoked if a component approaches a cycle counting action limit and a fatigue usage action limit as fatigue reanalysis, repair, or replacement.

  Enclosure 2 provides line-in/line-out revision to LRA Section A2.1.

- The revision to LRA Appendix B3.1 is provided in STP Letter NOC-AE-11002750.

- LRA Table A4-1 Commitment No. 30 will be revised consistent with the changes made in LRA section A2.1 where the corrective actions to be invoked if a component approaches a cycle counting action limit and a fatigue usage action limit as fatigue reanalysis, repair, or replacement.

  Enclosure 3 provides line-in/line-out revision to LRA Table A4-1 Commitment 30.

RAI B3.1-3a (Follow-up)

Background:

In its response to RAI B31-3 dated September 15, 2011, the applicant stated that the UFSAR will be updated in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 54.29 to identify those transients used in the leak before breaking (LBB) analyses. The applicant also stated that LRA Appendix B3.1 will be revised to reflect the enhancements to Element 1, Scope of Program and Element 7, Corrective Actions.

Issue:

The applicant did not provide the revised UFSAR Supplement in LRA Section A2.1. It is not clear to the staff why the transients used in the LBB analyses should be the only information to be included in the UFSAR Supplement. The staff noted that the corrective actions for LBB analyses, which are different from those of fatigue analyses, and other relevant information regarding the use of cycle-counting activities for LBB analyses, should also be included in the UFSAR Supplement. The applicant also did not provide the revised LRA Appendix B3.1 and the staff cannot determine the acceptability of the changes without reviewing the proposed revision. Furthermore, the applicant did not revise Table A4-1 Commitment No. 30 consistent with the changes to the enhancements in LRA Appendix B3.1. It is also not clear to the staff whether the plant's cycle-counting procedure will be updated regarding the use of cycle-counting activities for LBB analyses.

Request:

- Provide the UFSAR Supplement regarding the use of cycle-counting activities to ensure the fatigue crack growth analyses for LBB remain valid and associated corrective actions to be invoked if a component approaches the cycle-counting action limit.

- Confirm that the changes to the plant's cycle-counting procedure are consistent with the response to RAI B3.1-3 regarding the use of cycle-counting activities to ensure the fatigue crack growth analyses for LBB remain valid and associated corrective actions to be invoked if a component approaches the cycle-counting action limit. If not, justify why the changes are not needed.

- Provide the proposed revision of LRA Appendix B3.1. Revise Table A4-1 Commitment No. 30 consistent with the changes to the enhancements discussed in the response to RAI B3.1-3, or justify that the Table A4-1 Commitment No. 30 provides sufficient information regarding the use of cycle-counting activities to ensure the fatigue crack growth analyses for LBB remain valid

STPNOC Response:

- LRA Section A2.1 will be revised to state:

  If a cycle count or cumulative usage factor value increases to a program action limit, corrective actions include fatigue reanalysis, repair, or replacement. Any re-analysis of a fatigue crack growth analysis will be consistent with or reconciled to the originally submitted analysis and will receive the same level of regulatory review as the original analysis. Action limits permit completion of corrective actions before the design basis number of events is exceeded.

  Enclosure 2 provides line-in/line-out revision to LRA Section A2.1.

- The changes to the plant's cycle-counting procedure will be made consistent with enhancements provided in response to RAI B3.1-3, regarding the use of cycle-counting activities to ensure the fatigue crack growth analyses for LBB, remain valid and associated corrective actions to be invoked if a component approaches the cycle-counting action limit.

- The revision to LRA Appendix B3.1 was provided in NOC-AE-11002750.

- LRA Table A4-1 Commitment No. 30 will be revised consistent with the changes made in LRA section A2.1 where the corrective actions to be invoked if a component approaches a cycle counting action limit and a fatigue usage action limit as fatigue reanalysis, repair, or replacement..

  Enclosure 3 provides line in/line out revision to LRA Table A4-1 Commitment 30.

RAI B3.1-5a (Follow-up)

Background:

In its response to RAI B3.1-5 dated September 15, 2011, the applicant added a new commitment (Commitment No. 34) in LRA Table A4-1 indicating that it will perform a review of design basis ASME Class 1 component fatigue evaluations to determine whether additional components may be more limiting than the components identified in NUREG/CR-6260.

Issue:

The staff noted that the applicant's new commitment will be implemented as part of its Metal Fatigue of Reactor Coolant Pressure Boundary Program. However, the applicant did not include this as an enhancement to its program in LRA Appendix B3.1. The applicant also did not revise the UFSAR Supplement in LRA Section A2.1.

Request:

Revise LRA Appendix B3.1 and the UFSAR Supplement in LRA Section A2.1 consistent with the additional commitment discussed in the response to RAI B3.1-5.

STPNOC Response:

LRA Section A2.1, Appendix B3.1 and LRA Basis Document AMP X.M1 (B3.1) will be revised consistent with the commitment discussed in the response to RAI B3.1-5 to perform a review of design-basis ASME Class 1 component fatigue evaluations to determine whether the NUREG/CR-6260 locations are limiting.

Enclosure 2 provides line-in/line-out revision to LRA Section A2.1, Appendix B3.1.

Electrical Scoping and Screening
RAI 2.5-2a (Follow-up), Components within the scope of license renewal- SSO

Background:

In request for additional information (RAI) 2.5-2 dated March 17, 2011, the staff requested the applicant to provide justification for why the control circuits and structures associated with the switchyard circuit breakers used to supply the Station Blackout (SBO) recovery paths are not within the scope of license renewal. In letter dated May 5, 2011, (ADAMS Accession No. ML11130A026) the applicant stated that the control circuits are not required for SBO recovery because the switchyard circuit breakers used to supply the SBO recovery paths remain in closed position when offsite power is interrupted and that they contain stored energy in order to be operated without the use of control circuits.

Issue:

During telephone discussions with the staff, on July 19, 2011, the licensee stated that the South Texas Project has a unique switchyard configuration in its design with regards to SBO. The licensee stated that the breakers can be manually closed locally without the need of any control circuits. Section 2.5.2.1 1, "Components Within the Scope of SBO (10 CFR 50.63)" of NUREG-1800, "Final Report - Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (December 2010)," identifies the control circuits associated with the switchyard circuit breakers as being part of the equipment that should be included within the SBO restoration equipment scope irrespective of manual or remote mode of operation. Based on this information, the staff finds that the control circuits associated with SBO restoration equipment (i.e., switchyard circuit breakers) needs to be within the scope of license renewal.

Request:

Based on the above, supplement the application to include the control circuits associated with the switchyard circuit breakers used to supply SBO recovery paths as being within the scope of license renewal.

STPNOC Response:

LRA Section 2.1.2.3.5, Station Blackout, states, "... the switchyard breakers and switchyard breaker control cables and connections are within the scope of license renewal". The control cable aging is managed by aging management program B2.1.24, Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements. Connections are managed as part of aging management program B2.1.36, Electrical Cable Connections Not Subject to 10

CFR 50.49 Environmental Qualification Requirements. The control cables are included in LRA Table 3.6.2-1 component type Insulated Cable and Connections. The connections are included in LRA Table 3.6.2-1 component type Cable Connections (Metallic Part).

LRA Section 2.4.7, Tables 2.4-7 and 3.5.2-7, Appendix B2.1.32 and LRA AMP Bases Document XI.S6, Structures Monitoring program, will be revised to clarify that the Switchyard Control building is part of the Electrical Foundations and Structures. The aging of the Switchyard Control building associated with the switchyard circuit breakers will be managed by aging management program B2.1.32, Structures Monitoring Program.

Enclosure 2 provides line-in/line-out revision to LRA Sections 2.4.7, Tables 2.4-7 and 3.5.2-7, and Appendix B2.1.32.

Enclosure 3 provides line-in/line-out revision to LRA Table A4-1 Commitment No. 25.

Enclosure 2

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

List of Revised LRA Sections

RAI Number	Affected LRA Section	Reason for Change
RAI B3.1-1a (Follow-up)	Section A2.1	Revised to describe the corrective actions to be invoked if a component approaches a cycle counting action limit and a fatigue usage action limit as fatigue reanalysis, repair, or replacement.
RAI B3.1-3a (Follow-up)	Section A2.1	Revised to include commitment to update the UFSAR to identify those transients used in the leak before breaking (LBB) analyses. Also revised LRA Appendix to reflect enhancements to Element 1and Element 7.
RAI B3.1-5a (Follow-up)	Section A2.1 Appendix B3.1	Revised to add commitment to perform a review of design basis ASME Class 1 component fatigue evaluations to determine whether additional components may be more limiting than the components identified in NUREG/CR-6260.
RAI 2.5-2a (Follow-up)	Section 2.4.7 Table 2.4-7 Table3.5.2-7 Appendix B2.1.32	Revised to include support SSC's within the scope of License Renewal Aging Management.

A2.1 METAL FATIGUE OF REACTOR COOLANT PRESSURE BOUNDARY

The Metal Fatigue of Reactor Coolant Pressure Boundary program manages fatigue cracking caused by anticipated cyclic strains in metal components of the reactor coolant pressure boundary. 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 program tracks the number of transient cycles and cumulative fatigue usage at monitored locations. The program will also consider the effects of the reactor water environment for a set that includes the NUREG/CR-6260 sample locations for a newer-vintage Westinghouse Plant, and plant-specific bounding EAF locations. If a cycle count or cumulative usage factor value increases to a program action limit, corrective actions include fatigue reanalysis, repair, or replacement ~~will be initiated to evaluate the design limits and determine appropriate specific corrective actions~~. Any re-analysis of a fatigue crack growth analysis will be consistent with or reconciled to the originally submitted analysis and will receive the same level of regulatory review as the original analysis. Action limits permit completion of corrective actions before the design basis number of events is exceeded.

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, 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 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.

2.4.7 Electrical Foundations and Structures

Structure Description

The foundations for the main, auxiliary, and standby transformers are reinforced concrete pads founded on undisturbed soil and/or engineered structural backfill. All oil-filled transformers are provided with pits to catch any transformer oil which may be released due to a leak or rupture.

Outdoor switchgear, in the 345 kV switchyard, and all equipment from the main and standby transformers up to the first circuit breakers in the 345 kV switchyard, are supported on reinforced concrete pads founded on undisturbed soil and/or engineered structural backfill.

The switchyard control building is a single story metal-sided structure with a sheet metal roof. The building is supported by a reinforced concrete foundation on structural backfill. The switchyard control building houses equipment required by SBO requirements.

All of the transmission towers up to the first circuit breakers in the 345 kV switchyard are steel towers. The transmission towers are founded on reinforced concrete bases supported on undisturbed soil and/or engineered structural backfill.

The Class 1E underground electrical raceway system provides electrical distribution from the MEAB to the essential cooling water intake structure. The raceway system consists of banks of PVC conduits in a spaced arrangement encased in reinforced concrete. Manholes are provided along these duct banks for cable installation and access.

The main and auxiliary transformers are separated by concrete fire barrier walls.

Structure Intended Function

The Class 1E underground electrical raceway system provides structural support and shelter/protection of components relied upon to provide the capability to shutdown the reactor and maintain it in a safe shutdown condition. Therefore, it is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1).

The concrete pads for the main transformers, auxiliary transformers, standby transformers, the concrete pads for the outdoor switchgear, the switchyard control building, and concrete bases for the transmission towers, provide structural support for SSCs required for station blackout recovery. The concrete fire barrier walls separating the main and auxiliary transformers provide spatial separation and fire barriers to meet the requirements for fire protection. The concrete duct banks and manholes provide structural support, shelter and protection for SSCs required for fire protection. Therefore, they are within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(3).

Table 2.4-7 Electrical Foundations and Structures

Component Type	Intended Function
Caulking and Sealant	Flood Barrier Shelter, Protection
Compressible Joints and Seals	Expansion/Separation
Concrete Elements	Fire Barrier Flood Barrier Missile Barrier Shelter, Protection Structural Pressure Boundary Structural Support
Doors	Shelter, Protection
Duct Banks and Manholes	Shelter, Protection Structural Support
Metal Siding	Shelter, Protection
Structural Steel	Structural Support
Transmission Tower	Structural Support

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Caulking and Sealant	FLB, SH	Elastomer	Atmosphere/ Weather (Structural) (Ext)	Loss of sealing	Structures Monitoring Program (B2.1.32)	III.A6-12	3.5.1.44	A
Caulking and Sealant	FLB, SH	Elastomer	Buried (Structural) (Ext)	Loss of sealing	Structures Monitoring Program (B2.1.32)	III.A6-12	3.5.1.44	A
Caulking and Sealant	FLB, SH	Elastomer	Plant Indoor Air (Structural) (Ext)	Loss of sealing	Structures Monitoring Program (B2.1.32)	III.A6-12	3.5.1.44	A
Compressible Joints and Seals	ES	Elastomer	Buried (Structural) (Ext)	Loss of sealing	Structures Monitoring Program (B2.1.32)	III.A6-12	3.5.1.44	A
Compressible Joints and Seals	ES	Elastomer	Encased in Concrete (Ext)	Loss of sealing	Structures Monitoring Program (B2.1.32)	III.A6-12	3.5.1.44	A
Concrete Elements	FB, MB, SH, SPB, SS	Concrete	Atmosphere/ Weather (Structural) (Ext)	Cracking due to expansion	Structures Monitoring Program (B2.1.32)	III.A3-2	3.5.1.27	A
Concrete Elements	FB, MB, SH, SPB, SS	Concrete	Atmosphere/ Weather (Structural) (Ext)	Loss of material (spalling, scaling) and cracking	Structures Monitoring Program (B2.1.32)	III.A3-6	3.5.1.26	A
Concrete Elements	FB, MB, SH, SPB, SS	Concrete	Atmosphere/ Weather (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

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	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
Concrete Elements	SH, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)	Structures Monitoring Program (B2.1.32)	III.A3-10	3.5.1.24	A
Doors	SH	Carbon Steel	Atmosphere/ Weather (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.A3-12	3.5.1.25	A
Doors	SH	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.A3-12	3.5.1.25	A
Duct Banks and Manholes	SH, SS	Concrete	Atmosphere/ Weather (Structural) (Ext)	Cracking due to expansion	Structures Monitoring Program (B2.1.32)	III.A3-2	3.5.1.27	A
Duct Banks and Manholes	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

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
Duct Banks and Manholes	SH, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)	Structures Monitoring Program (B2.1.32)	III.A3-10	3.5.1.24	A
Metal Siding	SH	Carbon Steel	Atmosphere/ Weather (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.A3-12	3.5.1.25	A
Metal Siding	SH	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.A3-12	3.5.1.25	A
Structural Steel	SS	Carbon Steel	Atmosphere/ Weather (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.A3-12	3.5.1.25	A
Structural Steel	SS	Carbon Steel	Encased in Concrete (Ext)	None	None	VII.J-21	3.3.1.96	C
Structural Steel	SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.A3-12	3.5.1.25	A
Transmission Tower	SS	Carbon Steel	Atmosphere/ Weather (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.A3-12	3.5.1.25	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:

Scope of Program (Element 1)

Procedures will be enhanced to include the switchyard control building into the scope of the Structures Monitoring Program.

Parameters Monitored or Inspected (Element 3)

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.

Detection of Aging Effects (Element 4)

Procedures will be enhanced to specify inspection intervals so that all accessible areas of both units are inspected every ten years.

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

Enclosure 3

Revised Regulatory Commitments

Table A4-1 License Renewal Commitments

Item #	Commitment	LRA Section	Implementation Schedule
25	Enhance the Structures Monitoring Program procedures to: • 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: 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 • 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 technique	B2.1.32	Prior to the period of extended operation

Item #	Commitment	LRA Section	Implementation Schedule
30	Enhance the Metal Fatigue of Reactor Coolant Pressure Boundary program procedures to: • include additional locations necessary to ensure accurate calculations of fatigue, • include additional transients that contribute significantly to fatigue usage, • include counting of the transients used in the fatigue crack growth analyses, which support the leak-before-break analyses and ASME Section XI evaluations to ensure the analyses remain valid, • include additional transients necessary to ensure accurate calculations of fatigue, fatigue usage monitoring at specified locations, and 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, • 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. The acceptance criteria associated with the NUREG/CR-6260 sample locations for a newer vintage Westinghouse plant will account for environmental effects on fatigue, and • include appropriate corrective actions to be invoked if a component approaches a cycle count action limit or a fatigue usage action limit. Acceptable corrective actions include fatigue reanalysis, repair, or replacement ~~or augmented inspections~~. 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.	B3.1	Prior to the period of extended operation