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July 30, 2009

L-PI-09-086
10 CFR 54

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

Prairie Island Nuclear Generating Plant Units 1 and 2
Dockets 50-282 and 50-306
License Nos. DPR-42 and DPR-60

NSPM Comments on NRC Safety Evaluation Report With Open Items Related to Renewal of Operating Licenses

By letter dated April 11, 2008, Northern States Power Company, a Minnesota Corporation, (NSPM) submitted an Application for Renewed Operating Licenses (LRA) for the Prairie Island Nuclear Generating Plant (PINGP) Units 1 and 2. In a letter dated June 4, 2009, the NRC issued its Safety Evaluation Report With Open Items Related to the License Renewal of Prairie Island Nuclear Generating Plant Units 1 and 2. This letter provides the NSPM comments on the Safety Evaluation Report.

If there are any questions or if additional information is needed, please contact Mr. Eugene Eckholt, License Renewal Project Manager.

Summary of Commitments

This letter contains no new commitments or changes to existing commitments.

For M. Wadley

Michael D. Wadley
Site Vice President, Prairie Island Nuclear Generating Plant Units 1 and 2
Northern States Power Company - Minnesota

Enclosure (1)

cc:
Administrator, Region III, USNRC
License Renewal Project Manager, Prairie Island, USNRC
Resident Inspector, Prairie Island, USNRC
Prairie Island Indian Community ATTN: Phil Mahowald
Minnesota Department of Commerce

A193
NRR

Enclosure 1

NSPM Comments on NRC Safety Evaluation Report With Open Items Related to the License Renewal of Prairie Island Nuclear Generating Plant Units 1 and 2

170 Pages Follow

Safety Evaluation Report

With Open Items Related to the License Renewal of Prairie Island Nuclear Generating Plant Units 1 and 2

Docket Nos. 50-282 and 50-306

Northern States Power Company, a Minnesota Corporation (NSPM)

United States Nuclear Regulatory Commission

Office of Nuclear Reactor Regulation

June 2009

Summary of Comments on Microsoft Word - SER No Track Edits 6-4-09.doc

Page: 1

Sequence number: 1
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Note: The page numbers shown on the following comment sheets are the page numbers from the pdf file of the SER.

ABSTRACT

This safety evaluation report (SER) documents the technical review of the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2, license renewal application (LRA) by the United States (US) Nuclear Regulatory Commission (NRC) staff (the staff). By letter dated April 11, 2008, Nuclear Management Company, LLC, (NMC or the applicant) submitted the LRA in accordance with Title 10, Part 54, of the Code of Federal Regulations, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." NMC requests renewal of the Units 1 and 2 operating licenses (Facility Operating License Numbers DPR-42 and DPR-60, respectively) for a period of 20 years beyond the current expirations at midnight August 9, 2013, for Unit 1, and at midnight October 29, 2014, for Unit 2.

PINGP is located within the city limits of the City of Red Wing, Minnesota on the West bank of the Mississippi River in southeastern Minnesota. The NRC issued the construction permits for Units 1 and 2 on June 25, 1968. The NRC issued the operating licenses for Unit 1 on August 9, 1973, and on October 29, 1974, for Unit 2. Units 1 and 2 employ a two-loop pressurized water reactor design with a dry ambient containment. Westinghouse Electric Corporation supplied the nuclear steam supply system and 1 uor Pioneer originally designed the balance of the plant, and Northern States Power constructed the plant. The licensed power output of each unit is 1650 megawatt thermal with a gross electrical output of approximately 575 megawatt electric.

This SER presents the status of the staff's review of information submitted through May 8, 2009, the cutoff date for consideration in the SER. The staff identified 3 open items that must be resolved before any final determination on the LRA is reached by the staff on the LRA. SER Section 1.5 summarizes these items. The staff will present its final conclusion on its LRA review in an update to this SER.

Page: 3

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T Should state Pioneer Service & Engineering Company. See USAR Section 1.1.1 or 1.4 for principal contractors.

SECTION 1

INTRODUCTION AND GENERAL DISCUSSION

1.1 Introduction

This document is a safety evaluation report (SER) on the license renewal application (LRA) for Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2, as filed by Nuclear Management Company, LLC, (NMC or the applicant). By letter dated April 11, 2008, NMC submitted its application to the US Nuclear Regulatory Commission (NRC) for renewal of PINGP operating licenses for an additional 20 years. The NRC staff (the staff) prepared this report to summarize the results of its safety review of the LRA for compliance with Title 10, Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," of the *Code of Federal Regulations* (10 CFR Part 54). The NRC project manager for the license renewal review is Richard Plasse. Mr. Plasse may be contacted by telephone at 301-415-1427 or by electronic mail at richard.plasse@nrc.gov. Alternatively, written correspondence may be sent to the following address:

US Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of License Renewal
Washington, D.C. 20555-0001
Attention: Richard Plasse, Mail Stop O11-F1

By letter dated September 15, 2008, the Commission issued an Order approving transfer of operating authority of Facility Operating License No. DPR-42 and DPR-60, from Nuclear Management Company, LLC, (NMC) to Northern States Power Company, a Minnesota Corporation (NSPM), for PINGP, Units 1 and 2. For the purposes of the SER, the use of the term "applicant" refers to NMC up to September 15, 2008, and to NSPM on and after September 15, 2008.

In its April 11, 2008, submission letter, the applicant requested renewal of the operating licenses issued under Section 104b (Operating License Nos. DPR-42 and DPR-60) of the Atomic Energy Act of 1954, as amended, for Units 1 and 2 for a period of 20 years beyond the current expirations at midnight August 9, 2013, for Unit 1, and at midnight October 29, 2014, for Unit 2. Prairie Island is located approximately 18 miles southeast of Minneapolis, Minnesota. The NRC issued the construction permits for Units 1 and 2 on June 25, 1968. The NRC issued the operating licenses for Unit 1 on August 9,1973, and on October 29,1974, for Unit 2. Units 1 and 2 employ a pressurized water reactor design with a dry ambient containment. Westinghouse Electric Corporation supplied the nuclear steam supply system and 2 uor Pioneer originally designed the balance of the plant, and Northern States Power constructed the plant. The licensed power output of each unit is 1650 megawatt thermal with a gross electrical output of approximately 575 megawatt electric. The updated final safety analysis report (UFSAR) contains details of the plant and the site.

Page: 22

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See the Environmental Report Section 2.1 for general location information. Plant is approximately 39 miles from Minneapolis and 32 miles from St. Paul.

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Should state Pioneer Service & Engineering Company. See USAR Section 1.1.1 or 1.4 for principal contractors.

The license renewal process consists of two concurrent reviews, a technical review of safety issues and an environmental review. The NRC regulations in 10 CFR Part 54 and 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," respectively, set forth requirements for these reviews. The safety review for the PINGP license renewal is based on the applicant's LRA and on its responses to the staff's requests for additional information. The applicant supplemented the LRA and provided clarifications through its responses to the staff's RAIs in audits, meetings, and docketed correspondence. Unless otherwise noted, the staff reviewed and considered information submitted through May 8, 2009. The staff reviewed information received after that date depending on the stage of the safety review and the volume and complexity of the information. The public may view the LRA and all pertinent information and materials, at the NRC Public Document Room, located on the first floor of One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738 (301-415-4737 / 800-397-4209), and the Red Wing Public Library, 225 East Avenue, Red Wing, MN 55066. In addition, the public may find the LRA, as well as materials related to the license renewal review, on the NRC Web site at http://www.nrc.gov.

This SER summarizes the results of the staff's safety review of the LRA and describes the technical details considered in evaluating the safety aspects of the units' proposed operation for an additional 20 years beyond the term of the current operating licenses. The staff reviewed the LRA in accordance with NRC regulations and the guidance in NUREG-1800, Revision 1, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR), dated September 2005.

SER Sections 2 through 4 address the staff's evaluation of license renewal issues considered during the review of the application. SER Section 5 is reserved for the report of the Advisory Committee on Reactor Safeguards (ACRS). The conclusions of this SER are in Section 6.

SER Appendix A is a table showing the applicant's commitments for renewal of the operating licenses. SER Appendix B is a chronology of the principal correspondence between the staff and the applicant regarding the LRA review. SER Appendix C is a list of principal contributors to the SER and Appendix D is a bibliography of the references in support of the staff's review.

In accordance with 10 CFR Part 51, the staff will prepare a draft plant-specific supplement to NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS)." This supplement discusses the environmental considerations for license renewals for Units 1 and 2. The staff is scheduled to issue the draft, plant-specific GEIS Supplement in July 2009. The final, plant-specific GEIS Supplement is scheduled to be issued in January 2010.

1.2 License Renewal Background

Pursuant to the Atomic Energy Act of 1954, as amended, and NRC regulations, operating licenses for commercial power reactors are issued for 40 years and can be renewed for up to 20 additional years. The original 40-year license term was selected based on economic and antitrust considerations rather than on technical limitations; however, some individual plant and equipment designs may have been engineered for an expected 40-year service life.

In 1982, the staff anticipated interest in license renewal and held a workshop on nuclear power plant aging. This workshop led the NRC to establish a comprehensive program plan for nuclear

Page: 23

Sequence number: 1
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The Red Wing Library only has the LRA. Highlighted wording should be stated in a separate sentence from the PDR information

apply to all nuclear power plants and are codified in Appendix B, "Environmental Effect of Renewing the Operating License of a Nuclear Power Plant," to Subpart A, "National Environmental Policy Act - Regulations Implementing Section 102(2)," of 10 CFR Part 51. Pursuant to 10 CFR 51.53(c)(3)(i), a license renewal applicant may incorporate these generic findings in its environmental report. In accordance with 10 CFR 51.53(c)(3)(ii), an environmental report also must include analyses of environmental impacts that must be evaluated on a plant-specific basis (i.e., Category 2 issues).

In accordance with the National Environmental Policy Act of 1969 and 10 CFR Part 51, the staff reviewed the plant-specific environmental impacts of license renewal, including whether there was new and significant information not considered in the GEIS. As part of its scoping process, the staff held a public meeting on July 30, 2008 at the Red Wing Public Library, 225 East Avenue, Red Wing, Minnesota, to identify plant-specific environmental issues. The draft, plant-specific GEIS Supplement will document the results of the environmental review and make a preliminary recommendation as to the license renewal action. The staff will hold another public meeting in August, 2009 to discuss the draft, plant-specific GEIS Supplement. After considering comments on the draft, the staff will publish the final, plant-specific GEIS Supplement separately from this report.

1.3 Principal Review Matters

Part 54 of 10 CFR describes the requirements for renewal of operating licenses for nuclear power plants. The staff's technical review of the LRA was in accordance with NRC guidance and 10 CFR Part 54 requirements. Section 54.29, "Standards for Issuance of a Renewed License," of 10 CFR sets forth the license renewal standards. This SER describes the results of the staff's safety review.

Pursuant to 10 CFR 54.19(a), the NRC requires a license renewal applicant to submit general information, which the applicant provided in LRA Section 1. The staff reviewed LRA Section 1 and finds that the applicant has submitted the required information.

Pursuant to 10 CFR 54.19(b), the NRC requires that the LRA include "conforming changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewed license." On this issue, the applicant stated in the LRA:

[1]MC requests that conforming changes be made to indemnity agreement No. B-60 for the Prairie Island Nuclear Generating Plant Units 1 and 2, as required, to ensure that the indemnity agreement continues to apply during both the terms of the current licenses and the terms of the renewed licenses. [2]MC understands that no changes may be necessary for this purpose if the current operating license numbers are retained."

The staff intends to maintain the original license numbers upon issuance of the renewed licenses, if approved. Therefore, conforming changes to the indemnity agreement need not be made and the 10 CFR 54.19(b) requirements have been met.

Pursuant to 10 CFR 54.21, "Contents of Application - Technical Information," the NRC requires that the LRA contain (a) an integrated plant assessment, (b) a description of any CLB changes during the staff's review of the LRA, (c) an evaluation of TLAAs, and (d) an FSAR supplement. LRA Sections 3 and 4 and Appendix B address the license renewal requirements of

Page: 26

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The letter dated 4/13/09 revised LRA Section 1.3.8 to change NMC to NSPM..

Thus, the components of the radioactive waste gas system are designed to and relied upon to prevent potential offsite exposures. These components function as a pressure boundary to prevent a rupture that could release the contents of the waste gas decay tanks. The postulated rupture of a waste gas decay tank has been evaluated as a design basis event in the Prairie Island UFSAR.

1 The offsite dose consequences of the gas decay tank rupture are comparable to those referred to in 10 CFR 100.11 in the sense that the calculated offsite exposures for all design basis accidents are compared to limits derived from those specified in 10 CFR 50.67(b)(2) or 10 CFR 100.11. Although the potential offsite dose consequences may be a small fraction of those referenced in 10 CFR 100.11, the comparison remains necessary to confirm the acceptability of the plant design. This contrasts with the offsite consequences of other routine operational events (e.g., effluent releases) that are compared to limits derived from other regulations.

Thus, the staff determined that the waste gas decay tanks should be included within the scope of license renewal in accordance with 10 CFR 54.4(a)(1)(iii). This is **SER Open Item 2.1.4.1.2-01**.

OI 3.0.3.1.21-1: (SER Section 3.0.3.1.21 – PWR Vessel Internals Program)

The staff received the applicant's amended plant-specific PWR Vessel Internals Program and the associated changes to LRA Commitment No. 25 in a letter dated May 12, 2009. Due to its recent submittal, the staff has not yet had time to review the new, plant-specific program elements for the applicant's AMP against the recommendations and criteria for AMP program elements that are defined in SRP-LR, Appendix A.1, Section A.1.2.3. However, since the acceptability of the PWR Vessel Internals Program is pending the results of the staff's review of the AMP's program elements, the staff's acceptance of the PWR Vessel Internals Program remains open. This is **SER Open Item 3.0.3.1.21-1, Part 1**.

The staff verified that the applicant's UFSAR Supplement includes Commitment No. 25 that was issued on the PWR Vessel Internals Program and that was revised in the applicant's letter of 2 ay 12, 2009. Due to its recent submittal, the staff has not yet had time to review the changes that were made to LRA Commitment No. 25. However, since the acceptability of the PWR Vessel Internals Program is pending the staff's review of the revisions to LRA Commitment No. 25, the staff's acceptance of LRA Appendix A2.32 and of LRA Commitment No. 25 remains open. This is **SER Open Item 3.0.3.1.21-1, Part 2**.

OI 3.0.3.2.17-1: (SER Section 3.0.3.2.17 – Structures Monitoring Program)

During the audit, the staff discovered an ongoing issue with water seepage from the refueling cavity into the containment sumps. In RAI B2.1.38-2 dated November 5, 2008, the staff requested the applicant provide information regarding the root cause analysis of the seepage, as well as corrective and preventive actions taken to correct the problem. In the LRA, this seepage issue is tracked under the Structures Monitoring Program, but the staff believes that it also applies to the IWE program due to the possibility of borated water coming into contact with the containment vessel.

By letter dated December 5, 2008, the applicant responded to RAI B2.1.38-2. The applicant stated that the condition was detected by the ASME Section XI, Subsection IWE Program while

Page: 29

Sequence number: 1
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T It is recommended that this paragraph be revised as discussed below.

This paragraph is based on a nonstandard definition of "comparable" and conflicts with a position taken previously by the NRC. As written, it implies that the act of comparing to 10 CFR 100, not the result, is what determines whether a component is or is not in scope of license renewal. This means that there could be no threshold value for event-caused off-site exposures that define the boundary between in scope and out of scope components, and by logical extension, safety-related and non safety-related as defined in 10 CFR 50. In the NRC's Denial of Petition for Rule Making related to license renewal scoping of liquid and gaseous radwaste systems (66 FR 65141), the NRC stated the position that the consequences of a catastrophic failure of liquid or gaseous radwaste components are well below the scoping threshold for license renewal and that the consequences of any failure are a small fraction of the 10 CFR part 100 limits used in the scoping criteria of license renewal (clearly indicating there is a threshold). Therefore the Commission agreed that the liquid and gaseous radwaste system components were not within the scope of license renewal under criterion a(1).

The PINGP WGDTs are classified as safety-related based on plant-specific criteria. Therefore, it is requested that this paragraph be revised to simply state, "The staff concluded that the plant-specific classification of the Waste Gas Decay Tanks as safety-related outweighed any question of whether a failure of a tank would meet any threshold of comparability to 10 CFR 100.11. Thus, the staff determined ...".

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T The wording of Commitment 25 was further revised in NSPM letter dated June 24, 2009.

examining the Class MC pressure retaining vessel. Both the Structures Monitoring Program and the ASME Section XI, Subsection IWE Program took corrective actions to address the leakage. In addition, the applicant provided information during a public meeting on March 2, 2009. The staff reviewed the information provided in both the RAI response and during the public meeting, and discovered that borated water was coming into contact with the containment vessel during refueling outages. Due to the leakage path of borated water along the bottom of the containment vessel, the staff determined that there is a possibility that portions of the containment vessel may remain wetted after refueling outages. By letter dated March 31, 2009, the staff issued follow-up RAI B2.1.38 asking the applicant to discuss its plan for assessing the current condition of the steel containment vessel and to explain how the IWE program, or a plant-specific program, will manage aging of the vessel, especially in inaccessible regions, during the period of extended operation. By letter dated April 6, 2009, the applicant responded to follow-up RAI B2.1.38. The staff is currently reviewing the response, and this is **SER Open Item 3.0.3.2.17-1**.

1.6 Summary of Confirmatory Items

As a result of its review of the LRA, including additional information submitted through May 08, 2009, the staff determines that no confirmatory items exist which would require a formal response from the applicant.

1.7 Summary of Proposed License Conditions

Following the staff's review of the LRA, including subsequent information and clarifications from the applicant, the staff identified three proposed license conditions.

The first license condition requires the applicant to include the UFSAR supplement required by 10 CFR 54.21(d) in the first UFSAR update required by 10 CFR 50.71(e) following the issuance of the renewed licenses.

The second license condition requires future activities described in the UFSAR supplement to be completed prior to the period of extended operation.

The third license condition requires that all capsules in the reactor vessel that are removed and tested meet the requirements of American Society for Testing and Materials (ASTM) E 185-82 to the extent practicable for the configuration of the specimens in the capsule. Any changes to the capsule withdrawal schedule, including spare capsules, must be approved by the staff prior to implementation. All capsules placed in storage must be maintained for future insertion. Any changes to storage requirements must be approved by the staff, as required by 10 CFR Part 50, Appendix H.

Page: 30

Sequence number: 1
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Additional information was also provided in NSPM letter dated June 24, 2009 in response to a follow-up question issued in NRC letter dated June 10, 2009

the applicant's methodology for identifying systems and structures is consistent with the SRP-LR and 10 CFR 54.4(a)(1), and therefore, is acceptable. The open item will be addressed in a subsequent SER.

2.1.4.2 Application of the Scoping Criteria in 10 CFR 54.4(a)(2)

2.1.4.2.1 Summary of Technical Information in the Application

LRA Section 2.1.2.4.2, "Scoping Criterion 2 - Non-Safety Related Affecting Safety-Related," states:

> 1SCs meeting Scoping Criterion 2 for PINGP are included in one of the following three categories:
>
> - The plant's Current Licensing Basis (CLB). The PINGP CLB was used to identify nonsafety-related SSCs that have the potential to prevent satisfactory accomplishment of safety related SSC intended functions, and therefore are within the scope of license renewal for 10 CFR 54.4(a)(2).
> - Non-safety related SSCs directly connected to safety related SSCs (typically piping systems) up to and including the first seismic or equivalent anchor past the safety/non-safety interface are within the scope of license renewal for 10 CFR 54.4(a)(2).
> - Non-safety related SSCs that are not directly connected to safety related SSCs, or are connected downstream of the first seismic or equivalent anchor past the safety/non-safety interface, but have a potential spatial interaction such that their failure could adversely impact the performance of a safety related SSC intended function, are within the scope of license renewal for 10 CFR 54.4(a)(2).
>
> SSCs meeting scoping Criterion 2 in the first two categories were identified during document reviews including the UFSAR, plant drawings, design documents, piping analyses, plant equipment database, and other CLB documents. SSCs in the third category were identified by both document reviews and plant walkdowns to identify possible spatial interactions meeting the broader criteria established for license renewal.

LRA Section 2.1.2.4.2 states in relation to nonsafety-related SSCs directly connected to safety-related SSCs:

> For nonsafety-related SSCs directly connected to safety related SSCs (typically piping and duct systems), the non-safety piping and supports, up to and including the first seismic or equivalent anchor beyond the safety/non-safety interface, are within the scope of license renewal per 10 CFR 54.4(a)(2). As an alternative to specifically identifying a seismic anchor or series of equivalent anchors, a bounding approach was typically used, which includes enough of the non-safety

Page: 43

Sequence number: 1
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General comment about all quotes from the Prairie Island LRA or docketed letters throughout entire SER:

It is not always possible to tell whether wording is intended to be a quote of another document or a paraphrased summary. Quotation marks are generally not used on indented material even though it appears to be intended as a direct quote. As a result, there are numerous instances where it appears that material identified as a quote of a licensee document has been revised such that it is no longer a direct quote. Either the quoted material should be an exact quote, changes to each quote should be shown (typical convention is to show changes in brackets), or the material should not be shown as a quote.

This comment applies to all licensee material in the SER that is identified as a quote by indenting or quotation marks.

replacement based on a qualified life or specified time period (long-lived) and that the remaining passive, long-lived components were determined to be subject to an AMR.

The staff checked to see whether if the screening methodology outlined in the LRA and implementing procedures were appropriately implemented and if the scoping results were consistent with CLB requirements. During the scoping and screening methodology audit, the staff reviewed selected screening reports to verify proper implementation of the screening process. Based on these onsite review activities, the staff did not identify any discrepancies between the methodology documented and the implementation results.

2.1.5.4.3 Conclusion

On the basis of its review of the LRA, implementing procedures, plant drawings, and a sample of the results of the screening methodology, the staff concludes that the applicant's methodology for identification of electrical components within the scope of license renewal and subject to an AMR is in accordance with the requirements of 10 CFR 54.21(a)(1) and, therefore, is acceptable.

2.1.5.5 Screening Methodology Conclusion

On the basis of a review of the LRA, the screening implementing procedures, and a sample review of screening results, the staff concludes that the applicant's screening methodology was consistent with the guidance contained in the SRP-LR and identified those passive, long-lived components within the scope of license renewal that are subject to an AMR. The staff concludes that the applicant's methodology is consistent with the requirements of 10 CFR 54.21(a)(1) and therefore is acceptable.

2.1.6 Summary of Evaluation Findings

On the basis of its review of the information presented in LRA Section 2.1, the supporting information in the scoping and screening implementing procedures and reports, the information presented during the scoping and screening methodology audit, the staff confirms that the applicant's scoping and screening methodology is consistent with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1). The staff also concludes that the applicant's description and justification of its scoping and screening methodology are adequate to meet the requirements of 10 CFR 54.21(a)(1). From this review, the staff concludes that the applicant's methodology for identifying systems and structures within the scope of license renewal and SCs requiring an AMR is acceptable.

2.2 Plant-Level Scoping Results

2.2.1 Introduction

In LRA Section 2.1, the applicant described the methodology for identifying SSCs within the scope of license renewal. In LRA Section 2.2, the applicant used the scoping methodology to determine which SSCs must be included within the scope of license renewal. The staff reviewed the plant-level scoping results to determine whether the applicant has properly identified [1] systems and structures relied upon to remain functional during DBEs, as required by

Page: 65

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Suggest this state "... all safety-related systems..."

In its December 18, 2008 response, the applicant provided the continuation locations. However, for LRA Section 2.3.3.17 the applicant stated that the boundaries extend up to and include normally closed isolation valves or installed end devices providing a pressure boundary for the system, but did not provide continuations.

The staff requested that an NRC Inspection Team conduct an inspection to verify the applicant's response for selected LRA Section 2.3.3.17 lines. The Inspection Team verified the applicant's response and that all component types within the license renewal boundary are subject to AMR for the selected lines. The full description of this inspection is documented in NRC Inspection Report 05000282/2009006 and 05000306/2009006 dated March 27, 2009.

For LRA sections 2.3.4.5 and 2.3.4.6, the staff located the drawing continuations from the applicant's response; however, several differences in the license renewal scoping criteria between the main drawing and continuation drawings were noted. In a February 26, 2009 letter, the applicant satisfactorily responded to these staff followup questions by clarifying which license renewal scoping criteria was correct.

Based on its review, the staff finds the applicant's response to RAI 2.3-01 acceptable because the applicant provided the continuation locations and clarified which license renewal scoping criteria was correct. An NRC Inspection Team confirmed for those lines where a continuation was not provided that all component types within the license renewal boundary are identified and subject to an AMR. Therefore, the staff's concern described in RAI 2.3-01 is resolved.

In RAI 2.3-02, dated November 19, 2008, the staff noted that during the scoping and screening review process the continuation from one drawing to another was potentially identified, but not definitively established. Accordingly, the staff made certain assumptions regarding continuation from one drawing to another. The staff asked the applicant to confirm the staff assumptions.

In its response, dated December 18, 2008, the applicant provided confirmation that all of the staff assumed continuation locations were correct.

Based on its review, the staff finds the applicant's response to RAI 2.3-02 acceptable because the applicant confirmed the staff assumed drawing continuations were correct. Therefore, the staff's concern described in RAI 2.3-02 is resolved.

In RAI 2.3-03, dated November 19, 2008, the staff noted drawings that show a continuation without the submission of the continuation drawing. The staff asked the applicant to provide the continuation drawings or a corrected continuation.

In its response, dated December 18, 2008, the applicant provided corrected continuation locations. However, for LRA Section 2.3.3.17 the applicant stated that the boundaries extend up to and include normally closed isolation valves or installed end devices providing a pressure boundary for the system. The applicant, however, did not provide continuations.

The staff requested that an NRC Inspection Team conduct an inspection to verify the applicant's response for selected LRA Section 2.3.3.17 lines. The Inspection Team verified the applicant's response and that all component types within the license renewal boundary are identified and

Page: 76

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The RAI response provided the correct continuation locations, but did not specifically confirm that staff assumptions were correct. NSPM can not confirm that these statements about staff assumptions are accurate as written.

are connected to ductwork that is not shown to be within the scope of license renewal. The staff requested the applicant to verify the boundary drawings were correct or to provide justification why the duct sections were not in-scope for license renewal.

In its response, dated January 15, 2009, the applicant stated the ductwork referenced in the RAIs was within the scope of license renewal. The applicant also provided clarification that as an alternative to specifically identifying a seismic anchor or series of equivalent anchors, a bounding approach was used that included enough nonsafety-related ducting to ensure these anchors are included and thereby ensure the ducting and anchor intended functions are maintained.

In RAI 2.3.3.5-02 dated December 16, 2008, the staff noted that in LR Drawing LR39603-1, the applicant marked a fire damper as not within the scope of license renewal, but marked the ductwork on either side of it as in scope. The staff asked the applicant to explain why it did not consider the fire damper to be in scope for license renewal.

In its response, dated January 15, 2009, the applicant stated that the damper was incorrect and that the fire damper was is in-scope of license renewal.

The staff reviewed the applicant's responses for RAIs 2.3.3.5-01, 2.3.3.5-02, and 2.3.3.5-04. The staff finds the applicant's response acceptable based on the clarification that the ductwork and damper in question are in-scope for license renewal. Therefore, the staff's concerns described in RAIs 2.3.3.5-01, 2.3.3.5-02, and 2.3.3.5-04 have been addressed.

In RAI 2.3.3.5-03 dated December 16, 2008, the staff asked the applicant to clarify whether the control room ventilation equipment is within the same protected ventilation zone as the control room and, specifically, whether there are any condensate drains on the air handling units that would be considered to be in scope as barriers to prevent the units from drawing in contaminated air.

In its response, dated January 15, 2009, the applicant identified the continuation drawings for the condensate drawings. The applicant indicated that the drawings incorrectly classified the condensate drains as in-scope under 10 CFR 54.4(a)(1) and that they are actually in-scope under 10 CFR54.4 (a)(2).

The staff reviewed the applicant's response. The applicant considered the equipment drains and any water traps (if installed) in the drain as a potential source of unfiltered in-leakage into the control room envelope. The applicant also considered the spatial interactions between the air-handling units and the floor due to the equipment drains. The applicant's response is acceptable.

In RAIs 2.3.3.5-05, 2.3.3.5-06, and 2.3.3.5-07 dated December 16, 2008, the staff noted that fan housings were classified as out-of-scope, but that adjacent ductwork and cooling coils were classified as in scope under 10 CFR 54.4(a)(2). The staff asked the applicant to confirm that the fan housing were not in-scope and to justify that determination.

In its response, dated January 15, 2009, the applicant stated the fan housings are correctly identified as not in-scope of license renewal. The applicant explained that the adjacent ductwork

Page: 85

Sequence number: 1
Author:
Date: 7/14/2009 11:14:03 AM

The RAI response did not discuss traps or the potential for unfiltered in-leakage. The drain lines are within the scope of license renewal. There are no traps in the drains. The drains are a source of unfiltered leakage.

from the RCS during and following DBEs, including loss of normal feedwater, steam generator tube rupture, main steam or feedwater line break, small break LOCA, and during normal operation, such as startup and shutdown, when the main feedwater system is not available. The AF system for each unit consists of one turbine-driven and one electric-driven pump and the necessary piping, valves and instrumentation. In LRA Table 2.3.4-1, the applicant identifies AF system component types it believes are within the scope of license renewal and subject to an AMR.

2.3.4.1.2 Conclusion

Based on the results of the staff evaluation discussed in Section 2.3 and on a review of the LRA, UFSAR, and applicable boundary drawings, the staff concludes that the applicant has appropriately identified the AF system mechanical components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the system components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

2.3.4.2 Bleed Steam System

2.3.4.2.1 Summary of Technical Information in the Application

LRA Section 2.3.4.2 describes the bleed steam (BL) system. The BL system is a steam and power conversion system that is designed to improve turbine cycle efficiency by using turbine exhaust steam for feedwater heating. The BL system includes the heater vents subsystem. The BL system is an operating system. The BL system for each PINGP unit consists of the necessary piping, valves and instrumentation for supplying turbine exhaust steam to the feedwater heaters for feedwater heating. In LRA Table 2.3.4-2, the applicant identifies BL system component it believes are types within the scope of license renewal and subject to an AMR.

2.3.4.2.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.2, UFSAR Section 11.7, and the license renewal boundary drawings using the evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3. The staff's review identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

In RAI 2.3.4.2-01, dated November 19, 2008, the staff noted drawing LR-39224, locations D-2, and E-2, depicted FW Heaters #15A and #15B as not in-scope for license renewal whereas the corresponding Unit 2 FW Heaters #25A and #25B are shown as in-scope on drawing LR-39225. The staff also noted that the FW heaters are not included in LRA Table 2.3.4-2 Bleed Steam System, as component type subject to an AMR.

In its response, dated December 18, 2008, the applicant stated that the feedwater heaters #15A and 15B are contained within the shell and that their failure will not affect any SR components. The applicant also stated that the shells and channel heads are shown as within the scope of license renewal per 10 CFR 54.4(a)(2). The applicant also explained that the feedwater heaters

Page: 116

Sequence number: 1
Author:
Date: 7/14/2009 11:19:07 AM

Should read, "...#15B tubes are contained ...."

collection 1hd facilities for both units. The radwaste building components such as sumps, dikes, curbs, walls, or vaults are specifically constructed to retain any spilled liquids.

The rectangular steel-framed old administration building with insulated metal siding is part of the original construction and is located adjacent to the north wall of the turbine building with its center portion located immediately above the safety-related reinforced concrete aisle of the turbine building. In order to meet space requirements for offices, storage areas, lockers, etc, a five-story administration building addition with reinforced concrete footings and pier foundations was later constructed. The addition is a U-shaped structure that wraps around the north, east, and west sides of the old administration building.

The applicant identified the radwaste building, old administration building and administration building addition as in-scope of LR based on 10 CFR 54.4(a)(2) criterion since they are located adjacent to the auxiliary and turbine buildings. In LRA Table 2.4.6-1, the applicant identifies the components subject to an AMR for the radwaste building, old administration building, and administration building addition by component type and intended function. In the first column of LRA Table 3.5.2-6, the applicant lists the SCs included within each of the component type groups in LRA Table 2.4.6-1.

2.4.6.2 Conclusion

The staff followed the evaluation methodology discussed in Section 2.4 and reviewed LRA Section 2.4.6, the first three columns of LRA Table 3.5.2-6, LR drawing LR-193817, and UFSAR Sections 1.3.2, 1.3.10, 9.2, and 12.2 to determine whether the applicant failed to identify any SSCs within the scope of license renewal. In addition, the staff's review determined whether the applicant failed to identify any SCs subject to an AMR. On the basis of its review, the staff concludes that the applicant has adequately identified the radwaste building, old administration building, and the administration building addition SCs within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.4.7 Reactor Containment Vessels, Unit 1 and Unit 2

2.4.7.1 Summary of Technical Information in the Application

LRA Section 2.4.7 describes the reactor containment vessels (RCV) for Units 1 and 2, which form the primary containment system. The RCV for each unit is a free-standing, low-leakage steel vessel, including penetrations, isolation systems, and heat removal systems designed to withstand the internal pressure accompanying a loss-of-coolant accident. The RCV consists of steel cylinder walls, a hemispherical dome, and an ellipsoidal bottom. A five-foot wide-annular space between the RCV walls and the shield building walls, and a seven-foot clearance between the top of the vessel and shield building roof dome allows for maintenance and visual inspection of the RCV. The RCV internal structures are, for the most part, conventional reinforced concrete. The concrete forms floor slabs and compartments that support and protect the reactor pressure vessel (RPV) and components associated with engineered safeguards systems, and it provides the primary biological shield for the RPV. The RCV major internal structural components include the reactor/refueling cavity/biological shield wall, the steam generator and pressurizer vaults, the refueling floor, operating floor, the mezzanine floor, and the basement floor. In LRA Table 2.4.7-1, the applicant identifies the components it believes are

Page: 129

Sequence number: 1
Author:
Date: 7/29/2009 7:52:42 AM
Appears to be missing word disposal - "... and disposal facilities ..."

components with intended functions delineated under 10 CFR 54.4(a). The staff also reviewed the licensing basis documents to determine whether the LRA specified all intended functions delineated under 10 CFR 54.4(a). The staff requested additional information to resolve any omissions or discrepancies identified.

After its review of the scoping results, the staff evaluated the applicant's screening results. For those SCs with intended functions, the staff sought to determine whether (1) the functions are performed with moving parts or a change in configuration or properties or (2) the SCs are subject to replacement after a qualified life or specified time period, as described in 10 CFR 54.21(a)(1). For those meeting neither of these criteria, the staff sought to confirm that these SCs were subject to an AMR, as required by 10 CFR 54.21(a)(1). The staff requested additional information to resolve any omissions or discrepancies identified.

2.5.1 Electrical and Instrumentation and Controls Systems

2.5.1.1 Summary of Technical Information in the Application

LRA Section 2.5 describes the electrical and I&C systems. The scoping method includes all plant electrical and I&C components. Evaluation of electrical systems includes electrical and I&C components in mechanical systems. The default inclusion of plant electrical and I&C systems in the scope of license renewal reflects the method for the integrated plant assessments (IPA) of electrical systems. This method is different from those for mechanical systems and structures.

The basic philosophy of the electrical and I&C components IPA is that components are included in the scoping review unless specifically screened out. The electrical and I&C IPA began by grouping all components into commodity groups of similar electrical and I&C components with common characteristics and by determining component level intended functions of the commodity groups.

The IPA eliminated commodity groups and specific plant systems from further review as the intended functions of commodity groups were examined. In addition to the plant electrical systems, certain switchyard components required to restore offsite power following SBO were included conservatively within the scope of license renewal even though those components are not relied on in safety analyses or plant evaluations for functions that demonstrate compliance with the SBO regulations. The offsite power system evaluation boundaries are described next.

The offsite power system provides the electrical interconnection between PINGP and the offsite transmission network. The offsite power sources required to support SBO recovery actions supply the 1o.10 transformer, 1R (161 kV) and 2RS (345 kV) transformers as stated in section 2.5 of the April 11, 2008 LRA, Enclosure 1, of the applicant's letter dated May 16, 2008, and the applicant's letter dated December 11, 2008. Specifically, the applicant stated that 2e offsite power recovery path includes 3e No.10 transformer, transformers 1R (161 kV) and 2RS (345 kV), the 345 kV and 161 kV switchyard circuit breakers supplying 4e No.10 transformer, the 1R and 2RS transformers, the circuit breaker-to-transformer and transformer-to-onsite electrical distribution interconnections, control circuits, and structures.

Page: 139

Sequence number: 1
Author:
Date: 7/15/2009 11:10:43 AM
This should read "... CT-11 (345kV), CT-12 (13.8kV), 1R (161kV) and 2RS (345kV) transformers ..." as indicated in LRA Section 2.5.

Sequence number: 2
Author:
Date: 7/29/2009 7:52:55 AM
Suggest inserting the words License Renewal (... the license renewal offsite power recovery path ...) to make clear that the CLB path for SBO differs from the scoping boundaries established for license renewal purposes. See the letter dated May 16, 2008.

Sequence number: 3
Author:
Date: 7/15/2009 11:17:24 AM
Should list "... the No. 1 Cooling Tower Transformer, the No. 10 ..." to be consistent with the scope defined in the May 16, 2008 letter.

Sequence number: 4
Author:
Date: 7/15/2009 11:17:18 AM
Should list "... the No. 1 Cooling Tower Transformer, the No. 10 ..." to be consistent with the scope defined in the May 16, 2008 letter.

not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

1eneral Design Criterion 17 of 10 CFR Part 50, Appendix A, requires, in part, that electric power from the transmission network to the onsite electric distribution system be supplied by two physically independent circuits to minimize the likelihood of their simultaneous failure. In addition, the staff noted that the guidance provided by letter dated April 1, 2002, "Staff Guidance on Scoping of Equipment Relied on to Meet the Requirements of the Station Blackout Rule (10 CFR 50.63) for License Renewal (10 CFR 54.4(a)(3))," and later incorporated in SRP-LR Section 2.5.2.1.1 states the following:

> For purposes of the license renewal rule, the staff has determined that the plant system portion of the offsite power system that is used to connect the plant to the offsite power source should be included within the scope of the rule. This path typically includes switchyard circuit breakers that connect to the offsite system power transformers (startup transformers), the transformers themselves, the intervening overhead or underground circuits between circuit breaker and transformer and transformer and onsite electrical system, and the associated control circuits and structures. Ensuring that the appropriate offsite power system long-lived passive SSCs that are part of this circuit path are subject to an AMR will assure that the bases underlying the SBO requirements are maintained over the period of extended license.

In its original application dated April 11, 2008, the applicant described the SBO recovery path that was in the scope of license renewal. The applicant initially stated that the SBO recovery path included all the components and connections from offsite power source including switchyard transformers, high side disconnects, conductors, transformers, buses up to the PINGP Units 1 and 2 safeguards buses. In a letter dated May 16, 2008, the applicant 2vised the scope of the SBO recovery path to include all components starting from the transmission line breakers, conductors and connections, up to the safeguard buses in both PINGP Units. The staff finds that the revised scope of 3e SBO recovery path is consistent with the scope of NUREG 1801, Revision 1, and, therefore, is acceptable. In addition, the applicant also revised Section 2.5.10 of the LRA in the May 16, 2008 letter to reflect the revised scope of 4e SBO recovery path. The staff finds that the revision to Section 2.5.10 of the LRA is consistent with NUREG 1801, Revision 1, and, therefore, is acceptable.

During its review of LRA Section 2.5, the staff identified a need for additional information and therefore issued RAI 2.5 dated November 20, 2008, regarding the inclusion of control circuits of the switchyard circuit breakers (at the transmission voltage) in the scope of license renewal.

In its response, dated December 11, 2008, the applicant stated that the control circuits for the switchyard circuit breaker are included in the scope of license renewal as they are part of the SBO recovery path. The staff finds that the applicant's response is consistent with NUREG 1801, Revision 1 and therefore is acceptable.

The staff reviewed Section 2.5 of the LRA and determined that further clarification on LRA Section 2.5.4 was warranted to ensure that scope described in this section is consistent with the scope described in NUREG 1801, Revision 1. The staff discussed this point of clarification with

Page: 141

Sequence number: 1
Author:
Date: 7/18/2009 8:43:47 AM
This generic sentence concerning GDC 17 should be deleted. 10CFR54 does not require the two circuits required by GDC 17 to be in-scope of License Renewal. The SBO rule (10CFR50.63) is the only rule directly relevant to SBO scoping for License Renewal, and should be cited as the basic source requirement that defines the SBO scope in a plant's CLB applicable to License Renewal.

Sequence number: 2
Author:
Date: 7/15/2009 11:42:24 AM
Suggest revising to read, "...SBO recovery path for license renewal purposes to include ...". The May 16, 2008 letter expanded the boundary beyond the CLB SBO recovery path to include additional components to be consistent with draft LR-ISG-2008-01. This expansion was requested by NRC in a conference call on May 15, 2008. These additional components were non-plant transmission system equipment that was outside the CLB scope of SBO recovery equipment.

Sequence number: 3
Author:
Date: 7/15/2009 11:40:54 AM
Suggest changing to "... the license renewal SBO ..." as discussed above.

Sequence number: 4
Author:
Date: 7/15/2009 11:40:30 AM
Suggest changing to "... the license renewal SBO ..." as discussed above.

project personnel and others with technical expertise relevant to aging management. The staff's audit activities are documented in the Audit Report (ADAMS Accession No. ML090850009)

3.0.3 Aging Management Programs

SER Table 3.0.3-1 presents the AMPs credited by the applicant and described in LRA Appendix B. The table also indicates the systems or structures that credit the AMPs and the GALL AMP with which the applicant claimed consistency and shows the section of this SER in which the staff's evaluation of the program is documented.

Table 3.0.3-1 PINGP Aging Management Programs

PINGP AMP (LRA Section)	New or Existing AMP	GALL Report Comparison	GALL Report AMPs	LRA Systems or Structures That Credit the AMP	Staff's SER Section
10 CFR 50, Appendix J (B2.1.1)	Existing	Consistent	XI.S4	structures and component supports	3.0.3.1.1
Aboveground Steel Tanks (B2.1.2)	New	Consistent	XI.M29	1 auxiliary systems / steam and power conversion systems	3.0.3.1.2
ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.3)	Existing	Consistent	XI.M1	2 reactor vessel, internals and reactor coolant system	3.0.3.1.3
ASME Section XI, IWE (B2.1.4)	Existing	Consistent	XI.S1	structures and component supports	3.0.3.1.4
ASME Section XI, IWF (B2.1.5)	Existing	Consistent	XI.S3	structures and component supports	3.0.3.1.5
Bolting Integrity (B2.1.6)	Existing	Consistent with exception and enhancement	XI.M18	reactor vessel, internals and reactor coolant system / engineered safety features systems / auxiliary systems / steam and power conversion systems	3.0.3.2.1
Boric Acid Corrosion (B2.1.7)	Existing	Consistent	XI.M10	reactor vessel, internals and reactor coolant system / engineered safety features systems / auxiliary systems / steam and power conversion systems / structures and component supports	3.0.3.1.6

Page: 149

Sequence number: 1
Author:
Date: 7/14/2009 12:11:40 PM
T Final program applies to Steam and Power Conversion only

Sequence number: 2
Author:
Date: 7/14/2009 12:13:01 PM
T Program also applies to Engineered Safety Features and Auxiliary Systems

PINGP AMP (LRA Section)	New or Existing AMP	GALL Report Comparison	GALL Report AMPs	LRA Systems or Structures That Credit the AMP	Staff's SER Section
Buried Piping and Tanks Inspection (B2.1.8)	New	Consistent	XI.M34	1 gineered safety features systems / auxiliary systems / steam and power conversion systems	3.0.3.1.7
Closed-Cycle Cooling Water System (B2.1.9)	Existing	Consistent with exceptions and enhancement	XI.M21	reactor vessel, internals and reactor coolant system / engineered safety features systems / auxiliary systems	3.0.3.2.2
Compressed Air Monitoring (B2.1.10)	Existing	Consistent with exceptions and enhancements	XI.M24	auxiliary systems	3.0.3.2.3
Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B2.1.11)	New	Consistent with exceptions	XI.E6	electrical and instrumentation and controls	3.0.3.2.4
Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B2.1.12)	New	Consistent	XI.E1	electrical and instrumentation and controls	3.0.3.1.8
Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits (B2.1.13)	New	Consistent	XI.E2	electrical and instrumentation and controls	3.0.3.1.9
External Surface Monitoring (B2.1.14)	Existing	Consistent with enhancements	X.M36	reactor vessel, internals and reactor coolant system / engineered safety features systems / auxiliary systems / steam and power conversion systems / structures and component supports	3.0.3.2.5

Page: 150

Sequence number: 1
Author:
Date: 7/29/2009 7:53:19 AM
T Program only applies to Auxiliary Systems

PINGP AMP (LRA Section)	New or Existing AMP	GALL Report Comparison	GALL Report AMPs	LRA Systems or Structures That Credit the AMP	Staff's SER Section
Fire Protection (B2.1.15)	Existing	Consistent with exception and enhancements	XI.M26	auxiliary systems	3.0.3.2.6
Fire Water System (B2.1.16)	Existing	Consistent with enhancement	XI.M27	auxiliary systems	3.0.3.2.7
Flow-Accelerated Corrosion (B2.1.17)	Existing	Consistent with exception	XI.M17	1actor vessel, internals and reactor coolant system / engineered safety features systems / auxiliary systems / steam and power conversion systems	3.0.3.1.10
Flux Thimble Tube Inspection (B2.1.18)	Existing	Consistent with enhancement	XI.M37	reactor vessel, internals and reactor coolant system	3.0.3.2.8
Fuel Oil Chemistry (B2.1.19)	Existing	Consistent with exception and enhancement	XI.M30	auxiliary systems	3.0.3.2.9
Fuse Holders (B2.1.20)	New	Consistent	XI.E5	electrical and instrumentation and controls	3.0.3.1.11
Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B2.1.21)	New	Consistent	XI.E3	electrical and instrumentation and controls	3.0.3.1.12
Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B21.1.22)	New	Consistent	XI.M38	2actor vessel, internals and reactor coolant system / engineered safety features systems / auxiliary systems / steam and power conversion systems / structures and component supports	3.0.3.1.13
Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.23)	Existing	Consistent with enhancement	XI.M23	structures and component supports	3.0.3.2.10

Page: 151

Sequence number: 1
Author:
Date: 7/14/2009 12:16:02 PM
Program only applies to Auxiliary Systems and Steam and Power Conversion Systems

Sequence number: 2
Author:
Date: 7/14/2009 12:18:57 PM
Program does not apply to Reactor Vessel, Internals and Reactor Coolant System

PINGP AMP (LRA Section)	New or Existing AMP	GALL Report Comparison	GALL Report AMPs	LRA Systems or Structures That Credit the AMP	Staff's SER Section
Lubricating Oil Analysis (B2.1.24)	Existing	Consistent	XI.M39	reactor vessel, internals and reactor coolant system / engineered safety features systems / auxiliary systems / steam and power conversion systems	3.0.3.1.14
Masonry Wall (B2.1.25)	Existing	Consistent	XI.S5	structures and component supports	3.0.3.1.15
Metal-Enclosed Bus (B2.1.26)	New	Consistent	XI.E4	electrical and instrumentation and controls	3.0.3.1.16
Nickel-Alloy Nozzles and Penetrations (B2.1.27)	2ew	1nsistent	XI.M11	reactor vessel, internals and reactor coolant system	3.0.3.1.17 and 3.0.3.3.1
Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors (B2.1.28)	Existing	Consistent 3th enhancement	XI.M11A	reactor vessel, internals and reactor coolant system	3.0.3.2.11
One-Time Inspection (B2.1.29)	New	Consistent	XI.M32	4gineered safety features systems / auxiliary systems / steam and power conversion systems	3.0.3.1.18
One-Time Inspection of ASME Code Class 1 Small-Bore Piping (B2.1.30)	New	Consistent	XI.M35	5actor vessel, internals and reactor coolant system	3.0.3.1.19
Open-Cycle Cooling Water System (B2.31)	Existing	Consistent	XI.M20	6xiliary systems	3.0.3.1.20
Protective Coating Monitoring and Maintenance Program	Existing	Consistent	XI.S8	structures and component supports	3.0.3.1.24
PWR Vessel Internals (B2.1.32)	E8sting	7nsistent	XI.M16	reactor vessel, internals and reactor coolant system	3.0.3.1.21
Reactor Head Closure Studs (B2.1.33)	Existing	Consistent with enhancement	XI.M3	reactor vessel, internals and reactor coolant system	3.0.3.2.12

Page: 152

Sequence number: 1
Author:
Date: 7/29/2009 7:53:32 AM
This is a plant-specific AMP per letter L-PI-09-042 dated 3/27/09

Sequence number: 2
Author:
Date: 7/15/2009 7:33:47 AM
This is an existing AMP per letter L-PI-09-042 dated 3/27/09

Sequence number: 3
Author:
Date: 7/15/2009 7:33:38 AM
Program does not have an enhancement per letter L-PI-09-043 dated 4/13/09

Sequence number: 4
Author:
Date: 7/14/2009 12:21:09 PM
Program also applies to Reactor Vessel, Internals and Reactor Coolant system

Sequence number: 5
Author:
Date: 7/14/2009 12:20:47 PM
Program also applies to Engineered Safety Features

Sequence number: 6
Author:
Date: 7/14/2009 12:22:13 PM
Program also applies to Steam and Power Conversion Systems

Sequence number: 7
Author:
Date: 7/15/2009 7:33:15 AM
This is a plant-specific AMP per letter L-PI-09-044 dated 5/12/09

Sequence number: 8
Author:
Date: 7/29/2009 7:54:00 AM
This is a new AMP per letter L-PI-09-044 dated 5/12/09

PINGP AMP (LRA Section)	New or Existing AMP	GALL Report Comparison	GALL Report AMPs	LRA Systems or Structures That Credit the AMP	Staff's SER Section
Reactor Vessel Surveillance (B2.1.34)	Existing	Consistent with enhancement	XI.M31	reactor vessel, internals and reactor coolant system	3.0.3.2.13
RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.35)	Existing	Consistent with enhancement	XI.S7	structures and component supports	3.0.3.2.14
Selective Leaching of Materials (B2.1.36)	New	Consistent with exception	XI.M33	1 xiliary systems / steam and power conversion systems,	3.0.3.2.15
Steam Generator Tube Integrity (B2.1.37)	Existing	Consistent with exception	XI.M19	reactor vessel, internals and reactor coolant system	3.0.3.2.16
Structures Monitoring (B2.1.38)	Existing	Consistent with enhancement	XI.S6	structures and component supports	3.0.3.2.17
Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (B2.1.39)	New	Consistent	XI.M12	reactor vessel, internals and reactor coolant system	3.0.3.1.22
Water Chemistry (B2.1.40)	Existing	Consistent with exception and enhancement	XI.M2	reactor vessel, internals and reactor coolant system / engineered safety features systems / auxiliary systems / steam and power conversion systems / structures and component supports	3.0.3.2.18
Environmental Qualification (EQ) of Electrical Components (B3.1)	Existing	Consistent	X.E1	electrical and instrumentation and controls	3.0.3.1.23
Metal Fatigue of Reactor Coolant Pressure Boundary (B3.2)	Existing	Consistent with enhancement	X.M1	reactor vessel, internals and reactor coolant system	3.0.3.2.19

Page: 153

Sequence number: 1
Author:
Date: 7/14/2009 12:23:54 PM
T Program also applies to Reactor Vessel, Internals and Reactor Coolant System and Engineered Safety Features

3.0.3.1 AMPs Consistent with the GALL Report

In LRA Appendix B, the applicant identified the following AMPs as consistent with the GALL Report:

- 10 CFR Part 50, Appendix J Program
- Aboveground Steel Tanks Program
- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program
- ASME Section XI, Subsection IWE Program
- ASME Section XI, Subsection IWF Program
- Boric Acid Corrosion Program
- Buried Piping and Tanks Inspection Program
- Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program
- Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program
- Flow-Accelerated Corrosion Program[1]
- Fuse Holders Program
- Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components
- Lubricating Oil Analysis Program
- Masonry Walls Program
- Metal-Enclosed Bus Program
- Nickel-Alloy Nozzles and Penetrations Program
- One-Time Inspection Program
- One-Time Inspection of ASME Code Class 1 Small Bore Piping Program
- Open-Cycle Cooling Water System Program
- PWR Vessel Internals Program
- Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program
- Environmental Qualification (EQ) of Electrical Components Program
- Protective Coating Monitoring and Maintenance Program

[1]: In a letter dated March 12, 2009, the applicant amended its Flow-Accelerated Corrosion Program to comply with the latest EPRI guidance. The amended AMP is consistent with an exception to the GALL Report.

Page: 154

Sequence number: 1
Author:
Date: 7/29/2009 7:54:04 AM
Bulleted list should also include Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program. This AMP is Consistent with no enhancement per L-PI-09-043 dated 4/13/09.

Sequence number: 2
Author:
Date: 7/15/2009 7:37:52 AM
This is a Plant-Specific AMP per L-PI-09-042 dated 3/27/09

The staff noted that, in its final statement of consideration (SOC) on the updates of 10 CFR 50.55a, "codes and standards" (Federal Register (FR) Volume 73, No. 176, pages 52730 – 52750), the staff mandated new augmented inspection requirements for upper reactor vessel closure head (RVCH) penetration nozzles that are made from nickel alloy materials or that are structurally welded to the upper RVCH using bimetallic (i.e., nickel alloy) weld filler metals. For these components, the updated rule imposed: (1) new augmented non-visual inspection methods for the components in accordance with the methods and criteria in ASME Code Case N-729-1, as defined, referenced and subject to the limitations in 10 CFR 50.55a(g)(6)(ii)(D), and (2) new augmented bare metal visual examinations requirements in accordance with the methods and criteria in ASME Code Case N-722, as defined, referenced and subject to the limitations in 10 CFR 50.55a(g)(6)(ii)(E). The referenced SOC makes the following statement with respect to PWR applicants whose LRAs include AMPs corresponding to GALL AMP XI.M-11A and whose LRAs are currently under review:

"For new or current license renewal applicants, they may reference conformance GALL AMP XI.M11A and compliance with the augmented inspection requirements in paragraphs 10 CFR 50.55a(g)(6)(ii)(D) and (E) without the need for taking an exception to the program elements in GALL AMP XI.M11A."

In its final statement of consideration (SOC) on the updates of 10 CFR 50.55a, the staff also mandated new augmented inspection requirements for partial or full penetration welds in Class 1 components fabricated with Alloy 600/82/182 material pressure boundary leakage in pressurized water reactor (PWR) plants. For these components, the updated rule imposed augmentation of the applicant's Inservice Inspection Program (ISI) program by implementing the visual inspection methods of ASME Code Case N-722 subject to the limitations in 10 CFR 50.55a(g)(6)(ii)(E).

The staff noted that in Commitment No. 1, the applicant committed to submit amendments to the PINGP LRA (including any changes to the UFSAR supplements and Commitment List for the LRA) pursuant to the LRA update requirements in 10.CFR 54.21(b), which requires that each year following submittal of the LRA and at least three months before scheduled completion of the NRC review, an amendment to the LRA be submitted that identifies any change to the CLB of the facility that materially affects the contents of the LRA, including the Updated Final Safety Analysis Report (UFSAR) supplement. Based on the applicant's Commitment No. 1, the staff finds the applicant will implement the new mandated augmented inspection requirements in 10 CFR 50.55a(g)(6)(ii)(D) and (E).

The applicant's ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (B2.1.3) states that the provisions of ASME Section XI are augmented by additional inspections to detect general and pitting corrosion on the shell to transition cone weld of the Westinghouse Model 51 steam generators in Unit 2. Westinghouse Model 51 steam generators have a high stress region at the shell to transition cone weld, and corrosion of the steam generator shell is known to exist. The staff noted that the inspection method was not identified in the applicant's AMP. During discussions between the staff and the applicant, the applicant stated that the visual inspection of the interior of the transition cone weld is performed 1r each, ISI interval. The staff finds visual inspection of the interior circumference of the transition cone

Page: 161

Sequence number: 1
Author:
Date: 7/15/2009 7:40:52 AM
T Prairie Island Inservice Inspection Program requires a visual examination of one S/G inside diameter transition cone girth weld during each refueling outage.

degradation was not captured under a coating AMP. The applicant explained that an AMP was not needed for coatings because they are not credited for aging management. Although the coatings are not credited for aging management, the staff believes their failure could result in the failure of a safety system to perform its intended function. In RAI B2.1.4-1 dated November 5, 2008, the staff requested that the applicant justify not having an AMP for coatings.

In its response dated December 5, 2008, the applicant stated that coatings inside containment provide protection for the underlying base metal but are not relied upon to mitigate any aging effect. The Containment Inservice Inspection and Containment Leak Rate Programs are credited with managing the containment vessel for loss of material due to corrosion. The applicant further stated that both programs look for evidence of flaking, blistering, peeling, discoloration, corrosion and other signs of distress. Suspect areas are accepted by engineering evaluation or corrected by repair or replacement. The RAI response also explains that PINGP has performed an analysis of the susceptibility of the Emergency Core Cooling System (ECCS) and Core Spray System (CSS) recirculation functions to adverse effects of post-accident debris blockage. The analysis assumed that all qualified coating within the zone of influence of the worst case pipe break fail and that all unqualified coatings inside containment fail. The applicant concluded that the analysis demonstrated that debris will not prevent a safety-related component from performing its intended function. The applicant further stated that since the failed coatings would not prevent a safety-related component from performing its safety function, the coatings inside containment do not fall within the scope of 10 CFR 54.4(a)(2).

Based on its review, the staff finds the applicant's response to RAI B2.1.4-1 acceptable because PINGP has programs in place to capture, evaluate and correct degraded coatings and has performed an analysis which demonstrates that failed coatings inside containment will not prevent a safety system from performing its intended function. The staff's concern described in RAI B2.1.4-1 is resolved.

During the audit, the staff also noted that PINGP had identified an ongoing issue with water seepage from the refueling cavity into the containment sumps. In RAI B2.1.38-2 dated November 5, 2008, the staff requested the applicant provide information regarding the root cause analysis of the seepage, as well as corrective and preventive actions taken to correct the problem. In the LRA, this seepage issue is tracked under the Structures Monitoring Program, but the staff believes that it also applies to the IWE program due to the possibility of borated water coming into contact with the containment vessel.

By letter dated December 5, 2008, the applicant responded to RAI B2.1.38-2. The applicant stated that the condition was detected by the ASME Section XI, Subsection IWE Program while examining the Class MC pressure retaining vessel. Both the Structures Monitoring Program and the ASME Section XI, Subsection IWE Program took corrective actions to address the leakage. In addition, the applicant provided information during a public meeting on March 2, 2009. The staff reviewed the information provided in the RAI response and during the public meeting and discovered that borated water was coming into contact with the containment vessel during refueling outages. Due to the leakage path of borated water along the bottom of the vessel, the staff realized there is also a possibility that portions of the containment vessel may remain wetted after refueling outages. By letter dated March 31, 2009, the staff issued follow-up RAI B2.1.38 asking the applicant to discuss its plan for assessing the current condition of the steel containment vessel and to explain how the IWE program, or a plant specific program, will

Page: 164

Sequence number: 1
Author:
Date: 7/21/2009 12:14:48 PM
May wish to incorporate additional information that recognizes that PINGP did include a Protective Coating Monitoring & Maintenance Program per the letter dated 3/12/09. This program is described/evaluated in SER Section 3.0.3.1.24.

The staff reviewed the applicant's license renewal basis document for the Boric Acid Corrosion Program and confirmed that the program scope includes those steel (including carbon steel, alloy steel, and cast iron), copper alloy, and aluminum alloy systems and components that could be affected by the impacts of borated water leakage and boric acid corrosion. In comparing the program elements in the applicant's program to those in GALL AMP XI.M10, the staff confirmed that the program elements in the applicant's program are consistent with the recommended program elements of GALL AMP XI.M10.

In comparing the program elements in the applicant's AMP to those in GALL AMP XI.M10, the staff found that the applicant has identified all the systems and components included in the scope of the Boric Acid Corrosion Control Program. This includes those [1]eel, copper alloy, or aluminum alloy components that are in the vicinity of [2]lass 1 nickel alloy components, where the potential exists for cracks to initiate and grow through wall because of stress corrosion cracking (SCC) and which have the potential to be a source of borated water leakage. This includes any [3]eel, copper alloy, or aluminum alloy components in the vicinity of the RPV closure head penetration nozzles, RPV inlet and outlet safe-end welds, pressurizer penetration or steam space nozzles, or other [4]ckel alloy components in the reactor coolant pressure boundary. Based on its review, the staff finds the applicant's Boric Acid Corrosion Program consistent with the program elements of GALL AMP XI.M10 and therefore acceptable.

Operating Experience. The staff reviewed the OE provided in LRA Section B2.1.7 and interviewed the applicant's technical personnel to confirm that the plant-specific OE did not reveal any aging effects not bounded by the GALL Report. The staff also confirmed that applicable aging effects and industry and plant-specific OE have been reviewed by the applicant and are evaluated in the GALL Report. Furthermore, the staff confirmed that the applicant has addressed OE identified after the issuance of the GALL Report.

The staff also reviewed the OE discussion in the applicant's license renewal basis document for the Boric Acid Corrosion Program. The staff reviewed a sample of the CRs and confirmed that the applicant has identified boric acid corrosion and has implemented appropriate corrective actions.

In the OE element of LRA Section B2.1.7, the applicant stated that PINGP found borated water leakage and boric acid crystal accumulations. The staff issued RAI B2.1.7-1 by letter dated November 5, 2008, to ask the applicant to (a) to clarify what type of corrective actions are implemented for steel, copper alloy, and aluminum components that are exposed to borated water leakage or to boric acid residues that has precipitated out as a result of previous borated water leakage; (b) to clarify whether the program permits PINGP to leave any boric acid residues in place, and if so, how the program assesses the impacts of boric acid residues on the structural integrity of impacted components if the residues are left in place for any period of time; (c) to identify all relevant PINGP OE with borated water leakage or boric acid residues over the past five years; and (d) to discuss the corrective actions that were taken on the impacted steel, copper alloy or aluminum alloy components in order to correct the adverse conditions.

In its letter dated December 5, 2008, in response to RAI B2.1.7-1, the applicant stated, in part, that:

Page: 167

Sequence number: 1
Author:
Date: 7/15/2009 7:46:36 AM
Should also list cast iron and chrome-molybdenum for completeness.

Sequence number: 2
Author:
Date: 7/29/2009 7:54:18 AM
Should also list stainless steel. Class 1 components may be stainless steel or nickel alloy.

Sequence number: 3
Author:
Date: 7/29/2009 7:54:28 AM
Should also list cast iron and chrome-molybdenum steel for completeness

Sequence number: 4
Author:
Date: 7/29/2009 7:54:40 AM
Should also list stainless steel since Class 1 components may be of either material.

Tanks Inspection" were consistent with the recommended program elements in the GALL AMP, with the exception of the "detection of aging effects" element in the applicant's AMP that the staff determined were in need of additional clarification and for which requests for additional information (RAIs) were issued to the applicant for resolution.

The staff noted that the applicant indicates that it will perform opportunistic or focused excavations and will perform subsequent visual inspections on buried piping and tanks. However, the staff also noted that the applicant's inspection method bases did not provide the basis the applicant would use to select buried piping or tank components for inspection or the basis that would it would use to expand the inspection scope if degradation was detected in the buried piping or tank components as a result of implementing this AMP. In RAI B2.1.8-2 dated December 5, 2008, the staff requested that the applicant identify the methods that it will use to select components for inspection and to expand the inspection scope if degradation is detected in the components.

In a letter dated December 18, 2008, the applicant responded to RAI B2.1.8-2 stating that there are no specific areas that are more prone to corrosion than others because the below ground environment is relatively benign and there has been no indication of loss of material on the outside of buried piping. Therefore, the applicant stated that locations for focused excavations will be based on industry experience and any degradation will be evaluated through the corrective action program and the results of this process will be used to identify susceptible locations for further inspections. The staff finds that the applicant's method to identify areas for focused inspections and potential expansion of inspection scope acceptable because initial inspections will be based on industry experience and, if necessary, expanded inspection scope will be based on the applicant's corrective action process should degradation be found.

Based on its review, the staff finds the Buried Piping and Tanks Inspection Program consistent with the program elements of GALL AMP XI.M34 and therefore acceptable.

Operating Experience. The applicant stated that the Buried Piping and Tanks Inspection Program is a new program, and therefore, has no OE related to program implementation. The applicant also stated that a review of OE did reveal that portions of the Cooling Water and Fire Protection Systems' buried piping were replaced in 1992 as a result of microbiologically influenced corrosion (MIC) indications on the internal surfaces of dead-leg portions of these systems. No external surface degradation or anomalies were identified.

The staff audited the OE reports and interviewed the applicant's technical staff. The staff noted that high tritium levels were discovered in on-site and off-site groundwater during the early days of plant operation but the OE element of AMP B2.1.8 did not discuss what caused the high tritium and whether or not the tritium source was buried tanks or piping. Discussion between the staff and the applicant during the audit indicated that the source of tritium contamination was not buried piping and that [1] system with buried piping contains radioactive materials or has fluids that are contaminated. Therefore, the staff determined that OE dealing with tritium contamination does not need to be included in the OE element of AMP B2.1.8 because the source of tritium contamination is not buried piping.

The staff noted that portions of buried coated carbon steel piping of the Cooling Water and Fire Protection Systems have been replaced as a result of MIC indications on the piping inside

Page: 171

Sequence number: 1
Author:
Date: 7/29/2009 9:14:06 AM
This should be clarified to say, "... no system with buried piping in scope of license renewal that contains radioactive materials or has fluids that are contaminated." There is contaminated buried piping that is not in scope.

In its letter dated December 5, 2008, in response to RAI B2.1.17-1, the applicant stated that prior to 2004 the PINGP FAC Program utilized a software application referred to as the Pipe Thinning Inspection Program (PTIP), which was developed by NSPM. The applicant further stated that the software program lacked certain features (e.g.; had no predictive capability, did not consider plant chemistry, offered limited trending ability) and did not meet the noble water chemistry standard for a predictive code for the FAC Program. The applicant also stated that this resulted in its replacement in 2004 with the EPRI CHECWORKS SFA (Steam/Feedwater Application), which was considered both the industry standard and the NMC standard. The applicant indicated that it upgraded to the CHECWORKS SFA model in order to improve its FAC Program through implementation of a more robust predictive code and that there were no FAC-related failures identified at PINGP that prompted the upgrade to CHECWORKS.

The staff reviewed the applicant response and noted that the applicant converted to CHECWORKS because it was a significantly better program than what it was using at that time. It is considered the industry standard and is recommended in the GALL AMP XI.M17 as a predictive code that could be used to predict component degradation because it provides a bounding analysis for FAC. The staff also noted that there were no FAC-related failures that prompted the upgrade to CHECWORKS. On the basis that the applicant converted to CHECWORKS because it is an industry standard and not because of significant FAC-related failures, the staff finds the applicant response acceptable. Thus, RAI B.2.17-1 is resolved.

The staff's review of the program basis document indicated that the applicant, as part of the program requirement, compares actual measured wall thickness of the component with CHECWORKS predictions of wall thickness for that component. The staff issued RAI B2.1.17-2 by letter dated November 5, 2008, requesting the applicant to confirm whether it has established a correlation between predicted results and actual wall thickness measurements, and whether PINGP had ever experienced excessive loss of material by FAC that was not predicted by CHECWORKS modeling results.

In its letter dated December 5, 2008, in response to RAI B2.1.17-2, the applicant stated that:

> Wear rate analyses are performed using the CHECWORKS SFA model. A Pass 1 Wear Rate Analysis is an analysis based solely on the plant predictive model, and is not enhanced by results of the plant wall thickness measurements. A Pass 2 Wear Rate Analysis generates predicted wear rate and remaining service life similar to a Pass 1 Wear Rate Analysis with one significant difference; results incorporate inspection data. Pass 1 Analysis results are not relied on by themselves to select locations for examination.
>
> After each inspection period, a Pass 2 Analysis is performed on each Analysis Line. An Analysis Line is defined as one or more physical lines of piping that have been analyzed together in the CHECWORKS model. As an output of the Pass 2 Analysis, CHECWORKS correlates the measured wear to the predicted wear for each Analysis Line.
>
> When calculating a component's remaining service life (RSL) and schedule for examination, both the measured wear rate and CHECWORKS predicted wear rate, among other things, are considered. The CHECWORKS predicted wear rate from a Pass 2 Analysis provides an important input to these FAC Program

Page: 177

Sequence number: 1
Author:
Date: 7/29/2009 7:54:53 AM
Should be "... did not meet the NMC standard for ...".

all in-scope piping, and are applied consistently to both safety-related and nonsafety-related piping.

The staff reviewed the applicant's response and noted that the applicant provided the sample expansion criteria, which includes additional components within two pipe diameters upstream and downstream of the degraded component, the two most susceptible components in the same train, and 1 minimum of two components in another train of a multi-train system. In addition, the staff noted that the applicant will increase the sample size until no additional components with significant wear are detected. The staff finds the applicant response acceptable because the sample expansion scope includes the appropriate locations to determine the extent of degraded components, and the applicant is consistent with the GALL AMP XI.M17 recommendation of evaluating the results of the inspection to determine if additional inspections are needed. In its response to Part B, the staff noted that the applicant uses both the wall thickness and wear rate as a basis for sample expansion. The staff finds the applicant's response to (b) acceptable because using both the actual measured wall thickness and the wear rate in combination provides a more realistic basis for calculating remaining life and for sample expansion. In response to (c), the staff noted that the applicant applies the FAC Program to safety-related and nonsafety-related systems. The staff determined that the CHECWORKS model identifies the most FAC-susceptible piping in the plant irrespective of safety or nonsafety-related system. The staff finds the applicant's response to (c) acceptable because the FAC Program and the CHECWORKS model does not distinguish between safety- and nonsafety-related systems, but determines the most FAC-susceptible piping, and uses the same sample expansion criteria for safety and nonsafety-related systems. RAI B2.1.17-4 is resolved.

The "detection of aging effects" program element in GALL AMP XI.M17 states that the extent and schedule of the inspections assure detection of wall thinning before the loss of intended function. The staff issued RAI B2.1.17-5, by letter dated November 5, 2008, to request the applicant to indicate how PINGP calculates minimum permitted wall thickness to avoid loss of intended function and how it is used for the determination of the schedule of inspections in the FAC analysis.

In its letter dated December 5, 2008, in response to RAI B2.1.17-5, the applicant stated that:

> Per the requirements of the PINGP Flow-Accelerated Corrosion (FAC) Program, the minimum permitted wall thickness or Code Minimum Wall Thickness (t_{min}) is calculated in accordance with the original construction code, which is USAS B31.1.0, Power Piping, 1967 Edition. Additionally, the program may define a Critical Wall Thickness (t_{crit}) for a component, as determined by engineering analysis. The critical wall thickness is typically a larger value than tmin. In turn, the remaining service life for a component is the estimated number of years until the wall thickness violates t_{min}, t_{crit}, or other established acceptance criteria. The remaining service life is based on measured wear rates or the predicted wear rates calculated by the CHECWORKS SFA application. The remaining service life is used to determine the appropriate future inspection schedule.
> The FAC Program schedules follow-on examinations for specific components based upon previous examinations and evaluation results. Follow-on examinations are scheduled no later than the normal inspection period (e.g.,

Page: 181

Sequence number: 1
Author:
Date: 7/29/2009 7:55:02 AM
Suggest replacing "a minimum of two" with "corresponding" or other similar words to better match NSPM RAI Response.

refueling outage) preceding the end of the predicted FAC remaining service life of the component. Engineering judgment and an appropriate safety factor (per the guidance of NSAC-202L, "Recommendations for an Effective Flow-Accelerated Corrosion Program") are utilized when scheduling follow-on exams. Typically, follow-on examinations are scheduled at half of the remaining service life and no later than the normal inspection period prior to the point at which the calculated t_{min} or t_{crit} is reached.

The extent and schedule of the examinations assure detection of wall thinning before the loss of intended function.

The staff reviewed the applicant response and noted that the applicant uses the B31.1.0 Code to determine the minimum permitted wall thickness. The staff also noted that the applicant uses a thickness value 1rger than the minimum to determine the remaining service life. The staff reviewed EPRI guidelines in NSAC-202L-R2, Section 4.4.3, Follow-On Inspections, which states that the next inspection for each component be scheduled for no later than the normally scheduled refueling outage preceding the end of the predicted FAC service life of the component plus an appropriate safety factor. Since the GALL AMP XI.M17 relies on implementation of EPRI guidelines in NSAC-202L-R2 for an effective FAC program, the staff finds that the applicant is consistent with GALL AMP XI.M17. The staff finds the applicant's response acceptable because the applicant is using the original construction code to determine minimum wall thickness, the applicant 2ses a higher thickness value to determine remaining service life, and based on the wear rates determines the intervals of follow-on inspections, and is consistent with GALL AMP XI.M17. RAI B2.1.17-5 is resolved.

In a letter dated March 12, 2009, the applicant revised the LRA for the FAC Program to update to the latest EPRI guidance, which is an exception to the GALL Report XI.M17, Flow-Accelerated Corrosion. In the letter, the applicant states the following for the Program Description:

The Flow-Accelerated Corrosion (FAC) Program is a condition monitoring program established in accordance with the Electric Power Research Institute (EPRI) guidelines in Nuclear Safety Analysis Center (NSAC)-202L-R3 for carbon steel and bronze components containing high-energy single phase or two phase fluids. The program manages loss of material due to FAC in piping and components by (a) conducting an analysis to determine critical locations, (b) performing baseline inspections to determine the extent of thinning at these locations, and (c) performing follow-up inspections to confirm the predictions of the rate of thinning, or repairing or replacing components as necessary. This program complies with PINGP's response to NRC Generic Letter 89-08.

This change in the LRA produces an exception to the GALL Report. The applicant stated in the letter the following:

Exceptions to NUREG-1801

Program Elements Affected

Page: 182

Sequence number: 1
Author:
Date: 7/29/2009 7:55:11 AM
The RAI response states that remaining service life can be based on either minimum or critical thickness (tmin or tcrit), and is not limited to tmin.

Sequence number: 2
Author:
Date: 7/29/2009 7:55:21 AM
Consistent with comment above, suggest rephrasing to "... uses an acceptable thickness value to ...".

from clip relaxation/fatigue (ohmic heating, thermal cycling or electrical transients, mechanical fatigue caused by frequent removal/replacement of the fuse, or vibration), or if it exposes the fuse holder to chemical contamination or moisture that would promote corrosion and oxidation of the metallic fuse clips.

Fuse holders requiring aging management will be visually inspected and tested at least once every 10 years. The first visual inspections and tests will be completed before the period of extended operation. The specific type of test to be performed will be determined prior to the initial test, and is to be a proven test for detecting deterioration of metallic clamps of the fuse holders, such as thermography, contact resistance testing, or other appropriate testing.

In LRA Table 3.0-3, "Electrical Service Environments," on Page 3.0-19, the applicant deleted the last line item on the page (Mechanical Cycling) in its entirety and replaced with the following:

"Stressors: Fuse Holders (Metallic Parts - clips) exposed to the following stressors, if applicable: fatigue, mechanical stress, vibration, chemical contamination, and corrosion."

In LRA Section 3.6.2.1.7, on Page 3.6-7, under Environment, the applicant replaces the two bullet items "Adverse localized environment (causing corrosion and/or fatigue)" and "Mechanical Cycling" with the single new bullet environment "Stressors."

In LRA Table 3.6.2-1, "Electrical Components - Electrical Commodity Groups - Summary of Aging Management Evaluation," on Page 3.6-20, for the line item "Fuse Holders (metallic parts) not part of a larger active assembly," the applicant replaces the existing entries under Environment, "Adverse localized environment, Mechanical Cycling" with the new entry "Stressors."

The staff finds the applicant response acceptable because the applicant revised various LRA sections to remove a reference to "adverse localized environments" and replaced them with the applicable stressors as described in GALL AMP XI.E5 for fuse holders (metallic clamps). These stressors are fatigue, mechanical stress, vibration, chemical contamination, and corrosion. With these revisions, the staff finds the applicant's Fuse Holders AMP is consistent with the GALL AMP XI.E5.

By letter dated April 13, 2009, the applicant proposed a commitment (Commitment No. 16) to enhance the program as described above.

Based on its review of the LRA, including the applicant's response to RAI B2.1.20-1, the staff finds the applicant's Fuse Holder Program consistent with the program elements of GALL AMP XI.E5, and therefore acceptable.

Operating Experience. In LRA Section B2.1.20, the applicant states that Fuse Holders Program is a new program, and, therefore, has no OE related to program implementation. The applicant conducted a review of plant-specific OE and did not identify any fuse connection failure from potential age-related causes. The applicant's plant OE review did identify fuse enclosure issues involving water intrusion from event driven causes (e.g., water leaked into conduit and emptied

Page: 186

Sequence number: 1
Author:
Date: 7/27/2009 7:09:08 AM

The PINGP Fuse Holders Program was not addressed in the 4/13/09 letter. In addition, there are no enhancements associated with this program. Commitment No. 16 is the commitment to implement this new AMP; this commitment was part of the original LRA submittal. Please delete this sentence or revise accordingly.

into enclosure). These moisture intrusion events for enclosures exposed [1] this adverse localized environment could promote a corrosion for the metallic contact surfaces, leading to increased contact resistance and circuit failure if left unmanaged. The applicant also states that inspections and testing (thermography) were performed on fuse holders in-scope of license renewal in terminal boxes and junction boxes located outside containment. This initial inspection and testing revealed that some enclosures had significant signs of oxidation that could adversely affect the fuse holders if not repaired or reworked. The applicant entered these conditions into the Corrective Action Program for disposition. For adverse aging environments, this program will ensure the integrity of fuse holders in-scope of License Renewal and located in passive enclosures during the period of extended operation.

The staff reviewed the OE provided in the LRA and in the basis documents that were available during the audits. Based on the review of the applicant-identified OE, the staff has confirmed that the applicant has identified aging effects of fuse holders, etc, increased contact resistance due to corrosion and taken appropriate corrective actions to address the fuse holder corrosion issue. Therefore, the staff determines that the applicant has adequately addressed this element. The staff confirmed that the "operating experience" program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable

UFSAR Supplement. In LRA Section A2.20, the applicant provided the UFSAR supplement for the Fuse Holder AMP. The staff reviewed this section and determined that the information in UFSAR supplement is an adequate summary description of the program, as required by 10 CFR 54.21(d).

The applicant committed to implement this AMP prior to the period of extended operation and identified it as LRA Commitment No. 16.

Conclusion. On the basis of its audit and reviews of the applicant Fuse Holders Program, including the applicant's response to RAI B2.1.20-1, the staff finds all program elements consistent with the GALL Report. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.1.12 Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements

Summary of Technical Information in the Application. LRA Section B2.1.21 describes the new Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program as consistent with GALL AMP XI.E3, "Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements." The applicant stated that this AMP will conduct periodic tests to provide an indication of the condition of the conductor insulation for medium voltage cables in-scope of license renewal exposed to [2] adverse localized environments and subjected to voltage stress. The applicant also stated that periodic inspections of the underground medium voltage cable manhole for the accumulation of water

Page: 187

Sequence number: 1
Author:
Date: 7/18/2009 9:01:22 AM
As discussed above in response to RAI B2.1.20-1, the term adverse localized environment as defined in the GALL should not be used here and should be replaced with the term stressor.

Sequence number: 2
Author:
Date: 7/18/2009 9:01:29 AM
The words used in the LRA, " (i.e.,periods of high moisture greater than a few days at a time)" should be inserted after the term adverse localized environments to avoid confusion with the GALL definition of adverse localized environment.

(and draining if necessary) will be conducted to minimize prolonged high moisture conditions that promote the growth of water trees.

Staff Evaluation. During its audit, the staff reviewed the applicant's claim of consistency with the GALL Report. The staff reviewed and compared the "scope of program," "preventive actions," "parameters monitored/detected," "detection of aging effects," "monitoring and trending," "acceptance criteria," and "operating experience" program elements of the AMP to the corresponding program element criteria in GALL AMP XI.E3, "Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements."

The staff's review of the "corrective actions," "administrative controls," and "confirmatory controls" program elements for the new Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program was performed as part of the staff's review of the QA attributes of the AMPs and is discussed in SER Section 3.0.4.

The staff compared the programs elements in the applicant's program to those in GALL AMP XI.E3. The staff noted that the program elements that the applicant claimed to be consistent with GALL were consistent with the corresponding program element in GALL AMP XI.E3.

Based on its review, the staff finds the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program consistent with the program elements of GALL AMP XI.E3, and therefore acceptable.

Operating Experience. The staff also reviewed the OE described in LRA Section B2.1.21. The applicant stated that in response to NRC Generic Letter 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients," dated February 7, 2007, the applicant reported that three underground medium voltage power cable failures had occurred. The staff noted PINGP has OE with two medium voltage cable failures and a failed megger test. Corrective actions have been taken to address all cable failure issues by replacing failed cables. The applicant also responded that it intended to implement an "Underground Cable Maintenance Program" by the end of 2007 due to its history with cable failures. During the AMR audit, the staff found that the applicant had not yet implemented this program. The applicant created Action Report #01150075 in response to the site not having implemented the response to NRC Generic Letter (GL) 2007-01. The staff reviewed and referred this issue to the Reactor Oversight Process. During a follow-up Regional License Renewal Inspection, the staff revisited this issued and noted that PINGP had a cable condition monitoring program (H43) in place as of March 2008 and the actual testing of the cables is governed by Procedures PE 4826 (testing of cables rated less than 600 volts) and 4825 (testing of cables rated greater than 600 volts). The applicant stated that Preventive Maintenance Change Requests (PMCRS) 01123654 (low voltage cables) and 01123652 (medium voltage cables) have been generated by the licensee to complete testing of cables within the 1 ext four outages. The full description of this inspection is documented in Inspection Report 0500282/2009006 and 0500306/2009006 dated March 27, 2009.

The staff reviewed CRs as part of its on-site review of the AMP. In reviewing OE for PINGP, the staff observed that the applicant had two separate cable failures and one additional failed cable test. As noted above, corrective actions have been taken to address all cable failure issues by replacing failed cables. The staff determined that the CRs demonstrated that the applicant had

Page: 188

Sequence number: 1
Author:
Date: 7/22/2009 2:05:32 PM
Clarify to state "... next four refueling outages for each unit." to accurately reflect plant intent. As written, statement can be misinterpreted.

implemented appropriate corrective actions. The staff also verified that the aging effects are bounded by those identified in the GALL AMP XI.E3. Therefore, the staff determines that the applicant has adequately addressed this element. The staff confirmed that the "operating experience" program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable.

UFSAR Supplement. In LRA Section A2.21, the applicant provided the UFSAR supplement for the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program. The staff reviewed this section and determines that the information in the UFSAR supplement provided an adequate summary description of the program, as required by 10 CFR 54.21(d).

The applicant committed to implement this AMP prior to the period of extended operation and identified it as LRA Commitment No. 17.

Conclusion. On the basis of its review of the applicant's Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program, the staff finds all program elements consistent with the GALL Report. The staff concludes that the applicant has demonstrated that effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.1.13 Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components

Summary of Technical Information in the Application. LRA Section B2.1.22 describes the new Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program as consistent with GALL AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components." The applicant stated that this is a new program and will be credited to manage loss of material and cracking for the internal surfaces of mechanical components in the scope of this program. The applicant stated that this program provides for internal visual inspections during scheduled preventive and corrective maintenance activities[1] during routine surveillance procedures when the internal surfaces are accessible for these inspections.

Staff Evaluation. During its audit, the staff reviewed the applicant's claim of consistency with the GALL Report. The staff's summary of its on-site review of AMP B2.1.22, Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components, is documented in staff's Audit Summary Report Section for this AMP.

In comparing the seven programs elements in the applicant's program to those in GALL AMP XI.M38, the staff noted that the program elements which the applicant claimed its AMP were consistent with the GALL Report were consistent with the corresponding program element criteria recommended in the program elements of GALL AMP XI.M38 with the exception of those areas in which the staff determined there was a need for additional clarification, for which RAIs were issued. The OE program element is discussed separately below.

Page: 189

Sequence number: 1
Author:
Date: 7/22/2009 2:05:43 PM
Suggest revising to match LRA Sections A2.22 and B2.1.22 which state: "or during other routinely scheduled tasks such as surveillance procedures".

Analysis AMP will provide reasonable assurance that loss of material will be adequately managed through the period of extended operation. The applicant stated that the Lubricating Oil Analysis Program is consistent with the 10 elements of AMP XI.M39, "Lubricating Oil Analysis," with no exceptions or enhancements.

During the on-site review, the staff reviewed documents supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. Based on its review, the staff determined that the program elements for the applicant's Lubricating Oil Analysis Program are consistent with the program elements of GALL AMP XI.M39. Based on this review, the staff finds that the program elements for the applicant's Lubricating Oil Analysis Program acceptable.

Operating Experience. The applicant stated that the Lubricating Oil Analysis program has been effective in preventing component failures due to oil contamination or degradation. The applicant noted that in some instances where oil samples contained water or particulate contamination in excess of the established limits, appropriate actions were taken in accordance with the Corrective Action Program to correct the identified conditions, and no instances of component failures attributed to lubricating oil contamination or degradation have been identified.

The applicant also stated that the management of aging effects is achieved through objective evidence showing that aging effects/mechanisms are being adequately managed consistent with the CLB for the period of extended operation.

The staff audited the OE reports, including a sample of CRs available in the Corrective Action Program, and interviewed the applicant's technical staff. This staff noted that the CRs did not include any reports where wear or equipment failure had resulted because of poor lubricating oil quality, which is an indication of the effectiveness of the applicant's Lubricating Oil Analysis.

The staff noted that the documentation provided by the applicant during the onsite review supports the applicant's statements regarding OE and confirmed that the plant-specific OE did not reveal any degradation not bounded by industry experience.

The staff confirmed that the "operating experience" program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable.

UFSAR Supplement. The applicant provided its UFSAR Supplement for the Lubricating Oil Analysis Program in LRA, Appendix A, Section A2.24. The staff verified that provisions of the UFSAR Supplement for the Lubricating Oil Analysis Program is in conformance with the recommended UFSAR Supplement summary description for Lubricating Oil Analysis Programs in SRP-LR, Tables 3.3.1-2, 3.2-2, 3.3-2 and 3.4-2. Based on this review, staff finds that the applicant's UFSAR Supplement for the Lubricating Oil Analysis Program is acceptable.

The staff finds that the UFSAR Supplement for the Lubricating Oil Analysis Program provides an adequate summary description of the program as required by 10 CFR 54.21(d).

Page: 193

Sequence number: 1
Author:
Date: 7/21/2009 3:34:11 PM
Suggest replacing "loss of material" with "aging effects". Loss of material is not the only aging effect managed by the program.

Conclusion. On the basis of its review Lubricating Oil Analysis Program, the staff finds all program elements consistent with the GALL Report. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.1.15 Masonry Wall Program

Summary of Technical Information in the Application. LRA Section B2.1.25 describes the existing Masonry Wall Program as consistent with GALL AMP XI.S5, "Masonry Wall Program." This program will manage aging effects so that the evaluation basis established for each masonry wall within the scope of license renewal remains valid through the period of extended operation.

The applicant stated that the program includes all masonry walls identified as performing intended functions in accordance with 10 CFR 54.4. Included components are the 10 CFR 50.48 required masonry walls, radiation shielding masonry walls, and masonry walls with the potential to affect safety-related components.

The applicant further stated that the steel supports and steel bracing of masonry walls in-scope of license renewal are inspected as part of the Structures Monitoring Program. The applicant also stated that masonry walls are visually examined at a frequency selected to ensure there is no loss of intended function between inspections.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. The staff reviewed the associated basis documents to determine whether the AMP remains adequate to manage the aging effects for which it is credited in the LRA.

The staff interviewed the applicant's technical staff and reviewed those portions of the Masonry Wall Program for which the applicant claims consistency with GALL AMP XI.S5.

During its review, the staff asked for the visual examination frequency for the program and its technical basis. In its response, the applicant stated that the inspection is implemented by the Structures Monitoring Program and consists of visual inspection for cracking in joints, deterioration of penetrations, missing or broken blocks, missing mortar, and general mechanical soundness of steel supports. The applicant also stated that visual inspections are conducted at least every five years to ensure no loss of intended function between inspections. Based on its review, the staff finds the Masonry Wall Program consistent with the program elements of GALL AMP XI.S5, and therefore acceptable.

Operating Experience. The staff reviewed the OE provided in LRA Section B2.1.25, and Operation Experience Review Report (Masonry Walls section), and interviewed the applicant's technical staff to confirm that the plant-specific OE has been reviewed by the applicant and was evaluated as intended in the GALL Report. During its audit, the staff found some minor indications that did not affect the structural integrity of any of the structures reviewed.

Page: 194

Sequence number: 1
Author:
Date: 7/22/2009 2:06:11 PM
This list should also include the 10 CFR 50.63 required masonry walls, flood barriers, HELB shielding, missile barriers, and structural supports for masonry walls, to be consistent with LRA pages 3.5-70 and 3.5-160)

B2.1.27-1, dated December 5, 2008, to request plant-specific OE with regard to nickel-alloy components other than those of the closure head.

The staff also noted that by letter dated March 27, 2009, the applicant amended AMP B2.1.27, Nickel-Alloy Nozzles and Penetrations Program, to redefine the program as an existing plant-specific AMP for the LRA that incorporates the ten program elements for AMPs, as recommended in SRP-LR Appendix A, Section A.1.2.3, and to delete the commitment in the previous version of the AMP and in Commitment No. 21 from the scope of the LRA.

The staff element for the amended Nickel-Alloy Nozzles and Penetrations Program in SER Section 3.0.3.3.1.

UFSAR Supplement. The applicant provided its UFSAR Supplement for the Nickel-Alloy Nozzles and Penetrations Program in PINGP LRA, Appendix A, Section A2.27. The staff verified that provisions of the UFSAR Supplement are acceptable because these provisions are in accordance with SRP-LR Tables 3.X-2, Nickel-Alloy Nozzles and Penetrations.

In a letter dated March 27, 2009, the applicant amended the LRA UFSAR Supplement A2.27 to (1) delete LRA Commitment No. 21 on UFSAR Supplement summary description A2.27 from the scope of the LRA, and (2) reflect the new augmented inspection activities and requirements for the non-upper RVCH penetration nozzle ASME Code Class 1 nickel-alloy components. The staff's evaluation of the amended UFSAR Supplement summary description A2.27 for the Nickel-Alloy Nozzles and Penetration Program is given in SER Section 3.0.3.3.1.

Conclusion. The staff's conclusion on the acceptability of AMP B2.1.27, Nickel-Alloy Nozzles and Penetrations Program and on the acceptability of the amended UFSAR Supplement summary description for this program are given in SER Section 3.0.3.3.1.

3.0.3.1.18 One-Time Inspection

Summary of Technical Information in the Application. LRA Section B2.1.29 describes the new One-Time Inspection Program as consistent with GALL AMP XI.M32, "One-Time Inspection." The applicant stated that the One-Time Inspection Program provides additional assurance, through sampling inspections using nondestructive examination (NDE) techniques, that aging is not occurring or that the rate of degradation is so insignificant that additional aging management actions are not needed. The applicant also stated that the program includes measures to verify the effectiveness of other AMPs, such as the Water Chemistry Program, in mitigating aging effects and, in other cases, to confirm that a separate AMP is not needed when significant aging is not expected to occur. The applicant further stated that if aging effects are identified that could adversely impact an intended function prior to the end of the period of extended operation, additional actions will be taken to correct the condition, perform additional inspections, and perform periodic inspections, as needed. Elements of the One-Time Inspection Program include the following: (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and OE; (b) identification of inspection locations in the system, component, or structure based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect being examined; and (d) evaluation of the need for follow-up examination if degradation is identified that could jeopardize an intended function prior to the end of the period

Page: 200

Sequence number: 1
Author:
Date: 7/15/2009 7:55:32 AM
This program is not discussed in SRP Table 3.1-2. It is discussed in SRP Section 3.1.2.2.13, Cracking due to Primary Water Stress Corrosion Cracking (PWSCC) and 3.1.3.2.13, Cracking due to Primary Water Stress Corrosion Cracking.

time inspection program, a periodic inspection program will be implemented to manage applicable aging effects during the period of extended operation.

Staff Evaluation. During its audit, the staff reviewed the applicant's claim of consistency with the GALL Report. In comparing the elements in the applicant's program to those in GALL AMP XI.M35, the staff noted that the program elements in the applicant's AMP claimed to be consistent with the GALL Report were consistent with the corresponding program element criteria recommended in the program elements of GALL AMP XI.M35. The staff also confirmed that the plant program contains all of the elements of the referenced GALL AMP. On-site interviews were also held to confirm these results.

Based on its review, the staff finds the One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program consistent with the program elements of GALL AMP XI.M35, and therefore acceptable.

Operating Experience. The staff reviewed the OE described in LRA Section B2.1.30 and interviewed the applicant's technical personnel to confirm that the plant-specific OE did not reveal any aging effects not bounded by the GALL Report. The staff also confirmed that applicable aging effects and industry and plant-specific OE have been reviewed by the applicant and are evaluated in the GALL Report.

The applicant stated that the One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program is a new program, and therefore, has no OE related to program implementation. The applicant also stated that both plant and industry OE will be used to establish the program. The applicant stated that the specific examination techniques utilized will be qualified prior to performing the examinations.

In LRA Section B2.1.30, the applicant stated that it had conducted 41 UT examinations of ASME Class 1 and 2 small-bore piping welds during the 1007 refueling outages at Units 1 and 2. The applicant stated that it had not detected any rejectable indications in either Unit 1 or Unit 2.

Based upon a review of previous OE, the staff determined that the applicant has not identified any cracking of ASME Code Class 1 small-bore piping. Furthermore, the staff verified that the applicant has addressed OE identified after the issuance of the GALL Report. Based on its review, the staff finds that the applicant's One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program can be expected to ensure that effects of aging will be adequately managed during the period of extended operation because plant and industry OE will be considered in developing the One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program and the specific examination techniques utilized will be qualified prior to performing the examinations.

The staff confirmed that the OE program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable.

UFSAR Supplement. In LRA Section A2.30, the applicant provided the UFSAR supplement for the One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program. The staff verified that the UFSAR supplement summary description for the One-Time Inspection of ASME Code

Page: 204

Sequence number: 1
Author:
Date: 7/15/2009 7:56:31 AM
Should be "2006" refueling outages. See LRA B2.1.30 One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program.

(1) participate in the industry programs for investigating and managing aging effects on reactor internals;

(2) evaluate and implement the results of the industry programs as applicable to the reactor internals; and

(3) upon completion of these programs, but not less than 24 months before entering the period of extended operation, submit an inspection plan on reactor internals to the NRC for review and approval.

The applicant has also included this commitment as Commitment No. 25 to LRA Appendix A (UFSAR supplement).

In a letter dated May 12, 2009, the applicant submitted a change to AMP B.2.1.32, that deleted the original version of the PWR Vessel Internals Program and that instead replaced the original program with a plant-specific PWR Vessel Internals Program that is defined in terms of the 10 program elements for AMPs that are defined in SRP-LR, Appendix A1, Section A.1.2.3.1 the letter of May 12, 2009, the applicant also replaced Commitment No. 25 with the following plant-specific commitment for the PWR Vessel Internals Program, as placed on LRA Appendix A, Section A.:

(a) A PWR Vessel Internals Program will be implemented. Program features will be as described in LRA Section B2.1.32.

(b) An inspection plan for reactor internals will be submitted for NRC review and approval at least twenty-four months prior to the period of extended operation.

Staff Evaluation. The staff received the applicant's amended plant-specific PWR Vessel Internals Program and the associated changes to LRA Commitment No. 25 in letter dated May 12, 2009. Due to its recent submittal, the staff has not yet had ample time to review the new, plant-specific program elements for the applicant's AMP against the recommendations and criteria for AMP program elements that are defined in SRP-LR, Appendix A.1, Section A.1.2.3. However, since the acceptability of the PWR Vessel Internals Program is pending the results of the staff's review of the AMP's program elements, the staff's acceptance of the PWR Vessel Internals Program is remains open. The staff will document its review of the program elements for the PWR Vessel Internals Program in the 2FSAR for the application. This is **Open Item 3.0.3.1.21-1, Part 1**.

UFSAR Supplement. The applicant provided an UFSAR supplement summary description of its PWR Reactor Internals Program in LRA Appendix A2.32.

The staff verified that the applicant's UFSAR Supplement includes Commitment No. 25 that was issued on the PWR Vessel Internals Program and 3at was revised in the applicant's letter of May 12, 2009. Due to its recent submittal, the staff has not yet had ample time to review the changes that were made to LRA Commitment No. 25. However, since the acceptability of the PWR Vessel Internals Program is pending the staff's review of the revisions to LRA Commitment No. 25, the staff's acceptance of LRA Appendix A2.32 and of LRA Commitment No. 25 remains open. This is **Open Item 3.0.3.1.21-1, Part 2**.

Page: 208

Sequence number: 1
Author:
Date: 7/15/2009 7:59:22 AM
Note that Commitment No. 25 was further revised in L-PI-09-082 dated 6/24/09. The revised commitment language should be reflected in the SER writeup.

Sequence number: 2
Author:
Date: 7/22/2009 2:19:10 PM
Should be SER, not UFSAR

Sequence number: 3
Author:
Subject: test
Date: 7/22/2009 2:07:11 PM
Should also cite additional change in 6/24/09 letter.

Flaking was also observed on a hanger support at elevation 695 feet of zone B that covered one square foot of area.

The results of these inspections and the discovery of coating degradation were entered into the corrective actions program. The degraded coatings were either removed or evaluated to ensure that the amount of unqualified and degraded qualified coatings were less than the calculated minimum.

The staff confirmed that the OE program element satisfies the criterion defined in the GALL Report and SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable.

UFSAR Supplement. In LRA Section A2.41, the applicant provided the UFSAR supplement for the Protective Coating Monitoring and Maintenance Program.

Based on this review, the staff finds that the UFSAR supplement summary in LRA Section A2.41 provides an acceptable description of the applicant's Protective Coating Monitoring and Maintenance Program because it is consistent with the UFSAR supplement summary description recommended in the SRP-LR for a Protective Coating Monitoring and Maintenance Program

The staff determines that the information in the UFSAR supplement is an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's Protective Coating Monitoring and Maintenance Program, the staff finds all program elements consistent with the GALL Report. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.0.3.2 AMPs Consistent with the GALL Report with Exceptions or Enhancements

In LRA Appendix B, the applicant stated that the following AMPs are, or will be, consistent with the GALL Report, with exceptions or enhancements[1]:

- Bolting Integrity Program
- Closed-Cycle Cooling Water System Program
- Compressed Air Monitoring Program
- Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program
- External Surfaces Monitoring Program
- Fire Protection Program
- Fire Water System Program
- Flux Thimble Tube Inspection Program

Page: 216

Sequence number: 1
Author:
Date: 7/21/2009 1:39:43 PM
This should read "... coatings left inside containment ..." to be more precise.

Sequence number: 2
Author:
Date: 7/21/2009 1:46:24 PM
This conclusion should be worded differently since coatings are not in scope of license renewal. Suggest using the following alternate wording, "... condition of Service Level I containment coatings are adequately managed to ensure that post-accident accumulation of failed coating debris on containment sump B strainers does not exceed the strainers design limits, consistent with the CLB, for the period of extended operation." This wording is consistent with the NSPM letter dated March 12, 2009).

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. The staff reviewed the enhancement and exception to determine whether the AMP, with the enhancement and exceptions is adequate to manage the aging effects for which the LRA credits it.

In the PINGP LRA, the applicant stated that the PINGP AMP B2.1.6 is an existing program that is consistent with GALL AMP XI.M18, "Bolting Integrity" with exception and an enhancement. The exception affects the "parameters monitored or inspected," and the "detection of aging effects" program elements. The enhancement affects the same program elements

During its audit and review, the staff reviewed the applicant's on-site documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL report. The staff interviewed the applicant's technical staff and reviewed on-site documents.

In comparing the program elements in the applicant's program to the elements in GALL AMP XI.M18, the staff found that the GALL Report "monitoring and trending" program element recommended leak rates to be monitored on a particularly defined schedule was not properly documented in the applicant's bolting integrity program. The staff found that this GALL Report recommendation was not specifically addressed, and should possibly be identified as an exception if it is indeed not met. Therefore, by letter dated November 5, 2008, the staff issued RAI B.2.1.6-1 requesting additional information on the applicant's leak rate monitoring schedule.

By letter dated December 5, 2008, the applicant responded to RAI B.2.1.6-1 by stating that it agrees with the staff's position that the leak rate monitoring issue should be identified as an exception to the GALL Report "monitoring and trending" program element. The applicant submitted this exception crediting its current corrective action program and leak detection process for meeting the recommendations of the GALL Report "monitoring and trending" program element. Furthermore, the applicant states that each new Corrective Action Program Action Request that affects plant equipment is reviewed and assessed by a Senior Reactor Operator. Once a leak is identified, the issue is documented in the corrective action program and frequency of followup inspections is assigned based on the evaluation of the problem. The applicant further stated that, for any leak, an evaluation is completed to determine the actions required based on the severity of the leak and the potential to impact normal operations and safety. Furthermore, if the leak rate changes, further evaluation is performed to determine the actions required based on factors such as leak stability, leak reduction, and containment of leakage. Based on the justification provided, the staff found the applicant's response and exception to be acceptable.

Additionally, the applicant stated in PINGP AMP B2.1.6 that its 1bolting Integrity Program follows the guidance and standards outlined in NUREG-1339 "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants," EPRI NP-5769 "Degradation and Failure of Bolting in Nuclear Power Plants," EPRI TR-104213 "Bolted Joint Maintenance & Application Guide," EPRI TR-111472 "Assembling Bolted Connections Using Spiral-Wound Gaskets," and EPRI NP-5067 Volume 1 and 2 "Good Bolting Practices." However, GALL AMP XI.M18 identifies only NUREG-1339, EPRI NP-5769, and EPRI TR-104213 as guidance relied upon for the Bolting Integrity Program. The applicant did not include an enhancement or

Page: 218

Sequence number: 1
Author:
Date: 7/21/2009 3:44:55 PM
The document discussion here and in the following two paragraphs does not mention PINGP's use of EPRI NP-6316, which is included in the Exception and discussed in the cited RAI Responses. This document should be listed for completeness.

specific events that have occurred since issuance of the GALL Report, Revision 1. The staff reviewed additional selected CRs related to the applicant's Closed-Cycle Cooling Water System Program and interviewed the applicant's subject matter experts for the Closed-Cycle Cooling Water System Program. CRs reviewed by the staff included ones where the applicant found indications of corrosion, out-of-specification-chemistry conditions, and leaking components in the closed-cycle cooling water system. For all CRs reviewed, the staff noted that the applicant had performed adequate evaluations to determine a cause for the event and had taken corrective action adequate to repair or replace components or to restore operation within specification. Based on its review of the plant-specific OE, the staff finds that the applicant's program has demonstrated its capability to monitor, trend and control closed-cycle cooling water chemistry parameters consistent with recommendations of the EPRI guidelines referenced in the GALL Report, and to implement corrective actions adequate to prevent loss of intended functions for components and systems affected by the Closed-Cycle Cooling Water System Program.

Based on this review, the staff finds (1) that the OE for this AMP demonstrates that the applicant's Closed-Cycle Cooling Water System Program is achieving its objective of mitigating aging effects of cracking, loss of material, or reduction of heat transfer due to fouling for materials exposed to treated water in the closed-cycle cooling water system, and (2) that the applicant is taking appropriate corrective actions through implementation of this program.

The staff confirmed that the OE program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable.

UFSAR Supplement. In LRA Section A2.9, the applicant provided the UFSAR supplement for the Closed-Cycle Cooling Water System Program. The staff verified that the UFSAR supplement summary for the Closed-Cycle Cooling Water System Program conforms to the staff's recommended UFSAR supplement for this type of program as described in the SRP-LR.

In its letter dated April 13, 2009, the applicant provided a list of license renewal commitments. The staff verified that the applicant has included the program enhancements identified in the LRA for the Closed-Cycle Cooling Water System Program in Commitment No. 6 of the final License Renewal Commitment List. The staff also verified that the applicant's commitment No. 6 includes a statement that periodic visual inspections of the cold lab chiller loop, computer room chiller loop, or hot lab chiller loop will be performed to identify the presence of aging effects and to confirm the effectiveness of chemistry controls.

The staff finds that the UFSAR supplement summary in LRA Section A2.9 provides an acceptable description of the applicant's Closed-Cycle Cooling Water System Program because it is consistent with the UFSAR supplement summary description recommended in the SRP-LR for a Closed-Cycle Cooling Water System program. The applicant has appropriately included all program enhancements in Commitment No. 6 of the License Renewal Commitment list, which is linked with UFSAR supplement Section A.2.9 and scheduled for implementation prior to the period of extended operation.

The staff determined that the information in the UFSAR supplement is an adequate summary description of the program, as required by 10 CFR 54.21(d).

Page: 227

Sequence number: 1
Author:
Subject: Highlight
Date: 7/20/2009 7:13:41 AM

The actual commitment is not a specific commitment for the mentioned chiller loops as implied in this statement, but is a general commitment applicable to all closed cycle system loops.

Commitment No. 6 in the April 13, 2009 letter states:
"The Closed-Cycle Cooling Water System Program will be enhanced to include periodic inspection of accessible surfaces of components serviced by closed cycle cooling water when the systems or components are opened during scheduled maintenance or surveillance activities. Inspections are performed to identify the presence of aging effects and to confirm the effectiveness of the chemistry controls. Visual inspection of component internals will be used to detect loss of material and heat transfer degradation. Enhanced visual or volumetric examination techniques will be used to detect cracking."

Suggest revising statement to more closely conform to actual commitment.

supplement is an adequate summary description of the program, as required by 10 CFR 54.21(d).

The applicant committed to implement this AMP prior to the period of extended operation and identified it as LRA Commitment No. 8.

Conclusion. On the basis of its audit and reviews of the applicant Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirement Program, the staff determines that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the exceptions and determined that the AMP, with the exceptions, is adequate to manage the aging effect for which it is credited. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.5 External Surfaces Monitoring

Summary of Technical Information in the Application. LRA Section B2.1.14 describes the applicant's existing External Surfaces Monitoring Program as consistent, with enhancements, with GALL AMP XI.M36, "External Surfaces Monitoring." The applicant stated that this program is credited to manage loss of material, cracking, change in material properties, and heat transfer degradation for applicable metallic and non-metallic components. The applicant further stated that this program will utilize periodic visual inspections during system walkdowns and inspections for the accessible external surfaces for components that are within the scope of this program. The applicant stated that this program will be credited for managing degradation of internal surfaces for those situations where the external surfaces condition is representative of the conditions on the external surface, consistent with the recommendations provided in GALL AMP XI.M36.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. The staff reviewed the enhancements to determine whether the AMP, with the enhancements, is adequate to manage the aging effects for which the LRA credits it. The staff's summary of its on-site review of AMP B2.1.14 is documented in staff's Audit Summary Report Section for this AMP. The applicant claims that the AMP B2.1.21 is consistent with GALL AMP XI.M36, "External Surfaces Monitoring," with enhancements

In comparing the seven program elements in the applicant's program to those in GALL AMP XI.M36, the staff noted that the program elements in which the applicant's AMP claimed to be consistent with GALL were consistent with the corresponding program element criteria recommended in the program elements of GALL AMP XI.M36 with the exception of those portions of the program elements that related to the enhancements and additional areas in which the staff determined there was a need for additional information and clarification for which a RAI was issued.

Page: 237

Sequence number: 1
Author:
Date: 7/20/2009 7:16:50 AM
The word "external" should be "internal"

Enhancement 1. In LRA Section B2.1.14, the applicant stated that the program element, scope of program, for the External Surfaces Monitoring Program will be enhanced prior to the period of extended operation. The applicant's enhancement to the scope of program states that:

> The scope of program will be expanded as necessary to include all metallic and non-metallic components within the scope of License Renewal that require aging management in accordance with this program.

The staff noted that the scope of GALL AMP XI.M36, "External Surfaces Monitoring," is applicable only to the management of loss of material in components that are fabricated from steel materials or to degradation of their external liners or coatings, if the designs include these features. However, the staff noted that the applicant is proposing to expand the scope of this program to include several other metallic and non-metallic components. Therefore, by letter dated November 5, 2008, the staff issued RAI B2.1.14-1 requesting the applicant to do:

(a) provide an appropriate program to manage non-metallic components and their associated aging effects;

(b) justify why the aging effect of heat transfer degradation due to fouling as it applies to the additional metallic components added to the scope of this program is not considered an enhancement to this program element; and

(c) justify how this program will adequately manage the aging effects of loss of material and heat transfer degradation as it applies to the additional metallic components added to the scope of this program.

The applicant responded to RAI B2.1.14-1 by letter dated December 5, 2008. In its response to (a) of RAI B2.1.14-1, the applicant stated that the aging effects in non-metallic materials can be detected by a visual inspection evidence of surface discontinuities that include cracking, crazing, peeling, blistering, chalking, flaking, physical distortion, discoloration, loss of material from wear, and signs of leakage. The applicant further stated that a physical manipulation of non-metallic components will supplement the visual examination in order to verify aging effects such as hardening, embrittlement, or gross softening are not occurring. The staff noted that the physical manipulation will supplement and aid the visual inspection in detecting age-related degradation because changes in material properties, such as hardening and loss of strength, can be detected during manipulation of non-metallic components, when appropriate, by the relative inflexibility of the component, or by the failure of the component to return to its previous shape or configuration.

During its review of the applicant's response the staff noted that the applicant did not amend Commitment No. 11.to indicate that a physical manipulation will supplement a visual inspection when appropriate. During a teleconference on January 22, 2009, the applicant stated that it will amend Commitment No. 11 to indicate physical manipulation will supplement the visual inspection when appropriate. By letter dated April 13, 2009, the applicant amended Commitment No. 11 to indicate physical manipulation will supplement a visual inspection when appropriate. On the basis of its review, the staff finds the applicant's response acceptable because (1) the applicant will supplement the visual inspection for non-metallic components with a physical manipulation, when appropriate, which is capable of detecting age-related degradation for non-metallic components as described above and (2) the applicant amended its

Page: 238

Sequence number: 1
Author:
Date: 7/20/2009 7:18:36 AM
Correct reference is to letter dated "February 6, 2009," not 4/13/09.

Commitment No. 11 to specifically indicate that a physical manipulation of non-metallic components will supplement the visual examination, when appropriate.

The applicant stated in its response to (b) of B2.1.14-1 that this program is only credited for the management of heat transfer degradation due to fouling of the external surfaces of cooling coils that are exposed to an external air environment (plant indoor air or primary containment air). The staff noted that the visual examinations performed as part of this program will be capable of identifying corrosion, discoloration and accumulation of dirt/debris, which is consistent with the intention of GALL AMP XI.M36. The staff noted that indications of corrosion, discoloration and accumulation of dirt/debris are indicative of fouling on the cool coil external surface and has the potential to lead to heat transfer degradation. The staff noted that because the program will be capable of identifying corrosion, discoloration and accumulation of dirt/debris that are indicative of heat transfer degradation due to fouling that the addition of this aging effect to the scope of the program is not considered an enhancement. On the basis of its review the staff finds the applicant's response and this augmentation to be acceptable because the applicant's program consists of visual examinations, consistent with GALL AMP XI.M36, which are capable of detecting fouling (buildup from whatever source) which may potentially degrade the heat transfer capability of the cooling coil surface to the external air environment.

The applicant stated in its response to (c) of RAI B2.1.14-1 that a visual inspection that is performed during activities of this program will be capable of identifying [1]ss of material for metallic components (aluminum, copper alloy, copper-nickel, chrome-molybdenum alloy, carbon steel with stainless steel clad) other than steel. The applicant further stated that the visual inspection performed during activities of this program will monitor parameters such as corrosion wastage, oxidation, discoloration, cracking, coating degradation, accumulation of dirt/debris, evidence of leakage, surface discontinuities and pitting [2]at are indicative of loss of material.) The staff noted that metallic components other than steel would exhibit indications of loss of material on the surface similar to steel and a visual inspection will be capable of detecting age-related degradation. The staff further noted that the these visual inspections will be performed by the applicant's staff that are qualified to perform the activities of the visual inspection in accordance with site controlled procedures and processes at least once per refueling cycle. Furthermore, deficiencies, problems and concerns are documented and corrective actions are taken as appropriate, which is consistent with the program elements, (1) detection of aging effects and (2) monitoring and trending, of GALL AMP XI.M36. On the basis of its review, the staff finds that the applicant's basis for aging management, as amended in the RAI response, to be acceptable because: (1) the applicant will be performing visual inspections that are capable of detecting loss of material in metallic components as they display indications of degradation similar to steel, for which GALL AMP XI.M36 was intended and (2) these visual inspections will be performed at least once per refueling cycle by the applicant's staff that has been qualified in accordance with site controlled procedures and processes, which is consistent with GALL AMP XI.M36.

The staff verified that the applicant has incorporated this enhancement of the AMP in LRA Commitment No. 11, which was placed on UFSAR Supplement for the LRA in a letter dated April 13. 2009.

Page: 239

Sequence number: 1
Author:
Date: 7/20/2009 7:23:44 AM
This should be expanded to, "... loss of material and heat transfer degradation for ..." to be consistent with RAI response.

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Author:
Date: 7/20/2009 7:26:12 AM
The words "that are ... material" should be deleted, since they are not applicable to all the parameters listed.

consistency with the GALL Report are consistent. In addition, the staff reviewed the enhancements and confirmed that their implementation through Commitment No. 11 prior to the period of extended operation would make the existing AMP consistent with the GALL AMP to which it was compared. The staff concludes that the applicant has demonstrated that effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.6 Fire Protection Program

Summary of Technical Information in the Application. LRA Section B2.1.15 describes the Fire Protection Program as an existing program that is consistent with an exception and enhancements with GALL AMP XI.M26, "Fire Protection." The applicant stated that the Fire Protection Program is a condition monitoring program that consists of fire barrier inspection activities, diesel-driven fire pump inspection activities and halon/carbon dioxide (CO_2) fire suppression system inspection activities. The applicant also stated that the fire barrier inspection activities include (1) periodic visual inspection of fire barrier penetration seals, fire barrier walls, ceilings, and floors, and periodic inspection and functional testing of all fire-rated doors that perform a fire barrier function to ensure that their operability and intended functions are maintained; (2) periodic pump performance testing to ensure that the fuel supply line can perform its intended function; and (3) periodic inspection and functional testing of the halon/CO_2 fire suppression system to manage the aging effects and degradation that may affect the intended function and performance of the system.

Staff Evaluation. During its audit, the staff reviewed the applicant's claim of consistency with the GALL Report. The staff's summary of its on-site review of AMP B2.1.15, Fire Protection Program, is documented in staff's Audit Summary Report Section for this AMP.

The staff reviewed the exception and enhancements to determine whether the AMP, with the exception and enhancements, is adequate to manage the aging effects for which the LRA credits it. In comparing the elements in the applicant's program to those in GALL AMP XI.M26, the staff noted that the program elements in the applicant's AMP claimed to be consistent with GALL were consistent with the corresponding program element criteria recommended in the program elements of GALL AMP XI.M26, with the exception of two program element aspects. These program element aspects are identified below and the staff determined there was a need for additional clarification. The staff also confirmed that the plant program contains all of the elements of the referenced GALL program. On-site interviews were also held to confirm these results.

The Fire Protection Program basis document states that the diesel-driven fire pump inspection activities require that the pump be periodically performance tested. PINGP credits the Fire Protection Program to manage cracking in the fuel oil lines. The staff issued RAI B2.1.15-1 by letter dated November 5, 2008, requesting the applicant to explain how the periodic performance test will manage the aging effect of cracking in the fuel oil lines.

In its letter dated December 5, 2008, in response to RAI B2.1.15-1, the applicant stated that as recommended in GALL AMP XI.M26, "Fire Protection," program element 4, periodic

Page: 243

Sequence number: 1
Author:
Date: 7/29/2009 7:56:26 AM
This should be changed to "... that Fire Protection Program activities include ...". Only the first numbered item pertains to fire barrier inspection activities. Item 2 is a diesel-driven fire pump inspection activity and Item 3 is a halon/carbon dioxide (CO_2) fire suppression system inspection activity.

On the basis that the applicant is performing visual inspections once every six months consistent with GALL AMP XI.M26 recommendation, periodic internal surface inspections every refueling outage and based on the plant OE that did not identify any age-related degradation, the staff finds that the three-year and five-year testing intervals are adequate to ensure the system maintains its function and finds the exception acceptable.

Enhancement 1. In LRA Section B2.1.15, the applicant included an enhancement in the "parameters monitored/inspected" program element to require functional testing of the halon system smoke detectors in the guardhouse every five years.

However, in its response to RAI B2.1.15-3, the applicant stated that halon system smoke detectors in the guardhouse are already being functionally tested every five years, and this enhancement is unnecessary. The applicant revised the LRA and deleted the enhancement. The applicant also revised the Commitment List to delete this enhancement from Commitment No. 12.

On the basis that the applicant is already performing functional tests of halon smoke detectors in the guardhouse every five years, the staff finds the enhancement is not necessary and therefore finds the deletion of the enhancement to be acceptable.

Enhancement 2. In LRA Section B2.1.15, the applicant included an enhancement in the "detection of aging effects" program element to require periodic visual inspection of the fire barrier walls, ceilings, and floors to be performed during walkdowns at least once every refueling cycle.

The staff verified that the applicant has included Commitment No. 12 in the commitment list to enhance the program to require periodic visual inspection of the fire barrier walls, ceilings, and floors to be performed during walkdowns at least once every refueling cycle. This enhancement, when implemented, will make the Fire Protection Program consistent with the GALL AMP XI.M26, which recommends that visual inspection of fire barriers once every refueling cycle ensures timely detection of aging effects. Based on this review, the staff finds the enhancement acceptable.

Based on its review of the exception and enhancements, and resolution of the RAI as described above, the staff finds the Fire Protection Program consistent with program elements of GALL AMP XI.M26, with acceptable exception, and therefore acceptable.

Operating Experience. The staff reviewed the OE provided in LRA Section B2.1.15 and interviewed the applicant's technical personnel to confirm that the plant-specific OE did not reveal any aging effects not bounded by the GALL Report. The staff also confirmed that applicable aging effects and industry and plant-specific OE have been reviewed by the applicant and are evaluated in the GALL Report.

The staff also reviewed the applicant's "operating experience" discussion that was provided in the applicant's license renewal basis document for the Fire Protection Program. The staff reviewed a sample of CRs and confirmed that the applicant had identified age-related degradation in penetration seals, and in the diesel-driven fire pump strainer. The applicant repaired the penetration seals and determined that the strainer failure was due to an active

Page: 247

Sequence number: 1
Author:
Date: 7/29/2009 7:56:32 AM
This should read "... periodic external surface inspections every refueling cycle and ..." to be consistent with RAI response.

and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.9 Fuel Oil Chemistry

Summary of Technical Information in the Application. LRA Section B2.1.19 describes the applicant's existing Fuel Oil Chemistry Program as consistent, with exceptions and enhancements. The Fuel Oil Chemistry Program manages the aging effects of loss of material and cracking on internal surfaces of the diesel fuel oil system piping, piping components and tanks by minimizing the potential for a corrosive environment, and by verifying that the actions taken to mitigate corrosion are effective. The program includes testing to detect unacceptable level of water, sediment and particulate contamination, periodic draining, cleaning and inspection of fuel oil tanks, and one-time ultrasonic inspections of selected tank bottom and piping locations.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. The staff reviewed the exceptions and enhancements to determine whether the AMP, with the exceptions and enhancements, is adequate to manage the aging effects for which the LRA credits it.

LRA Section B2.1.19 provides the program description, statement of consistency with the GALL Report, OE, and the conclusion that the PINGP Fuel Oil Chemistry AMP after implementation of enhancements will provide reasonable assurance that loss of material will be adequately managed through the period of extended operation. The applicant stated that the Fuel Oil Chemistry Program is consistent with the 10 elements of GALL AMP XI.M30, "Fuel Oil Chemistry," after implementing two program enhancements, with two exceptions.

Section B2.1.19 Fuel Oil Chemistry, of the LRA identifies two exceptions to the program elements in GALL AMP XI.M30, "Fuel Oil Chemistry." The acceptability of these exceptions is evaluated as follows.

Exception 1. In Exception No. 1, the applicant took an exception to the recommendation in the "preventive actions" program element in GALL AMP XI.M30 to perform periodic sampling, draining, and cleaning of diesel fuel oil tanks and to add corrosion inhibitors and/or biocide agents to the diesel fuel oil inventories. The applicant stated in LRA B2.1.19 that preventive actions such as periodic fuel oil sampling, and draining and cleaning of all fuel oil tanks are not performed, and additives are not added to fuel oil.

The staff noted that there are, in fact, three exceptions to GALL AMP XI.30 "preventive actions" element as follows:

(1) Periodic fuel oil sampling of specific fuel oil tanks (day tanks and leakage collection tanks) will not be performed. The staff noted that the applicant relies on the high turnover of fuel in these tanks to preclude the need for periodic sampling because the tanks that supply fuel oil to these tanks, is sampled on a periodic basis. However, MIC could be active in these tanks because the source of the oil is not monitored for biological activity. The staff noted that the applicant relies on OE of the supply tanks, where no general, pitting and crevice corrosion and MIC

Page: 256

Sequence number: 1
Author:
Date: 7/20/2009 3:40:35 PM
The program does not include periodic draining & cleaning. This is identified as a program Exception. Refer to Exception 1 below.

because tanks selected for the one-time inspection at each unit would not necessarily be indicative of the fuel oil conditions in the remaining un-inspected fuel oil tanks for the units. During a conference call on March 30, 2009 between the staff and the applicant, the staff expressed concern that loss of material could be occurring in tanks (i. e. day tanks and leakage collection tanks) that do not receive any monitoring, preventive, or confirmatory actions and therefore, degradation would not be detected.

In a letter dated April 6, 2009 the applicant stated that one-time inspections using ultrasonic thickness measurements will be performed on selected day tanks and clean fuel oil leakage collection tanks prior to the period of extended operation as part of the One-Time Inspection Program where specific locations to be selected include: an external UT on select bottom locations on four of the seven diesel fuel oil day tanks, and an external UT on select bottom locations of one of the two D1/D2 clean fuel oil leakage collection tanks.

The staff finds that one-time UT inspection of diesel fuel oil day tanks and clean fuel oil leakage collection tanks sufficient to detect loss of material of tank bottoms because any wall thinning in these tanks would trigger additional actions such as expansion of tank bottom inspections, tank repair/replacement, tank cleaning, increased monitoring as determined through the applicant's corrective action program. Therefore, the staff finds that not monitoring fuel oil day tanks and fuel oil leakage collection tanks for particulate, sediment and biological activity and not cleaning and internally inspecting these tanks acceptable because degradation of tank bottoms resulting from contaminated fuel oil will be detected and corrective actions will be implemented.

The staff reviewed the exception that periodic draining and cleaning 1 specific fuel oil tanks (day tanks and leakage, collection tanks) will not be performed. The staff noted that the applicant relies on the lack of degradation of other fuel oil tanks and fuel oil quality trends as justification for not periodically draining and cleaning these tanks. The staff does not consider OE alone justification for not draining and cleaning these tanks..

The staff reviewed the exception that biocides and/or corrosion inhibitors will not be added to fuel oil. The staff noted that the applicant relies on the lack of degradation and fuel oil quality trends as justification for not using biocides and corrosion inhibitors. The staff does not consider OE alone justification for not using biocides or corrosion inhibitors particularly for those tanks that will not receive periodic cleaning and interior visual inspection or UT examination of tank bottoms. Additional actions and/or evaluations are necessary to justify not using biocides and/or corrosion inhibitors.

GALL AMP XI.M30 recommends in the "monitoring and trending" element to monitor and trend biological activity at least quarterly. In its review of LRA B2.1.19 and the associated basis document, the staff noted that the applicant does not state whether fuel oil is tested for biological activity. By letter dated December 5, 2008, the staff issued RAI B2.1.19-2 asking the applicant if microbiological activity monitored in fuel oil and if so, identify the frequency of monitoring for microbiological activity. If not, why is lack of monitoring for biological activity not identified as an exception to GALL AMP XI.M30?

By letter dated December 18, 2008, the applicant responded to RAI B2.1.19-2 stating that PINGP does not monitor fuel oil for biological activity, as recommended by NUREG-1801, Program XI.M30, Element 5, Monitoring and Trending because 1) no indications of biological

Page: 258

Sequence number: 1
Author:
Date: 7/29/2009 7:56:47 AM
Suggest rewording to "... of the storage, day and leakage collection tanks are not performed." to be consistent with the LRA. Also this paragraph appears to be incomplete. Additional relevant information was provided in response to a follow-up question in the letter dated April 6, 2009

applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.10 Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems

Summary of Technical Information in the Application. LRA Section B2.1.23 describes the existing Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program as consistent, with enhancements with GALL AMP XI.M23, "Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems." The program utilizes periodic visual inspections to manage aging effects for structural components of cranes and hoists including the bridge, trolley, rail system, structural bolting, and lifting devices in accordance with the provisions of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants."

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. The staff reviewed the enhancements to determine whether the AMP, with the enhancements, is adequate to manage the aging effects for which the LRA credits it. Additionally, the staff interviewed the applicant's technical staff and reviewed on-site documents.

The enhancements include guidance requiring components and structures subject to inspection to be clearly identified, and additional clarification of inspection procedures to include corrosion and wear where it is currently left out.

Through its onsite review and discussions with the applicant, the staff learned that the Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program is implemented through station procedures that are based on NRC approved guidance. Inspections are visual in nature, and are conducted on a routine basis for degradation.

Additionally, the staff found that the 1 ALL Report, acceptance criteria program element included reference to the use of EOCI-61 as guidance for the containment polar cranes and turbine cranes. According to GALL Report recommendations, use of the specification that was applicable at the time the crane was manufactured is acceptable. The staff reviewed both the EOCI-61 specifications, and the CMAA-70 specifications as recommended in the GALL Report, as well as the licensee's point-by-point comparison of the two specifications. The point by point comparison was previously submitted to and accepted by the NRC in 1982.

Enhancement 1. LRA Section B2.1.23 states an enhancement to the GALL Report "scope of program," program element to include guidance in licensee procedures to clearly identify the components and structures subject to inspection. The staff finds this enhancement acceptable because when implemented, the Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program will be consistent with the GALL AMP XI.M23 and will add assurance of adequate management of aging effects.

Page: 262

Sequence number: 1
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The words "GALL Report" should be deleted. GALL Report XI.M23 does not list EOCI-61 but rather lists CMAA Specification #70. The more detailed acceptance criterion discussion in the Program Basis Document lists EOCI-61.

Enhancement 2. LRA Section B2.1.23 states an enhancement to the GALL Report "parameters monitored/inspected," program element to include guidance in licensee procedures to require inspection of crane components for corrosion and wear where it is currently omitted. The staff finds this enhancement acceptable because when implemented, the Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program will be consistent with the GALL AMP XI.M23 and will add assurance of adequate management of aging effects.

Operating Experience. The staff also reviewed the OE described in LRA Section B2.1.23. The applicant stated that "the OE review showed that examples of paint damage and corrosion in load handling systems had been identified and corrected prior to loss of intended functions." The staff also reviewed the OE reports, including a sample of CRs, and interviewed the applicant's technical staff to confirm that the plant-specific OE did not reveal any degradation not bounded by industry experience. A CR indicated that in 2003, a crack was discovered in the turbine building crane girder. A NDE was completed to verify the crack and the staff found that proper corrective actions were taken to address the issue.

The staff confirmed that the "operating experience" program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable.

UFSAR Supplement. In LRA section A.2.23, the applicant provided the UFSAR Supplement for the Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program. The staff reviewed this section and finds it acceptable because it is consistent with the corresponding program description in SRP-LR Table 3.3-2.

The staff determines that the information in the UFSAR supplement is an adequate summary description of the program, as required by 10 CFR 54.21(d).

The applicant committed (Commitment No. 19) to implement this program prior to the period of extended operation.

Conclusion. On the basis of its audit and review of the applicant's Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program the staff determined that those program elements for which the applicant claimed consistency with the GALL Report are consistent with the GALL Report. The staff also reviewed the enhancements and confirmed that their implementation before the period of extended operation will result in the existing AMP being consistent with the GALL AMP to which it was credited. The staff concludes that the applicant demonstrated that the effects of aging will be adequately managed so that intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21 (a)(3). The staff also reviewed the UFSAR supplement for this AMP and concluded that it adequately describes the program, as required by 10 CFR 54.21 (d).

Page: 263

Sequence number: 1
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Date: 7/21/2009 1:56:04 PM
This is not a direct quote. Either the text should be corrected, or the quotation marks should be removed.

1 0.3.2.11 Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors

Summary of Technical Information in the Application. LRA Section B2.1.28 describes the applicant's existing Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program. The applicant stated that the Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program (Nickel-Alloy Vessel Head Penetration Nozzle Program) is a condition monitoring program that implements the requirements of the NRC's First Revised Order EA-03-009, "Issue of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors," dated February 20, 2004 (Order). This program manages the aging effects of cracking due to PWSCC of the nickel-alloy vessel head penetration nozzles welded to the upper reactor vessel head.

In addition, the program monitors the upper reactor vessel head surface and the region above the reactor vessel head for boric acid leakage. The upper reactor vessel heads for both Units 1 and 2 have been replaced. The new heads now incorporate Nickel-Alloy 690 (SB167) for each of the reactor head penetration nozzles instead of the Nickel-Alloy 600 utilized in the previous heads.

Staff Evaluation. During its audit, the staff confirmed the applicant's claim of consistency with the GALL Report. The staff reviewed enhancements to determine whether the AMP, with the enhancements, is adequate to manage the aging effects for which the LRA credits it.

The staff noted that where the applicant claimed the Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program to be consistent with elements of the GALL AMP XI.M11A, the Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program elements are consistent with the GALL AMP XI.M11A after the enhancements are implemented.

LRA Section B2.1.28, Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program, identifies four enhancements to the program, as follows:

(1) on the "detection of aging effects" program element - the program will be enhanced to require that any deviations from implementing the appropriate required inspection methods of the NRC First Revised Order EA-03-009, will be submitted for NRC review and approval;

(2) on the "monitoring and trending" program element - the program will be enhanced to require that any deviations from implementing the required inspection frequencies will be submitted for NRC review and approval;

(3) on the "acceptance criteria" program element – the program will be enhanced to require that relevant flaw indications detected as a result of implementing the augmented inspections of the upper reactor vessel closure head penetration nozzles will be evaluated in accordance with the criteria approved by the NRC; and

Page: 264

Sequence number: 1
Author:
Date: 7/29/2009 7:57:01 AM

T This section should be updated to reflect the revised AMP as submitted via L-PI-09-043 dated 4/13/09. Revised AMP has no Enhancements, and already incorporates N-729-1.

Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program in order to incorporate the new augmented inspection requirements for upper reactor vessel closure head penetration nozzles that were mandated in 10 CFR 50.55a(g)(6)(ii)(D) - (E. The staff finds this to be is acceptable because it is in compliance with the requirements 10 CFR 54.21(b) and because the applicant will be required to update the program elements for this AMP to incorporate these new augmented inspection requirements for nickel alloy components [1] the next LRA update required by 10 CFR 54.21(b).

Based on this review, the staff finds that the applicant's UFSAR Supplement for this AMP is acceptable because it is in conformance with the recommended UFSAR Supplement summary description for these types of programs in Table 3.1-2 of the SRP-LR and because the applicant will update the UFSAR Supplement following the augmented inspection requirements for these components in 10 CFR 50.55a (g)(6)(ii)(D) - (E) and in the ASME code cases that are referenced in and subject to the limitations of these regulatory paragraphs.

The staff finds that the UFSAR Supplement for the Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program provides an adequate summary description of the program as required by 10 CFR 54.21(d).

Conclusion. On the basis of its review of the applicant's Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program, the staff finds all program elements are consistent with the GALL Report. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.12 Reactor Head Closure Studs

Summary of Technical Information in the Application. LRA Section B2.1.33 describes the Reactor Head Closure Studs program as consistent, with an enhancement to the GALL AMP XI.M3, "Reactor Head Closure Studs." The program manages the effects of aging for reactor head closure studs and stud components through the implementation of plant procedures following the examination and inspection requirements of ASME Section XI Table, IWB-2500-1, and the guidance provided in NRC Regulatory Guide 1.65, "Materials and Inspection for Reactor Vessel Closure Studs." AERM include cracking due to SCC, and loss of material due to wear, [2]eneral, pitting and crevice corrosion.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. The staff reviewed the enhancement to determine whether the AMP, with the enhancement is adequate to manage the aging effects for which the LRA credits it. The staff reviewed the applicant's on-site documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP and compared the elements in the applicant's program with the GALL AMP XI.M3 program elements.

Page: 268

Sequence number: 1
Author:
Date: 7/15/2009 8:12:08 AM
This update was provided in the annual update letter submitted as L-PI-09-043 on 4/13/09.

Sequence number: 2
Author:
Date: 7/15/2009 8:12:59 AM
The AMP does not specifically manage loss of material due to general, pitting, or crevice corrosion. These aging mechanisms were not applied to the reactor head closure studs. See LRA Table 3.1.2-4.

The staff compared the elements in the applicant's program with the GALL Report program elements. The applicant confirmed that it conforms to the requirements of the ASME Code, Section XI, Subsection IWB 1998 edition including the 1998, 1999, and 2000 Addenda for the current ISI interval, and not the 2001 edition as recommended by GALL Report. The staff noted that the applicant discusses its basis for crediting the ASME Code Section XI edition in LRA AMP B2.1.3, ASME Section XI Inservice Inspection, Subsection IWB, IWC, and IWD Program. The staff evaluates AMP B2.1.3 in SER Section 3.0.3.1.3.

Enhancement 1. LRA Section B2.1.33 states an enhancement to the GALL Report "corrective actions," program elements to include controls to be implemented prior to August 9, 2013, for Unit 1, and October 29, 2014, for Unit 2 which "ensure that future procurement of reactor head closure studs will be in accordance with the material and inspection guidance provided in NRC Regulatory Guide 1.65." The staff confirmed with the applicant that current reactor head closure studs are already in accordance with NRC RG 1.65, and the applicant further explained that though they are aware of, and currently conform to the specifications in NRC RG 1.65, no controls currently exist at PINGP that would prevent non-conformance. The staff finds this enhancement acceptable because when implemented, the Reactor Head Closure Studs Program will be consistent with GALL AMP XI.M3 and will add assurance of adequate management of corrective actions.

Operating Experience. The staff also reviewed the OE described in LRA Section B2.1.33. The applicant stated that the program is effective in the management of age-related degradation associated with reactor head closure studs, as well as the detection of closure bolting leakage associated with reactor head closure studs. The staff reviewed the OE reports to confirm that the plant-specific OE did not reveal any degradation not bounded by industry experience. The reports indicated that two undesirable indications have been recorded on the reactor head closure studs at the PINGP site. These conditions were minor in severity, and were corrected through its corrective action program. PINGP did not identify any adverse trend in program performance. PINGP also reviews industry OE and completes periodic self assessments to evaluate its own program effectiveness.

The staff confirmed that the "operating experience" program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable.

UFSAR Supplement. In LRA section A.2.33, the applicant provided the UFSAR Supplement for the Reactor Head Closure Studs Program. The staff reviewed this section and finds it acceptable because it is consistent with the corresponding program description in SRP-LR Table 3.1-2.

The staff determines that the information in the UFSAR supplement is an adequate summary description of the program, as required by 10 CFR 54.21(d).

The staff verified that, in LRA Commitment No. 26, the applicant committed to implementing the enhancements to the program as described in LRA Section B2.1.33 prior to the period of extended operation.

Page: 269

Sequence number: 1
Author:
Date: 7/17/2009 7:07:50 AM
Suggest changing "basis for crediting" to "use of". The LRA really does not discuss its "basis" for using Section XI vs some other inspection program since Section XI is specified in the GALL.

Sequence number: 2
Author:
Date: 7/29/2009 7:57:10 AM
May wish to note that these indications were not age related per LRA B2.1.33 Reactor Head Studs Program.

The program manages the steps taken (e.g., the review and updating of 60-year fluence projections to support the preparation of new P-T limit curves and pressurized thermal shock reference temperature calculations) for altered RV exposure conditions.

Staff Evaluation. The staff reviewed the applicant's proposed enhancements to the GALL Report requirements to determine whether the AMP, with the enhancements, remains adequate to manage the aging effects for which it is credited. The RVSP, which is designed and implemented in accordance with 10 CFR Part 50, Appendix H, uses testing of the RV surveillance capsule test specimens as the basis for monitoring for neutron irradiation-induced embrittlement in base metals (plate or forgings) and welds that are located in the beltline region of the low alloy steel RV.

Units 1 and 2 RVSP consists of six surveillance capsules for each unit and each capsule contains mechanical test specimens, Charpy V-Notch specimens, neutron dosimetry, and thermal monitors. Fracture toughness of beltline materials is indirectly monitored through measurement of the impact energy of Charpy V-Notch specimens. The applicant has tested four of the six surveillance capsules in each unit to date, and the latest capsules of PINGP, Units 1 and 2 were tested at projected fluence values, which are less than 60 year fluence. Section 6.0 of AMP XI.M31 in NUREG-1801, "Generic Aging Lessons Learned Report," Volume 2, Revision 1, states that if an applicant has a surveillance program that consists of capsules with a projected fluence of less than the projected 60 year fluence at the end of 40 years, at least one capsule is to remain in the RV and to be tested during the extended period of operation. To ensure that the applicant complies with the aforementioned GALL Report requirement, in RAI B2.1.34 (A), by letter dated November 4, 2008, the staff requested that the applicant confirm whether one of the two remaining capsules in each unit will be tested during the extended period of operation. Furthermore, the staff requested that the applicant provide the following relevant information regarding the testing of the capsules in Units 1 and 2.

(1) Applicant's plan to test an additional surveillance capsule from each unit,
(2) the projected refueling outages of withdrawal for each unit, and
(3) projected neutron fluence value for each capsule at the time of withdrawal.

In response to the staff's RAI, in a letter dated November 13, 2008, the applicant stated that one of the two remaining capsules in each unit will be withdrawn after the capsules have received a neutron fluence equivalent to the 54 effective full power years (EFPY). The applicant did provide the projected maximum RV fluence values that represent the fluence values for 54 EFPY at the time of withdrawal of the surveillance capsules from Units 1 and 2. The Unit 1 surveillance capsule is planned for withdrawal during the re-fueling outage 1R27 which is expected to occur in 2011, and the Unit 2 surveillance capsule is planned for withdrawal during the re-fueling outage 2R27 which is expected to occur in 2012. The staff finds the applicant's response acceptable because it complies with the GALL Report requirement and it provides adequate assurance that the applicant intends to monitor the neutron embrittlement of the RV during the extended period of operation.

In RAI B.2.1.34 (B), in a letter dated November 4, 2008, the staff requested that the applicant confirm that the withdrawal schedule of the capsules to be used for future tests during the extended period of operation is consistent with the requirements specified in paragraph 7.6.2 of

Page: 271

Sequence number: 1
Author:
Date: 7/15/2009 8:26:33 AM

This statement appears to come from Section 5.0 of NUREG-1801, AMP XI.M31 and does not apply to PINGP, since the capsules will reach the projected 60 year fluence before the period of extended operation. Section 6.0 is the correct section number but it should state: If an applicant has a surveillance program that consists of capsules with a projected fluence exceeding the 60-year fluence at the end of 40 years, the applicant withdraws one capsule at an outage in which the capsule receives a neutron fluence equivalent to the 60-year fluence and tests the capsule in accordance with the requirements of ASTM E 185.

the American Society of Testing Materials (ASTM) E 185, 1982 Edition, "Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels."

In response to the staff's RAI B.2.1.34 (B), in a letter dated November 13, 2008, the applicant confirmed that consistent with the requirements specified in ASTM E 185, 1982 Edition, it will withdraw the surveillance capsules from Units 1 and 2 during the license renewal period when their exposure exceeds the peak neutron fluence value at 54 EFPY but does not exceed twice this peak neutron fluence value. The staff accepts this response as it is consistent with the requirements specified in ASTM E 185, 1982 Edition.

In RAI B.2.1.34 (C), by letter dated November 4, 2008, the staff requested that the applicant confirm that untested surveillance capsules (standby capsules) will be stored for future use at Units 1 and 2. In response to the staff's RAI B.2.1.34 (C), by a letter dated November 13, 2008, the applicant stated that consistent with its Commitment No. 27, it will add a requirement to AMP B2.1.34 indicating that the untested standby capsules will be placed in storage and maintained for future insertion at PINGP.

The staff finds this response acceptable because future capsule testing will provide reasonable assurance that neutron irradiation-induced embrittlement in the RV beltline materials as a result of any change in projected neutron fluence can be monitored effectively during the extended period of operation. The staff determined that the aforementioned applicant's response will be included in the staff's safety evaluation as a part of a standard license condition.

After reviewing the applicant's response to the staff's RAI B.2.1.34(A), (B) and (C), the staff concludes that its concern described in RAI B.2.1.34 is resolved.

The staff accepts the applicant's RVSP based on the following reasons:

- the testing of the surveillance capsules in accordance with the proposed schedule provides reasonable assurance that the neutron-induced embrittlement in low alloy steel RV base metals and their associated welds will be adequately monitored during the extended period of operation and,
- the applicant's RVSP complies with the requirements of the 10 CFR Part 50, Appendix H.

The staff confirmed that the applicant's discussion of the OE program element satisfies the criteria defined in the GALL Report and in Section A.1.2.3.10 of the "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." The staff finds this program element acceptable.

Operating Experience. The applicant stated that the RVSP has been effectively used to monitor the RV material aging effects due to neutron embrittlement. Based on the projected neutron fluence for the extended period of operation [i.e., 54 effective full power years (EFPY)], the applicant claimed that the RV beltline materials will maintain projected upper-shelf energy values exceeding the minimum required value of 50 ft-lb. The PTS reference temperatures for the beltline materials are projected to be below the screening criteria of 270 °F for longitudinal welds, plates and forgings and 300 °F for circumferential welds at 54 EFPY.

Page: 272

Sequence number: 1
Author:
Date: 7/30/2009 8:34:12 AM

TNSPM did not commit to withdrawing the capsule during the period of extended operation (PEO) in the letter referenced. NSPM commited to withdrawing one of the remaining capsules from each Unit when its neutron fluence exposure exceeds the new peak EOL (54 EFPY) vessel fluence, but prior to exceeding twice that fluence exposure. The capsule will reach the EOL (54 EFPY) prior to the PEO. Refer to the response to RAI B2.1.34 in the letter dated November 12, 2008. In addition, "license renewal period" should be "period of extended operation."

the program will be managed adequately so that the structure and component intended functions will be maintained during the period of extended operations.

The staff confirmed that the "operating experience" program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable.

UFSAR Supplement. In LRA Section A2.37, the applicant provided the UFSAR supplement for the Steam Generator Tube Integrity Program. The staff verified that the UFSAR supplement summary description for the Steam Generator Tube Integrity Program was in conformance with the staff's recommended UFSAR supplement for these types of programs provided in Table 3.1-2 of the SRP-LR.

Based on this review, the staff determines that UFSAR supplement Section A2.37 provides an acceptable UFSAR supplement summary description of the applicant's Steam Generator Tube Integrity Program because it is consistent with those UFSAR supplement summary description in the SRP-LR for Steam Generator Tube Integrity Program. The staff determines that the information in the UFSAR supplement is an adequate summary description of the program as required by 10 CFR54.21(d).

Conclusion. On the basis of its audit and review of the applicant's Steam Generator Tube Integrity Program, the staff determines that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the exception and determines that the AMP, with the exception, is adequate to manage the aging effects for which the LRA credits it. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.17 Structures Monitoring

Summary of Technical Information in the Application. LRA Section B2.1.38 describes the existing Structures Monitoring Program as consistent, with enhancements, with the GALL AMP XI.S6, "Structures Monitoring Program." In the LRA, the applicant stated that the program will manage aging effects such that loss of material, cracking, change of material properties, and loss of form are detected by visual inspection prior to the loss of the structure's or component's intended function(s). The applicant also stated that the program incorporates inspection guidance based on recommendations contained in ACI 349.3R, "Evaluation of Existing Nuclear Safety-Related Concrete Structures."

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. The staff reviewed the enhancements in Commitment No. 30 to determine whether the AMP, with the enhancements, is adequate to manage the aging effects for which it is credited in the LRA.

During its audit, the staff audited the applicant's on-site documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL

Page: 281

Sequence number: 1
Author:
Date: 7/21/2009 3:08:22 PM
These AERMs are not applicable to the SMP and were not used in the LRA. Suggest replacing with "... and increase in porosity and permeability, among others."

The staff reviewed the applicant's response and the proposed LRA changes. The staff noted that by deleting Exception 2 from the LRA and providing a new enhancement to require that reactor coolant system dissolved oxygen action level limits be consistent with the limits established in the EPRI PWR Primary Water Chemistry Guidelines, the applicant is committing to eliminate the difference between its procedural limits on dissolved oxygen and the limits as recommended in EPRI guidelines. This change will result in this feature of the applicant's Water Chemistry Program being consistent with the recommendations in GALL AMP XI.M2, "Water Chemistry."

The staff finds the applicant's action levels for dissolved oxygen to be acceptable because the applicant has amended the LRA to make these actions levels consistent with the EPRI PWR Primary Water Chemistry Guidelines and because this is consistent with the recommendations in the GALL AMP XI.M2 to use these guidelines for primary coolant chemistry monitoring.

In a letter dated January 20, 2009, the applicant revised Commitment No. 32 of the list of "Preliminary License Renewal Commitments" to include a statement that the Water Chemistry Program will require reactor coolant system dissolved oxygen Action Level limits to be consistent with the limits established in the EPRI PWR Primary Water Chemistry Guidelines. The staff noted that implementation of this commitment is scheduled prior to the beginning of the period of extended operation. The staff finds this revised commitment acceptable because it ensures that this feature of the applicant's Water Chemistry Program is consistent with the recommendations in the GALL AMP XI.M2.

Based on its review of Exception 2 and changes made to the LRA in response to RAI AMP-B2.1.40-3, including the applicant's revision to Commitment No. 32, the staff finds the affected features of the applicant's Water Chemistry program to be consistent with the GALL AMP XI.M2, and therefore to be acceptable.

Exception 3. LRA Section B2.1.40 states an exception to the "acceptance criteria" program element in that feedwater hydrazine levels during heatup, hot shutdown, and startup (Modes 2, 3, and 4) are maintained greater than 100 ppb, which is higher, and more conservative than the 20 ppb recommended by the EPRI guidelines.

The staff noted that the applicant has recirculating steam generators and reviewed the feedwater hydrazine control parameter limit in EPRI's Pressurized Water Reactor Secondary Water Chemistry Guidelines, Revision 6, Table 5-2, Recirculating Steam Generator Heatup/Hot Shutdown and Startup Feedwater Sample. The staff noted that the hydrazine control parameter limit recommended in the EPRI report is a minimum concentration of 20 ppb. The staff also noted that the applicant uses hydrazine for oxygen control, not for pH control, and that an upper limit on hydrazine content is not specified in the EPRI guidelines when it is used for oxygen control. Because the applicant's feedwater minimum hydrazine limit is 100 ppb, which is greater than 20 ppb and conservative relative to EPRI's recommended minimum hydrazine concentration, the staff finds Exception 3 to the "acceptance criteria" program element to be acceptable.

Enhancement 1. LRA Section B2.1.40 states an enhancement to the "monitoring and trending" program element, to be implemented prior to the period of extended operation. The applicant stated that the program will be enhanced to require increased sampling to be performed as

Page: 290

Sequence number: 1
Author:
Date: 7/29/2009 7:57:31 AM
Letter was dated December 5, 2008.

applicant further states that at least once each quarter, the program owner conducts a review of plant operating records to determine if a "cycle" has occurred for any of the design pressure or temperature transients. Then, the program owner will add the event to the proper cycle summary sheet along with a brief description of the transient cycle, if a cycle has occurred.

The applicant stated that the majority of transient cycles logged to date have been associated with heatup, cooldown and reactor trip events. The applicant stated that the historic averages of the PINGP plant heatup and plant cooldown temperature rates were approximately 40 °F/hr and 70 °F/hr, respectively. As for the reactor trip events, the applicant stated that approximately 65 percent of the reported reactor trip events in both units have occurred from an initial power level between 75 percent and 100 percent power and the remaining 35 percent of reactor trip events occurred from an initial power level lower than 75 percent of full power. For design purposes, the reactor trip transient is based on a trip from 100 percent power conditions. Therefore, the applicant states that the actual plant heatup, cooldown and reactor trip events are all bounded by the design transients.

The applicant further states that if a design limit for the number or severity of a transient were exceeded, a Corrective Action Program (CAP) would be initiated to determine the effects on system components. And the corrective 1 tion includes reanalysis, repair, or replacement of the affected components, and assessment of additional pressure boundary locations that may be affected.

Based on its review, the staff finds the applicant's response to RAI 4.3.1-1 acceptable because: (1) PINGP has developed Metal Fatigue of Reactor Coolant Pressure Boundary Program to appropriately track the number of occurrences of design cycles, (2) PINGP has developed Technical Specifications and surveillance procedures to ensure that components are maintained within the design limits, (3) PINGP has acquired records of major thermal events such as heatup, cooldown and reactor trip transients confirming that the temperature and pressure values experienced by the PINGP structural components are bounded by the design transients, (4) PINGP has developed a Corrective Action Program, which initiates and determines appropriate actions to be taken if abnormal situations should occur, and the operational procedures that PINGP adopts for the transient events tracking are consistent with the GALL Report and conservative to ensure a valid fatigue management program.

The staff notes that RAI 4.3.1-1 and the applicant response to this RAI are discussed in greater details in SER Section 4.3.1.

Enhancement. The applicant stated in LRA Section B3.2 that PINGP Metal Fatigue of Reactor Coolant Pressure Boundary Program will be enhanced in three areas: (1) monitoring of the six component/locations identified in NUREG/CR-6260, as applicable to PINGP; (2) implementing stress-based fatigue usage monitoring for selected locations subject to pressurizer insurge/outsurge transients; (3) Reducing cycle limit of the plant loading (at 5 percent per minute) and plant unloading (at 5 percent per minute) to 1835 cycles just so fatigue requirement for the RV internals baffle bolts is satisfied.

The staff noted that the enhancements stated in the LRA have been revised as a result of the RAI 4.3.1.1-1. The staff noted that RAI 4.3.1.1-1 and the applicant response to this RAI are discussed in greater details in SER Section 4.3.1.1. In the new version, for Area (1) of the

Page: 295

Sequence number: 1
Author:
Date: 7/21/2009 3:52:55 PM
T Suggest adding word "potentially" ("action potentially includes") to be consistent with the response to RAI 4.3.1-1 Part (a). Every action listed would not necessarily be applicable to a transient entered into the Corrective Action Program.

enhancement (monitoring of the NUREG/CR-6260 locations), the "monitoring type" assignment to each of the six NUREG/CR-6260 locations is dropped. Previously, three monitoring types were indicated among the six NUREG/CR-6260 locations. Specifically, two of those six components/locations were assigned to stress-based fatigue usage monitoring, another two locations were assigned to cycle-based fatigue usage monitoring, and the remaining two locations were assigned to cycle counting. Area (2) of the enhancement (implementing stress-based fatigue usage monitoring) is now completely removed. The staff noted that dropping out from enhancement does not mean fatigue requirement for the affected components is ignored. Fatigue requirement for the affected components are addressed in the appropriate subsections under SER Section 4.3.

Based on its review of the program, the staff finds the enhancement described in this section acceptable because it is consistent with the GALL AMP X.M1 guidance to address the light water reactor environment effects on fatigue life of structural components. All changes made to the enhancement to remove the reference to (or performance of) *stress-based fatigue monitoring*, are necessary because FatiguePro (analytical software PINGP selected for performing the stress-based monitoring) does not follow the NRC endorsed ASME guidelines in evaluating fatigue usage. The staff noted that the changes mentioned here are caused by the issue described in RAI 4.3.1.1-1. The other part of the changes made to the enhancement is dropping out "monitoring type" assignment for each of the NUREG/CR-6260 components/locations, is acceptable because all those 6 components are now evaluated following the ASME Section III subsection NB guidelines based on the monitored transient cycles along with the guidelines in NUREG/CR-6583 and NUREG/CR-5704 to address the environmental effects.

The staff noted that under the enhancement paragraphs in LRA Section B3.2, the applicant included statements regarding acceptance criteria. 1s a result of RAI 4.3.1-1, however, the applicant revised the acceptance criteria. A comparison of the affected segment is as follows (in italic typeface):

The acceptance criteria as appeared in LRA Section B3.2:

> *"... acceptance criteria will be clarified to require corrective action to be taken before a cumulative fatigue usage factor exceeds 1.0 or a design basis transient cycle limit is exceeded."*

The acceptance criteria as appeared in the response to RAI 4.3.1-1 (contained in Enclosure 1 under a letter to NRC Document Control Desk, L-PI-09-030, dated February 26, 2009):

> *"... acceptance criteria will be revised to clarify that corrective action is to be taken before any monitored location exceeds either a cumulative fatigue usage factor of 1.0 or a design basis transient cycle limit."*

2he applicant indicated that the criteria described in the LRA will be replaced by the one described in the response to RAI-4.3.1-1 as shown above. The staff reviewed both versions of the acceptance criteria and found little difference between them. Both versions have addressed the limit on the cumulative usage factor (CUF) and the limits on the cycles and both versions state that corrective action will be taken either before CUF is greater than 1.0 or before the

Page: 296

Sequence number: 1
Author:
Date: 7/21/2009 3:55:15 PM
This sentence should be deleted. The response to RAI 4.3.1-1 (NSPM letter dated 2/26/09) did not result in a revision to the program enhancements. See additional comments below

Sequence number: 2
Author:
Date: 7/29/2009 7:57:45 AM
This statement and the following discussion does not accurately reflect the intent of the discussion regarding acceptance criteria in the February 26, 2009, letter.

The quotation from the February 26 letter is a summary of the enhancement provided in Section B3.2 of the LRA and in Commitment 33. This statement in the response to RAI 4.3.1-1 was not a quote of the existing commitment, nor did it revise the LRA or commitment regarding the planned clarification of acceptance criteria. The February 26 letter explicitly states that the letter contains no new commitments or revisions to existing commitments, so the wording of the commitment remains as revised in the letter dated 1/9/09.

The language used to describe the commitment in the response to RAI 4.3.1-1 is considered equivalent to the language used in commitment 33 and has the same intended meaning. As stated in the SER, the difference between the wording of the two versions is subtle; it is not considered to be a substantive technical difference.

1ansients exceed their design cycle limits. The difference between the two versions is subtle. To wit, the new version limits corrective actions applicable to the monitored locations only, whereas the original version does not impose such restrictions.

2he staff noted that to enforce corrective action before either the CUF or transient cycles exceeds their respective limits is a proper way to manage aging issue associated with fatigue damage. However, the manner the criteria were stated is improper because the requirement of "before exceeding 1.0" on the CUF, and the requirement of "before exceeding the design cycles" on the cycles are automatically satisfied by all components at the beginning of services. This would result in an improbable situation (i.e., calling for corrective actions from day one).

Based on the discussion described above, the staff determined the necessity of setting appropriate bars on the CUF value and cycles, above which corrective action would be triggered to assure fatigue requirements being maintained.

Reactor internals baffle bolt fatigue transient limits of 1835 cycles of plant loading at 5 percent per minute and 1835 cycles of plant unloading at 5 percent per minute will be incorporated into the Metal Fatigue of Reactor Coolant Pressure Boundary Program and UFSAR Table 4.1-8 to conform to the baffle bolt fatigue limits discussed in LRA Section 4.3.1.2, RVIs.

On area (3) of the enhancement (reducing cycle limit of the plant loading/unloading transients), the applicant described the reason for the necessity of a reduction in cycle limit for these particular transients for this particular component (RV internals baffle bolts) in LRA Section 4.3.1.2. Details of the staff review of the subject are shown in SER Section 4.3.1.2.2. On the basis of its review, the staff found the applicant's request of cycle limit reduction acceptable for the reasons described in SER Section 4.3.1.2.2. The applicant incorporated the new limit into the Metal Fatigue of Reactor Coolant Pressure Boundary Program as stated in Commitment No.34.

Operating Experience. The staff also reviewed the OE described in LRA Section B3.2. The applicant stated that it has reviewed the OE associated with the Metal Fatigue of Reactor Coolant Pressure Boundary Program and indicates the PINGP program has demonstrated the ability of effectively monitor plant transients and track the accumulation of these transients.

The applicant indicated that PINGP has factored industry experience into its program, including evaluation of thermal/operating stresses that were not considered in the original design such as evaluation of Pressurizer Surge Line Thermal Stratification which is described in NRC Bulletin 88-11 and is in progress to implement EPRI guidelines provided in "Management of Thermal Fatigue in Normally Stagnant Non-Isolable RCS Branch Lines," which is contained in EPRI Report MRP-146. The staff noted that MRP-146 presents guidelines for screening, evaluating and inspecting potential thermal fatigue cracking issues due to swirl penetration and/or valve in-leakage that may occur in normally stagnant non-isolable piping systems attached to pressurized water reactor coolant system (PWRCS) piping. As stated in MRP-146, the objective of these guidelines is to provide a common industry approach to reduce the probability of cracking and leakage from piping potentially susceptible to thermal fatigue.

The applicant indicated that it has performed evaluation of the effects of light water reactor environment on fatigue life of structural components for the six NUREG/CR-6260 components

Page: 297

Sequence number: 1
Author:
Date: 7/21/2009 3:58:19 PM
TContinuation of above comment

Sequence number: 2
Author:
Date: 7/29/2009 7:57:56 AM
TThese paragraphs should be deleted as they do not appear to be applicable to the NRC review of the PINGP LRA.

(or locations) applicable to PINGP. The applicant indicated that in performing the environmental fatigue analyses, PINGP first has to calculate the fatigue usage under the air environment for three of the NUREG/CR-6260 component locations (charging nozzle, safety injection nozzle, and residual heat removal Class 1 piping tee). That was because these three components were designed in accordance with B31.1.0 and so no explicit fatigue analysis was required in the original design report. As a result, fatigue monitoring is now expanded to include locations not previously monitored by the cycle counting program.

UFSAR Supplement. In LRA Section A.4.2, the applicant provided the UFSAR supplement for the Metal Fatigue of Reactor Coolant Pressure Boundary Program. The staff also verified that in 1ommitment No. 34, the applicant has committed to the enhancement of the program which is scheduled for implementation prior to the period of extended operation (August 09, 2013, for Unit 1 and October 12, 2014, for Unit 2). The staff reviewed UFSAR Supplement section and determines that the information in the UFSAR supplement is an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's Metal Fatigue of Reactor Coolant Pressure Boundary Program, including the applicant's responses to RAIs 4.3.1.1-1 and 4.3.1-1, the staff concludes that those program elements for which the applicant claimed consistency with the GALL Report are consistent. Also, the staff reviewed the enhancements and confirmed that its implementation prior to the period of extended operation through 2ommitment No. 34 would make the existing AMP consistent with the GALL AMP. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and determined that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3 AMPs Not Consistent with or Not Addressed in the GALL Report

3.0.3.3.1 Nickel Alloy Nozzles and Penetration Program

In LRA Appendix B, the applicant identified the following AMPs as plant-specific:

For AMPs not consistent with or not addressed in the GALL Report the staff performed a complete review to determine their adequacy to monitor or manage aging. The staff's review of these plant-specific AMPs is documented in the following sections.

Summary of Technical Information in the Application. By letter dated March 27, 2009, the applicant amended the Nickel-Alloy Nozzles and Penetrations Program to redefine the program as an existing plant-specific AMP for the LRA that incorporates the ten program elements for AMPs, as recommended in SRP-LR Appendix A, Section A.1.2.3, and to delete the commitment in the previous version of the AMP and in LRA Commitment No. 21 from the scope of the LRA.

LRA Section B2.1.27 as amended in the letter March 27, 2009, describes the existing Nickel-Alloy Nozzles and Penetration Program as a plant-specific AMP for those ASME Code Class 1 nickel-alloy base metal and weld components. In this amended version of the AMP, the applicant defined the AMP in terms of the 10 program elements that are recommended for

Page: 298

Sequence number: 1
Author:
Date: 7/29/2009 7:58:05 AM
This should recognize both Commitments 33 and 34

Sequence number: 2
Author:
Date: 7/29/2009 7:58:16 AM
This should recognize both commitments 33 and 34

The staff noted that the Nickel-Alloy Nozzles and Penetrations Program is an inspection program such that only item 1) above applies this program. The staff noted that the parameters to be monitored/inspected that are linked to specific degradation (PWSCC) are identified in the Nickel-Alloy Nozzles and Penetrations Program. The staff noted that cracking is monitored through the ISI program using visual bare metal inspection (for BMI penetration and associated welds), surface inspection (for core support pads) and volumetric inspections (for the weld overly of the Unit 2 surge nozzle). The staff also noted that volumetric, surface, and visual inspections are performed on a periodic basis such that degradation can be detected in a timely manner.

The staff confirmed that the "parameters monitored or inspected" program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.3. The staff finds this program element acceptable.

Detection of Aging Effects. LRA Section B2.1.27 states that the program utilizes visual and volumetric examination techniques to detect cracking in Alloy 600/82/182 materials. 10 CFR 50.55a requires that all power reactors maintain an Inservice Inspection Program in accordance with the ASME Boiler and Pressure Vessel Code, Section XI. The Nickel-Alloy Nozzles and Penetrations Program implements the inspection of the Alloy 600/82/182 materials through the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. The applicant further stated that:

(1) For the reactor vessel core support pads, the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program conducts a visual VT-1 examination of the accessible interior attachment welds per Table IWB-2500-1, Examination Category B-N-2, once per Inservice Inspection interval.

(2) Inspection of the FSWOL on the pressurizer surge nozzle-to-safe end dissimilar metal weld (Alloy 82) and safe end-to-reducer stainless steel butt weld are ultrasonically examined in accordance with ASME Section XI, Nonmandatory Appendix Q, Figure Q-4300-1. Inservice examinations as described in Q-4300 are performed in accordance with the requirements of MRP-139, "Primary System Piping Butt Weld Inspection and Evaluation Guidelines," with the additional requirement of at least one ultrasonic examination within ten years of the FSWOL application.

(3) Reactor pressure vessel bottom head bare metal visual examinations are performed by removing insulation sections and/or examining under the insulation using remote viewing equipment that provides a high degree of resolution in order to identify very small volumes of boric acid that may result from Alloy 600 PWSCC. The inspections are in compliance with ASME Code Case N-722, "Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated With Alloy 600/82/182 Materials," as required by and modified by 10 CFR 50.55a(g)(6)(ii)(E).

The staff reviewed the applicant's "detection of aging effects" program element against the criteria in SRP-LR Section A.1.2.3.4, which states that AMPs should:

(1) Provide information that links the parameters to be monitored or inspected to the aging effects being managed.

Page: 302

Sequence number: 1
Author:
Date: 7/29/2009 7:58:25 AM
Delete "surface" and replace with "visual". Visual inspections are conducted for the core supports. Refer to letter dated March 27, 2009.

Sequence number: 2
Author:
Date: 7/29/2009 7:58:33 AM
Delete "surface." Visual inspections are conducted for the core supports. Refer to letter dated March 27, 2009.

(2) Describe when, where, and how program data are collected (i.e., all aspects of activities to collect data as part of the program).

(3) Link the method or technique and frequency, if applicable, to plant-specific or industry-wide OE.

(4) Provide the basis for the inspection population and sample size when sampling is used to inspect a group of SCs. The inspection population should be based on such aspects of the SCs as a similarity of materials of construction, fabrication, procurement, design, installation, operating environment, or aging effects.

The staff noted that inspection for PWSCC using appropriate methods for the specific components are performed on a periodic basis such that cracking will be detected before the intended function is compromised. Inspection using volumetric, surface, and visual techniques are performed and scheduled in accordance with ASME Section XI, MRP-139, and the requirements of ASME Code Case N-722, "Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated With Alloy 600/82/182 Materials," as required by and modified by 10 CFR 50.55a(g)(6)(ii)(E). Therefore, the frequencies and techniques used to detect PWSCC are established in accordance with ASME code, regulatory, and industry program requirements. The staff noted that inspections would be carried out through the end of the period of extended operation.

The staff confirmed that the "detection of aging effects" program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.4. The staff finds this program element acceptable.

Monitoring and Trending. LRA Section B2.1.27 states that the program incorporates the inspection schedules and frequencies for the nickel-alloy components in accordance with the PINGP ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program and, where applicable, ASME Code Case N-722, subject to the conditions specified in 10 CFR 50.55a(g)(6)(ii)(E), where flaw indications detected during the required examinations are dispositioned in accordance with the Corrective Actions program. The applicant further stated that the PINGP Nickel-Alloy Nozzles and Penetrations Program ranks the reactor pressure vessel bottom head penetrations as moderate for their lower susceptibility to PWSCC given the cooler temperature environment, good volumetric examination experience, and the medium-to-high failure consequence and are inspected in accordance with ASME Code Case N-722 which requires inspection of the reactor pressure vessel bottom head penetrations every other refueling outage.

The staff reviewed the applicant's "monitoring and trending" program element against the criteria in SRP-LR Section A.1.2.3.5, which states that monitoring and trending activities should be described, and they should provide predictability of the extent of degradation and thus effect timely corrective or mitigative actions, this program element describes how the data collected are evaluated and may also include trending, and the parameter or indicator trended should be described.

The staff noted that monitoring and trending in the applicant's Nickel-Alloy Nozzles and Penetrations Program is acceptable because monitoring and trending is performed in accordance with ASME code requirements, EPRI MRP guidelines and ASME Code Case N-

Page: 303

Sequence number: 1
Author:
Date: 7/29/2009 7:58:42 AM
Delete "surface." Visual inspections are conducted. No requirement exists for the conduct of surface exams on these nickel-alloy components. Refer to letter dated March 27, 2009.

The staff confirmed that the "corrective action" program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.7. The staff finds this program element acceptable.

Operating Experience. The staff also reviewed the OE described in LRA Section B2.1.27. The applicant stated that:

(1) the PINGP Unit 2 pressurizer surge nozzle-to-safe end weld was ultrasonically examined in November 2006 and September 2008 where no reportable PWSCC indications were detected. The applicant further stated that in October 2008, following installation of the FSWOL, ultrasonic examinations (UT) were performed of the new overlay weld and the nozzle-to-safe end dissimilar metal weld. One hundred percent of the Code-required volume was achieved during the examinations where no recordable indications were detected.

(2) PINGP conducted bare metal visual examinations of the reactor vessel instrumentation tube penetrations (bottom head) in May 2006 for Unit 1 and April 2005 for Unit 2 where no indications were observed.

(3) A visual VT-1 examination of the accessible welds of the reactor vessel core support pads was conducted in October 2004 for Unit 1 and in May 2005 for Unit 2. where no recordable indications on the core support pads were detected in either Unit.

The staff noted that the applicant did not identify any leakage of the borated reactor coolant due to cracking in the bottom head penetration nozzles or the nickel alloy welds. Thus, the staff concludes that the applicant has addressed the generic OE for the bottom head penetrations because the applicant will now follow the current augmented inspection requirements, as mandated in 10 CFR 50.55a g)(6)(ii)(D) - (E) and in the ASME code cases are referenced in and subject to the limitations of these regulatory paragraphs. The staff also noted that the applicant installed a FSWOL on the Unit 2 surge nozzle-to-safe end dissimilar weld and will provide inspection of the FSWOL in accordance with ASME Section requirements and MRP-139 Guidelines implemented through the applicant's augmented ISI Program.

The staff audited the OE reports. The staff noted that the Nickel-Alloy Nozzles and Penetrations Program provide the inspection details for detection of PWSCC. The documents reviewed by the staff confirm that the plant-specific OE did not reveal any degradation not bounded by industry experience. The OE provides evidence that PWSCC will be adequately managed through the period of extended operation.

The staff confirmed that the OE program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable.

UFSAR Supplement. The applicant provided its UFSAR Supplement for the Nickel-Alloy Nozzles and Penetrations Program in PINGP LRA, Appendix A, Section A2.27. The staff verified that provisions of the UFSAR Supplement are acceptable because these provisions are in accordance with SRP-LR, 2 ables 3.1-2, Nickel-Alloy Nozzles and Penetrations. The staff noted, the applicant has amended the LRA to eliminate LRA Commitment No. 21 from the LRA because of the new augmented 3 nspection bases for nickel alloy components in 10 CFR 50.55a(g)(6)(ii)(D) - (E) and ASME Code Cases N-729-1 and N-22, which are invoked

Page: 306

Sequence number: 1
Author:
Date: 7/15/2009 9:00:40 AM
This sentence should be corrected. PINGP does follow the augmented inspection requirements of 10 CFR 50.55a(g)(6)(ii)(D). However, 10 CFR 50.55a(g)(6)(ii)(D) refers to reactor vessel head inspections and is not related to this program. In addition, Code Case N-722 is not subject to the conditions of 10 CFR 50.55a(g)(6)(ii)(D). Refer to letter to the NRC dated March 27, 2009. Compliance with 10 CFR 50.55a(g)(6)(ii)(D) is discussed in the letter dated April 13, 2009, in B2.1.28 Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program.

Sequence number: 2
Author:
Date: 7/15/2009 9:00:34 AM
This program is not discussed in SRP Table 3.1-2. It is discussed in SRP Section 3.1.2.2.13, Cracking due to Primary Water Stress Corrosion Cracking (PWSCC) and 3.1.3.2.13, Cracking due to Primary Water Stress Corrosion Cracking.

Sequence number: 3
Author:
Date: 7/15/2009 9:06:17 AM
Should read: "...inspection bases for nickel alloy components in 10 CFR 50.55a(g)(6)(ii)(E) and ASME Code Case N-722,...". Refer to letter dated March 27, 2009.

Note that Commitment No. 22 was eliminated due to compliance with 10 CFR 50.55a(g)(6)(ii)(D) and ASME Code Case N-729-1 as discussed in letter dated April 13, 2009

(with limitations) by these paragraphs, respectively. The staff noted the applicant, by letter dated March 27, 2009, provided an update of LRA Section A2.27 that provides a plant-specific Nickel-Alloy Nozzles and Penetrations Program, which will implement inspection, mitigation, and repair/replacement activities in accordance with new requirements described above through augmentation of the ASME Section XI Inservice Inspection Program.

The staff finds that the UFSAR Supplement for the Nickel-Alloy Nozzles and Penetrations Program provides an adequate summary description of the program, as identified in the SRP-LR UFSAR Supplement, Table 3.1-2 as required by 10 CFR 54.21(d).

Conclusion. On the basis of its review of the applicant's Nickel-Alloy Nozzles and Penetrations Program, the staff finds all program elements consistent with the GALL Report. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.4 Quality Assurance Program Attributes Integral to Aging Management Programs

3.0.4.1 Summary of Technical Information in Application

In Appendix A, "UFSAR Supplement," Section A2.0, "Summary Descriptions of Programs that Manage the Effects of Aging," and Appendix B, "Aging Management Programs," Section B1.3, "Quality Assurance Program and Administrative Controls," of the LRA , the applicant described the elements of corrective action, confirmation process, and administrative controls that are applied to the AMPs for both safety-related and nonsafety-related components. The PINGP quality assurance program (QAP) is used which includes the elements of corrective action, confirmation process, and administrative controls. Corrective actions, confirmation process, and administrative controls are applied in accordance with the QAP regardless of the safety classification of the components. Section A2.0 and Section B1.3, of the LRA state that the QAP implements the requirements of 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," and is consistent with the NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (SRP-LR)," Revision 1.

3.0.4.2 Staff Evaluation

Pursuant to 10 CFR 54.21(a)(3), an applicant is required to demonstrate that the effects of aging on SCs subject to an AMR will be adequately managed so that their intended functions will be maintained consistent with the CLB for the period of extended operation. The SRP-LR, Branch Technical Position RLSB-1, "Aging Management Review - Generic," describes ten attributes of an acceptable AMP. Three of these 10 attributes are associated with the (QA) activities of corrective action, confirmation process, and administrative controls. Table A.1-1, "Elements of an Aging Management Program for License Renewal," of Branch Technical Position RLSB-1 provides the following description of these quality attributes:

Page: 307

Sequence number: 1
Author:
Date: 7/15/2009 9:07:08 AM
This program is not discussed in SRP Table 3.1-2. It is discussed in SRP Section 3.1.2.2.13, Cracking due to Primary Water Stress Corrosion Cracking (PWSCC) and 3.1.3.2.13, Cracking due to Primary Water Stress Corrosion Cracking.

Sequence number: 2
Author:
Date: 7/29/2009 7:58:58 AM
The GALL report does not have program elements for the Nickel-Alloy Nozzles and Penetrations Program. This program is a plant-specific program, and program elements are consistent with the guidance of in the SRP.

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Stainless steel, steel with stainless steel cladding reactor coolant system cold leg, hot leg, surge line, and spray line piping and fittings exposed to reactor coolant (3.1.1-62)	Cracking due to cyclic loading	Inservice Inspection (IWB, IWC, and IWD)	No	Not applicable	Not applicable to PINGP (See SER Section 3.1.2.1.1)
Steel reactor vessel flange, stainless steel and nickel alloy reactor vessel internals exposed to reactor coolant (e.g., upper and lower internals assembly, CEA shroud assembly, core support barrel, upper grid assembly, core support shield assembly, lower grid assembly) (3.1.1-63)	Loss of material due to wear	Inservice Inspection (IWB, IWC, and IWD)	No	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (B2.1.3).	Consistent with GALL Report
Stainless steel and steel with stainless steel or nickel alloy cladding pressurizer components (3.1.1-64)	Cracking due to stress corrosion cracking, primary water stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD) and Water Chemistry	No	ASME Section XI Inservice Inspection Subsections IWB, IWC, and IWD Program (B2.1.3) and Water Chemistry Program (B2.1.40)	Consistent with GALL Report

Page: 324

Sequence number: 1
Author:
Date: 7/29/2009 7:59:07 AM
Should also list PWR Vessel Internals Program here

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Nickel alloy reactor vessel upper head and control rod drive penetration nozzles, instrument tubes, head vent pipe (top head), and welds (3.1.1-65)	Cracking due to primary water stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD) and Water Chemistry and Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors	No	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (B2.1.3), Water Chemistry Program (B2.1.40), and 1ckel-Alloy Nozzles and Penetrations Program (B2.1.27)	Consistent with GALL Report
Steel steam generator secondary manways and handholds (cover only) exposed to air with leaking secondary-side water and/or steam (3.1.1-66)	Loss of material due to erosion	Inservice Inspection (IWB, IWC, and IWD) for Class 2 components	No	Not applicable	Not applicable to PINGP (See SER Section 3.1.2.1.1)
Steel with stainless steel or nickel alloy cladding; or stainless steel pressurizer components exposed to reactor coolant (3.1.1-67)	Cracking due to cyclic loading	Inservice Inspection (IWB, IWC, and IWD), and Water Chemistry	No	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (B2.1.3) and Water Chemistry (B2.1.40)	Consistent with GALL Report
Stainless steel, steel with stainless steel cladding Class 1 piping, fittings, pump casings, valve bodies, nozzles, safe ends, manways, flanges, CRD housing; pressurizer heater sheaths, sleeves, diaphragm plate; pressurizer relief tank components, reactor coolant system cold leg, hot leg, surge line, and spray line piping and fittings (3.1.1-68)	Cracking due to stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD), and Water Chemistry	No	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (B2.1.3) and Water Chemistry (B2.1.40)	Consistent with GALL Report

Page: 325

Sequence number: 1
Author:
Date: 7/20/2009 8:20:47 AM
This should be "Nickel-Alloy Penetration Nozzles Welded to the Upper Rector Vessel Closure Heads of Pressurized Water Reactors Program (B2.1.28)".

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Nickel alloy steam generator tubes exposed to secondary feedwater/ steam (3.3.1-79)	Denting due to corrosion of steel tube support plate	Steam Generator Tube Integrity; Water Chemistry and, for plants that could experience denting at the upper support plates, evaluate potential for rapidly propagating cracks and then develop and take corrective actions consistent with Bulletin 88-02	No	Steam Generator Tube Integrity (B2.1.37) Water Chemistry (B2.1.40)	Consistent with the GALL Report
Cast austenitic stainless steel reactor vessel internals (e.g., upper internals assembly, lower internal assembly, CEA shroud assemblies, control rod guide tube assembly, core support shield assembly, lower grid assembly) (3.1.1-80)	Loss of fracture toughness due to thermal aging and neutron irradiation embrittlement	Thermal Aging and Neutron Irradiation Embrittlement of CASS	No	Thermal Aging and Neutron Irradiation Embrittlement of CASS (B2.1.39)	Consistent with GALL Report (See SER Section 3.1.2.1.4)
Nickel alloy or nickel-alloy clad steam generator divider plate exposed to reactor coolant (3.1.1-81)	Cracking due to primary water stress corrosion cracking	Water Chemistry	No	Water Chemistry Program (B2.1.40)	Consistent with GALL Report
Stainless steel steam generator primary side divider plate exposed to reactor coolant (3.1.1-82)	Cracking due to stress corrosion cracking	Water Chemistry	No	Water Chemistry Program (B2.1.40)	Consistent with GALL Report

Page: 328

Sequence number: 1
Author:
Date: 7/29/2009 7:59:16 AM
Listed program is incorrect. This should be the PWR Vessel Internals Program

For component groups evaluated in the GALL Report for which the applicant claimed consistency with the report and for which it does not recommend further evaluation, the staff's audit and review determined whether the plant-specific components of these GALL Report component groups were bounded by the GALL Report evaluation.

The applicant noted for each AMR line item how the information in the tables aligns with the information in the GALL Report. The staff audited those AMRs with notes A through E indicating how the AMR is consistent with the GALL Report.

Note A indicates that the AMR line item is consistent with the GALL Report for component, material, environment, and aging effect. In addition, the AMP is consistent with the GALL AMP. The staff reviewed these line items to verify consistency with the GALL Report and validity of the AMR for the site-specific conditions.

Note B indicates that the AMR line item is consistent with the GALL Report for component, material, environment, and aging effect. In addition, the AMP takes some exceptions to the GALL AMP. The staff reviewed these line items to verify consistency with the GALL Report and verified that the identified exceptions to the GALL AMPs have been reviewed and accepted. The staff also determined whether the applicant's AMP was consistent with the GALL AMP and whether the AMR was valid for the site-specific conditions.

Note C indicates that the component for the AMR line item, although different from, is consistent with the GALL Report for material, environment, and aging effect. In addition, the AMP is consistent with the GALL AMP. This note indicates that the applicant was unable to find a listing of some system components in the GALL Report; however, the applicant identified in the GALL Report a different component with the same material, environment, aging effect, and AMP as the component under review. The staff reviewed these line items to verify consistency with the GALL Report. The staff also determined whether the AMR line item of the different component was applicable to the component under review and whether the AMR was valid for the site-specific conditions.

Note D indicates that the component for the AMR line item, although different from, is consistent with the GALL Report for material, environment, and aging effect. In addition, the AMP takes some exceptions to the GALL AMP. The staff reviewed these line items to verify consistency with the GALL Report. The staff verified whether the AMR line item of the different component was applicable to the component under review and whether the identified exceptions to the GALL AMPs have been reviewed and accepted. The staff also determined whether the applicant's AMP was consistent with the GALL AMP and whether the AMR was valid for the site-specific conditions.

Note E indicates that the AMR line item is consistent with the GALL Report for material, environment, and aging effect, but credits a different AMP. The staff reviewed these line items to verify consistency with the GALL Report. The staff also determined whether the credited AMP would manage the aging effect consistently with the GALL AMP and whether the AMR was valid for the site-specific conditions.

Page: 331

Sequence number: 1
Author:
Date: 7/20/2009 8:24:28 AM
Note E also applies when NUREG-1801 identifies a plant-specific aging management program. This should be added to the end of the existing sentence.

The staff reviewed the applicant's AMP B2.1.32 "PWR Vessels Internals Program," and the staff's evaluation is documented in SER Section 3.0.3.1.21. The staff confirmed that, in a letter dated February 6, 2009 the applicant submitted its License Renewal Commitment List for the PINGP LRA and placed these commitments in the UFSAR Supplement for the application. The staff verified that, in Commitment No. 25, the applicant committed to implementing AMP B2.1.32, "PWR Vessels Internal Program" at least two years prior to the period of extended operation. The staff also verified that Commitment No. 25 includes the actions and activities listed in the bullets above.

Based on a review of the requirements in the ASME Code Section XI for PWR RVI components, the staff noted that PWR RVI components may be categorized into one of the following two groups:

- Those RVI components that are ASME Code Class 1 components and are within the scope of the staff's inservice inspection requirements of 10 CFR 50.55a and ASME Code Section XI, Examination Category B-N-1 for interior of the reactor vessel, B-N-2 for weld core support structure components, or B-N-3 for removable core support structure components
- RVI components that are not ASME Code Class and thus are not subject to the ASME Code Section XI, Examination Category B-N-1, B-N-2, or B-N-3 requirements

In the 2005 update of the SRP-LR and the GALL Report, the NRC recommended that aging management of PWR vessel internals needs to be done on a consistent basis among licensed PWRs in the U.S. to account for the fact that not all of the PWR RVI components are ASME Code Class and to account for the fact that additional aging management measures may be necessary for some of the non-ASME Code Class PWR RVI components. Hence, the staff updated its aging management basis in the AMRs for PWR RVI components in the GALL Report through the following recommended commitment that was recommended to be adopted in the UFSAR Supplements for PWR LRAs:

> "(1) participate in the industry programs for investigating and managing aging effects on reactor internals; (2) evaluate and implement the results of the industry programs as applicable to the reactor internals; and (3) upon completion of these programs, but not less than 24 months before entering the period of extended operation, submit an inspection plan for reactor internals to the NRC for review and approval."

Thus, for current Westinghouse-designed PWR LRAs pending staff approval, the staff's updated basis for managing the aging effects that are attributed to the RVI components is given in NRC NUREG-1833, Table IIIC, which states the following:

> "The AMP column was changed to delete reference to XI.M16 (AMP M16 was also deleted from the GALL report) and instead require a commitment in the FSAR Supplement to apply industry programs to be developed in the future for proper management of reactor internals. Also, added to the further evaluation column the requirement for the licensee commitment to be confirmed."

Page: 337

Sequence number: 1
Author:
Date: 7/20/2009 8:41:06 AM
The remainder of this section should be revised to reflect submittal of the PWR Vessel Internals Program in a letter dated May 12, 2009.

The commitment that is recommended by the staff includes a provision for PWR applicant's to submit an inspection plan for their RVI components that is based on the industry's augmented inspection program recommendations for PWR RVI components to the NRC for review and approval at least two years prior to entering the period of extended operation.

The staff has noted that the applicant is relying on the activities of the EPRI MRP to form the basis of the applicant's augmented inspection program for the RVI components. The EPRI MRP activities include an assessment on whether loss of material, cracking, loss of fracture toughness, changes in dimension, and for fastened, keyed or bolted RVI connections, loss of preload are aging effects that need to be managed for the period of extended operation, and if so include recommendations to perform augmented inspections of these components. The staff noted that the applicant has incorporated this aging management basis in LRA Commitment No. 25, which includes a commitment to participate in the MRP activities for Westinghouse designed RVI components, to implement the MRP recommendations that are applicable to the RVI component designs at PINGP, and to submit either a MRP-based or plant-specific inspection plan for these components for NRC review and approval at least two years from the time PINGP is scheduled to enter the period of extended operation.

The staff considers this to be a sufficient aging management basis for the PINGP because: (1) the applicant's commitment for RVI components, as placed in the PWR Vessel Internals Program and in LRA Commitment No. 25 is consistent with the commitment recommendation for RVI components as given in Sections 3.1.2.2.6, 3.1.2.2.9, 3.1.2.2.12., 3.1.2.2.15, and 3.1.2.2.17 of the SRP-LR and in the AMRs of the GALL Report associated with these SRP-LR Sections, (2) the augmented inspection plan for the RVI components will supplement those mandated ISI that are required to be implemented in accordance with ASME Code Section XI, Examination Categories B-N-1, B-N-2, or B-N-3 requirements, and (3) the inspection plan that will be submitted in accordance with LRA Commitment No. 25 will be subject to an NRC review and approval process. On this basis the staff finds that the applicant has provided an acceptable basis for managing the aging effects that are applicable to the RVI components at PINGP, and, specifically as a basis for managing loss of fracture toughness in the BMI column cruciforms that are fabricated from CASS. Thus, the staff resolved its concern in RAI 3.1.1-1.

On the basis of the staff's evaluation of the AMP and the applicant's Commitment No. 25, the staff finds the applicant's use of the PWR Vessels Internals Program acceptable. The staff concludes that the applicant has demonstrated that the effects of aging for these components will be adequately managed so that their intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.1.2.2 AMR Results Consistent with the GALL Report for Which Further Evaluation is Recommended

In LRA Section 3.1.2.2, the applicant further evaluates aging management, as recommended by the GALL Report, for the reactor vessel, internals, and reactor coolant system components and provides information concerning how it will manage the following aging effects:

- cumulative fatigue damage
- loss of material due to general, pitting, and crevice corrosion
- loss of fracture toughness due to neutron irradiation embrittlement

Page: 338

Sequence number: 1
Author:
Date: 7/20/2009 8:41:31 AM
The remainder of this section should be revised to reflect submittal of the PWR Vessel Internals Program in a letter dated May 12, 2009.

Based on the program identified above and Commitment No. 25, the staff concludes that the applicant's programs meet SRP-LR Section 3.1.2.2.6 criteria. For those line items that apply to LRA Section 3.1.2.2.6, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.1.2.2.7 Cracking due to Stress Corrosion Cracking

(1) LRA Section 3.1.2.2.7.1 addresses the applicant's aging management basis for managing cracking due to SCC in the stainless steel flange O-ring leak detection tubes and the BMI guide tubes. The applicant uses RV flange O-ring leak detection tubes as the terminology for its RV flange leak detection lines. The applicant stated that this aging effect/mechanism will be managed with the Water Chemistry Program, alone.

The staff reviewed LRA Section 3.1.2.2.7.1 against the criteria in SRP-LR Section 3.1.2.2.7.1, which states that cracking due to SCC could occur in the PWR stainless steel reactor vessel (RV) flange leak detection lines and bottom-mounted instrument (BMI) guide tubes exposed to reactor coolant. SRP-LR Section 3.1.2.2.7.1, AMR item 23 in Table 1 of the GALL Report Volume 1, and AMR items IV.A2-1 and IV.A2-5 are applicable to the management of cracking due to SCC in PWR BMI guide tubes and PWR reactor vessel flange leakage detection lines. The SRP-LR sections states that for these components, the GALL Report recommends further evaluation of a plant-specific AMP to ensure that this aging effect is adequately managed during the period of extended operation.

The staff noted that the applicant's Water Chemistry Program does not include a component inspection activity to confirm that water chemistry control is adequate to prevent occurrence of the aging effect. In a letter dated December 18, 2008, the staff issued RAI 3.1.2.2.7-01 asking the applicant to include a component inspection activity or to provide a justification for not including one.

The applicant responded to the RAI in a letter dated January 20, 2009. In that letter the applicant revised the LRA to assign the ASME Section XI Inspection, Subsections IWB, IWC, and IWD Program to manage cracking due to SCC in addition to the Water Chemistry Program for the stainless steel BMI guide tubes and fittings exposed to treated water. In addition, the applicant revised the LRA to assign the ASME Section XI Inspection, Subsections IWB, IWC, and IWD Program and the One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program to manage cracking due to SCC in addition to the Water Chemistry Program for the stainless steel flange O-ring leak detection tubes, which are the applicant's components that are equivalent to the reactor vessel flange leakage detection lines assessed in the GALL Report. The staff confirmed that in the letter of January 20, 2009, the applicant amended LRA Table 3.1.1, LRA Table 3.1.2-4, and LRA Section 3.1.2.2.7 to incorporate these changes. The applicant stated that with these changes the BMI guide tubes and fittings are inspected in accordance with applicable Examination Categories in ASME Code Section XI, Table IWB-2500-1, and that the stainless steel flange O-ring leak detection tubes receive a one-time volumetric examination of butt weld locations determined to be potentially

Page: 345

Sequence number: 1
Author:
Date: 7/20/2009 8:44:52 AM
This should state that the "... stainless steel flange O-ring leak detection tubes may receive one-time volumetric examination of butt weld locations if determined to be potentially susceptible to cracking using the methodology of the site specific NRC approved Risk Informed In-service Inspection Program. See the referenced RAI response.

For component type, material, and environment combinations not evaluated in the GALL Report, the staff reviewed the applicant's evaluation to determine whether the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation. The staff's evaluation is documented in the following sections.

3.1.2.3.1 Pressurizer System - Summary of Aging Management Review – LRA Table 3.1.2-1

The staff reviewed LRA Table 3.1.2-1, which summarizes the results of AMR evaluations for the pressurizer system component groups. The staff determined that all AMR evaluation results in LRA Table 3.1.2-1 are consistent with the GALL Report.

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

The staff reviewed LRA Table 3.1.2-2, which summarizes the results of AMRs for reactor coolant system component groups.

LRA Table 3.1.2-2, the applicant proposed to manage cumulative fatigue damage-fatigue in CASS reactor coolant pump (RCP) casings and piping/fittings in a treated water (interior) environment by using TLAA. The staff reviewed the applicant's proposal and documented its findings in SER sections 4.3.1.5 and 4.3.1.6.

In LRA Table 3.1.2-2, the applicant proposed to manage loss of material - selective leaching in copper alloy piping and fittings; cast iron filters and strainer housings; and bronze valve bodies in an interior environment of lubricating oil by using the Selective Leaching of Materials Program. The applicant referenced Footnote H for these line items indicating that the aging effect is not in the GALL Report for these components, material, and environment combination. The applicant also referenced a plant-specific note (118), which stated that for these line items loss of material due to selective leaching for copper alloys and gray cast iron is evaluated in a fuel oil and lubricating oil internal environment.

In LRA B2.1.36, the applicant stated that the Selective Leaching of Materials Program will include a one-time visual inspection in conjunction with a hardness measurement, or other suitable detection technique of selected components that may be susceptible to selective leaching. The staff's evaluation of the Selective Leaching of Materials Program is documented in SER Section 3.0.3.2.15. The One-Time Inspection Program credited under the applicant's Selective Leaching Program is consistent with the One-Time Inspection basis credited in GALL AMP XI.M33, "Selective Leaching," for component materials that are identified as being susceptible to selective leaching. Table IX.C in the GALL Report Volume 2 identifies that copper alloys with greater than 15% alloying zinc content, aluminum bronzes with greater than 8% Al alloying contents and cast irons may be susceptible to selective leaching. On this basis, the staff finds the Selective Leaching of Materials Program is a valid program to credit for the management of loss of material due to selective leaching in these copper alloy piping and fittings because the basis is consistent with: the basis in GALL Table IX.C, which identifies that copper alloys with greater than 15% alloying zinc contents may be susceptible to selective leaching, and the basis in GALL AMP XI.M33 that the one-time inspection proposed in Selective

Page: 363

Sequence number: 1
Author:
Date: 7/28/2009 10:23:47 AM

This is a one-time visual inspection and hardness test to determine if selective leaching is occurring as required by the GALL, and not the One-Time Inspection Program. The PINGP One-Time Inspection Program is not credited with the PINGP Selective Leaching Program.

Following "one-time inspection", delete "Program" and do not capitlize One-Time Inspection.

Leaching Programs is an acceptable basis for managing loss of material in for copper alloy, aluminum bronze and cast iron components as a result of selective leaching.

On the basis of its review, the staff finds that the applicant has appropriately evaluated the AMR results of material, environment, AERM, and AMP combinations not evaluated in the GALL Report. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.1.2.3.3 Reactor Internals System - Summary of Aging Management Review – LRA Table 3.1.2-3

The staff reviewed LRA Table 3.1.2-3, which summarizes the results of AMR evaluations for the reactor internals system component groups. The staff determined that all AMR evaluation results in LRA Table 3.1.2-3 are consistent with the GALL Report.

3.1.2.3.4 Reactor Vessel System - Summary of Aging Management Review – LRA Table 3.1.2-4

The staff reviewed LRA Table 3.1.2-4, which summarizes the results of AMR evaluations for the reactor vessel system component groups. The staff determined that all AMR evaluation results in LRA Table 3.1.2-4 are consistent with the GALL Report.

3.1.2.3.5 Steam Generator System - Summary of Aging Management Review – LRA Table 3.1.2-5

The staff reviewed LRA Table 3.1.2-5, which summarizes the results of AMRs for the steam generator system component groups.

In LRA Table 3.1.2-5, the applicant proposed to manage heat transfer degradation due to fouling for nickel alloy U-tubes in the steam generator exposed to an environment of treated water using the Water Chemistry Program alone. The applicant cited generic Note H, indicating that the aging effect is not in the GALL Report for this component, material and environment combination.

The staff noted that in GALL Volume 2, line item V.A-16, for heat exchanger tubes, where the material is stainless steel, the environment is treated water, and the aging effect is reduction of heat transfer due to fouling, the recommended AMPs are Water Chemistry and One-Time Inspection. The staff also noted that the applicant did not provide any discussion in the LRA to explain why a confirmation of water chemistry effectiveness is not needed for this component, material, environment and aging effect combination. In a letter dated December 18, 2008, the staff issued RAI 3.1.2-5-01, asking the applicant to provide a program for confirmation of water chemistry effectiveness or to provide a technical justification why such a confirmation is not needed.

The applicant responded to the RAI in a letter dated January 20, 2009. In that letter the applicant stated that the One-Time Inspection Program will be used to verify effectiveness of the Water Chemistry Program on the external side of the steam generator U-tubes where the

Page: 364

Sequence number: 1
Author:
Date: 7/20/2009 8:50:36 AM
This information has been superseded by NSPM letter dated May 12th, 2009. The letter added several lines to Table 3.1.2-3 with Note H. This section should be revised to discuss these lines.

of some system components in the GALL Report; however, the applicant identified in the GALL Report a different component with the same material, environment, aging effect, and AMP as the component under review. The staff audited these line items to verify consistency with the GALL Report. The staff also determined whether the AMR line item of the different component was applicable to the component under review and whether the AMR was valid for the site-specific conditions.

Note D indicates that the component for the AMR line item, although different from, is consistent with the GALL Report for material, environment, and aging effect. In addition, the AMP takes some exceptions to the GALL AMP. The staff audited these line items to verify consistency with the GALL Report. The staff verified whether the AMR line item of the different component was applicable to the component under review and whether the identified exceptions to the GALL AMPs have been reviewed and accepted. The staff also determined whether the applicant's AMP was consistent with the GALL AMP and whether the AMR was valid for the site-specific conditions.

Note E indicates that the AMR line item is consistent with the GALL Report for material, environment, and aging effect, but credits a different AMP. The staff audited these line items to verify consistency with the GALL Report. The staff also determined whether the credited AMP would manage the aging effect consistently with the GALL AMP and whether the AMR was valid for the site-specific conditions.

The staff audited and reviewed the information in the LRA. The staff did not repeat its review of the matters described in the GALL Report; however, the staff did verify that the material presented in the LRA was applicable and that the applicant identified the appropriate GALL Report AMRs.

The staff reviewed the LRA to confirm that the applicant: (a) provided a brief description of the system, components, materials, and environments; (b) stated that the applicable aging effects were reviewed and evaluated in the GALL Report; and (c) identified those aging effects for the ESF components that are subject to an AMR. On the basis of its audit and review, the staff determines that, for AMRs not requiring further evaluation, as identified in LRA Table 3.2.1, the applicant's references to the GALL Report are acceptable and no further staff review is required, with the exception of the following AMRs that the applicant had identified were consistent with the AMRs of the GALL Report and for which the staff determined were in need of additional clarification and assessment. The staff's evaluations of these AMRs are provided in the subsections that follows.

3.2.2.1.1 AMR Results Identified as Not Applicable

In LRA Table 3.2.1, items 18-20, the applicant states that the corresponding AMR items in GALL Report are not applicable to PINPG because the AMR items in the GALL Report are only applicable to particular components in BWR reactor designs and because PINGP is a Westinghouse-designed PWR facility. The staff verified that the stated AMR items in the GALL Report are only applicable to BWR designed facilities and are not applicable to the PINGP LRA.

Page: 379

Sequence number: 1
Author:
Date: 7/20/2009 8:52:53 AM
Note E also indicates that the GALL identifies a plant specific aging management program. This should be added to the end of the existing sentence.

In LRA Table 3.2.1, item 21, the applicant states that the corresponding AMR result line in the GALL Report is not applicable because PINGP does not have high strength closure bolting in the ESF Systems. The staff reviewed the documentation supporting the applicant's AMR evaluation and confirmed the applicant's claim that PINGP does not have high strength closure bolting in the ESF Systems. Therefore, the staff agrees with the applicant's determination that the corresponding AMR result line in the GALL Report is not applicable to PINGP.

In LRA Table 3.2.1, item 22, the applicant states that the corresponding AMR result line in the GALL Report is not used at PINGP. In addition, the LRA states to see line item 3.2.1-23 for further discussion. The staff noted that the aging effect and component type for item 3.2.1-23 include the aging effect and component type for item 3.2.1-22. In addition, the applicant manages the components with the same AMP recommended by GALL Report for item 3.2.1-23. Therefore, the staff agrees with the applicant's determination that the corresponding AMR result line in the GALL Report is not applicable to PINGP.

In LRA Table 3.2.1, item 26, the applicant states that the corresponding AMR result line in the GALL Report is not applicable because PINGP has no in-scope steel piping exposed to closed-cycle cooling water in the ESF Systems. The staff reviewed the documentation supporting the applicant's AMR evaluation and confirmed the applicant's claim that PINGP has no in-scope steel piping exposed to closed-cycle cooling water in the ESF Systems. Therefore, the staff agrees with the applicant's determination that the corresponding AMR result line in the GALL Report is not applicable to PINGP.

In LRA Table 3.2.1, items 12-40, 43, 44, 47, 51, and 54, the applicant states that the corresponding AMR result line in the GALL Report is not applicable because PINGP does not have the component, material, and environment combination in the ESF Systems. The staff reviewed the documentation supporting the applicant's AMR evaluation and confirmed the applicant's claim that PINGP does not have the component, material, and environment combination in the ESF Systems. Therefore, the staff agrees with the applicant's determination that the corresponding AMR result line in the GALL Report is not applicable to PINGP.

In LRA Table 3.2.1, item 55, the applicant states that further evaluation in LRA Section 3.5.2.2.1.4 concluded that steel components in concrete are not susceptible to aging and do not requiring aging management. The staff noted this item applies to GALL line item V.F-14 and V.F-17, which indicate that there is no aging effect for this component type and environment, and therefore do not require an AMP. Therefore, the staff agrees with the applicant in that this line item does not require aging management.

3.2.2.2 AMR Results Consistent with the GALL Report for Which Further Evaluation is Recommended

In LRA Section 3.2.2.2, the applicant further evaluates aging management, as recommended by the GALL Report, for the ESF systems components and provides information concerning how it will manage the following aging effects:

- cumulative fatigue damage
- loss of material due to cladding breach
- loss of material due to pitting and crevice corrosion

Page: 380

Sequence number: 1
Author:
Date: 7/28/2009 8:38:15 AM
Items 33, 34 and 47 are "not applicable" due to reasons other than PINGP not having the component, material and environment (should be addressed separately). Line 33: PINGP has this combination, but used a different line. Line 34: Only applicable to BWRs. Line 47: PINGP has this combination, but used a different line.

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Elastomer seals and components exposed to raw water (3.3.1-75)	Hardening and loss of strength due to elastomer degradation; loss of material due to erosion	Open-Cycle Cooling Water System	No	Not applicable	Not applicable to PINGP (See SER Section 3.3.2.1.1)
Steel piping, piping components, and piping elements (without lining/ coating or with degraded lining/coating) exposed to raw water (3.3.1-76)	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, fouling, and lining/coating degradation	Open-Cycle Cooling Water System	No	1pen-Cycle) Cooling Water) System Program (B2.1.31);	Consistent with GALL Report (See SER Section 3.3.2.1.9)
Steel heat exchanger components exposed to raw water (3.3.1-77)	Loss of material due to general, pitting, crevice, galvanic, and microbiologically influenced corrosion, and fouling	Open-Cycle Cooling Water System	No	Open-Cycle Cooling Water System Program (B2.1.31) or Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program (B2.1.22) or 2re Water Systems Program) (B2.1.16);	Consistent with GALL Report (See SER Section 3.3.2.1.10)
Stainless steel, nickel alloy, and copper alloy piping, piping components, and piping elements exposed to raw water (3.3.1-78)	Loss of material due to pitting and crevice corrosion	Open-Cycle Cooling Water System	No	Not applicable	Addressed in item 3.3.1-79 (See SER Section 3.3.2.1.11)
Stainless steel piping, piping components, and piping elements exposed to raw water (3.3.1-79)	Loss of material due to pitting and crevice corrosion, and fouling	Open-Cycle Cooling Water System	No	Open-Cycle Cooling Water System Program (B2.1.31)	Consistent with GALL Report

Page: 412

Sequence number: 1
Author:
Date: 7/29/2009 7:59:35 AM
Should add "or Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program (B2.1.22)" after "Open-Cycle ... (B2.1.31)" to reflect NSPM letter dated 12/18/08

Sequence number: 2
Author:
Date: 7/28/2009 6:40:38 AM
Fire Water Systems Program should be deleted to reflect NSPM letter of 12/18/08

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Glass piping elements exposed to air, air - indoor uncontrolled (external), fuel oil, lubricating oil, raw water, treated water, and treated borated water (3.3.1-93)	None	None	NA	None	Consistent with GALL Report
Stainless steel and nickel alloy piping, piping components, and piping elements exposed to air - indoor uncontrolled (external) (3.3.1-94)	None	None	NA	None	Consistent with GALL Report
Steel and aluminum piping, piping components, and piping elements exposed to air - indoor controlled (external) (3.3.1-95)	None	None	NA	None	Not applicable to PINGP (See SER Section 3.3.2.1.1)
Steel and stainless steel piping, piping components, and piping elements in concrete (3.3.1-96)	None	None	NA	None	Not applicable to PINGP (See SER Section 3.3.2.1.1)
Steel, stainless steel, aluminum, and copper alloy piping, piping components, and piping elements exposed to gas (3.3.1-97)	None	None	NA	None	Consistent with GALL Report
Steel, stainless steel, and copper alloy piping, piping components, and piping elements exposed to dried air (3.3.1-98)	None	None	NA	None	Consistent with GALL Report

Page: 416

Sequence number: 1
Author:
Date: 7/28/2009 8:45:17 AM

This line item is applicable to PINGP. Further evaluation discussed in LRA Section 3.5.2.2.1.4 concluded that steel and stainless steel piping, piping components, and piping elements in concrete are not susceptible to aging and do not require aging management. This is consistent with the GALL Report.

Suggest this be changed to, "Consistent with GALL Report"

(See SER Section 3.5.2.2.1)

In LRA Tables 3.3.2-1 through 3.3.2-21, the applicant summarizes AMRs for the auxiliary system components and indicates AMRs that it claims are consistent with the GALL Report.

For component groups evaluated in the GALL Report for which the applicant claimed consistency with the report and for which it does not recommend further evaluation, the staff's audit and review determined whether the plant-specific components of these GALL Report component groups were bounded by the GALL Report evaluation.

The applicant noted for each AMR line item how the information in the tables aligns with the information in the GALL Report. The staff audited those AMRs with Notes A through E indicating how the AMR is consistent with the GALL Report.

Note A indicates that the AMR line item is consistent with the GALL Report for component, material, environment, and aging effect. In addition, the AMP is consistent with the GALL AMP. The staff audited these line items to verify consistency with the GALL Report and validity of the AMR for the site-specific conditions.

Note B indicates that the AMR line item is consistent with the GALL Report for component, material, environment, and aging effect. In addition, the AMP takes some exceptions to the GALL AMP. The staff audited these line items to verify consistency with the GALL Report and verified that the identified exceptions to the GALL AMPs have been reviewed and accepted. The staff also determined whether the applicant's AMP was consistent with the GALL AMP and whether the AMR was valid for the site-specific conditions.

Note C indicates that the component for the AMR line item, although different from, is consistent with the GALL Report for material, environment, and aging effect. In addition, the AMP is consistent with the GALL AMP. This note indicates that the applicant was unable to find a listing of some system components in the GALL Report; however, the applicant identified in the GALL Report a different component with the same material, environment, aging effect, and AMP as the component under review. The staff audited these line items to verify consistency with the GALL Report. The staff also determined whether the AMR line item of the different component was applicable to the component under review and whether the AMR was valid for the site-specific conditions.

Note D indicates that the component for the AMR line item, although different from, is consistent with the GALL Report for material, environment, and aging effect. In addition, the AMP takes some exceptions to the GALL AMP. The staff audited these line items to verify consistency with the GALL Report. The staff verified whether the AMR line item of the different component was applicable to the component under review and whether the identified exceptions to the GALL AMPs have been reviewed and accepted. The staff also determined whether the applicant's AMP was consistent with the GALL AMP and whether the AMR was valid for the site-specific conditions.

Note E indicates that the AMR line item is consistent with the GALL Report for material, environment, and aging effect, but credits a different AMP. The staff audited these line items to verify consistency with the GALL Report. The staff also determined whether the credited AMP

Page: 418

Sequence number: 1
Author:
Date: 7/28/2009 6:47:23 AM
For completeness, should add "or that the GALL Report identifies a plant-specific AMP" after "AMP".

3.3.2.1.2 Loss of Material due to Pitting and Crevice Corrosion

LRA Table 3.3.1, item 3.3.1-53, addresses loss of material due to general and pitting corrosion for carbon steel components with its internal surfaces exposed to wetted air/gas in the Waste Disposal System.

The LRA credits the PINGP AMP B2.1.22 "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components" to manage this aging effect for the internal surfaces of carbon [1]eel valve bodies in wetted air/gas environment only. The GALL Report recommends for item 3.3.1-53 that GALL AMP XI.M24, "Compressed Air Monitoring" to manage this aging effect. These AMR line items cite Note E, indicating that the AMR line items are consistent with GALL Report material, environment, and aging effect, but a [2]fferent AMP is credited.)

The staff noted that the component types in LRA AMR item 3.3.1-53 correspond to recommended AMRs in AMR item 53 in the GALL Report, Volume 1, and in AMR item VII.D-2 of the GALL Report, Volume 2 , which pertain to piping, piping components and piping elements in a compressed air system. The staff verified that the only PINGP components that the applicant had referenced to GALL AMR item VII.D-2 using a different program from the AMP recommended in these GALL AMR items are specific [3]alve bodies in the Waste Disposal System that are fabricated from carbon steel materials. For the remaining auxiliary components that the applicant had referenced to AMR item 53 in the GALL Report, Volume 1, and in AMR item VII.D-2 of the GALL Report, Volume 2, the applicant credited the Compressed Air Monitoring Program to manage loss of material in the internal surfaces exposed to the wetted air/gas environment, which is consistent with the GALL Report recommendations and is acceptable. The staff's evaluation of these AMR items is given in SER Section 3.3.2.1.

The staff noted that for the stated valves in the Waste Disposal System, the applicant credited its Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program to manage loss of material in the internal surfaces that are exposed to a wetted air/gas environment. The staff noted that the wetted air/gas environment is not the same as a compressed air environment for which GALL AMP XI.M24 is intended to manage, and thus cannot be used for aging management. The staff further noted that the applicant has credited this program for aging management of loss of material due to crevice corrosion. The applicant indicates in a plant-specific note that this aging mechanism is not addressed in the GALL Report for this material, component and environment combination. The staff noted that loss of material will show evidence of material wastage on the surface regardless if the aging mechanism is general, pitting or crevice corrosion.

The staff reviewed the applicant's Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program and its evaluation is documented in SER Sections 3.0.3.1.13. The staff determined that this program credits visual inspections that will be implemented during periodic system and component surveillance activities or during maintenance activities when the internal surface is accessible for visual inspections. The staff finds that the applicant has provided an acceptable basis for crediting the visual examinations of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program to manage loss of material in the internal surfaces of these carbon steel [4]alve bodies because they are equivalent to the visual examination criteria that are established in the "detection of aging effects" program

Page: 420

Sequence number: 1
Author:
Date: 7/29/2009 7:59:48 AM
By letter dated June 6, 2009, PINGP added the waste gas decay tanks and associated components within the scope of LR. Therefore, manifolds, piping / fittings and tanks should be added to this list of components.

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Author:
Date: 7/28/2009 6:46:58 AM
For completeness, should add "or that the GALL Report identifies a plant-specific AMP" after "credited".

Sequence number: 3
Author:
Date: 7/28/2009 8:51:42 AM
By letter dated June 6, 2009, PINGP added the waste gas decay tanks and associated components within the scope of LR. Therefore, manifolds, piping / fittings and tanks should be added to this list of components.

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Author:
Date: 7/28/2009 8:52:13 AM
By letter dated June 6, 2009, PINGP added the waste gas decay tanks and associated components within the scope of LR. Therefore, manifolds, piping / fittings and tanks should be added to this list of components.

element of GALL AMP XI.M24, "Compressed Air Monitoring," for components exposed to a wetted air/gas environment and because these periodic visual inspections will be capable of detecting deterioration or degradation on the material surface that would be an indication of loss of material due to general, pitting and crevice corrosion.

On the basis of periodic visual inspections, the staff finds the applicant's use of this program acceptable. The staff concludes that the applicant has demonstrated that the effects of aging for these components will be adequately managed so that their intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.3.2.1.3 Increased Hardness, Shrinkage and Loss of Strength due to Weathering

In LRA Table 3.3.1, item 3.3.1-61, addresses increased hardness, shrinkage and loss of strength due to weathering for elastomer fire barrier penetration seals exposed to outdoor air or uncontrolled indoor air in the Fire Protection System.

The LRA credits the PINGP AMP B2.1.14 "External Surfaces Monitoring Program," to manage change in material properties due to ozone and thermal exposure and cracking due to ozone and thermal exposure for neoprene in the RCP oil collection components in a primary containment air (internal and external) environment only. The GALL Report recommends for item 3.3.1-61 that GALL AMP XI.M26, "Fire Protection," to manage this aging effect. These AMR line items cite Note E, indicating that the AMR line items are consistent with GALL Report material, environment, and aging effect, but a different AMP is credited.

The staff notes that the component type recommended by GALL item VII.G-1 is fire barrier penetration seals. However, the applicant referenced the RCP oil collection components when referencing item 3.3.1-61. The staff further notes that the applicant referenced item 3.3.1-61 of LRA Table 3.3.1 because there was not another applicable line item in LRA Table 3.3.1, for the Auxiliary Systems, which corresponded to the same combination of component type, material, environment, and specifically to the aging effect. The staff verified that the neoprene RCP oil collection components are within the Fire Protection System but are not fire barrier penetration seals, so the specific requirements for the inspection of fire barrier penetration seals as recommended by the GALL AMP XI.M26 "Fire Protection Program" are not applicable.

The applicant credits PINGP AMP B2.1.14 "External Surfaces Monitoring Program," for aging management. The staff notes that the applicant has proposed to enhance the scope of program of GALL AMP XI.M36, "External Surfaces Monitoring," to include non-metallic components, including PVC and fiberglass, and the aging effects of change in material properties and cracking. The staff further notes the intent of GALL AMP XI.M36 is to perform visual inspections of steel components for loss of material. The staff determined that additional information was needed on the applicant's proposed augmentation of its program. Therefore by letter dated November 5, 2008 the staff issued RAI B2.1.14-1 requesting the applicant provide an appropriate program that will manage the effects of aging for non-metallic components, including fiberglass and PVC. The applicant responded to RAI B2.1.14-1 by letter dated December 5, 2008 and the staff finds the applicant's response acceptable as documented in the staff's evaluation of RAI B2.1.14-1 in SER Section 3.0.3.2.5.

Page: 421

Sequence number: 1
Author:
Date: 7/28/2009 6:48:13 AM
For completeness, should add "or that the GALL Report identifies a plant-specific AMP" after "credited".

and rupture discs, thermowells and valve bodies, etc.) in the Waste Disposal System, the Water Treatment System and the Circulating Water System (which is a steam and power conversion system) under exposure to an internal raw water environment.

The staff noted that for the stainless steel piping, piping components, and piping elements in the Cooling Water System, the Radiation Monitoring System, and the Diesel Generators and Support System that the applicant had referenced to GALL AMR VII.H2-18, the applicant credited the Open-Cycle Cooling Water System Program to manage loss of material in the internal surfaces exposed to the wetted air/gas environment, which is consistent with the GALL Report recommendations and is acceptable. The staff's evaluation of these AMR items is given in SER Section 3.3.2.1.

For those stainless steel components in the Waste Disposal System, Water Treatment System, and Circulating Water System whose AMR items had been referenced to GALL AMR item VII.H2-18, the staff determined the applicant's crediting of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program credits periodic visual inspections and volumetric testing that will be performed during periodic system and component surveillance activities or during maintenance activities when the internal surfaces are made accessible for visual inspections. The staff confirmed that the program description in GALL AMP XI.M38, "Internal Surfaces in Miscellaneous Piping and Ducting Components," indicates that the visual examinations of the program are valid for the detection of loss of material that may occur in the internal surfaces as a result of corrosion. The staff also noted that these visual examination activities are consistent with those visual examination activities that recommended by GALL AMP XI.M20, "Open-Cycle Cooling Water Systems."

Based on this review, the staff finds that the periodic visual inspections credited under the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program are acceptable to manage loss of material in the internal component surfaces because the visual examination basis credited under this AMP is consistent with the visual examination criteria that would be recommended under GALL AMP XI.M20, "Open-Cycle Cooling Water Systems," and because the GALL recommendation in GALL AMP XI.M38, "Internal Surfaces in Miscellaneous Piping and Ducting Components," indicates that this type of program may be used to manage loss of material by corrosion in internal piping surfaces. The staff reviewed the ability of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program to manage loss of material due to corrosion in internal piping and ducting surfaces and the staff's evaluation of this AMP is given in SER Section 3.0.3.1.13

The staff also verified that the PINGP design does include any copper alloy components, but verified that the applicant had aligned its AMR items for these component to AMR item 81 in Table 3 of the GALL Report, and to AMR item VII.C1-9, which is a copper alloy AMR item in the GALL report for copper alloy service water piping components that is analogous and has identical aging management recommendations to those in GALL AMR item VII.H2-11 for copper diesel generator piping components. The staff's evaluation of the AMRs for these copper alloy components is given in SER Section 3.3.2.1.5.

On the basis that the applicant will perform periodic visual inspections and volumetric testing during periodic system and component surveillance activities or during maintenance activities, the staff concludes that the applicant has demonstrated that the effects of aging for these

Page: 423

Sequence number: 1
Author:
Date: 7/28/2009 6:50:44 AM
Should delete ducting as not applicable, and replace with "piping components and piping elements"

components will be adequately managed so that their intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.3.2.1.5 Loss Of Material Due To Pitting, Crevice, And Microbiologically Influenced Corrosion And Fouling

In LRA Table 3.3.1, item 3.3.1-81, addresses loss of material due to pitting, crevice, and MIC and fouling for copper alloy components with its internal surfaces exposed to raw water in the 1ooling Water System, Station and Instrument Air System, and Diesel Generators and Support System, Waste Disposal System and Water Treatment System.

The staff noted that the component types in LRA AMR item 3.3.1-81 correspond to recommended AMRs in AMR item 81 in the GALL Report, Volume 1, and in AMR item VII.C1-9 of the GALL Report, Volume 2, which pertains to copper alloy 2ping, piping components and piping elements in the service water system under internal exposure to raw water. The staff verified that the only PINGP components that the applicant had referenced to referenced GALL AMR items using a different program from the AMP recommended in the GALL AMR items are copper 3alve bodies in the Waste Disposal System 4nd Water Treatment System that are exposed to an internal raw water environment. The staff noted that for these copper alloy components, the applicant credited its Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program to manage loss of material in the internal surfaces that are exposed to a raw water environment.

The staff noted that for the copper alloy piping, piping components, and piping elements in the 5ooling Water System, the Station and Instrument Air System, and the Diesel Generators and Support System that the applicant had referenced to GALL AMR VII.C1-9, the applicant credited the Open-Cycle Cooling Water System Program to manage loss of material in the internal surfaces exposed to the 6etted air/gas environment, which is consistent with the GALL Report recommendations and is acceptable. The staff's evaluation of these AMR items is given in SER Section 3.3.2.1.

For those copper alloy components in the 7/aste Disposal System and Water Treatment System whose AMR items had been referenced to GALL AMR item VII.C1-9, the staff determined the applicant's crediting of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program credits periodic visual inspections and volumetric testing that will be performed during periodic system and component surveillance activities or during maintenance activities when the internal surfaces are made accessible for visual inspections. The staff confirmed that the program description in GALL AMP XI.M38, "Internal Surfaces in Miscellaneous Piping and Ducting Components," indicates that the visual examinations of the program are valid for the detection of loss of material that may occur in the internal surfaces as a result of corrosion. The staff also noted that these visual examination activities are consistent with those visual examination activities that recommended by GALL AMP XI.M20, "Open-Cycle Cooling Water Systems."

Based on this review, the staff finds that the periodic visual inspections credited under the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components

Page: 424

Sequence number: 1
Author:
Date: 7/28/2009 8:55:37 AM
The LRA also included the the Circulating Water System and Turbine Generator and Support System (steam and power conversion systems).

By letter dated December 5, 2008, Heating System components were added that also credit Table 3.3.1, Item 3.3.1-81.

Sequence number: 2
Author:
Date: 7/28/2009 8:57:00 AM
The component types should be piping / fittings, thermowells and valve bodies.

Sequence number: 3
Author:
Date: 7/28/2009 8:59:40 AM
Should also list piping/fittings

Sequence number: 4
Author:
Date: 7/28/2009 8:58:59 AM
By letter dated December 5, 2008, Heating System components were added that also credit Table 3.3.1, Item 3.3.1-81 with Note E.

By letter dated April 6, 2009, Diesel Generator and Support System components were added that also credit Table 3.3.1, Item 3.3.1-81 with Note E.

Sequence number: 5
Author:
Date: 7/28/2009 9:01:11 AM
The LRA also included the the Circulating Water System and Turbine Generator and Support System (steam and power conversion systems).

Sequence number: 6
Author:
Date: 7/28/2009 6:54:46 AM
This should read "raw water environment"

Sequence number: 7
Author:
Date: 7/28/2009 9:02:26 AM

Comments from page 424 continued on next page

components will be adequately managed so that their intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.3.2.1.5 Loss Of Material Due To Pitting, Crevice, And Microbiologically Influenced Corrosion And Fouling

In LRA Table 3.3.1, item 3.3.1-81, addresses loss of material due to pitting, crevice, and MIC and fouling for copper alloy components with its internal surfaces exposed to raw water in the Cooling Water System, Station and Instrument Air System, and Diesel Generators and Support System, Waste Disposal System and Water Treatment System.

The staff noted that the component types in LRA AMR item 3.3.1-81 correspond to recommended AMRs in AMR item 81 in the GALL Report, Volume 1, and in AMR item VII.C1-9 of the GALL Report, Volume 2, which pertains to copper alloy piping, piping components and piping elements in the service water system under internal exposure to raw water. The staff verified that the only PINGP components that the applicant had referenced to referenced GALL AMR items using a different program from the AMP recommended in the GALL AMR items are copper valve bodies in the Waste Disposal System and Water Treatment System that are exposed to an internal raw water environment. The staff noted that for these copper alloy components, the applicant credited its Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program to manage loss of material in the internal surfaces that are exposed to a raw water environment.

The staff noted that for the copper alloy piping, piping components, and piping elements in the Cooling Water System, the Station and Instrument Air System, and the Diesel Generators and Support System that the applicant had referenced to GALL AMR VII.C1-9, the applicant credited the Open-Cycle Cooling Water System Program to manage loss of material in the internal surfaces exposed to the wetted air/gas environment, which is consistent with the GALL Report recommendations and is acceptable. The staff's evaluation of these AMR items is given in SER Section 3.3.2.1.

For those copper alloy components in the Waste Disposal System and Water Treatment System whose AMR items had been referenced to GALL AMR item VII.C1-9, the staff determined the applicant's crediting of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program credits periodic visual inspections and volumetric testing that will be performed during periodic system and component surveillance activities or during maintenance activities when the internal surfaces are made accessible for visual inspections. The staff confirmed that the program description in GALL AMP XI.M38, "Internal Surfaces in Miscellaneous Piping and Ducting Components," indicates that the visual examinations of the program are valid for the detection of loss of material that may occur in the internal surfaces as a result of corrosion. The staff also noted that these visual examination activities are consistent with those visual examination activities that recommended by GALL AMP XI.M20, "Open-Cycle Cooling Water Systems."

Based on this review, the staff finds that the periodic visual inspections credited under the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components

T By letter dated December 5, 2008, Heating System components were added that also credit Table 3.3.1, Item 3.3.1-81 with Note E.
By letter dated April 6, 2009, Diesel Generator and Support System components were added that also credit Table 3.3.1, Item 3.3.1-81 with Note E.

Program are acceptable to manage loss of material in the internal component surfaces because the visual examination basis credited under this AMP is consistent with the visual examination criteria that would be recommended under GALL AMP XI.M20, "Open-Cycle Cooling Water Systems," and because the GALL recommendation in GALL AMP XI.M38, "Internal Surfaces in Miscellaneous Piping and Ducting Components," indicates that this type of program may be used to manage loss of material by corrosion in internal piping surfaces. The staff reviewed the ability of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program to manage loss of material due to corrosion in 1 internal piping and ducting surfaces and the staff's evaluation of this AMP is given in SER Section 3.0.3.1.13

On the basis that the applicant will perform periodic visual inspections and volumetric testing during periodic system and component surveillance activities or during maintenance activities, the staff concludes that the applicant has demonstrated that he effects of aging for these components will be adequately managed so that their intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.3.2.1.6 Loss Of Material due to Pitting, Crevice, Galvanic, and Microbiologically Influenced Corrosion and Fouling

In LRA Table 3.3.1, item 3.3.1-82, addresses loss of material due to pitting, crevice, galvanic, and MIC corrosion and fouling for copper heat exchanger components (i.e., heat exchanger tubes and other components) in the 2 ontrol Room and Miscellaneous Area Ventilation System, Cooling Water System, Diesel Generators and Support System, Primary Containment Ventilation System, Station and Instrument Air System, Waste Disposal System, and Fire Protection System whose surfaces are exposed either internally or externally to a raw water environment.

The staff noted that the component types in LRA AMR item 3.3.1-82 correspond to recommended AMRs in AMR item 82 in the GALL Report, Volume 1, and in AMR item VII.C1-3 of the GALL Report, Volume 2, which pertains to copper alloy heat exchanger components in the service water system under internal exposure to raw water. The staff verified that the only PINGP components that the applicant had referenced to GALL AMR items using a different program from the AMP recommended in the GALL AMR items are copper alloy 3 eat exchanger components in the Waste Disposal System and Fire Protection System that are exposed to an internal raw water environment. The staff noted that for these copper alloy heat exchanger components in the 4 aste Disposal System, the applicant credited its Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program to manage loss of material in the internal surfaces that are exposed to an external raw water environment. The staff noted that for the copper alloy heat exchanger components in the Fire Protection Program, the applicant credited its Fire Water Systems Program to manage loss of material in the internal surfaces that are exposed to an external raw water environment.

The staff noted that for the copper alloy 5 ping, piping components, and piping elements in the Cooling Water System, the Station and Instrument Air System, and the Diesel Generators and Support System that the applicant had referenced to GALL 6 MR VII.C1-9, the applicant credited the Open-Cycle Cooling Water System Program to manage loss of material in the internal surfaces exposed to the 7 etted air/gas environment, which is consistent with the GALL Report

Page: 425

Sequence number: 1
Author:
Date: 7/28/2009 6:57:18 AM
This should read, "internal piping, piping components and piping elements"

Sequence number: 2
Author:
Date: 7/28/2009 9:03:38 AM
By letter dated December 5, 2008, Heating System components were added that also credit Table 3.3.1, Item 3.3.1-82.

By letter dated January 20, 2009, Turbine Generator and Support System components were added that also credit Table 3.3.1, Item 3.3.1-82.

Sequence number: 3
Author:
Date: 7/28/2009 9:06:32 AM
By letter dated December 5, 2008, Heating System "HEATERS" were added that also credit Table 3.3.1, Item 3.3.1-82 with a Note E.

Sequence number: 4
Author:
Date: 7/28/2009 9:07:19 AM
"Heating System" should also be listed per letter dated December 5, 2008.

Sequence number: 5
Author:
Date: 7/28/2009 9:09:33 AM
Should be heat exchanger tubes and heat exchanger components.

Sequence number: 6
Author:
Date: 7/29/2009 7:32:54 AM
It appears this should be VII.C1-3

Sequence number: 7
Author:
Date: 7/28/2009 7:04:53 AM
"wetted air/gas" should be "raw water"

recommendations and is acceptable. The staff's evaluation of these AMR items is given in SER Section 3.3.2.1.

The staff noted that for the copper alloy heat exchanger components in the 1ontrol Room and Miscellaneous Area Ventilation System, Cooling Water System, Diesel Generators and Support System, Primary Containment Ventilation System, Station and Instrument Air System, that the applicant had referenced to GALL AMR VII.C1-3, the applicant credited the Open-Cycle Cooling Water System Program to manage loss of material in the internal surfaces exposed to the 2etted air/gas environment, which is consistent with the GALL Report recommendations and is acceptable. The staff's evaluation of these AMR items is given in SER Section 3.3.2.1.

For those copper alloy heat exchanger components in the 3/aste Disposal System whose AMR items had been referenced to GALL AMR item VII.C1-3, the staff determined the applicant's crediting of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program credits periodic visual inspections and volumetric testing that will be performed during periodic system and component surveillance activities or during maintenance activities when the internal surfaces are made accessible for visual inspections. The staff confirmed that the program description in GALL AMP XI.M38, "Internal Surfaces in Miscellaneous Piping and Ducting Components," indicates that the visual examinations of the program are valid for the detection of loss of material that may occur in the internal surfaces as a result of corrosion. The staff also noted that these visual examination activities are consistent with those visual examination activities that recommended by GALL AMP XI.M20, "Open-Cycle Cooling Water Systems."

The staff noted that the referenced AMR items for the copper alloy heat exchanger components in the 4/aste Disposal System are not in the scope of an open-cycle cooling water system that is tied to the ultimate heat-sink, as described in GL 89-13, and, thus, are not within the scope of GALL AMP XI.M20, "Open-cycle Cooling Water System." During its review, the staff also noted that, in the stated AMR items for the copper alloy heat exchanger components in the Waste Disposal System, the applicant indicated that the Internal Surfaces in Miscellaneous Piping and Ducting Components is used to manage the external surfaces of the components that are exposed to the raw water environment. However, the staff noted that, for these components, the applicant credited a program that will implement visual inspections of internal component surfaces. Therefore, by letter dated December 18, 2008 the staff issued RAI 3.3.2-20-01 to the applicant and requested that the applicant clarify why a program crediting visual inspections of internal component surfaces had been credited for aging management of component surfaces that are exposed to an external raw water environment.

By letter dated January 20, 2009, the applicant responded to RAI 3.3.2-20-01. In this response, the applicant stated these components that credit this program in a raw water environment are heat exchanger tubes and tubesheets. The applicant further stated that the internal and external environments are assigned based on the side of the heat exchanger tubes and tubesheets that is exposed to the environment. However, the applicant clarified that these components (tubes and tubesheets) are located internally to the heat exchanger shells and that is why this program is credited for aging management. The staff verified that the applicant used an equivalent aging management basis to evaluate the components whose internal and external heat exchanger surfaces were exposed to a raw water environment because the surfaces are exposed to identical material and environmental conditions. On the basis of its review, the staff finds that

Page: 426

Sequence number: 1
Author:
Date: 7/28/2009 9:12:08 AM
By letter dated January 20, 2009, Turbine Generator and Support System components were added that also credit Table 3.3.1, Item 3.3.1-82 and credit OCCW.

Sequence number: 2
Author:
Date: 7/28/2009 7:05:46 AM
"wetted air/gas" should be "raw water"

Sequence number: 3
Author:
Date: 7/28/2009 9:12:48 AM
By letter dated December 5, 2008, Heating System components were added that also credit Table 3.3.1, Item 3.3.1-82 with a Note E. Add Heating System.

Sequence number: 4
Author:
Date: 7/28/2009 9:13:40 AM
By letter dated December 5, 2008, Heating System components were added that also credit Table 3.3.1, Item 3.3.1-82 with a Note E. Add Heating System.

The applicant stated that copper and copper alloys are in the middle of the galvanic series and will preferentially corrode when coupled with more cathodic metals such as stainless steel; however, the rate of corrosion is expected to be low due to the small electrochemical potential difference. The applicant also stated that OE at their plant has not identified galvanic corrosion concerns with copper and copper alloys.

The staff reviewed the applicant's RAI response and noted that the response provides a reasonable technical basis, confirmed by plant-specific OE, for the applicant to expect that loss of material due to galvanic corrosion is not an expected aging effect/mechanism for copper components exposed to treated water in systems at their plant. The staff further noted that the same inspection activities that detect loss of material due to pitting and crevice corrosion will also detect loss of material due to galvanic corrosion, if it should occur. Because the applicant has a reasonable expectation that loss of material due to galvanic corrosion will not occur, and because the applicant provides inspection for loss of material due to pitting and crevice corrosion, which would also detect indications of galvanic corrosion, the staff finds that the applicant response resolves the issues raised in RAI 3.3.1-51-01.

Based on the programs identified and the applicant's response to RAI.3.3.1-51-01, the staff finds that the effects of aging for these components have been appropriately identified and will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.3.2.1.9 Loss of Material Due to General, Pitting, Crevice, and Microbiologically Influenced Corrosion, and Fouling, and Lining/Coating Degradation

LRA Table 3.3.1, AMR item 3.3.1-76, addresses loss of material due to general, pitting, crevice, and MIC, fouling, and lining/coating degradation for steel piping, piping components, and piping elements (without lining/coating or with degraded lining/coating) exposed to raw water in the auxiliary systems. For these components, the GALL Report recommends managing the aging effect with the Open-Cycle Cooling Water System program (GALL AMP XI.M20).

LRA Tables 1 3.2-5, 3.3.2-6, 3.3.2-7, 3.3.2-8, 3.3.2-20, and 3.3.2-21 all include AMR results referring to LRA Table 3.3.1, AMR item 3.3.1-76, for which the applicant proposes using the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program. The components are 1) humidifiers in the control room and miscellaneous area ventilation system; 2) piping and fittings in the cooling water system; 3) piping and fittings in the diesel generator and screen house ventilation system; 4) 2 nks and valve bodies in the diesel generators and support system; 5) filter/strainer housings, manifolds, piping and fittings, pump casings, thermowells, and valve bodies in the waste disposal system; 6) and demineralizers, eductors, filter/strainer housings, heaters, manifolds, piping and fittings, pump casings, and valve bodies in the water treatment 3 ystem. For these AMR results, the material is carbon steel, cast iron or galvanized steel, the environment is raw water and aging effect is loss of material due to general, pitting, crevice, galvanic corrosion, or MIC. The AMR results refer to GALL item VII.C1-19. GALL item VII.C1-19 has the same material, environment, and aging effect combination, but recommends aging management using the Open-Cycle Cooling Water System Program. For these AMR results, the applicant cited generic Note E, indicating that the result is consistent with the GALL Report for material, environment, and aging effect, but a 4 fferent AMP is credited. The staff noted that the applicant has conservatively included the

Page: 431

Sequence number: 1
Author:
Date: 7/28/2009 9:14:58 AM
Should also list Table 3.3.2-11. By letter dated December 5, 2008, Heating System components were added that also credit Table 3.3.1, Item 3.3.1-76 with a Note E.

Sequence number: 2
Author:
Date: 7/28/2009 9:15:59 AM
Should also list pipe/fittings per letter dated April 6, 2009.

Sequence number: 3
Author:
Date: 7/28/2009 9:17:38 AM
By letter dated December 5, 2008, Heating System components were added that also credit Table 3.3.1, Item 3.3.1-76 with a Note E. Therefore, should add:

7) Piping / fittings, pump casings, thermowells, traps and valve bodies in the heating system.

Sequence number: 4
Author:
Date: 7/29/2009 8:00:38 AM
"or that the GALL Report identifies a plant-specific AMP." should be added after "credited"

effect is loss of material due to general, pitting, crevice, or galvanic corrosion, and by MIC. The AMR results refer to GALL item VII.C1-5, which recommends aging management using the Open-Cycle Cooling Water System Program. For these AMR results, the applicant cited generic Note E, indicating that the result is consistent with the GALL Report for material, environment, and aging effect, but a different AMP is credited.

The staff noted that the discussion column in LRA Table 3.3.1, AMR item 3.3.1-77, states that the AMR results are consistent with the GALL Report and that the aging effect is managed by the Open-Cycle Cooling Water System Program. The staff also noted that the discussion further states that in some cases, the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program or the Fire Water System Program is credited in lieu of the Open-Cycle Cooling Water System Program. The staff reviewed all AMR results lines referring to LRA Table 3.3.1, AMR item 3.3.1-77, but was unable to find any AMR results where the Fire Water System Program was credited.

In a letter dated December 18, 2008, the staff issued RAI 3.3.1-77-01 asking the applicant to identify the AMR results line in the LRA that refer to AMR item 3.3.1-77 and where the Fire Water System Program is credited to provide aging management. The RAI also asked the applicant to explain why the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program or the Fire Water System Program (if actually used) are credited in lieu of the Open-Cycle Cooling Water System Program for some of these AMR result lines.

The applicant responded in a letter dated January 20, 2009. In that response the applicant stated that in LRA Table 3.3.1, AMR item 3.3.1-77, reference to the Fire Water System Program for providing aging management is incorrect, and that the reference to the Fire Water System Program should be deleted. The applicant revised the discussion column entry for LRA Table 3.3.1, AMR item 3.3.1-77 to read as follows: "Consistent with NUREG-1801. This aging effect is managed with the Open-Cycle Cooling Water System Program. In some cases, the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is credited in lieu of the Open-Cycle Cooling Water System Program."

The applicant also stated that the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is used in lieu of the Open-Cycle Cooling Water System Program where the components managed are not exposed to an open-cycle cooling water environment. The applicant stated that for LRA Table 3.3.1, AMR item 3.3.1-77, the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is credited for components exposed to a waste water environment in the waste disposal system.

The staff finds the applicant's change to Table 3.3.1, AMR item 3.3.1-77, acceptable because it corrects an error. The staff's evaluation of the applicant's use of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Component Program in lieu of the Open-Cycle Cooling Water System Program is presented below.

The staff reviewed all components evaluated under AMR item 3.3.1-77 where the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Component Program is credited for aging management in lieu of the Open-Cycle Cooling Water System Program, which is the AMP recommended in the GALL Report for aging management. The staff confirmed that the only

Page: 434

Sequence number: 1
Author:
Date: 7/29/2009 8:00:40 AM
"or that the GALL Report identifies a plant-specific AMP." should be added after "credited"

heat exchanger tubes and that the One-Time Inspection Program uses enhanced visual (VT-1 or equivalent) and/or volumetric methods to detect cracking due to SCC. The applicant stated that the One-Time Inspection Program uses a representative sampling approach to verify that significant degradation is not occurring, and that the sampling is based on an assessment of material of fabrication, environment, plausible aging effects, and OE. The applicant stated that the letdown and excess letdown heat exchangers are highly contaminated components, and that one-time Inspections of similar components with the equivalent material and environment combinations provides confirmation of the effectiveness of the Water Chemistry Program without requiring unnecessarily high personnel exposure. The applicant further stated that temperature and radioactivity monitoring of these non-regenerative heat exchangers is provided by installed plant instrumentation, and that the instrumentation provides points that are monitored on the plant's process computer.

The staff noted that the applicant's proposed management for the aging effect of cracking due to SCC in the non-regenerative heat exchangers includes temperature and radioactivity monitoring as recommended in the GALL Report; however, it does not include the recommended eddy current testing of the heat exchanger tubes. The staff noted, however, that for GALL Report, Volume 1, Table 3, item 90, the AMP recommended to manage the aging effect of cracking in stainless steel piping exposed to treated borated water greater than 60°C (>140°F) is the Water Chemistry Program, alone. The staff also noted that for GALL Report, Volume 1, Table 4, AMR item 14, the AMPs recommended to manage the aging effect of cracking in stainless steel piping exposed to treated water greater than 60°C (>140°F) are the Water Chemistry Program augmented by the One-Time Inspection Program for verification of water chemistry effectiveness. In this regard, the staff noted that the One-Time Inspection Program accomplishes verification of Water Chemistry Program effectiveness by crediting volumetric or enhanced VT-1 inspection techniques to confirm that cracking has not initiated in the components or, if it has, that it is progressing very slowly . The staff finds that the applicant has provided an acceptable basis for crediting the Water Chemistry Program and the One-Time Inspection Program because it is in accordance with the recommendations in GALL Report, Volume 1, Table 4, AMR item 14 and because GALL AMP XI.M32, "One-Time Inspection," indicates that volumetric examination methods or enhanced VT-1 visual examination methods are acceptable methods for the detection of cracking.

In its supplemental response dated February 26, 2009, the applicant stated that cracking due to cyclic loading is not an applicable aging mechanism because of the design and operation of the regenerative and non-regenerative heat exchangers in the chemical and volume control system. The applicant stated that a full fatigue analysis was not required for these heat exchangers; however, the Westinghouse design specification for these components included requirements to demonstrate that the heat exchangers satisfied all conditions of ASME Code Section III, Paragraph N-415.1, "Vessels Not Requiring Analysis for Cyclic Operation," for the transient conditions specified. The applicant stated that through compliance with N-415.1 (a) through (f), which consider pressure fluctuations, thermal cycling, and mechanical loading, the allowable peak stress limit is satisfied for these heat exchangers so that an analysis for cyclic operation is not required. The applicant stated that from a design standpoint, the regenerative heat

Page: 443

Sequence number: 1
Author:
Date: 7/30/2009 8:44:34 AM

This sentence does not accurately reflect RAI response:

In the licensee response (Letter dated February 26, 2009), NSPM stated that the One-Time Inspection Program is selected in lieu of temperature and radioactivity monitoring ... Although temperature and radioactivity monitoring is available, it has not been specifically credited for aging management.

Based on the programs identified, the staff concludes that the applicant's programs meet SRP-LR Section 3.3.2.2.4 criteria. For those line items that apply to LRA Section 3.3.2.2.4.3, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

(4) LRA Section 3.3.2.2.4.4 states that stress corrosion cracking of high strength steel closure bolting in an air with steam or water leakage environment is not managed for auxiliary systems at PINGP because they do not exist at PINGP. Furthermore, the applicant states that the conditions leading to SCC, including use of lubricants containing molybdenum disulfide, and high yield strength materials (>150 ksi) do not exist at PINGP. The staff reviewed the applicant's justification, and verified that although there are bolts with yield strength of 130 ksi in the Nuclear Steam Supply System component supports, and are conservatively treated by the applicant as high strength bolts, there are no high strength bolts in the plants auxiliary systems. Furthermore, the staff reviewed LRA Section B2.1.6 "Bolting Integrity Program" and found that the program includes preventive measures for lubricant control in accordance with the recommendations in EPRI NP-5769. Therefore, the staff finds that this is acceptable because it adequately considers the GALL Report recommendations for the Bolting Integrity Program. On this basis, the staff finds the criterion in SRP-LR Section 3.3.2.2.4.4 does not apply.

3.3.2.2.5 Hardening and Loss of Strength Due to Elastomer Degradation

The staff reviewed LRA Section 3.3.2.2.5 against the following criteria in SRP-LR Section 3.3.2.2.5:

(1) LRA Section 3.3.2.2.5.1 addresses hardening and loss of strength due to elastomer degradation that could occur in seals and components of HVAC and other plant systems exposed to plant indoor air-uncontrolled (internal or external), primary containment air, raw water and treated water environments. The applicant stated that these aging effects are managed with the External Surfaces Monitoring Program. In a letter dated 1ecember 16, 2008, the applicant added additional line items as a result of its response to RAI 2.3.3.5-04. The staff noted that these line items are flex connections made of ethylene propylene diene monomer (EPDM) and are managed with the External Surfaces Monitoring Program. The External Surfaces Monitoring Program includes periodic system inspections and walk downs to visually inspect accessible external surfaces for degradation. The applicant also stated that the External Surfaces Monitoring Program is credited with managing aging effects of internal surfaces where the external surfaces are subject to the same environment or stressor as the internal surfaces such that that external condition is representative of the internal surface condition. The applicant stated that this program assures the intended function of affected components will be maintained during the period of extended operation. The applicant further stated that it added change in material properties due to ultraviolet radiation and ozone exposure and, cracking due to ultraviolet radiation and ozone exposure for non-metallic, both elastomers and plastics (PVC, fiberglass, neoprene, rubber, etc.), in these environments.

Page: 447

Sequence number: 1
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Date: 7/28/2009 7:20:17 AM
Letter date should be January 15, 2009

The staff reviewed LRA Section 3.3.2.2.5.1 and the line items included in letter dated 1 ecember 16, 2008, against the following criteria in SRP-LR Section 3.3.2.2.5.1, which states that hardening and loss of strength due to elastomer degradation may occur in elastomer seals and components of heating and ventilation systems exposed to air - indoor uncontrolled (internal/external). The GALL Report recommends further evaluation of a plant-specific AMP to ensure that these aging effects are adequately managed.

The staff reviewed the External Surfaces Monitoring Program in SER Section 3.0.3.2.5. The program is a condition monitoring program that implements inspections and walkdowns of systems and components within the scope of the program. The staff confirmed that in the applicant's response to RAI B2.1.14-1, which was submitted in a letter dated 2 ovember 5, 2008, the applicant amended the scope of its External Surfaces Monitoring Program, as applied to the management of cracking, hardening, and loss of strength in elastomeric components to include physical manipulation testing in addition to the visual examinations that will be performed on these components. On the basis that the applicant will perform periodic inspections and walk downs of the elastomeric components with appropriate physical manipulation tests, the staff determines that External Surfaces Monitoring Programs is an acceptable program to credit for the management of hardening and loss of strength in these elastomeric components through the period of extended operation.

Based on the program identified above, the staff concludes that the applicant's program meets the SRP-LR Section 3.3.2.2.5.1 criteria. For those line items that apply to LRA Section 3.3.2.2.5.1, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

(2) LRA Section 3.3.2.2.5.2 addresses hardening and loss of strength due to elastomer degradation that could occur in elastomer lining exposed to treated water or treated borated water. The applicant stated that it does not have any elastomer-lined components in the Spent Fuel Pool Cooling and Cleanup System that are exposed to treated water or treated borated water.

The staff reviewed LRA Section 3.3.2.2.5.2 against the criteria in SRP-LR Section 3.3.2.2.5.2, which states that hardening and loss of strength due to elastomer degradation may occur in elastomer linings of the filters, valves, and ion exchangers in spent fuel pool cooling and cleanup systems (BWR and PWR) that are exposed to treated water or treated borated water. The staff reviewed the UFSAR and verified that the components in the Spent Fuel Pool Cooling and Cleanup Systems are not lined with protective elastomeric materials. On the basis that the Spent Fuel Pool Cooling and Cleanup Systems do not include any components lined with internal elastomer linings, the staff finds acceptable the applicant has provided an acceptable basis for concluding that the guidance in SRP-LR Section 3.3.2.2.5.2 is not applicable to the LRA.

Page: 448

Sequence number: 1
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Author:
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T Letter date should be December 5, 2008

to lubricating oil (as part of the fire protection system). SRP-LR Section 3.3.2.2.7.1 states that the existing AMP relies on the periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. SRP-LR Section 3.3.2.2.7.1 further states that the effectiveness of lubricating oil control should be verified to ensure that corrosion is not occurring and one-time inspection of selected components at susceptible locations is an acceptable method to use to ensure that corrosion is not occurring.

SRP-LR Section 3.3.2.2.7.1, AMR item 14 in Table 3 of the GALL Report, Volume 1, and GALL AMR items VII.E1-19 (Chemical and Volume Control System), VII.F1-19 (Control Room and Miscellaneous Area Ventilation System), VII.C1-17 (Cooling Water System, Water Treatment System), VII.H2-20 (Diesel Generators and Support System) and VII.G-22 (Fire Protection System) are applicable to loss of material due to general, pitting, and crevice corrosion of steel piping, piping component and piping elements exposed to lubricating oil. These components are identified in 1RA Table 3.3.2-2: Pump Casings, Tanks, LRA 3.3.2-5: Pump Casings, Piping/Fittings, LRA 3.3.2-6: Piping/Fittings, LRA 3.3.2-21: Pump Casings, Piping/Fittings.

The staff reviewed LRA Appendix B, Sections B2.1.24, "Lubricating Oil Analysis" and B2.1.29, "One-Time Inspection" in SER Sections 3.0.3.1.14 and 3.0.3.1.18 respectively and found that these programs 1) provide for periodic sampling of lubricating oil to maintain contaminants at acceptable limits to preclude loss of material due to general, pitting and crevice corrosion and 2) will perform one-time inspections of select steel piping, piping components, piping elements, and tanks exposed to lubricating oil for loss of material due to general, pitting, and crevice corrosion to verify the effectiveness of the Lubricating Oil Analysis Program in applicable Auxiliary Systems. The GALL Report states that one-time inspection is an acceptable method to verify the effectiveness of a mitigative AMP such as the Lubricating Oil Analysis Program. The staff noted that the applicant is crediting the Lubricating Oil Analysis Program as recommended in GALL 2MR item VII.C1-17 and the applicant is verifying effectiveness of the Lubricating Oil Analysis Program with the elements of the One-Time Inspection Program, which the GALL Report states is an acceptable program to verify the Lubricating Oil Analysis Program effectiveness. Therefore, the staff finds that, based on the programs identified above, the applicant has met the criteria of SRP-LR Section 3.3.2.2.7.1.

Based on the programs identified, the staff concludes that the applicant's programs meet SRP-LR Section 3.3.2.2.7.1 criteria. For those line items that are addressed in LRA Section 3.3.2.2.7.1, Part I, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

LRA Section 3.3.2.2.7.1, Part II refers to LRA Section 3.3.2.2.7.1, Part I. LRA Section 3.3.2.2.7.1, Part I states that 1) the loss of material due to general, pitting, and crevice corrosion could occur in steel components exposed to lubricating oil, 2) this aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program, 3) the Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results, 4) the program

Page: 451

Sequence number: 1
Author:
Date: 7/28/2009 9:25:35 AM
Should also list LRA Table 3.3.2.-8: filter / strainer housings and elements, heaters, oil pans, piping / fittings, pump casings, tanks, thermowells, turbochargers, valve bodies; and LRA Table 3.3.2-9: filter /strainer housings, piping / fittings.

Sequence number: 2
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Date: 7/29/2009 8:00:51 AM
Should also list "VII.E1-19, VII.G-22, VII.F1-19 and VII.H2-20"

Program will manage this aging effect in steel and stainless steel internal surfaces exposed to diesel exhaust.

The staff reviewed LRA Section 3.3.2.2.7.3 against the criteria in SRP-LR Section 3.3.2.2.7.3, which states that loss of material due to general (steel only), pitting and crevice corrosion in steel and stainless steel diesel engine exhaust piping, piping components and piping elements exposed to diesel exhaust can occur and recommends further evaluation of a plant-specific AMP to ensure this aging effect is adequately managed.

The GALL Report, under item VII.H2-2 recommends that a plant-specific program be credited to manage loss of material due to pitting and crevice corrosion for steel piping, piping components and piping elements in the Auxiliary Systems.

The staff verified that only piping, fittings, muffler, silencers and flex connections that align to GALL AMR VII.H2-2 for the Auxiliary System –Diesel Generator and Support System that are fabricated from steel and stainless steel materials are applicable to PINGP that credit this program.

The staff's review of the applicant's Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program and its evaluation are documented in SER Sections 3.0.3.1.13. The applicant stated that this is a new PINGP program that will perform periodic visual inspections of the internal surfaces of components to manage loss of material due to general (steel only), pitting and crevice corrosion. The staff finds that the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program performs visual inspections of internal surfaces of components during periodic system and component surveillance activities or during maintenance activities when the internal surface becomes accessible for visual inspections to detect aging effects that could result in a loss of the component's intended function The staff also determined that the periodic visual inspections will be capable of detecting deterioration or degradation on the material surface that would be an indication of loss of material due to general, pitting and crevice corrosion.

Based on the program identified, the staff concludes that the applicant's program meets SRP-LR Section 3.3.2.2.7.3 criteria. For those line items that are addressed in LRA Section 3.3.2.2.7.3, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.3.2.2.8 Loss of Material Due to General, Pitting, Crevice, and Microbiologically-Influenced Corrosion

The applicant states in LRA Section 3.3.2.2.8 that the loss of material due to general, pitting, crevice corrosion, and MIC could occur for steel piping, piping components, and piping elements buried in soil regardless of the presence of pipe coatings or wrappings and that this aging effect is managed with the Buried Piping and Tanks Inspection Program. LRA Section 3.3.2.2.8 further states that the Buried Piping and Tanks Inspection Program includes preventive measures to

Page: 454

Sequence number: 1
Author:
Date: 7/29/2009 8:00:53 AM
Suggest this be expanded to read, "due to general (steel only), pitting and crevice corrosion for stainless steel and steel piping, piping components and piping elements ..."..."

mitigate degradation (e.g., coatings and wrappings required by design) and visual inspections of external surfaces of buried piping components, when excavated, for evidence of coating damage and degradation and these inspections either verify that unacceptable degradation is not occurring or trigger additional actions.

The staff reviewed LRA Section 3.3.2.2.8 against the criteria in SRP-LR Section 3.3.2.2.8, which states that loss of material due to general, pitting, crevice corrosion, and MIC could occur for steel (with or without coating or wrapping) piping, piping components, and piping elements buried in soil. SRP-LR Section 3.3.2.2.8 further states that 1) the buried piping and tanks inspection program relies on industry practice, frequency of pipe excavation, and OE to manage the effects of loss of material from general, pitting, and crevice corrosion and MIC and 2) the effectiveness of the buried piping and tanks inspection program should be verified to evaluate an applicant's inspection frequency and OE with buried components, ensuring that loss of material is not occurring.

SRP-LR Section 3.3.2.2.8 invokes AMR item 19 in Table 3 of the GALL Report, Volume 1, and GALL 1MR items VII.H1-9 (Diesel Fuel Oil System) and VII.G-25 (Fire Protection System) as applicable to loss of material due to general, pitting, crevice, and MIC of steel piping, piping component, piping elements, and tanks exposed to soil. These components are identified in LRA Table 3.3.2-10: Piping and Fittings, and LRA Table 3.3.2-9: Piping and Fittings, Valve Bodies.

The staff reviewed LRA Appendix B, Sections B2.1.8, "Buried Piping and Tanks Inspection" in SER Section 3.0.3.1.7 and found that this program provides focused or opportunistic excavations and inspections for general, pitting, crevice, and MIC of buried steel piping and tanks within 10 years before the period of extended operation and within 10 years after the initiation of the period of operation. The staff finds that these activities are consistent with industry practice because this program include for periodic excavations and visual inspections of buried piping and tanks for general, pitting and crevice corrosion and MIC.

The GALL AMP XI.34 program element "parameters monitored/inspected" states that parameters such as coating and wrapping integrity, that are directly related to corrosion damage, of the external surface of buried steel piping and tanks should be monitored. The staff noted that the applicant is crediting the Buried Piping and Tanks Inspection Program as recommended in GALL 2MR items VII.H1-9 and VII.G-25, which the GALL Report states is an acceptable program to monitor possible corrosion damage to the external surface of piping and tanks. Therefore, the staff finds that, based on the program identified above, the applicant meets the criteria of SRP-LR Section 3.3.2.2.8.

Based on the programs identified, the staff concludes that the applicant's program meets SRP-LR Section 3.2.2.2.8 criteria. For those line items that are addressed in LRA Section 3.2.2.2.8, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

Page: 455

Sequence number: 1
Author:
Date: 7/29/2009 8:00:55 AM
Paragraph should also list VII.C1-18 and Tables 3.3.2-6 and 3.3.2-10 for CL and FP. Suggest wording is, "...AMR items VII.C1-18 (Open-Cycle Cooling Water System), VII.H1-9 (Diesel Fuel Oil System) and VII.G-25 (Fire Protection System) as applicable to loss of material due to general, pitting, crevice, and MIC of steel (with or without coating or wrapping) piping piping component, piping elements, and tanks exposed to soil. These components are identified in LRA Tables 3.3.2-6, 3.3.2-10 and 3.3.2-17: Piping and Fittings, and LRA Table 3.3.2-9: Piping and Fittings, Valve Bodies."

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Should also list "VII.C1-18" for consistency with LRA

3.3.2.2.9 Loss of Material Due to General, Pitting, Crevice, Microbiologically-Influenced Corrosion and Fouling

Steel Piping, Piping Components, Piping Elements, and Tanks Exposed to Fuel Oil. The applicant states in LRA Section 3.3.2.2.9.1 that loss of material due to general, pitting, crevice corrosion, MIC and fouling could occur for steel piping, piping components, piping elements, and tanks exposed to fuel oil. LRA Section 3.3.2.2.9.1 further states that 1) this aging effect is managed with a combination of the Fuel Oil Chemistry Program and the One-Time Inspection Program 2) the Fuel Oil Chemistry Program includes periodic sampling and testing of fuel oil, integrity testing, visual inspection and one-time inspections of selected components to assure the continued effectiveness of fuel oil chemistry control activities to ensure that degradation is not occurring and 3) the One-Time Inspection Program performs sampling inspections using NDE techniques that either verify unacceptable degradation is not occurring or trigger additional actions.

The staff reviewed LRA Section 3.3.2.2.9.1 against the criteria in SRP-LR Section 3.3.2.2.9.1 which states that loss of material due to general, pitting, crevice corrosion, MIC, and fouling could occur for steel piping, piping components, piping elements, and tanks exposed to fuel oil. SRP-LR Section 3.3.2.2.9.1 further states that 1) the existing AMP relies on the fuel oil chemistry program for monitoring and control of fuel oil contamination to manage loss of material due to corrosion or fouling, 2) corrosion or fouling may occur at locations where contaminants accumulate and 3) the effectiveness of the fuel oil chemistry control should be verified to ensure that corrosion is not occurring.

SRP-LR Section 3.3.2.2.9.1, AMR item 20 in Table 3 of the GALL Report, Volume 1, and GALL AMR items VII.H2-24 (Emergency Diesel Generator System) and VII.H1-10 (Diesel Fuel) as applicable to loss of material due to pitting, crevice, and MIC of steel, piping, piping components, and piping elements exposed to fuel oil. These components are identified in LRA Table 3.3.2-8: Piping and Fittings, Filter / Strainer Housings, Pump Casings, Tanks, Valve Bodies.

The GALL Report recommends further evaluation of programs to manage loss of material due to general, pitting, crevice corrosion, MIC, and fouling to verify the effectiveness of the Fuel Oil Chemistry program. A one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion is not occurring and that the component's intended function will be maintained during the period of extended operation.

The staff reviewed LRA Appendix B, Sections B2.1.19, "Fuel Oil Chemistry" and B2.1.29, "One-Time Inspection" in SER Sections 3.0.3.2.9 and 3.0.3.1.18 respectively and found that these programs 1) provide for periodic sampling of fuel oil and periodic, draining, cleaning and visual inspection of fuel tanks to maintain contaminants at acceptable limits to preclude loss of material due to pitting and corrosion and 2) one-time inspections of select steel piping, piping components, piping elements, and tanks exposed to fuel oil for loss of material due to general, pitting, crevice corrosion, MIC and fouling to verify the effectiveness of the Fuel Oil Chemistry Program in applicable Auxiliary systems. The GALL Report states that one-time inspection is an acceptable method to verify the effectiveness of mitigative aging management and condition monitoring programs. The staff noted that the Fuel Oil Chemistry provides for both mitigation of aging and condition monitoring of fuel oil tanks. The staff noted that the applicant is crediting the

Page: 456

Sequence number: 1
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Date: 7/28/2009 9:28:12 AM
Should also list Table 3.3.2-10: filter / strainer housings, manifolds, piping / fittings, pump casings, restricting orifices, tanks, valve bodies.

so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

(4) The applicant states in LRA Section 3.3.2.2.10.4 that loss of material due to pitting and crevice corrosion could occur for copper alloy piping, piping components and piping elements exposed to lubricating oil. LRA Section 3.3.2.2.10.4 further states that 1) [1]NGP excludes loss of material due to fouling or MIC in a lubricating oil environment based on plant-specific OE, 2) this aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program, 3) the Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results to maintain oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation, and 4) the One-Time Inspection Program either verifies unacceptable degradation is not occurring or trigger additional actions.

The staff reviewed LRA Section 3.3.2.2.10.4 against the criteria in SRP-LR Section 3.3.2.2.10.4 that states that loss of material due to pitting and crevice corrosion could occur for copper alloy piping, piping components, and piping elements exposed to lubricating oil. SRP-LR Section 3.3.2.2.10.4 further states that 1) the GALL Report recommends further evaluation of programs to manage corrosion to verify the effectiveness of the lubricating oil program and 2) a one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion is not occurring.

SRP-LR Section 3.3.2.2.10.4, AMR item 26 in Table 3 of the GALL Report, Volume 1, and GALL AMR items VII.E1-12 (Chemical and Volume Control System) and VII.H2-10 (Emergency Diesel Generator System) as applicable to loss of material due to pitting and crevice corrosion of copper alloy piping, piping components, and piping elements exposed to lubricating oil. These components are identified in LRA [2]able 3.3.2-2: Piping / Fittings, Valve Bodies, LRA Table 3.3.2-5: Piping / Fittings, and LRA Table 3.3.2-8: Heat Exchanger Components, Heat Exchanger Tubes, Heaters, and Valve Bodies.

The staff reviewed LRA Appendix B, Sections B2.1.24, "Lubricating Oil Analysis" and B2.1.29, "One-Time Inspection" in SER Sections 3.0.3.1.14 and 3.0.3.1.18 respectively and found that these programs 1) provide for periodic sampling of lubricating oil to maintain contaminants at acceptable limits to preclude loss of material due to pitting and crevice corrosion and 2) will perform one-time inspections of select copper alloy piping, piping components, and piping elements exposed to lubricating oil for loss of material due to pitting and crevice corrosion to verify the effectiveness of the Lubricating Oil Analysis Program. The GALL Report states that one-time inspection is an acceptable method to verify the effectiveness of a mitigative AMP such as the Lubricating Oil Analysis Program. The staff noted that the applicant is crediting the Lubricating Oil Analysis Program as recommended in GALL AMR items VII.E1-12 and VII.H2-10 and that the applicant is verifying effectiveness of the Lubricating Oil Analysis Program with the elements of the One-Time Inspection Program, which the GALL Report states is an acceptable program to verify the Lubricating Oil Analysis Program effectiveness. Therefore, the staff finds that, based on the programs identified above, the applicant meets the criteria of SRP-LR Section 3.3.2.2.10.4.

Page: 461

Sequence number: 1
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Highlighted text should be deleted. This AMR Line item and LRA section does not include MIC.

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Date: 7/28/2009 9:31:28 AM
Should also list LRA Table 3.3.2-1: Heat Exchanger Tubes.

includes periodic visual inspection of internal surfaces of piping and heat exchanger components for loss of material and fouling, monitoring of system air quality in accordance with industry standards and guidelines, and is consistent with the GALL AMP XI.M24, "Compressed Air Monitoring." The staff's review of the Compressed Air Monitoring Program and its evaluation are documented in SER Section 3.0.3.2.3. On the basis that periodic visual inspection and monitoring of system air quality will be performed, the staff finds that the Compressed Air Monitoring Program will adequately manage loss of material due to pitting and crevice corrosion of copper alloy piping, piping components, piping elements, and heat exchanger components exposed to wetted air in the control building ventilation system, and instrument and control air system through the period of extended operation.

Based on the program identified, the staff concludes that the applicant's program meets the SRP-LR Section 3.3.2.2.10.6 criteria. For those line items that apply to LRA Section 3.3.2.2.10.6, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

(7) LRA Section 3.3.2.2.10.7 addresses loss of material due to pitting and crevice corrosion in stainless steel piping, piping components, and piping elements exposed to soil, stating that this aging effect is not applicable because at PINGP, there are no stainless steel piping components exposed to soil in the auxiliary systems.

SRP-LR Section 3.3.2.2.10.7 states that loss of material due to pitting and crevice corrosion may occur in stainless steel piping, piping components, and piping elements exposed to soil.

The staff verified, through review of the PINGP UFSAR, that the auxiliary system does not contain any stainless steel piping, piping components, and piping elements. On this basis, the staff finds that the criteria in SRP-LR Section 3.3.2.2.10.7 are not applicable to PINGP.

(8) LRA Section 3.3.2.2.10.8 indicates that the aging effect described in SRP-LR Section 3.3.2.2.10.8 is related to BWR plants, and therefore not applicable to PINGP.

SRP-LR Section 3.3.2.2.10.8 states that loss of material due to pitting and crevice corrosion may occur in stainless steel piping, piping components, and piping elements of the BWR standby liquid control system exposed to sodium pentaborate solution.

The staff noted that PINGP is a PWR, and therefore does not have standby liquid control system. On this basis, the staff finds the criteria in SRP-LR 3.3.2.2.10.8 are not applicable to PINGP.

Based on the programs identified above, the staff concludes that the applicant's programs meet SRP-LR Section 3.3.2.2.10 criteria or else that the applicant has provided an acceptable basis for concluding that a particular recommendation in SRP-LR Section 3.3.2.2.10 is either not applicable to the LRA or did not need to be applied to the LRA. For those line items that apply to

Page: 464

Sequence number: 1
Author:
Date: 7/28/2009 7:42:01 AM
This should only list "... wetted air in the Station and Instrument Air system ..." to be consistent with LRA

SRP-LR Section 3.3.2.2.12.2, AMR item 33 in Table 3 of the GALL Report, Volume 1, and GALL AMR items VII.E1-15 (Chemical and Volume Control System), VII.H2-17 (Emergency Diesel Generator System) and VII.G-18 (Fire Protection System) are applicable to loss of material due to pitting and crevice corrosion of stainless steel piping, piping components, and piping elements exposed to lubricating oil. These components are identified in LRA Table 3.3.2-2: Piping / Fittings, LRA Table 3.3.2-8: Manifolds, Piping / Fittings, Thermowells, Valve Bodies, LRA Table 3.3.2-9: RCP Oil Collection components.

The staff reviewed LRA Appendix B, Sections B2.1.24, "Lubricating Oil Analysis" and B2.1.29, "One-Time Inspection" in SER Sections 3.0.3.1.14 and 3.0.3.1.18 and found that these programs 1) provide for periodic sampling of lubricating oil to maintain contaminants at acceptable limits to preclude loss of material due to pitting, crevice corrosion, and 1IC and 2) will perform one-time inspections of select stainless steel piping, piping components, and piping elements exposed to lubricating oil for loss of material due to pitting, crevice corrosion and MIC to verify the effectiveness of the Lubricating Oil Analysis Program in applicable auxiliary systems. The GALL Report states that one-time inspection is an acceptable method to verify the effectiveness of a mitigative AMP such as the Lubricating Oil Analysis Program. The staff noted that the applicant is crediting the Lubricating Oil Analysis Program as recommended in GALL AMR items VII.E1-15, VII.H2-17 and VII.G-18, and that the applicant is verifying effectiveness of the Lubricating Oil Analysis Program with the elements of the One-Time Inspection Program, which the GALL Report states is an acceptable program to verify the Lubricating Oil Analysis Program effectiveness. Therefore, the staff finds that, based on the programs identified above, the applicant meets the criteria of SRP-LR Section 3.3.2.2.12.2.

Based on the programs identified, the staff concludes that the applicant's programs meet SRP-LR Section 3.3.2.2.12.2 criteria. For those line items that apply to LRA Section 3.3.2.2.12.2, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.3.2.2.13 Loss of Material Due to Wear

LRA Section 3.3.2.2.13 addresses loss of material due to wear that could occur in elastomer seals and components in an indoor air environment (internal or external). The applicant stated that this aging effect is managed with the External Surfaces Monitoring Program. In a letter dated 2ecember 16, 2008, the applicant added additional line items as a result of its response to RAI 2.3.3.5-04. The staff noted that these line items are flex connections made of EPDM and are managed with the External Surfaces Monitoring Program. The External Surfaces Monitoring Program performs periodic system inspections and walkdowns to visually inspect accessible external surfaces for degradation. The applicant also stated that the External Surfaces Monitoring Program is credited with managing aging effects of internal surfaces where the external surfaces are subject to the same environment or stressor as the internal surfaces such that that external condition is representative of the internal surface condition. The applicant concluded that this program assures the intended function of affected components will be

Page: 468

Sequence number: 1
Author:
Date: 7/28/2009 9:32:53 AM
T Program B2.1.24 is not used to manage loss of material due to MIC. See NSPM Letter dated 2/26/09. Also see SER Section 3.3.2.2.9 for typical write-up that addressed this exclusion.

Sequence number: 2
Author:
Date: 7/28/2009 7:44:45 AM
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maintained during the period of extended operation. The applicant identified that this AMR evaluation is applicable to the management of loss of material in EDPM flexible connections in the auxiliary and radwaste ventilation system, control area and miscellaneous ventilation system, diesel generator ventilation system, and primary containment heating and ventilation system under exposure to either an internal or external indoor air environment.

The staff reviewed LRA Section 3.3.2.2.13 and the line items included in letter dated December 16, 2008; against the criteria in SRP-LR Section 3.3.2.2.13, which states that loss of material due to wear may occur in the elastomer seals and components exposed to air - indoor uncontrolled (internal or external). The GALL Report recommends further evaluation of an AMP to ensure that the aging effect is adequately managed. This SRP-LR Section references AMR item 34 in Table 3 of the GALL Report, Volume 1, and AMR items VII.F1-6, VII.F2-6, VII.F3-6, VII.F4-5, VII.F1-5, VII.F2-5, VII.F3-5, and VII.F4-4 in the GALL Report Volume 2, as applicable to the management of loss of material due to wear in elastomeric seals and components in auxiliary and radwaste ventilation system, control area and miscellaneous ventilation system, diesel generator ventilation system, and primary containment heating and ventilation system.

The staff noted that the applicant credited its External Surfaces Monitoring Program to manage loss of material due to wear of these EDPM elastomer flexible connections. The staff's review of the applicant's External Surfaces Monitoring Program is documented in SER Section 3.0.3.2.5. The staff notes that the applicant's External Surfaces Monitoring Program include periodic visual inspections of external surfaces that are periodically performed during system walkdowns of the plant. The staff also noted the ASME Code Section XI lists VT-1 and VT-3 visual inspection methods as acceptable inspection techniques for monitoring for discontinuities in component materials, including those that may be induced by loss of material.

Based on this determination, the staff concludes that the applicant's basis for crediting the External Surfaces Monitoring Program for aging management of loss of material due to wear in these flexible connections is valid because: (1) the program will perform visual examinations of the external surfaces to monitor for discontinuities that are induced by wear, (2) visual VT-1 and VT-3 examination methods are acceptable examination methods for detecting surface breaking discontinuities, such as those that may be induced by wear, and (3) the conforms to the recommendation in SRP-LR Section 3.3.2.2.13 that a valid AMP be evaluated and credited for managing loss of material in elastomeric ventilation system seals and components.

Based on the program identified above, the staff concludes that the applicant's program meets the SRP-LR Section 3.3.2.2.13 criteria. For those line items that apply to LRA Section 3.3.2.2.13, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.3.2.2.14 Loss of Material Due to Cladding Breach

The staff reviewed LRA Section 3.3.2.2.14 against the criteria in SRP-LR Section 3.3.2.2.14.

LRA Section 3.3.2.2.14 addresses cracking due to underclad cracking in PWR steel charging pump casings with stainless steel cladding exposed to treated borated water, stating that this

Page: 469

Sequence number: 1
Author:
Date: 7/29/2009 8:01:16 AM
Letter date was January 15, 2009

manipulation when appropriate. The staff notes stated that this program will supplement the visual examination with a physical manipulation in order to verify aging effects such as hardening, embrittlement, or gross softening are not occurring. The staff notes that the physical manipulation will supplement and aid the visual inspection in detecting age-related degradation because changes in material properties, such as hardening and loss of strength, can be detected during manipulation of non-metallic components, when appropriate, by the relative inflexibility of the component, or by the failure of the component to return to its previous shape or configuration. On the basis of periodic visual inspections supplemented by a physical manipulation, when appropriate, being performed during system walkdowns at a specified frequency, the staff finds the applicant's use of the External Surfaces Monitoring Program acceptable.

By letter dated April 13, 2009, the applicant submitted its annual update to the LRA. The applicant stated that heat exchanger tubes in certain ventilation air coolers are normally in service and may potentially be exposed to condensation. The applicant further stated that this should have been evaluated for an external environment of wet air/gas (external), but were incorrectly evaluated as plant indoor air – uncontrolled (external) or primary containment air (external). The staff noted that exposure to condensation may result in aging related degradation that were not initially accounted when these components were evaluated in a plant indoor air - uncontrolled or primary containment air environment. In LRA Table 3.3.2-5, the applicant proposed to manage heat transfer degradation due to fouling for heat exchanger tubes fabricated from copper alloy exposed to a wet air/gas (external) environment. The AMR line items cite Generic Note H, which indicates that the aging effect is not addressed in the GALL Report for this component, material and environment combination. The applicable heat exchangers are located within the Control Room and Miscellaneous Area Ventilation System with the external side of the tubes exposed to a wet air/gas (external) environment.

The staff's review of the applicant's External Surfaces Monitoring Program and its evaluation are documented in SER Sections 3.0.3.2.5. The staff notes that the External Surfaces Monitoring Program will include periodic visual inspections of external surfaces performed during system walkdowns at a specified frequency. The staff further notes that these periodic visual inspections are adequate to manage heat transfer degradation due to fouling for copper alloy heat exchanger tubes exposed to wet air/gas (external) environment addressed by this AMR because a visual inspection will be capable of detecting any fouling (buildup from whatever source) on the external surface of the copper alloy heat exchanger tube. On the basis of periodic visual inspections being performed during system walkdowns at a specified frequency of these components by the PINGP AMP B2.1.14, External Surfaces Monitoring, for heat transfer degradation due to fouling, the staff finds the applicant's use of the External Surfaces Monitoring Program acceptable.

In LRA Table 3.3.2-5, the applicant proposed to manage loss of material-selective leaching in copper alloy piping and fittings in an internal environment of lubricating oil and copper alloy heat exchanger tubes in a wet air/gas external environment by using the Selective Leaching of Materials Program. The applicant referenced Footnote H for this line item indicating that the aging effect is not in the GALL Report for these components, material, and environment combinations. The applicant also referenced a plant-specific note, which stated that for this line item loss of material due to selective leaching for copper alloys and gray cast iron is evaluated in a fuel oil and lubricating oil environment.

Page: 474

Sequence number: 1
Author:
Date: 7/28/2009 9:38:21 AM
The aging related degradation that was not initially accounted for was loss of material due to selective leaching; this AE is discussed in the last paragraph on page 3-332. Discussing the selective leaching of HX tubes here would provide the connection with the added aging related degradation statement.

By letter dated April 13, 2009, the applicant submitted its annual update to the LRA. The applicant stated that heat exchanger tubes in certain ventilation air coolers are normally in service and may potentially be exposed to condensation. The applicant further stated that this should have been evaluated for an external environment of wet air/gas (external), but was incorrectly evaluated as plant indoor air – uncontrolled (external) or primary containment air (external). The staff noted that exposure to condensation may result in aging related degradation that was not initially accounted when these components were evaluated in a plant indoor air - uncontrolled or primary containment air environment. In LRA Table 3.3.2-6, the applicant proposed to manage heat transfer degradation due to fouling for heat exchanger tubes fabricated from copper alloy exposed to a wet air/gas (external) and an external uncontrolled plant indoor air environment with the External Surfaces Monitoring Program. The AMR line items cite Generic Note H, which indicates that the aging effect is not addressed in the GALL Report for this component, material and environment combination. The applicable heat exchangers are located within the cooling water system with the external side of the tubes exposed to a wet air/gas (external) and an external uncontrolled plant indoor air environment.

The staff's review of the applicant's External Surfaces Monitoring Program and its evaluation are documented in SER Sections 3.0.3.2.5. The staff notes that the External Surfaces Monitoring Program will include periodic visual inspections of external surfaces performed during system walkdowns at a specified frequency. The staff further notes that these periodic visual inspections are adequate to manage heat transfer degradation due to fouling for copper alloy heat exchanger tubes exposed to wet air/gas (external) and an external uncontrolled plant indoor air environment addressed by this AMR because a visual inspection will be capable of detecting any fouling (buildup from whatever source) on the external surface of the copper alloy heat exchanger tube. On the basis of periodic visual inspections being performed during system walkdowns at a specified frequency of these components by the PINGP AMP B2.1.14, "External Surfaces Monitoring," for heat transfer degradation due to fouling, the staff finds the applicant's use of the External Surfaces Monitoring Program acceptable.

In LRA Table 3.3.2-6, the applicant proposed to manage change in material properties and cracking for piping and fittings fabricated from polyvinylidene difluoride (PVDF) and valve bodies fabricated from PVC exposed to an external uncontrolled plant indoor air environment with the External Surfaces Monitoring Program. The AMR line items cite Generic Note F, which indicates that the material is not addressed in the GALL Report for this environment.

The applicant credits PINGP AMP B2.1.14 "External Surfaces Monitoring Program" for aging management. The staff notes that the applicant has proposed to enhance the scope of program of GALL AMP XI.M36, "External Surfaces Monitoring" to include non-metallic components, including PVDF and PVC, and the aging effects of change in material properties and cracking. The staff further notes the intent of GALL AMP XI.M36 is to perform visual inspections of steel components for loss of material. The staff determined that additional information was needed on the applicant's proposed augmentation to PINGP AMP B2.1.14. Therefore, by letter dated November 5, 2008, the staff issued RAI B2.1.14-1 requesting the applicant provide an appropriate program that will manage the effects of aging for non-metallic components, including PVC. The applicant responded to RAI B2.1.14-1 by letter dated December 5, 2008, and the staff finds the applicant's response acceptable as documented in the staff's evaluation of RAI B2.1.14-1 in SER Section 3.0.3.2.5.

Page: 476

Sequence number: 1
Author:
Date: 7/30/2009 9:07:59 AM
The aging related degradation that was not initially accounted for was loss of material due to selective leaching; this AE is discussed in the last paragraph on page 3-336. Discussing the selective leaching of HX tubes here would provide the connection with the added aging related degradation statement.

AMR line item also cites Plant-Specific Note 306, which indicates that components that are buried in the ground are analyzed in the same manner as raw water (damp soil containing groundwater).

The LRA credits the PINGP AMP B2.1.6 "Bolting Integrity Program," to manage this aging effect. The staff's evaluation of the Bolting Integrity Program is documented in SER Section 3.0.3.2.1. The Bolting Integrity Program is an existing PINGP program that will manage the loss of preload for buried bolts and fasteners through the implementation of the Buried Piping and Tanks Inspection Program. This program is documented in PINGP LRA AMP B2.1.8, "Buried Piping and Tanks Inspection Program." The staff's evaluation of the Buried Piping and Tanks Inspection Program is documented in SER Section 3.0.3.1.7. The staff reviewed the Buried Piping and Tanks Inspection Program to verify that loss of preload for buried carbon steel bolts and fasteners will be managed in accordance with the recommendations specified by the Bolting Integrity Program. On the basis of its review, the staff finds that because these components will be inspected through the specifications of the Bolting Integrity Program, which are implemented by the Buried Piping and Tanks Inspection Program, they will be adequately managed.

LRA Table 3.3.2-6 summarizes the results of AMRs for the cooling water system valve bodies constructed from PVC exposed to raw water (internal). The applicant proposed no aging effect and therefore states that no AMP is required.

The applicant has indicated that Generic Note F is applicable for these items with Plant-Specific note 313. Generic Note F is "Material not in NUREG-1801 for this component." Plant-Specific note 313 states, "Materials science evaluation for this material in this environment results in no aging effects." The staff confirmed that this material is not in the GALL Report for this component. The staff also agrees that there will not be any aging mechanism for this material/environment combination and that no AMP is required. This conclusion is based on the fact that PVC is has no aging effect when in contact with raw water (Roff, W. J., *Fibres, Plastics, and Rubbers: A Handbook of Common Polymers*, Academic Press Inc., New York, 1956.)

In LRA Table 3.3.2-6, the applicant proposed to manage loss of material-selective leaching in copper alloy heat exchanger tubes in a wet air/gas external environment by using the Selective Leaching of Materials Program. The applicant referenced Footnote H for this line item indicating that the aging effect is not in the GALL Report for these components, material, and environment combinations.

In LRA B2.1.36, the applicant stated that the Selective Leaching of Materials Program will include a one-time visual inspection in conjunction with a hardness measurement, or other suitable detection technique of selected components that may be susceptible to selective leaching. The staff's evaluation of the Selective Leaching of Materials Program is documented in SER Section 3.0.3.2.16. The staff finds that this new one-time program is consistent with GALL AMP XI.M33, "Selective Leaching," and includes an approved exception related to physical examinations.

The staff noted that the one-time inspection program credited under the applicant's Selective Leaching Program is consistent with the one-time inspection basis credited in GALL AMP XI.M33, "Selective Leaching," for component materials that are identified as being susceptible to

Page: 478

Sequence number: 1
Author:
Date: 7/29/2009 8:01:26 AM
This SER Section is "Steam Generator Tube Integrity". The SER Section for Selective Leaching Program is 3.0.3.2.15.

LRA Table 3.3.2-10 summarizes the results of an AMR for the Fuel Oil System flame arrestors constructed from aluminum and exposed to outdoor air - not sheltered. The applicant claims that for this combination of component, material, and environment there is no AERM and therefore states that no AMR is required.

The staff noted that the applicant has indicated that generic Note G is applicable for these items with Plant-Specific Note 313. Nuclear Energy Institute (NEI) Standard Note G states "Environment not in NUREG-1801 for this component and material." Plant-Specific Note 313 states, "[m]aterials science evaluation for this material in this environment results in no aging effects." The staff noted that aluminum has an excellent resistance to corrosion when exposed to a humid air (outdoor environment) because aluminum oxide film is bonded strongly to its surface and, if damaged, reforms immediately in most environments. In addition, the oxide film is only 5 to 10 nanometers thick but is highly effective in protecting (i.e. passivating) the aluminum from corrosion.

The staff confirmed that this environment is not in the GALL Report for these components and materials. The staff also agrees that there is no aging effect for aluminum exposed to outdoor air. Aluminum alloys develop a passive film that quickly reforms if disturbed. (W. H. Ailor, *Atmospheric Corrosion,* McGraw-Hill, New York, 1986.)

On the basis of its review, the staff finds that the applicant has appropriately evaluated the AMR results of material, environment, AERM, and AMP combinations not evaluated in the GALL Report. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.2.3.11 Heating System - Summary of Aging Management Review – LRA Table 3.3.2-11

The staff reviewed LRA Table 3.3.2-11, which summarizes the results of AMR evaluations for the heating system component groups.

In LRA Table 3.3.2-11, the applicant proposed to manage cumulative fatigue damage due to fatigue for stainless steel piping and fittings exposed to an internal steam environment. The applicant stated this is TLAA and must be evaluated in accordance with 10 CFR 54.21(c)(1). The AMR line items cite Generic Note H, which indicates that the aging effect is not addressed in the GALL Report for this component, material and environment combination.

The staff verified that in LRA Section 4.3.2 the applicant provided its TLAA evaluation for this component. The staff's evaluation of this TLAA, Non-Class 1 Fatigue, is documented in SER Section 4.3.2.

On the basis of its review, the staff finds that the applicant has appropriately evaluated the AMR results of material, environment, AERM, and AMP combinations not evaluated in the GALL Report. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

Page: 494

Sequence number: 1
Author:
Date: 7/30/2009 8:45:03 AM
TNSPM Letter dated December 5, 2008, added several additional lines to the Heating System with a Note H. Appropriate discussion should be added to this section.

3.3.2.3.12 Miscellaneous Gas System - Summary of Aging Management Review – LRA Table 3.3.2-12

The staff reviewed LRA Table 3.3.2-12, which summarizes the results of AMR evaluations for the miscellaneous gas system component groups. The staff determined that all AMR evaluation results in LRA Table 3.3.2-12 are consistent with the GALL Report.

3.3.2.3.13 Plant Sample System - Summary of Aging Management Review – LRA Table 3.3.2-13

The staff reviewed LRA Table 3.3.2-13, which summarizes the results of AMR evaluations for the plant sample system component groups.

In LRA Table 3.3.2-13, the applicant proposed to manage cracking due to SCC for heat exchanger components, piping/fittings, pump casings, tanks, and valve bodies made of carbon steel exposed to a treated water environment using the Closed-Cycle Cooling Water System Program. For these AMR results the applicant cited Generic Note H, indicating that the aging effect is not in the GALL Report for this component, material and environment combination.

The staff noted that cracking due to SCC is not normally associated with carbon steel components and also that the Closed-Cycle Cooling Water System Program does not include examination techniques capable of detecting cracking in carbon steel components. In a letter dated December 18, 2008, staff issued RAI 3.3.2-13-01 asking the applicant to provide a basis for expecting that cracking due to SCC may occur in carbon steel components in the plant sample system. The staff also asked the applicant to provide an examination technique for detection of cracking in these carbon steel components, or to explain why such an examination is not needed.

The applicant responded to the RAI in a letter Dated January 20, 2009. In the response the applicant stated that to control anaerobic bacteria in the cold lab sample chiller, which is a part of the plant sample system, the cold lab sample chiller was drained, flushed and refilled with an approximately 50/50 mix of fleet-charge antifreeze which also contains a nitrite-based corrosion inhibitor. The applicant stated that EPRI 1010639, Non-Class 1 Mechanical Implementation Guidelines and Mechanical Tools, Revision 4, January 2006, describes one reported case suspected to be nitrite-induced SCC of carbon steel in a treated water system with a nitrite based corrosion inhibitor. The applicant stated that their cold lab sample chiller has environmental conditions similar to those described in the EPRI document where SCC of carbon steel may have occurred. The applicant stated that because of the OE described in the EPRI document, cracking due to SCC was conservatively assumed to occur in the plant sample system hot and cold lab sample chiller components made of carbon steel.

The applicant stated that the Closed-Cycle Cooling Water System Program is both a preventive and condition monitoring program based on EPRI's "Closed Cooling Water Chemistry Guideline." The applicant stated that the program includes preventive measures to minimize corrosion, heat transfer degradation, and SCC. The applicant stated that the program performs inspections to identify corrosion, fouling and SCC that may be present. The applicant further

Page: 495

Sequence number: 1
Author:
Date: 7/30/2009 9:11:53 AM
"because ... document" should be deleted. PINGP added this AE due to (1) a nitrate corrosion inhibitor is used (2) based on plant specific OE there is a potential for microbiological contamination, 3) the pH and temperature limits defined in the EPRI report are met.

should have been evaluated for an external environment of wet air/gas (external), but were incorrectly evaluated as plant indoor air – uncontrolled (external) or primary containment air (external). The staff noted that exposure to condensation may result in aging related degradation that was not initially accounted when these components were evaluated in a plant indoor air - uncontrolled or primary containment air environment. In LRA Table 3.3.2-14, the applicant proposed to manage heat transfer degradation due to fouling for heat exchanger tubes fabricated from copper alloy (copper-nickel) exposed to a wet air/gas (external) environment. The applicant credits PINGP AMP B2.1.14, "External Surfaces Monitoring Program," for aging management. The AMR line items cite Generic Note H, which indicates that the aging effect is not addressed in the GALL Report for this component, material and environment combination. The applicable heat exchangers are located within the Primary Containment Ventilation System with the external side of the tubes exposed to a wet air/gas (external) environment.

The staff's review of the applicant's External Surfaces Monitoring Program and its evaluation are documented in SER Sections 3.0.3.2.5. The staff notes that the External Surfaces Monitoring Program will include periodic visual inspections of external surfaces performed during system walkdowns at a specified frequency. The staff further notes that these periodic visual inspections are adequate to manage heat transfer degradation due to fouling for carbon steel and copper alloy (copper-nickel) heat exchanger tubes exposed to wet air/gas (external) environment addressed by this AMR because a visual inspection will be capable of detecting any fouling (buildup from whatever source) on the external surface of the carbon steel and copper alloy (copper-nickel) heat exchanger tube. On the basis of periodic visual inspections being performed during system walkdowns at a specified frequency of these components by the PINGP AMP B2.1.14, "External Surfaces Monitoring," for heat transfer degradation due to fouling, the staff finds the applicant's use of the External Surfaces Monitoring Program acceptable.

In LRA Table 3.3.2-14, the applicant proposed to manage loss of material-selective leaching in copper nickel heat exchanger tubes in a wet air/gas external environment by using the Selective Leaching of Materials Program. The applicant referenced Footnote H for this line item indicating that the aging effect is not in the GALL Report for these components, material, and environment combinations.

In LRA B2.1.36, the applicant stated that the Selective Leaching of Materials Program will include a one-time visual inspection in conjunction with a hardness measurement, or other suitable detection technique of selected components that may be susceptible to selective leaching. The staff's evaluation of the Selective Leaching of Materials Program is documented in SER Section 2.0.3.2.16. The staff finds that this new one-time program is consistent with GALL AMP XI.M33, "Selective Leaching," and includes an approved exception related to physical examinations.

The staff noted that the one-time inspection program credited under the applicant's Selective Leaching Program is consistent with the one-time inspection basis credited in GALL AMP XI.M33, "Selective Leaching," for component materials that are identified as being susceptible to selective leaching. The staff also noted that Table IX.C in the GALL Report Volume 2 identifies that copper alloys with greater than 15 percent alloying zinc content, aluminum bronzes with greater than 8 percent aluminum alloying contents and cast irons may be susceptible to selective leaching. On this basis, the staff finds the Selective Leaching of Materials Program is a

Page: 497

Sequence number: 1
Author:
Date: 7/28/2009 9:54:41 AM
The aging related degradation that was not initially accounted for was loss of material due to selective leaching; this AE is discussed below. Discussing the selective leaching of HX tubes here would provide the connection with the added aging related degradation statement.

Sequence number: 2
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Date: 7/15/2009 9:13:08 AM
This SER Section is "Steam Generator Tube Integrity". The SER Section for Selective Leaching Program is 3.0.3.2.15.

valid program to credit for the management of loss of material due to selective leaching in these copper alloy piping and fittings because the basis is consistent with: (1) the basis in GALL Table IX.C, which identifies that copper alloys with greater than 15 percent alloying zinc contents may be susceptible to selective leaching, and (2) basis in GALL AMP XI.M33 that the one-time inspection proposed in Selective Leaching Programs is an acceptable basis for managing loss of material in for copper alloy, aluminum bronze and cast iron components as a result of selective leaching.

On the basis of its review, the staff finds that the applicant has appropriately evaluated the AMR results of material, environment, AERM, and AMP combinations not evaluated in the GALL Report. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.3.2.3.15 Radiation Monitoring System - Summary of Aging Management Review – LRA Table 3.3.2-15

The staff reviewed LRA Table 3.3.2-15, which summarizes the results of AMR evaluations for the radiation monitoring system component groups. The staff determined that all AMR evaluation results in LRA Table 3.3.2-15 are consistent with the GALL Report.

3.3.2.3.16 Spent Fuel Pool Cooling System - Summary of Aging Management Review – LRA Table 3.3.2-16

The staff reviewed LRA Table 3.3.2-16, which summarizes the results of AMR evaluations for the spent fuel pool cooling system component groups. The staff determined that all AMR evaluation results in LRA Table 3.3.2-16 are consistent with the GALL Report.

3.3.2.3.17 Station and Instrument Air System - Summary of Aging Management Review – LRA Table 3.3.2-17

The staff reviewed LRA Table 3.3.2-17, which summarizes the results of AMR evaluations for the station and instrument air system component groups.

In LRA Table 3.3.2-17, the applicant proposed to manage change in material properties due to ozone and ultraviolet exposure and cracking due to ozone and ultraviolet exposure for flex connections fabricated from PVC exposed to an external uncontrolled plant indoor air environment. The AMR line items cite Generic Note F, which indicates that the material is not addressed in the GALL Report for this environment.

The applicant credits PINGP AMP B2.1.14, "External Surfaces Monitoring Program," for aging management. The staff notes that the applicant has proposed to enhance the scope of program of GALL AMP XI.M36, "External Surfaces Monitoring," to include non-metallic components, including PVC, and the aging effects of change in material properties and cracking. The staff further notes the intent of GALL AMP XI.M36 is to perform visual inspections of steel components for loss of material. The staff determined that additional information was needed on the applicant's proposed augmentation to PINGP AMP B2.1.14. Therefore, by letter dated November 5, 2008, the staff issued RAI B2.1.14-1 requesting the applicant to provide an

Page: 498

Sequence number: 1
Author:
Date: 7/28/2009 8:02:30 AM
T should be "heat exchanger tubes" to reflect LRA

Note D indicates that the component for the AMR line item, although different from, is consistent with the GALL Report for material, environment, and aging effect. In addition, the AMP takes some exceptions to the GALL AMP. The staff audited these line items to verify consistency with the GALL Report. The staff verified whether the AMR line item of the different component was applicable to the component under review and whether the identified exceptions to the GALL AMPs have been reviewed and accepted. The staff also determined whether the applicant's AMP was consistent with the GALL AMP and whether the AMR was valid for the site-specific conditions.

Note E indicates that the AMR line item is consistent with the GALL Report for material, environment, and aging effect, but credits a different AMP. The staff audited these line items to verify consistency with the GALL Report. The staff also determined whether the credited AMP would manage the aging effect consistently with the GALL AMP and whether the AMR was valid for the site-specific conditions.

The staff reviewed the information in the LRA. The staff did not repeat its review of the matters described in the GALL Report; however, the staff did verify that the material presented in the LRA was applicable and that the applicant identified the appropriate GALL Report AMRs.

The staff reviewed the LRA to confirm that the applicant: (a) provided a brief description of the system, components, materials, and environments; (b) stated that the applicable aging effects were reviewed and evaluated in the GALL Report; and (c) identified those aging effects for the steam and power conversion system components that are subject to an AMR. On the basis of its audit and review, the staff determines that, for AMRs not requiring further evaluation, as identified in LRA Table 3.4.1, the applicant's references to the GALL Report are acceptable and no further staff review is required, with the exception of the following AMRs that the applicant had identified were consistent with the AMRs of the GALL Report and for which the staff determined were in need of additional clarification and assessment. The staff's evaluations of these AMRs are provided in the subsections that follows.

3.4.2.1.1 AMR Results Identified as Not Applicable

In LRA Table 3.4.1, item 13, the applicant states that the corresponding AMR items in the GALL Report are not applicable to PINPG because the AMR items in the GALL Report are only applicable to particular components in BWR reactor designs and because PINGP is a Westinghouse-designed PWR facility. The staff verified that the stated AMR items in the GALL Report are only applicable to BWR designed facilities and are not applicable to the PINGP LRA.

In LRA Table 3.4.1, items 21, 23, 24, 26, 27, 34, and 42, the applicant states that the corresponding AMR result lines in the GALL Report are not applicable because PINGP does not have the component, material, and environment combination in the Steam and Power Conversion System. The staff reviewed the documentation supporting the applicant's AMR evaluation and confirmed the applicant's claim that PINGP does not have the component, material, and environment combination in the steam and power conversion system. Therefore, the staff agrees with the applicant's determination that the corresponding AMR result lines in the GALL Report are not applicable to PINGP.

Page: 516

Sequence number: 1
Author:
Date: 7/28/2009 9:57:39 AM
Note E goes on to say "... or NUREG-1801 identifies a plant-specific aging management program".

In LRA Table 3.4.1, item 43, the applicant states that further evaluation in LRA Section 3.5.2.2.1.4 concluded that steel components in concrete are not susceptible to aging and do not require aging management. The staff noted this item applies to GALL line items VIII.I-14.and VIII.I-11, which indicates that there is no aging effect for this component type and environment, and therefore do not require an AMP. Therefore, the staff agrees with the applicant in that this line item does not require aging management.

3.4.2.1.2 Loss of Material due to General Corrosion

In LRA Table 3.4.1, item 3.4.1-28, addresses loss of material due to general corrosion for carbon steel external surfaces exposed externally to air – indoor uncontrolled, condensation, or air outdoor in the condensate system.

In LRA Tables, 3.4.2-1, 3.4.2-2, 3.4.2-3, 3.4.2-4, 3.4.2-5, 3.4.2-6, 3.4.2-7, and 3.4.2-8, the applicant credits either AMP B2.1.14, External Surfaces Monitoring Program to manage loss of material due to general corrosion in the external carbon steel surfaces of steam and power conversion system piping, piping components, piping elements,(including pump casings, valve bodies, traps, and flow restrictors, filter/strainer housings, eductors, flow restrictors, manifold, and demineralizers), tanks, and heat exchanger components that are exposed to an uncontrolled environment or alternatively, AMP B2.1.2 "Aboveground Steel Tanks Program," to manage loss of material due to general corrosion in the carbon steel condensate storage tank surfaces that are exposed externally to an uncontrolled indoor air environment. These AMR result line items cite Generic Note E, indicating that the AMR line items are consistent with GALL Report material, environment, and aging effect, but a different AMP is credited.

The staff noted that AMR item 28 in Table 4 of the GALL Report, Volume 1, and GALL AMR item VIII.H-7 both recommend that GALL AMP XI.M36, "External Surfaces Monitoring" be credited to manage loss of material in the external steel tank surfaces that are exposed to an uncontrolled indoor air environment. The staff noted that for all the stated carbon steel components managed in accordance with LRA AMR item 3.4.1-28, the applicant credited the External Surfaces Monitoring Program to manage loss of material in the external carbon steel surfaces that are exposed to an uncontrolled indoor air environment. The staff finds this to be acceptable because it is consistent with the AMP that is recommended for aging management of these components in GALL AMR item VII.H-7.

The staff noted and verified that the only tanks at PINGP which correspond to recommended position in GALL AMR item VIII.H-7 and for which the applicant had credited the Aboveground Steel Tanks Program for aging management are slurry tanks, which are fabricated from carbon steel materials. Upon further review by the applicant, the applicant determined that the pre-coat slurry tanks do not fulfill a 10 CFR 54.4(a)(1), (a)(2), or (a)(3) scoping function. Therefore, in a letter dated December 5, 2008 the applicant amended its LRA to remove the pre-coated slurry tanks and any AMR items associated with these tanks from the scope of the LRA. The applicant stated that these tanks (pre-coat slurry tanks) were removed from the scope of license renewal because these tanks are normally dry and are only used during refueling outages. The staff notes that the pre-coat slurry tanks do not meet the criteria in 10 CFR 54.4(a)(1), (2) or (3); therefore, these tanks are not within the scope of license renewal and therefore do not need to be addressed in the AMR items for the LRA, including those that are referenced to AMR item 28

Page: 517

Sequence number: 1
Author:
Date: 7/28/2009 9:58:57 AM
Additional SC that use line 3.4.1-28 in the SPC systems include Blowers, Flex Connections, Restricting Orifices (strike flow restrictors in two places), Rupture Disks, Thermowells and Turbine Casings.

in Table 4 of the GALL Report, Volume 1 or to AMR item VIII.H-7 in the GALL Report, Volume 2.

On the basis of its review, the staff concludes that these pre-coat slurry tanks do not meet the criteria of 10 CFR 54.4(a)(1), (2) or (3); therefore, these tanks are not within the scope of license renewal.

3.4.2.1.3 Loss of Material Due to Pitting, Crevice, and Microbiologically Influenced Corrosion

In LRA Table 3.4.1, item 3.4.1-32 addresses loss of material due to pitting, crevice, and MIC for stainless steel and copper alloy components with internal surfaces exposed to raw water in the circulating water system and turbine generator and support system.

The LRA credits the PINGP AMP B2.1.22, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," to manage this aging effect for stainless steel heat exchanger tubes and components in a raw water (internal and external) environment only. The GALL Report recommends for item 3.4.1-32 that GALL AMP XI.M20, "Open-Cycle Cooling Water System," to manage this aging effect. These AMR line items cite Note E, indicating that the AMR line items are consistent with GALL Report material, environment, and aging effect, but a different AMP is credited.

The staff noted that the component type recommended by GALL item VIII.A-4 is piping, piping components and piping elements. However, the applicant included copper alloy (copper-nickel) heat exchanger tubes when referencing item 3.4.1-32. The staff further noted that the applicant referenced item 3.4.1-32 of LRA Table 3.4.1 because there was not another applicable line item in LRA Table 3.4.1, for the steam and power conversion systems, which corresponded to the same component, material, environment and aging effect combination. The staff's evaluation of heat exchanger tubes that referenced item 3.4.1-32 is evaluated separately, below.

The staff verified that only piping, fittings, pump casings and valve body components align to GALL item VIII.E-18 and VIII.E-27 and are fabricated from copper alloy and stainless steel materials that are applicable to PINGP. The staff noted that those AMR Line items that referenced GALL item VIII.A-4, VIII.E-18 and VIII.E-27 in circulating water system and turbine generator and support system are not in the scope of an open-cycle cooling water system as described in GL 89-13 and not associated with the ultimate heat sink, and, therefore, are not within the scope of GALL AMP XI.M20. The staff noted that the applicant referenced GALL item VII.C1-3 because the material, environment and aging effect requiring management corresponded.

The staff finds that the applicant's inclusion of heat exchanger tube components referencing GALL item VIII.A-4 to be reasonable because the material, environment and aging effect requiring management correspond. However, the staff noted during its review that the applicant credits a visual inspection to detect the aging effect of loss of material in heat exchanger components and tubes. The staff determined that additional information was needed. Therefore, by letter dated December 18, 2008, the staff issued RAI 3.3.2-20-02 requesting the applicant to justify how a visual inspection is capable of detecting loss of material in these components in those regions that are not directly visible (e.g. the bend of a heat exchanger tube). By letter dated January 20, 2009, the applicant responded by stating the AMR result line items in LRA

Page: 518

Sequence number: 1
Author:
Date: 7/28/2009 10:09:13 AM
Heat exchanger components and tubes no longer reference GALL item VIII.A-4. Reference NSPM letter dated 1/20/09.

Table 3.4.2-8 that are heat exchanger tubes in a raw water (internal) environment which reference LRA Table 3.4.1, item 3.4.1-32, are supplied by the cooling water system. The applicant further stated these AMR result line items should have credited the Open-Cycle Cooling Water Program because eddy current testing is performed on these heat exchanger components to detect loss of material by this program. The applicant amended its LRA such that these AMR result line items now credit the Open-Cycle Cooling Water Program and reference LRA Table 3.3.1, item 3.3.1-82 and GALL item VII.C1-3. The staff determined that based on the applicant's amendment to credit the Open-Cycle Cooling Water Program for these AMR result line items, the LRA is consistent with the recommendations of the GALL Report. On the basis of its review, the staff finds that this portion of RAI 3.3.2-20-02 is acceptable because the applicant is now crediting the Open-Cycle Cooling Water Program for aging management of these heat exchanger tubes in a raw water (internal) environment that is associated with the ultimate heat sink, which is consistent with the GALL Report recommendations in GALL item VII.C1-3.

The staff's review of the applicant's Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program and its evaluation are documented in SER Section 3.0.3.1.13. The staff determined that this program, which includes periodic visual inspections during periodic system and component surveillance activities or during maintenance activities when the internal surface is accessible for visual inspections, is adequate to manage loss of material for stainless steel heat exchanger tubes and components exposed to raw water (external and internal) addressed by this AMR. The staff further noted that these activities are consistent with those recommended by GALL AMP XI.M20. The staff also determined that the periodic visual inspections will be capable of detecting deterioration or degradation on the material surface that would be an indication of loss of material.

On the basis of periodic visual inspections, the staff finds the applicant's use of this program acceptable. The staff concludes that the applicant has demonstrated that the effects of aging for these components will be adequately managed so that their intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.4.2.1.4 Loss of Material due to Pitting, Crevice, and Microbiologically-Influenced Corrosion and Fouling

In LRA Table 3.4.1, item 3.4.1-33, addresses loss of material due to pitting, crevice, and MIC and fouling for stainless steel components with its external and internal surfaces exposed to raw water in the waste disposal system. The staff noted that the applicant referenced item 3.4.1-33 in LRA Table 3.3.2-20 because there was not another applicable line item in LRA Table 3.3.1 for the auxiliary systems, which corresponded to the same component, material, environment and aging effect combination.

The LRA credits the PINGP AMP B2.1.22 "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components" to manage this aging effect for stainless steel heat exchanger tubes and components in a raw water (internal and external) environment only. The GALL Report recommends for item 3.4.1-33 that GALL AMP XI.M20, "Open-Cycle Cooling Water System" manage this aging effect. These AMR line items cite Note E, indicating that the AMR line items are consistent with GALL Report material, environment, and aging effect, but a

Page: 519

Sequence number: 1
Author:
Date: 7/30/2009 9:17:00 AM
TNSPM stated these components are supplied by the Cooling Water System and, therefore, the appropriate aging management program is the OCCW Program. The OCCW Program does conduct eddy current testing on these heat exchangers, but that is not why the OCCW program was selected. Note that RAI 3.3.2-20-02, and the utility response, is addressed elsewhere in the SER and could be deleted from this discussion related to line 3.4.1-32. It was determined that 3.4.1-32 should not have been aligned to heat exchangers and heat exchanger tubes, and the RAI is no longer relevant to line 3.4.1-32.

Sequence number: 2
Author:
Date: 7/27/2009 12:20:17 PM
THeat exchanger tubes are no longer applicable. See previous comments.

Sequence number: 3
Author:
Date: 7/28/2009 10:14:33 AM
TSuggest clarifying that the topic to be evaluated is the use of item 3.4.1-33 with a different aging management program credited (i.e. Note E).

Sequence number: 4
Author:
Date: 7/27/2009 12:26:39 PM
TThis is true for some of the heat exchangers aligned to 3.4.1-33. For other heat exchangers aligned to 3.4.1-33, the LRA credited the OCCW Program.

different AMP is credited. The staff verified that only 1 ping, piping components and piping elements align to GALL item VIII.E-3 and are fabricated from stainless steel materials that are applicable to PINGP. The staff noted that those AMR Line items in Waste Disposal System and Water Treatment System are not in the scope of an open-cycle cooling water system as described in GL 89-13 and not associated with the ultimate heat sink, and, therefore, are not within the scope of GALL AMP XI.M20.

The staff noted during its review that several of the heat exchanger components are exposed to an external environment of raw water. However, the applicant credits a program that will perform visual inspections of the internal surfaces for aging management. Therefore, by letter dated December 18, 2008, the staff issued RAI 3.3.2-20-01 requesting the applicant to clarify why a program that performs visual inspections of internal surfaces has been credited for aging management of component surfaces that are exposed to an external raw water environment. By letter dated January 20, 2009, the applicant responded to RAI 3.3.2-20-01 by stating that these components that credit this program in a raw water environment are heat exchanger tubes and tubesheets. The applicant further stated that the internal and external environments are assigned based on the side of the heat exchanger tubes and tubesheets that is exposed to the environment. The applicant clarified that these components (tubes and tubesheets) are physically internal to the heat exchanger and that is why this program is credited for aging management. The applicant also stated that the internal environment of these components (tubes and tubesheets) are also internal to the heat exchanger and are evaluated in separate AMR result line items. The staff verified that for the same component, material, environment and aging effect combination, the applicant has evaluated the internal and external environments. On the basis of its review, the staff finds the applicant's response acceptable because the applicant clarified that these components (tubes and tubesheets) are internal to the heat exchanger and the internal and external environments of these components are evaluated separately.

The staff also noted during its review that the applicant credits a visual inspection to detect the aging effect of loss of material in heat exchanger components and tubes. However, the staff determined that additional information was needed, so by letter dated December 18, 2008, the staff issued RAI 3.3.2-20-02 requesting the applicant to justify how a visual inspection is capable of detecting loss of material in these components in those regions that are not directly visible (ex. the bend of a heat exchanger tube). By letter dated January 20, 2009, the applicant responded to RAI 3.3.2-20-02 by stating that this program is credited for aging management of heat exchanger components that include tubes, shells, tubesheets and channelheads. The applicant further stated the activities that will be performed as part of this program to detect degradation of these stainless steel components include periodic visual inspections during surveillance and maintenance activities. The staff noted that the applicant will choose the inspection locations based on conditions that are susceptible to the aging effects of concern. The staff further noted that the applicant's inspection will monitor parameters such as rust, discoloration, scale/deposits, pitting and surface discontinuities which are indications that loss of material and degradation are occurring. Based on the applicant's response to RAI 3.3.2-20-02, the staff noted the applicant evaluated the internal and external environments of these heat exchanger tubes and components separately because these components are physically internal to the heat exchanger. The staff confirmed in LRA Table 3.3.2-20 that the applicant evaluated the external side and internal side of the heat exchanger tubes and components, separately. Furthermore, the staff noted that the applicant is crediting a visual inspection on the external

Page: 520

Sequence number: 1
Author:
Date: 7/27/2009 12:27:45 PM
The LRA also includes Heat Exchanger Components, Heat Exchanger Tubes, Piping/Fittings and Valve Bodies.

The staff noted that 1ping, piping components, pump casings, turbine casings, demineralizers, and heat exchanger components in the 2eed steam system, condensate system, circulating water system, heating system, main steam system, turbine generator and support system, auxiliary feedwater system, chemical and volume control system, control room and miscellaneous area ventilation system, plant sample system, steam generator blowdown system, steam generator system, and water treatment system are included in the AMR results referring to LRA Section 3.4.2.2.2.1.

The staff also noted that the applicant had identified loss of material due to galvanic corrosion as a potential aging effect for 3ping, piping components, pump casings, and heat exchanger components made of carbon steel, cast iron, ductile iron, and chrome-molybdenum alloy exposed to treated water or steam in the systems listed above. For these components, the applicant had included a plant-specific note stating that loss of material due to galvanic corrosion is included as a potential aging effect/mechanism. The applicant also proposed to manage this aging effect/mechanism using the Water Chemistry Program and the One-Time Inspection Program.

The staff reviewed the applicant's Water Chemistry Program. The staff's evaluation of this program, which is documented in SER Section 3.0.3.2.18, found that the Water Chemistry Program provides mitigation for loss of material due to corrosion in components in a treated water environment. The staff reviewed the applicant's One-Time Inspection Program. The staff's evaluation of this program, which is documented in SER Section 3.0.3.1.18, determined that the applicant's One-Time Inspection Program is consistent with the One-Time Inspection AMP XI.M32, as described in the GALL Report, and is adequate to detect the presence or note the absence of loss of material due to general, pitting, crevice and galvanic corrosion for components within its scope. The staff confirmed 1) that the applicant is crediting the AMPs recommended in GALL AMR items VIII.A-16, VIII.B1-11, VIII.C-4, VIII.C-7, VIII.D1-8, VIII.E-37, VIII.F-25 and VIII.G-38; 2) that the Water Chemistry Program provides mitigation for the identified age-related degradation, and 3) that the One-Time Inspection Program provides verification of the effectiveness of the Water Chemistry Program to mitigate loss of material due to general, pitting or crevice corrosion in steel piping, piping components, pump casings, and heat exchanger exposed to treated water. The staff finds the applicant's AMR results acceptable because the AMPs credited with aging management are consistent with the guidance in SRP-LR Section 3.4.2.2.2.1 and in GALL AMR items VIII.A-16, VIII.B1-11, VIII.C-4, VIII.C-7, VIII.D1-8, VIII.E-37, VIII.F-25 and VIII.G-38.

Based on the programs identified, the staff concludes that the applicant's programs meet SRP-LR Section 3.4.2.2.2 criteria. For those line items that apply to LRA Section 3.4.2.2.2.1, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

(2) The applicant stated in LRA Section 3.4.2.2.2.2 that loss of material due to general, pitting and crevice corrosion could occur for steel piping, piping components, and piping elements exposed to lubricating oil. LRA Section 3.4.2.2.2.2 further states that 1) this aging effect is managed with a combination of the Lubricating Oil Analysis Program and

Page: 523

Sequence number: 1
Author:
Date: 7/29/2009 8:01:53 AM
LRA also includes blowers, eductors, restricting orifices, rupture discs, thermowells, traps, valve bodies, demineralizers, feedwater inlet nozzle thermal sleeve, filter/strainer housings and elements, mainfolds, pump casings and traps.

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Date: 7/27/2009 12:55:19 PM
List also includes feedwater system

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Date: 7/28/2009 10:17:36 AM
This list also includes blowers, eductors, demineralizers, feedwater inlet nozzle thermal sleeve, filter/strainer housings and elements, manifolds, restricting orifices, rupture discs, turbine casings, thermowells, traps and valve bodies.

the One-Time Inspection Program; 2) the Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results; 3) the program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation; 4) the One-Time Inspection Program performs sampling inspections using NDE techniques that either verify unacceptable degradation is not occurring or trigger additional actions and 5) components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program.

The staff reviewed LRA Section 3.4.2.2.2.2 against the criteria in SRP-LR Section 3.4.2.2.2.2, which states that loss of material due to general, pitting and crevice corrosion could occur for steel piping, piping components, and piping elements exposed to lubricating oil. SRP-LR Section 3.4.2.2.2.2 further states that: 1) the existing AMP relies on the periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion; 2) the GALL Report recommends further evaluation of programs to manage corrosion to verify the effectiveness of the lube oil chemistry control program; and 3) a one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion is not occurring.

SRP-LR Section 3.4.2.2.2.2 invokes AMR item 7 in Table 3 of the GALL Report, Volume 1, and GALL AMR item 1 II.G-35 (Auxiliary Feedwater System) as applicable to loss of material due to general, pitting, and crevice corrosion of steel piping, piping components, and piping elements exposed to lubricating oil. These components are identified in LRA Table 3.2.1-02: Filter / Strainer Housings, Piping / Fittings, Pump Casings, Valve Bodies, 3RA 3.4.2-1: F2er / Strainer Housings, Piping / Fittings, Pump Casings, Valve Bodies, Tanks.

The staff reviewed LRA Appendix B, Sections B2.1.23, "Lubricating Oil Analysis," and B2.1.18, "One-Time Inspection" in SER Sections 3.0.3.1.14 and 3.0.3.1.18 respectively, and found that these programs 1) provide for periodic sampling of lubricating oil to maintain contaminants at acceptable limits to preclude loss of material and 2) will perform one-time inspections of select steel components in the most susceptible locations exposed to lubricating oil for loss of material due to general, pitting and crevice corrosion at susceptible locations to verify the effectiveness of the applicant's Lubricating Oil Analysis Program in applicable steam and power systems. The GALL Report states that one-time inspection is an acceptable method to verify the effectiveness of a mitigative AMP such as the Lubricating Oil Analysis Program. The staff noted that the applicant is crediting the Lubricating Oil Analysis Program as recommended in GALL AMR item 4 II.G-35 and the applicant is verifying effectiveness of the Lubricating Oil Analysis Program with the elements of the One-Time Inspection Program, which the GALL Report states is an acceptable program to verify the Lubricating Oil Analysis Program effectiveness. Therefore, the staff finds that, based on the programs identified above, the applicant meets the criteria of SRP-LR Section 3.4.2.2.2.2.

For those line items that apply to LRA Section 3.4.2.2.2.2, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be

Page: 524

Sequence number: 1
Author:
Date: 7/27/2009 12:57:23 PM
Item 3.4.1-7 also aligns to VIII.A-14, VIII.D1-6, VIII.D2-5 and VIII.E-32. PINGP used lines VIII. A-14, VIII.D1-6 and VIII.G-35.

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Date: 7/27/2009 1:17:10 PM
This list of components is correct when taking into account LRA Table 3.4.2-01. Item 3.4.1-7 is also used in Table 3.4.2-02, 05 and 08; when these tables are taken into consideration there are several more components that would be added to this list.

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This line is also used in Table 3.4.2-02, 05 and 08.

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Date: 7/27/2009 1:18:09 PM
Item 3.4.1-7 also aligns to VIII.A-14, VIII.D1-6, VIII.D2-5 and VIII.E-32. PINGP used lines VIII. A-14, VIII.D1-6 and VIII.G-35.

maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.4.2.2.3 Loss of Material Due to General, Pitting, Crevice, and Microbiologically-Influenced Corrosion, and Fouling

LRA Section 3.4.2.2.3 addresses loss of material due to general, pitting, crevice, microbiologically-influenced corrosion and fouling in steel piping, piping components and piping elements exposed to raw water. The applicant stated that the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will manage this aging effect in steel internal surfaces exposed to internal raw water.

The staff reviewed LRA Section 3.4.2.2.3 against the criteria in SRP-LR Section 3.4.2.2.3, which states that loss of material due to pitting general, pitting, crevice, MIC and fouling in steel piping, piping components and piping elements exposed to raw water can occur and recommends further evaluation of a plant-specific AMP to ensure this aging effect is adequately managed.

The GALL Report, under item VIII.G-36, recommends that a plant-specific program be credited to manage loss of material due to pitting and crevice corrosion for steel piping, piping components, and piping elements in the Steam and Power Conversion Systems.

The staff verified that the only piping, fittings, valve bodies and [1]eat exchanger components aligning to GALL AMR VIII.G-36 for the Steam and Power Conversion System- Circulating Water System and Turbine Generator and Support System are fabricated from [2]eel materials.

The staff noted during its review that the applicant credits a visual inspection to detect the aging effect of loss of material in heat exchanger components and tubes. However, the staff determined that additional information was needed. Therefore, by letter dated December 18, 2008, the staff issued RAI 3.3.2-20-02 requesting the applicant to justify how a visual inspection is capable of detecting loss of material in these components in those regions that are not directly visible (e.g. the bend of a heat exchanger tube). By letter dated January 20, 2009, the applicant responded by stating the AMR result line items in LRA Table 3.4.2-8 that are heat exchanger components in a raw water (internal) environment which reference LRA Table 3.4.1, item 3.4.1-08, are supplied by the cooling water system. The applicant further stated these AMR result line items should have credited the Open-Cycle Cooling Water Program [3]ecause eddy current testing is performed on these heat exchanger components to detect loss of material by this program. The applicant amended its LRA such that these AMR result line items now credit the Open-Cycle Cooling Water Program and reference LRA Table 3.4.1, item 3.4.1-32 and GALL item VIII.E-6. The staff determined that based on the applicant's amendment to credit the Open-Cycle Cooling Water Program for these AMR result line items, the LRA is consistent with the recommendations of the GALL Report. On the basis of its review, the staff finds that that applicant's aging management basis, as amended in its response to RAI 3.3.2-20-02 is acceptable because the applicant is now crediting the Open-Cycle Cooling Water Program for aging management of these heat exchanger components in a raw water (internal) environment, which is consistent with the GALL Report recommendations in GALL item VIII.E-6.

The staff reviewed the applicant's Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program and its evaluation are documented in SER Sections 3.0.3.1.13.

Page: 525

Sequence number: 1
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There are no PINGP heat exchanger components aligned to VIII.G-36.

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Author:
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Should read "steel and cast iron materials"

Sequence number: 3
Author:
Date: 7/30/2009 8:48:15 AM
NSPM stated these components are supplied by the Cooling Water System and, therefore, the appropriate aging management program is the OCCW Program. The OCCW Program does conduct eddy current testing on these heat exchangers, but that is not why the OCCW program was selected. Note that RAI 3.3.2-20-02, and the associated utility response, is addressed elsewhere in the SER and could be deleted from this discussion related to line 3.4.1-8, since 3.4.1-8 should not have been aligned to HX and HX tubes. The RAI is no longer relevant to 3.4.1-8.

The staff reviewed LRA Section 3.4.2.2.5.1 against the criteria in SRP-LR Section 3.4.2.2.5.1, which states that loss of material due to general, pitting, crevice corrosion, and microbiologically-influenced corrosion could occur for steel (with or without coating or wrapping) piping, piping components, and piping elements buried in soil. SRP-LR Section 3.4.2.2.5.1 further states that 1) the buried piping and tanks inspection program relies on industry practice, frequency of pipe excavation, and OE to manage the effects of loss of material from general, pitting, and crevice corrosion and MIC and 2) the effectiveness of the buried piping and tanks inspection program should be verified to evaluate an applicant's inspection frequency and OE with buried components, ensuring that loss of material is not occurring.

SRP-LR Section 3.4.2.2.5.1 invokes AMR item 11 in Table 3 of the GALL Report, Volume 1, and GALL AMR item VIII.E-1 (Condensate System) as applicable to loss of material due to general, pitting, crevice, and MIC of steel piping, piping component, piping elements, and tanks exposed to soil. These components are identified in LRA Table 3.3.2-10: Tanks.

The staff reviewed LRA Appendix B, Sections B2.1.8, "Buried Piping and Tanks Inspection," in SER Section 3.0.3.1.7 and found that this program provides focused or opportunistic excavations and inspections for general, pitting, crevice, and microbiologically-influenced corrosion of buried steel piping and tanks within 10 years before the period of extended operation and within 10 years after the initiation of the period of extended operation. The staff finds that these activities are based on industry practice and provide for periodic excavations and visual inspections of buried piping and tanks for general, pitting and crevice corrosion and microbiologically-influenced corrosion.

The GALL AMP XI.34 program element "parameters monitored/inspected" states that the program monitors parameters such as coating and wrapping integrity that are directly related to corrosion damage of the external surface of buried steel piping and tanks. The staff noted that the applicant is crediting the Buried Piping and Tanks Inspection Program as recommended in GALL AMR item VIII.E-1 which the GALL Report states is an acceptable program to monitor possible corrosion damage to the external surface of piping and tanks. Therefore, the staff finds that, based on the programs identified above, the applicant meets the criteria of SRP-LR Section 3.4.2.2.5.1.

Based on the program identified, the staff concludes that the applicant's programs meet SRP-LR Section 3.4.2.2.5.1 criteria. For those line items that apply to LRA Section 3.4.2.2.5.1, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

(2) The applicant stated in LRA Section 3.4.2.2.5.2 that loss of material due to general, pitting, crevice, and MIC could occur for steel heat exchanger components exposed to lubricating oil. The LRA further states that: 1) this aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program; 2) the Lubricating Oil Analysis Program includes periodic oil sampling,

Page: 529

Sequence number: 1
Author:
Date: 7/30/2009 8:48:55 AM
TNSPM excludes loss of material due to MIC in lube oil. This section of the LRA was updated in TNSPM Letter dated 2/26/09, Response to Section 3.3.2.2.12.2 Follow Up Question.

analysis, and evaluation and trending of results; 3) the program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation; 4) the One-Time Inspection Program performs sampling inspections using NDE techniques that either verify unacceptable degradation is not occurring or trigger additional actions; and 5) components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program.

The staff reviewed LRA Section 3.4.2.2.5.2 against the criteria in SRP-LR Section 3.4.2.2.5.2 which states that loss of material due to general, pitting and crevice corrosion, and 1MIC could occur in steel heat exchanger components exposed to lubricating oil. SRP-LR Section 3.4.2.2.5.2 further states that 1) the existing AMP relies on the periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion and 2) the effectiveness of lubricating oil contaminant control can be achieved through a one-time inspection of selected components at susceptible locations.

SRP-LR Section 3.4.2.2.5.2 invokes AMR item 12 in Table 3 of the GALL Report, Volume 1, and GALL AMR item VIII.G-6 (Auxiliary Feedwater System) as applicable to loss of material due to general, pitting, crevice, and MIC of heat exchanger components, exposed to lubricating oil. These components are identified in 2RA Table 3.1.2-2: Heat Exchanger Components, LRA Table 3.4.2-5: Heat Exchanger Components, LRA Table 3.4.2-8: Heat Exchanger Components.

The staff reviewed LRA Appendix B, Sections B2.1.24, "Lubricating Oil Analysis" and B2.1.29, "One-Time Inspection" in SER Sections 3.0.3.1.14 and 3.0.3.18 respectively and found that these programs: 1) provide for periodic sampling of lubricating oil to maintain contaminants at acceptable limits to preclude loss of material due to general, pitting, crevice, and MIC; and 2) will perform one-time inspections of select steel heat exchanger tubing exposed to lubricating oil for loss of material due to general, pitting, crevice corrosion, and 3IC to verify the effectiveness of the Lubricating Oil Analysis Program in applicable steam and power conversion systems. The GALL Report states that one-time inspection is an acceptable method to verify the effectiveness of a mitigative AMP such as the Lubricating Oil Analysis Program. The staff noted that the applicant is crediting the Lubricating Oil Analysis Program as recommended in GALL AMR item VIII.G-6 and the applicant is verifying effectiveness of the Lubricating Oil Analysis Program with the elements of the One-Time Inspection Program, which the GALL Report states is an acceptable program to verify the Lubricating Oil Analysis Program effectiveness. In addition, the staff finds the applicant's use of the Lubricating Oil Analysis Program to manage components containing hydraulic fluid conservative and therefore acceptable. Therefore, the staff finds that, based on the programs identified above, the applicant meets the criteria of SRP-LR Section 3.4.2.2.5.2.

Based on the programs identified, the staff concludes that the applicant's programs meet SRP-LR Section 3.4.2.2.5.2 criteria. For those line items that apply to LRA Section 3.4.2.2.5.2, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately

Page: 530

Sequence number: 1
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TPINGP excludes loss of material due to MIC in lube oil. The LRA was updated with this exclusion in NSP Letter dated 2/26/09, Response to Section 3.3.2.2.12.2 Follow Up Question. Also see SER Section 3.3.2.2.9 for typical write-up that addressed this exclusion.

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TShould also list LRA Table 3.4.2-1: Heat Exchanger Components.

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TProgram B2.1.24 is not used to manage loss of material due to MIC. See NSP Letter dated 2/26/09, Response to Section 3.3.2.2.12.2 Follow Up Question. Also see SER Section 3.3.2.2.9 for typical write-up that addressed this exclusion.

managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.4.2.2.6 Cracking Due to Stress Corrosion Cracking

LRA Section 3.4.2.2.6 addresses the applicant's aging management basis for managing cracking due to SCC in stainless steel piping, piping components, piping elements, tanks, and heat exchangers components exposed to treated water greater than 60 °C (>140 °F). In the LRA, the applicant stated that the aging effect of cracking due to SCC in these components will be managed by a combination of the Water Chemistry program and the One-Time Inspection program.

The staff reviewed LRA Section 3.4.2.2.6 against the criteria in SRP-LR Section 3.4.2.2.6, which states that cracking due to SCC may occur in the stainless steel piping, piping components, piping elements, tanks, and heat exchangers components exposed to treated water greater than 60 °C (>140°F), and for stainless steel piping, piping components, and piping elements exposed to steam. The SRP-LR states that the existing AMP relies on monitoring and control of water chemistry to manage the effects of cracking due to SCC. However, high concentrations of impurities at crevices and locations of stagnant flow conditions could cause SCC. Therefore, the GALL Report recommends that the effectiveness of the water chemistry control program be verified to ensure that SCC is not occurring and that the component's intended function would be maintained during the period of extended operation.

SRP-LR Section 3.4.2.2.6 invokes AMR item 14 in Table 4 of the GALL Report, Volume 1, and GALL AMR items VIII.B-1, VIII.C-2, VIII.D1-5, VIII.E-30, VIII.E-38, VIII.F-3, and VIII.F-24. The staff noted that for all of the GALL AMR items, the recommended AMPs are Water Chemistry (GALL AMP XI.M2) and One-Time Inspection (GALL AMP XI.M32).

The staff noted that piping and piping components, expansion joints, 1edwater inlet nozzles, flex connections, heat exchanger tubes, tanks, and pump casings in the bleed steam system, the chemical and volume control system, the condensate system, the feedwater system, the heating system, the plant sample system, the radiation monitoring system, the reactor coolant system, the steam generator blowdown system, the steam generator system, and the turbine generator and support system are included in the AMR results referring to LRA Section 3.4.2.2.6.

The staff reviewed the applicant's Water Chemistry Program. The staff's evaluation of this program, which is documented in SER Section 3.0.3.2.19, found that the Water Chemistry Program provides mitigation for cracking due to SCC for stainless steel components in a treated water environment. The staff reviewed the applicant's One-Time Inspection Program. The staff's evaluation of this program, which is documented in SER Section 3.0.3.1.18 found that the One-Time Inspection Program is adequate to detect the presence or note the absence of cracking due to SCC for components within its scope. The staff confirmed 1) that the applicant is crediting the AMPs recommended in GALL AMR items VIII.B-1, VIII.C-2, VIII.D1-5, VIII.E-30, VIII.E-38, VIII.F-3, and VIII.F-24; 2) that the Water Chemistry Program provides mitigation for the identified age-related degradation; and 3) that the One-Time Inspection Program provides verification of the effectiveness of the Water Chemistry Program to mitigate cracking due to SCC in stainless steel piping, piping components, piping elements, tanks, and heat exchanger

Page: 531

Sequence number: 1
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Date: 7/27/2009 1:33:51 PM
Should be "feedwater inlet nozzle thermal sleeve".

Also list should include LEFM transducer housings, manifolds, restricting orifices, thermowells, valve bodies and secondary closures with Inserts.

components exposed to treated water greater than 60 °C (>140 °F). The staff finds the applicant's AMR results acceptable because the AMPs credited with aging management are consistent with the guidance in SRP-LR Section 3.4.2.2.6 and in GALL AMR items VIII.B-1, VIII.C-2, VIII.D1-5, VIII.E-30, VIII.E-38, VIII.F-3, and VIII.F-24.

Based on the programs identified, the staff concludes that the applicant's proposed programs are acceptable for managing the aging effects in the applicable components. The staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.4.2.2.7 Loss of Material Due to Pitting and Crevice Corrosion

(1) LRA Section 3.4.2.2.7.1 addresses the applicant's aging management basis for managing loss of material due to general (steel only), pitting, and crevice corrosion in steel and stainless steel tanks; in aluminum and copper alloy piping, piping components, and piping elements; and in stainless steel piping, piping components, and piping elements, tanks and heat exchanger components exposed to treated water. The applicant stated that for steel and stainless steel tanks, for stainless steel piping, piping components, and piping elements, and for stainless steel heat exchanger components, the aging effect is managed by a combination of the Water Chemistry Program and the One-Time Inspection Program. The applicant also stated that for aluminum and copper alloy piping, piping components and piping elements, the aging effect is managed with the Water Chemistry Program and One-Time Inspection Program, with the Closed-Cycle Cooling Water System Program, or with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program. The applicant stated that the Closed-Cycle Cooling Water System Program includes both preventive measures (corrosion inhibitor addition and chemical testing) to minimize aging effects and component inspections to monitor for the effects of aging.

The staff compared LRA Section 3.4.2.2.7.1 against the criteria of SRP-LR Section 3.4.2.2.7.1, which states that loss of material due to pitting and crevice corrosion may occur for stainless steel, aluminum, and copper alloy piping, piping components and piping elements and for stainless steel tanks and heat exchanger components exposed to treated water. The SRP-LR states that the existing AMP relies on monitoring and control of water chemistry to manage the effects of loss of material due to pitting, and crevice corrosion. However, control of water chemistry does not preclude corrosion at locations of stagnant flow conditions. Therefore, the GALL Report recommends that the effectiveness of the water chemistry program should be verified to ensure that corrosion is not occurring. The SRP-LR states that a one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion is not occurring and the component's intended function will be maintained during the period of extended operation.

SRP-LR Section 3.4.2.2.7.1 invokes AMR items 6, 15 and 16 in Table 4 of the GALL Report, Volume 1, and GALL AMR items [1]III.A-5, VIII.B1-4, VIII.C-1, VIII.D1-4, VIII.E-15, VIII.E-29, VIII.E-36, VIII.E-40, VIII.F-23, and VIII.G-32. The staff noted that components

Page: 532

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T should also list VIII.F-15

in the 1hemical and volume control system, the condensate system, the heating system, the reactor coolant system, the steam generator blowdown system, the auxiliary feedwater system, the containment spray system, the control room and miscellaneous area ventilation system, the fire protection system, the turbine generator and support system, and the water treatment system are included in the AMR results referring to LRA Section 3.4.2.2.7.1

The staff reviewed the applicant's Water Chemistry Program. The staff's evaluation of this program, which is documented in SER Section 3.0.3.2.18, determined that the applicant's Water Chemistry Program, provides mitigation for loss of material due to general corrosion in steel components and due to pitting and crevice corrosion in stainless steel, copper-alloy and aluminum components. The staff reviewed the applicant's One-Time Inspection Program. The staff's evaluation of this program, which is documented in SER Section 3.0.3.1.18, determined that the applicant's One-Time Inspection Program is consistent with the One-Time Inspection AMP XI.M32, as described in the GALL Report, and is adequate to detect the presence or note the absence of loss of material due to general, pitting, crevice, and galvanic corrosion for components within the scope of the program. The staff confirmed 1) that the applicant is crediting the AMPs recommended in GALL AMR items 2III.A-5, VIII.B1-4, VIII.C-1, VIII.D1-4, VIII.E-15, VIII.E-29, VIII.E-36, VIII.E-40, VIII.F-23, and VIII.G-32; 2) that the Water Chemistry Program provides mitigation for the identified age-related degradation, and 3) that the One-Time Inspection Program provides verification of the effectiveness of the Water Chemistry Program to mitigate loss of material due to general, pitting or crevice corrosion in steel and stainless steel tanks, piping, piping components, pump casings, and heat exchanger components, and in aluminum and copper alloy piping, piping components and piping elements exposed to treated water. The staff finds the applicant's AMR results acceptable because the AMPs credited with aging management are consistent with the guidance in SRP-LR Section 3.4.2.2.7.1 and in GALL AMR items 3III.A-5, VIII.B1-4, VIII.C-1, VIII.D1-4, VIII.E-15, VIII.E-29, VIII.E-36, VIII.E-40, VIII.F-23, and VIII.G-32.

The staff noted that the applicant credits the Closed-Cycle Cooling Water System Program in lieu of the Water Chemistry and One-Time Inspection programs for managing loss of material due to pitting and crevice corrosion in aluminum heat exchanger tubes exposed to treated water in the control room and miscellaneous area ventilation system and in aluminum heaters exposed to treated water in the fire protection system. The staff also noted that the applicant cited generic Note E for these AMR results, indicating that the results are consistent with the GALL Report for material, environment and aging effect, but the proposed AMP is different from the one recommended in the GALL Report.

The staff reviewed the applicant's Closed-Cycle Cooling Water System Program. The staff's evaluation of this program, which is documented in SER Section 3.0.3.2.2, determined that the Closed-Cycle Cooling System Program, with an enhancement, is consistent with the Closed-Cycle Cooling Water System AMP XI.M21, as described in the GALL Report with acceptable exceptions. The staff determined that the applicant's Closed-Cycle Cooling Water System Program includes preventive measures, such as use of corrosion inhibitors, to minimize the effects of aging due to corrosion; and it

Page: 533

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Should also list radation monitoring system, steam generator system and plant sample system.

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states that this aging effect is not applicable because there are no stainless steel components exposed to soil in the steam and power conversion systems.

SRP-LR Section 3.4.2.2.7.2 states that loss of material due to pitting and crevice corrosion may occur in stainless steel piping, piping components, and piping elements exposed to soil. The GALL Report recommends further evaluation of a plant-specific AMP to ensure that the aging effect is adequately managed.

The staff reviewed the PINGP UFSAR, and verified that there are no stainless steel components exposed to soil in the steam and power conversion systems that are within the scope the license renewal and subjected to an AMR.

On this basis, the staff finds that criteria in SRP-LR Section 3.4.2.2.7.2 are not applicable to PINGP.

(3) The applicant stated in LRA Section 3.4.2.2.7.3 that loss of material due to pitting and crevice corrosion could occur for copper alloy piping, piping components, and piping elements exposed to lubricating oil. LRA Section 3.4.2.2.7.3 further states that: 1) this aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program; 2) the Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results; 3) the program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation; 4) the One-Time Inspection Program performs sampling inspections using NDE techniques that either verify unacceptable degradation is not occurring or trigger additional actions; and 5) components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program.

The staff reviewed LRA Section 3.4.2.2.7.3 against the criteria in SRP-LR Section 3.4.2.2.7.3, which states that loss of material due to pitting and crevice corrosion could occur for copper alloy piping, piping components, and piping elements exposed to lubricating oil. The existing AMP relies on the periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. SRP-LR Section 3.4.2.2.7.3 further states that the effectiveness of lubricating oil contaminant control can be verified through a one-time inspection of selected components at susceptible locations and one-time inspection is an acceptable method to ensure that corrosion is not occurring.

SRP-LR Section 3.4.2.2.7.3 invokes AMR item 18 in Table 3 of the GALL Report, Volume 1, and GALL AMR items VIII.G-19 (Auxiliary Feedwater System), VIII.D1-2 (Feedwater System), VIII.A-3 (Steam Turbine System) as applicable to loss of material due to pitting and crevice corrosion of stainless steel and copper alloy piping, piping components, and piping elements exposed to lubricating oil. These components are identified in LRA Table 3.1.2-2: Piping / Fittings, Valve Bodies, LRA Table 3.4.2-8: Piping / Fittings, Valve Bodies, LRA Table 3.4.2-5: Filter / Strainer Housings, Valve Bodies.

The staff reviewed LRA Appendix B, Sections B2.1.24, "Lubricating Oil Analysis" and B2.1.29, "One-Time Inspection" in SER Sections 3.0.3.1.14 and 3.0.3.1.18 respectively,

Page: 535

Sequence number: 1
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Date: 7/27/2009 1:44:07 PM

LRA Table 3.4.2-5 should line-up with Piping / Fittings, Valve Bodies.

LRA Table 3.4.2-8 should line-up with Filter / Strainer Housings, Valve Bodies.

Also, should include LRA Table 3.4.2-1: Heat Exchanger Tubes and Valve Bodies.

and found that these programs: 1) provide for periodic sampling of lubricating oil to maintain contaminants at acceptable limits to preclude loss of material due to pitting and corrosion and 2) will perform one-time inspections of select copper alloy piping, piping components, and piping elements exposed to lubricating oil for loss of material due to pitting and crevice corrosion to verify the effectiveness of the Lubricating Oil Analysis Program in applicable Steam and Power Conversion systems. The GALL Report states that one-time inspection is an acceptable method to verify the effectiveness of a mitigative AMP such as the Lubricating Oil Analysis Program. The staff noted that the applicant is crediting the Lubricating Oil Analysis Program as recommended in GALL AMR items VIII.G-19, VIII.D1-2 and, VIII.A-3, the applicant is verifying effectiveness of the Lubricating Oil Analysis Program with the elements of the One-Time Inspection Program, which the GALL Report states is an acceptable program to verify the Lubricating Oil Analysis Program effectiveness. Therefore, the staff finds that, based on the programs identified above, the applicant has met the criteria of SRP-LR Section 3.4.2.2.7.3.

Based on the programs identified, the staff concludes that the applicant's programs meet SRP-LR Section 3.4.2.2.7.3 criteria. For those line items that apply to LRA Section 3.4.2.2.7.3, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.4.2.2.8 Loss of Material Due to Pitting, Crevice, and Microbiologically-Influenced Corrosion

The applicant stated in LRA Section 3.4.2.2.8 that loss of material due to pitting, crevice, and 1 IC could occur for stainless steel piping, piping components, heat exchanger components and tanks exposed to lubricating oil. LRA Section 3.4.2.2.8 further states that: 1) this aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program; 2) the Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results; the program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation; 3) the One-Time Inspection Program performs sampling inspections using NDE techniques that either verify unacceptable degradation is not occurring or trigger additional actions, and; 4) components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program.

The staff reviewed LRA Section 3.4.2.2.8 against the criteria in SRP-LR Section 3.4.2.2.8 which states that loss of material due to pitting, crevice, and MIC could occur in stainless steel piping, piping components, piping elements, and heat exchanger components exposed to lubricating oil. SRP-LR Section 3.4.2.2.8 further states that: 1) the existing AMP relies on the periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion; and, 2) the effectiveness of lubricating oil contaminant control can be verified through a one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion is not occurring.

Page: 536

Sequence number: 1
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Date: 7/30/2009 8:49:43 AM
TNSPM excludes loss of material due to MIC in lube oil. The LRA was updated with this exclusion in NSPM Letter dated 2/26/09, Response to Section 3.3.2.2.12.2 Follow Up Question. Also see SER Section 3.3.2.2.9 for typical write-up that addressed this exclusion.

SRP-LR Section 3.4.2.2.8 invokes AMR item 19 in Table 3 of the GALL Report, Volume 1, and GALL AMR items VIII.G-29 (Auxiliary Feedwater System), VIII.G-3 (Auxiliary Feedwater System), VIII.D1-3 (Feedwater System) and, VIII.A-9 (Steam Turbine System) as applicable to loss of material due to pitting and crevice corrosion of stainless steel piping, piping components, and piping elements exposed to lubricating oil. These components are identified in LRA Table 3.4.2-1: Filter / Strainer Elements; Restricting Orifices.

The staff reviewed LRA Appendix B, Sections B2.1.24, "Lubricating Oil Analysis" and B2.1.29, "One-Time Inspection" in SER Sections 3.0.3.1.14 and 3.0.3.1.18 respectively and found that these programs: 1) provide for periodic sampling of lubricating oil to maintain contaminants at acceptable limits to preclude loss of material due to pitting, crevice and MIC; and 2) will perform one-time inspections of select stainless steel piping, piping components, piping elements exposed to lubricating oil for loss of material due to pitting, crevice and MIC to verify the effectiveness of the Lubricating Oil Analysis Program in applicable Steam and Power Conversion systems. The GALL Report states that one-time inspection is an acceptable method to verify the effectiveness of a mitigative AMP such as the Lubricating Oil Analysis Program. The staff noted that the applicant is crediting the Lubricating Oil Analysis Program as recommended in GALL AMR items VIII.G-29, VIII.G-3, VIII.D1-3 and, VIII.A-9, the applicant is verifying effectiveness of the Lubricating Oil Analysis Program with the elements of the One-Time Inspection Program, which the GALL Report states is an acceptable program to verify the Lubricating Oil Analysis Program effectiveness. Therefore, the staff finds that, based on the programs identified above, the applicant has met the criteria of SRP-LR Section 3.4.2.2.8.

Based on the programs identified, the staff concludes that the applicant's programs meet SRP-LR Section 3.4.2.2.8 criteria. For those line items that apply to LRA Section 3.4.2.2.8, the staff determines that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.4.2.2.9 Loss of Material Due to General, Pitting, Crevice, and Galvanic Corrosion

LRA Section 3.4.2.2.9 addresses the applicant's aging management basis for managing loss of material due to general, pitting, crevice, and galvanic corrosion for steel heat exchanger components exposed to treated water. The applicant stated that LRA Table 3.4.1, AMR item 3.4.1-3 was used in lieu of AMR item 3.4.1-5 for evaluation of the steel heat exchanger components exposed to treated water in the condensate system; and, therefore, LRA Table 3.4.1, AMR item 3.4.1-5, was designated as "not used."

The staff compared LRA Section 3.4.2.2.9 against the criteria of SRP-LR Section 3.4.2.2.9, which states that loss of material due to general, pitting, crevice, and galvanic corrosion may occur in steel heat exchanger components exposed to treated water. The SRP-LR states that the existing AMP relies on monitoring and control of water chemistry to manage the aging effect of loss of material. However, control of water chemistry does not preclude loss of material at locations with stagnant flow conditions. The GALL Report recommends a one-time inspection program of selected components and susceptible locations to ensure that corrosion is not occurring.

Page: 537

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Program B2.1.24 is not used to manage loss of material due to MIC. See NSPM Letter dated 2/26/09, Response to Section 3.3.2.2.12.2 Follow Up Question. Also see SER Section 3.3.2.2.9 for typical write-up that addressed this exclusion

Table 3.5-1 Staff Evaluation for Structures and Component Supports Components in the GALL Report

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
PWR Concrete (Reinforced and Prestressed) and Steel Containments					
Concrete elements: walls, dome, basemat, ring girder, buttresses, containment (as applicable). (3.5.1-1)	Aging of accessible and inaccessible concrete areas due to aggressive chemical attack, and corrosion of embedded steel	ISI (IWL) and for inaccessible concrete, an examination of representative samples of below-grade concrete, and periodic monitoring of groundwater if environment is non-aggressive. A plant-specific program is to be evaluated if environment is aggressive.	Yes	Not applicable.	See SER Section 3.5.2.2.1.1
Concrete elements; All (3.5.1-2)	Cracks and distortion due to increased stress levels from settlement	Structures Monitoring Program. If a de-watering system is relied upon for control of settlement, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation	Yes	Structures Monitoring Program (B2.1.38)	Consistent with GALL Report (See SER Section 3.5.2.2.1.2)

Page: 551

Sequence number: 1
Author:
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This should list the Structures Monitoring Program (B2.1.38) for management of the unreinforced concrete

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Concrete elements: foundation, sub-foundation (3.5.1-3)	Reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete subfoundation	Structures Monitoring Program If a de-watering system is relied upon to control erosion of cement from porous concrete subfoundations, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation	Yes	1 ructures) Monitoring Program) (B2.1.38)	Consistent with GALL Report (See SER Section 3.5.2.2.1.2)
Concrete elements: dome, wall, basemat, ring girder, buttresses, containment, concrete fill-in annulus (as applicable) (3.5.1-4)	Reduction of strength and modulus of concrete due to elevated temperature	A plant-specific aging management program is to be evaluated.	Yes	Not applicable	See SER Section 3.5.2.2.1.3
Steel elements: drywell; torus; drywell head; embedded shell and sand pocket regions; drywell support skirt; torus ring girder; downcomers; liner plate, ECCS suction header, support skirt, region shielded by diaphragm floor, suppression chamber (as applicable) (3.5.1-5)	Loss of material due to general, pitting and crevice corrosion	ISI (IWE) and 10 CFR Part 50, Appendix J	Yes	Not applicable	Not applicable to PWRs (See SER Section 3.5.2.1.1)
Steel elements: steel liner, liner anchors, integral attachments (3.5.1-6)	Loss of material due to general, pitting and crevice corrosion	ISI (IWE) and 10 CFR Part 50, Appendix J	Yes	2 SME Section XI, IWE (B2.1.4) and 10 CFR Part 50, Appendix J (B2.1.1)	Consistent with GALL Report (See SER Section 3.5.2.2.1.4)

Page: 552

Sequence number: 1
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In addition, the Fire Protection Program (B2.1.15) should be listed.

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Prestressed containment tendons (3.5.1-7)	Loss of prestress due to relaxation, shrinkage, creep, and elevated temperature	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes	Not applicable	Not applicable to PINGP (See SER Section 3.5.2.2.1.5)
Steel and stainless steel elements: vent line, vent header, vent line bellows; downcomers; (3.5.1-8)	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes	Not applicable	Not applicable to PWRs (See SER Section 3.5.2.1.1)
Steel, stainless steel elements, dissimilar metal welds: penetration sleeves, penetration bellows; suppression pool shell, unbraced downcomers (3.5.1-9)	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes	TLAA - Metal fatigue	Consistent with GALL Report (See SER Section 3.5.2.2.1.6)
Stainless steel penetration sleeves, penetration bellows, dissimilar metal welds (3.5.1-10)	Cracking due to stress corrosion cracking	ISI (IWE) and 10 CFR Part 50, Appendix J, and additional appropriate examinations/ evaluations for bellows assemblies and dissimilar metal welds.	Yes	ISI (IWE) and 10 CFR Part 50, Appendix J (B2.1.1)	Consistent with GALL Report (See SER Section 3.5.2.2.1.7)
Stainless steel vent line bellows, (3.5.1-11)	Cracking due to stress corrosion cracking	ISI (IWE) and 10 CFR Part 50, Appendix J, and additional appropriate examination/ evaluation for bellows assemblies and dissimilar metal welds.	Yes	Not applicable	Not applicable to PWRs (See SER Section 3.5.2.1.1)

Page: 553

Sequence number: 1
Author:
Date: 7/22/2009 7:23:47 AM
In addition, the Fire Protection Program (B2.1.15) should be listed.

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Steel, stainless steel elements, dissimilar metal welds: penetration sleeves, penetration bellows; suppression pool shell, unbraced downcomers (3.5.1-12)	Cracking due to cyclic loading	ISI (IWE) and 10 CFR Part 50, Appendix J, and supplemented to detect fine cracks	Yes	TLAA	Consistent with GALL Report (See SER Section 3.5.2.2.1.8)
Steel, stainless steel elements, dissimilar metal welds: torus; vent line; vent header; vent line bellows; downcomers (3.5.1-13)	Cracking due to cyclic loading	ISI (IWE) and 10 CFR Part 50, Appendix J, and supplemented to detect fine cracks	Yes	Not applicable	Not applicable to PWRs (See SER Section 3.5.2.1.1)
Concrete elements: dome, wall, basemat ring girder, buttresses, containment (as applicable) (3.5.1-14)	Loss of material (scaling, cracking, and spalling) due to freeze-thaw	ISI (IWL). Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index > 100 day-inch/yr) (NUREG-1557).	Yes	Not applicable	See SER Section 3.5.2.2.1.9
Concrete elements: walls, dome, basemat, ring girder, buttresses, containment, concrete fill-in annulus (as applicable). (3.5.1-15)	Cracking due to expansion and reaction with aggregate; increase in porosity, permeability due to leaching of calcium hydroxide	ISI (IWL) for accessible areas. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R	Yes	Not applicable	See SER Section 3.5.2.2.1.10

Page: 554

Sequence number: 1
Author:
Date: 7/29/2009 8:03:03 AM

For completeness, suggest changing to, "Not applicable for increase in porosity, permeability due to leaching of calcium hydroxide. Structures Monitoring Program (B2.1.38) for cracking due to expansion and reaction with aggregate."

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Seals, gaskets, and moisture barriers (3.5.1-16)	Loss of sealing and leakage through containment due to deterioration of joint seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)	ISI (IWE) and 10 CFR Part 50, Appendix J	No	ASME Section XI, IWE (B2.1.4) and 10 CFR Part 50, Appendix J (B2.1.1)	Consistent with GALL Report
Personnel airlock, equipment hatch and CRD hatch locks, hinges, and closure mechanisms (3.5.1-17)	Loss of leak tightness in closed position due to mechanical wear of locks, hinges and closure mechanisms	10 CFR Part 50, Appendix J and plant Technical Specifications	No	1 ASME Section XI, IWE (B2.1.4), 10 CFR Part 50, Appendix J (B2.1.1), and Plant Technical Specification Program	Consistent with GALL Report
Steel penetration sleeves and dissimilar metal welds; personnel airlock, equipment hatch and CRD hatch (3.5.1-18)	Loss of material due to general, pitting, and crevice corrosion	ISI (IWE) and 10 CFR Part 50, Appendix J	No	2 ASME Section XI, IWE (B2.1.4) and 10 CFR Part 50, Appendix J (B2.1.1).	Consistent with GALL Report, (See SER Section 3.5.2.1.2)
Steel elements: stainless steel suppression chamber shell (inner surface) (3.5.1-19)	Cracking due to stress corrosion cracking	ISI (IWE) and 10 CFR Part 50, Appendix J	No	Not applicable	3 pt applicable to PWRs
Steel elements: suppression chamber liner (interior surface) (3.5.1-20)	Loss of material due to general, pitting, and crevice corrosion	ISI (IWE) and 10 CFR Part 50, Appendix J	No	Not applicable	4 pt applicable to PWRs
Steel elements: drywell head and downcomer pipes (3.5.1-21)	Fretting or lock up due to mechanical wear	ISI (IWE)	No	Not applicable	5 pt applicable to PWRs

Page: 555

Sequence number: 1
Author:
Date: 7/22/2009 7:28:55 AM
"ASME Section XI, IWE (B2.1.4)," should be deleted.

Sequence number: 2
Author:
Date: 7/22/2009 7:34:32 AM
Should also list Fire Protection Program (B2.1.15)

Sequence number: 3
Author:
Date: 7/22/2009 7:37:07 AM
Should replace "Not applicable to PWRs" with "See SER Section 3.5.2.1.1"

Sequence number: 4
Author:
Date: 7/22/2009 7:36:58 AM
Should replace "Not applicable to PWRs" with "See SER Section 3.5.2.1.1"

Sequence number: 5
Author:
Date: 7/22/2009 7:37:30 AM
Should replace "Not applicable to PWRs" with "See SER Section 3.5.2.1.1"

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
All Groups except Group 6: accessible and inaccessible concrete: foundation (3.5.1-26)	Loss of material (spalling, scaling) and cracking due to freeze-thaw	Structures Monitoring Program. Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index > 100 day-inch/yr) (NUREG-1557)	Yes	Structures Monitoring Program (B2.1.38)	Consistent with GALL Report (See SER Section 3.5.2.2.2.1 and 3.5.2.2.2.2.1)
All Groups except Group 6: accessible and inaccessible interior/exterior concrete (3.5.1-27)	Cracking due to expansion due to reaction with aggregates	Structures Monitoring Program. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R-77	Yes	1ructures Monitoring Program (B2.1.38)	Consistent with GALL Report, (See SER Section 3.5.2.2.2.1 and 3.5.2.2.2.2.2)
Groups 1-3, 5-9: All (3.5.1-28)	Cracks and distortion due to increased stress levels from settlement	Structures Monitoring Program. If a de-watering system is relied upon for control of settlement, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation	Yes	Structures Monitoring Program (B2.1.38)	Consistent with GALL Report (See SER Section 3.5.2.2.2.1 and 3.5.2.2.2.2.3)
Groups 1-3, 5-9: foundation (3.5.1-29)	Reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete subfoundation	Structures Monitoring Program. If a de-watering system is relied upon for control of settlement, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation	Yes	Not applicable	Not Applicable (See SER Section 3.5.2.2.2.1 and 3.5.2.2.2.2.3)

Page: 557

Sequence number: 1
Author:
Date: 7/29/2009 7:28:55 AM
Suggest adding after (B2.1.38) "for accessible areas only. No AMP necessary for inaccessible areas."

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Group 4: radial beam seats in BWR drywell; RPV support shoes for PWR with nozzle supports; steam generator supports (3.5.1-30)	Lock-up due to wear	ISI (IWF) or Structures Monitoring Program	Yes	1) CFR 50, Appendix J (B2.1.1) or Structures Monitoring Program (B2.1.38)	Consistent with GALL Report (See SER Section 3.5.2.2.2.1)
Groups 1-3, 5, 7-9: below-grade concrete components, such as exterior walls below grade and foundation (3.5.1-31)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling), aggressive chemical attack; cracking, loss of bond, and loss of material (spalling, scaling), corrosion of embedded steel	Structures Monitoring Program; examination of representative samples of below-grade concrete, and periodic monitoring of groundwater, if the environment is non-aggressive. A plant-specific program is to be evaluated if environment is aggressive.	Yes	Structures Monitoring Program (B2.1.38)	Consistent with GALL Report (See SER Section 3.5.2.2.2.2.4)
Groups 1-3, 5, 7-9: exterior above and below grade reinforced concrete foundations (3.5.1-32)	Increase in porosity and permeability, and loss of strength due to leaching of calcium hydroxide	Structures Monitoring Program for accessible areas. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R-77	Yes	2ructures Monitoring Program (B2.1.38)	Consistent with GALL Report (See SER Section 3.5.2.2.2.2.5)
Groups 1-5: concrete (3.5.1-33)	Reduction of strength and modulus due to elevated temperature	Plant-specific	Yes	Structures Monitoring Program (B2.1.38) & RG 1.127 , Inspection of Water-Control Structures Associated with Nuclear Power Plants Program (B2.1.35)	Consistent with GALL Report (See SER Section 3.5.2.2.2.3)

Page: 558

Sequence number: 1
Author:
Date: 7/22/2009 7:41:12 AM
This should be replaced with ASME Section XI, Subsection IWF Program (B2.1.5)

Sequence number: 2
Author:
Date: 7/22/2009 7:42:32 AM
Suggest adding after (B2.1.38) "for accessible areas only. No AMP necessary for inaccessible areas."

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Group 6: concrete; all (3.5.1-34)	Increase in porosity and permeability, cracking, loss of material due to aggressive chemical attack; cracking, loss of bond, loss of material due to corrosion of embedded steel	Inspection of Water-Control Structures or FERC/US Army Corps of Engineers dam inspections and maintenance programs and for inaccessible concrete, an examination of representative samples of below-grade concrete, and periodic monitoring of groundwater, if the environment is non-aggressive. A plant-specific program is to be evaluated if environment is aggressive.	Yes	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program (B2.1.35);	Consistent with GALL Report (See SER Section 3.5.2.2.2.4.1)
Group 6: exterior above and below grade concrete foundation (3.5.1-35)	Loss of material (spalling, scaling) and cracking due to freeze-thaw	Inspection of Water-Control Structures or FERC/US Army Corps of Engineers dam inspections and maintenance programs. Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index > 100 day-inch/yr) (NUREG-1557)	Yes	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program (B2.1.35)	Consistent with GALL Report (See SER Section 3.5.2.2.2.4.2)

Page: 559

Sequence number: 1
Author:
Date: 7/29/2009 8:03:24 AM
"Suggest adding after (B2.1.35) " for accessible areas. Structures Monitoring Program (B2.1.38) for inaccessible areas."

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Group 6: all accessible and inaccessible reinforced concrete (3.5.1-36)	Cracking due to expansion/reaction with aggregates	Accessible areas: Inspection of Water-Control Structures or FERC/US Army Corps of Engineers dam inspections and maintenance programs. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R-77	Yes	1 B 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program (B2.1.35)I	Consistent with GALL Report (See SER Section 3.5.2.2.2.4.3)
Group 6: exterior above and below grade reinforced concrete foundation interior slab (3.5.1-37)	Increase in porosity and permeability, loss of strength due to leaching of calcium hydroxide	For accessible areas, Inspection of Water-Control Structures or FERC/US Army Corps of Engineers dam inspections and maintenance programs. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R-77	Yes	2 B 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program (B2.1.35)I	Consistent with GALL Report (See SER Section 3.5.2.2.2.4.3)
Groups 7, 8: tank liners (3.5.1-38)	Cracking due to stress corrosion cracking; loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated	Yes	Water Chemistry Program (B2.1.40)	Consistent with GALL Report (See SER Section 3.5.2.2.2.5)
Support members; welds; bolted connections; support anchorage to building structure (3.5.1-39)	Loss of material due to general and pitting corrosion	Structures Monitoring Program	Yes	Structures Monitoring Program (B2.1.38)	Consistent with GALL Report (See SER Section 3.5.2.2.2.6)

Page: 560

Sequence number: 1
Author:
Date: 7/22/2009 7:46:28 AM
T Suggest adding after (B2.1.35) "for accessible areas only. No AMP necessary for inaccessible areas."

Sequence number: 2
Author:
Date: 7/22/2009 7:46:40 AM
T Suggest adding after (B2.1.35) "for accessible areas only. No AMP necessary for inaccessible areas."

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements; or Amendments	Staff Evaluation
Building concrete at locations of expansion and grouted anchors; grout pads for support base plates (3.5.1-40)	Reduction in concrete anchor capacity due to local concrete degradation, service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	Yes	Structures Monitoring Program (B2.1.38) ASME Section XI, Subsection IWF Program (B2.1.5)	Consistent with GALL Report (See SER Section 3.5.2.2.2.6)
Vibration isolation elements (3.5.1-41)	Reduction or loss of isolation function, radiation hardening, temperature, humidity, sustained vibratory loading	Structures Monitoring Program	Yes	Structures Monitoring Program (B2.1.38)	Consistent with GALL Report (See SER Section 3.5.2.2.2.6)
Groups B1.1, B1.2, and B1.3: support members: anchor bolts, welds (3.5.1-42)	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes	TLAA & ASME Section XI, Subsection IWF Program (B2.1.5)	Consistent with GALL Report (See SER Section 3.5.2.2.2.7)
Groups 1-3, 5, 6: all masonry block walls (3.5.1-43)	Cracking due to restraint shrinkage, creep, and aggressive environment	Masonry Wall Program	No	1 asonry Wall Program (B2.1.25), Fire Protection Program (B2.1.15)	Consistent with GALL Report (See SER Section 3.5.2.1.3)
Group 6: elastomer seals, gaskets, and moisture barriers (3.5.1-44)	Loss of sealing due to deterioration of seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)	Structures Monitoring Program	No	Structures Monitoring Program (B2.1.38)	Consistent with GALL Report

Page: 561

Sequence number: 1
Author:
Date: 7/22/2009 7:47:51 AM
T Should also list Structures Monitoring Program (B2.1.38)

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Group 6: exterior above and below grade concrete foundation; interior slab (3.5.1-45)	Loss of material due to abrasion, cavitation	Inspection of Water-Control Structures or FERC/US Army Corps of Engineers dam inspections and maintenance	No	1 RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program (B2.1.35)	Consistent with GALL Report
Group 5: fuel pool liners (3.5.1-46)	Cracking due to stress corrosion cracking; loss of material due to pitting and crevice corrosion	Water Chemistry and monitoring of spent fuel pool water level in accordance with technical specifications and leakage from the leak chase channels	No	2 ater Chemistry Program (B2.1.40) / Structures Monitoring Program (B2.1.38)	Consistent with GALL Report, (See SER Section 3.5.2.1.4)
Group 6: all metal structural members (3.5.1-47)	Loss of material due to general (steel only), pitting and crevice corrosion	Inspection of Water-Control Structures or FERC/US Army Corps of Engineers dam inspections and maintenance. If protective coatings are relied upon to manage aging, protective coating monitoring and maintenance provisions should be included	No	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program (B2.1.35) / Structures Monitoring Program (B2.1.38)	Consistent with GALL Report, (See SER Section 3.5.2.1.5)
Group 6: earthen water control structures - dams, embankments, reservoirs, channels, canals, and ponds (3.5.1-48)	Loss of material, loss of form due to erosion, settlement, sedimentation, frost action, waves, currents, surface runoff, Seepage	Inspection of Water-Control Structures or FERC/US Army Corps of Engineers dam inspections and maintenance programs	No	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program (B2.1.35)	Consistent with GALL Report

Page: 562

Sequence number: 1
Author:
Date: 7/29/2009 8:03:37 AM
Suggest adding after (B2.1.35) " for accessible areas only."

Sequence number: 2
Author:
Date: 7/28/2009 10:38:23 AM
For completeness, suggest adding after (B2.1.38) "supplemented by monitoring the spent fuel pool water level in accordance with Technical Specifications, and plant procedures for periodic monitoring of the spent fuel pool leak detection system.

Component Group (GALL Report Item No.)	Aging Effect/ Mechanism	AMP in GALL Report	Further Evaluation in GALL Report	AMP in LRA, Supplements, or Amendments	Staff Evaluation
Support members; welds; bolted connections; support anchorage to building structure (3.5.1-49)	Loss of material due to general, pitting, and crevice corrosion	Water Chemistry and ISI (IWF)	No	Not applicable	Not applicable to PWRs
Groups B2, and B4: galvanized steel, aluminum, stainless steel support members; welds; bolted connections; support anchorage to building structure (3.5.1-50)	Loss of material due to pitting and crevice corrosion	Structures Monitoring Program	No	Not applicable	Not applicable to PINGP (See SER Section 3.5.2.1.1)
Group B1.1: high strength low-alloy bolts (3.5.1-51)	Cracking due to stress corrosion cracking; loss of material due to general corrosion	Bolting Integrity	No	Bolting Integrity Program (B2.1.6)	Consistent with GALL Report
Groups B2, and B4: sliding support bearings and sliding support surfaces (3.5.1-52)	Loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	Structures Monitoring Program	No	Structures Monitoring Program (B2.1.38)	Consistent with GALL Report
Groups B1.1, B1.2, and B1.3: support members: welds; bolted connections; support anchorage to building structure (3.5.1-53)	Loss of material due to general and pitting corrosion	ISI (IWF)	No	ASME Section XI, IWF Program (B2.1.5)	Consistent with GALL Report
Groups B1.1, B1.2, and B1.3: constant and variable load spring hangers; guides; stops; (3.5.1-54)	Loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ISI (IWF)	No	ASME Section XI, IWF Program (B2.1.5)	Consistent with GALL Report

Page: 563

Sequence number: 1
Author:
Date: 7/29/2009 8:03:47 AM
Should replace Not applicable to PWRs with "See SER Section 3.5.2.1.1"

The staff's review of the structures and component supports followed any one of several approaches. One approach, documented in SER Section 3.5.2.1, reviewed AMR results for components that the applicant indicated are consistent with the GALL Report and require no further evaluation. Another approach, documented in SER Section 3.5.2.2, reviewed AMR results for components that the applicant indicated are consistent with the GALL Report and for which further evaluation is recommended. A third approach, documented in SER Section 3.5.2.3, reviewed AMR results for components that the applicant indicated are not consistent with, or not addressed in, the GALL Report. The staff's review of AMPs credited to manage or monitor aging effects of the structures and component supports is documented in SER Section 3.0.3.

3.5.2.1 AMR Results Consistent with the GALL Report

LRA Section 3.5.2.1 identifies the materials, environments, AERMs, and the following programs that manage aging effects for the structures and component supports components:

- 10 CFR Part 50, Appendix J Program
- ASME Section XI, Subsection IWE Program
- Bolting Integrity Program
- Boric Acid Corrosion Program
- Fire Protection Program
- Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program
- Masonry Wall Program
- RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program
- Structures Monitoring Program
- Water Chemistry Program

LRA Tables 3.5.2-1 through 3.5.2-11 summarize AMRs for the structures and component supports components and indicate AMRs claimed to be consistent with the GALL Report.

For component groups evaluated in the GALL Report for which the applicant claimed consistency with the report and for which it does not recommend further evaluation, the staff's audit and review determined whether the plant-specific components of these GALL Report component groups were bounded by the GALL Report evaluation.

The applicant noted for each AMR line item how the information in the tables aligns with the information in the GALL Report. The staff audited those AMRs with notes A through E indicating how the AMR is consistent with the GALL Report.

Note A indicates that the AMR line item is consistent with the GALL Report for component, material, environment, and aging effect. In addition, the AMP is consistent with the GALL AMP.

Page: 565

Sequence number: 1
Author:
Date: 7/22/2009 7:57:44 AM
List should also include ASME Section XI, Subsection IWF Program

On the basis of its review of AMR result lines as described in the preceding paragraphs and its comparison of the applicant's results to corresponding recommendations in the GALL Report, the staff finds that the applicant addressed the AERM adequately, as recommended by the GALL Report.

3.5.2.1.3 Cracking Due to Restraint Shrinkage, Creep, and Aggressive Environment

In the discussion section of LRA Table 3.5.1, item 3.5.1-43, the applicant stated that cracking due to restraint shrinkage, creep, and aggressive environment is managed by the Masonry Wall Program. The applicant stated that the Fire Protection Program will also be used to manage the aging effect/mechanism in areas relied upon as fire barriers. During the review, the staff noted that for the AMR results line pointing to Table 3.5.1, item 3.5.1-43, for four groups the applicant included a reference to Note E and plant-specific Note 30, which states "These masonry walls are not safety-related, and are relied upon to perform a function that demonstrates compliance with a regulated event(s)."

The staff reviewed the AMR results lines referenced to Note E, plant-specific Note 30, and determined that the component type, material, environment, and aging effect are consistent with the corresponding line of the GALL Report; however, where the GALL Report recommends AMP XI.S5, "Masonry Wall Program," the applicant has additionally proposed using the Fire Protection 1rogram. The GALL Report line item referenced is concrete block walls and the GALL Report recommends AMP XI.S5. The applicant stated that the AMR result line items that reference LRA table 3.5.1 item 3.5.1-43 are also located in areas that are relied upon as fire barriers, and the Fire Protection Program was also credited. Since the 2re Protection Program and Masonry Wall Program require visual inspections on a periodic basis to manage cracking due to restraint shrinkage, creep, and aggressive environment, the staff finds the applicant's additional use of the Fire Protection 3rogram to be acceptable.

On the basis of its review of AMR result lines as described in the preceding paragraphs and its comparison of the applicant's results to corresponding recommendations in the GALL Report, the staff finds that the applicant addressed the AERM adequately.

3.5.2.1.4 Cracking Due to Stress Corrosion Cracking; Loss of Material Due to Pitting and Crevice Corrosion.

In the discussion section of LRA Table 3.5.1, item 3.5.1-46, the applicant stated tha4racking due to SCC and loss of material due to pitting and crevice corrosion are managed by the Water Chemistry Program. The applicant stated that the Structures Monitoring Program will 5so be used to manage 6e aging effect/mechanism in areas subject to pitting and crevice corrosion. During the review, the staff noted that for the AMR results line pointing to Table 3.5.1, item 3.5.1-46, for two groups the applicant included a reference to Note E and plant-specific Note 16, which states, "NUREG-1801 line item material/environment combination is used to identify stainless steel sump liners in treated borated water. The Structures Monitoring Program is used to manage the aging effects cracking due to SCC and loss of material due to pitting and crevice corrosion for stainless steel sump liners rather then the NUREG referenced Water Chemistry Program since water quality in the sumps is not monitored."

Page: 568

Sequence number: 1
Author:
Date: 7/22/2009 8:06:39 AM
For completeness, should add after Program, "and "Structures Monitoring Program for non-safety related masonry walls in scope for a regulated event.

Sequence number: 2
Author:
Date: 7/22/2009 8:09:34 AM
Suggest changing to "... Fire Protection Program, Masonry Wall Program and Structures Monitoring Program require ..."

Sequence number: 3
Author:
Date: 7/22/2009 8:11:52 AM
Suggest adding after Program, "and the Structures Monitoring Program to"

Sequence number: 4
Author:
Date: 7/28/2009 11:05:11 AM
The discussion in Table 3.5.1, Line Item 3.5.1-46 states that cracking due to SCC is not applicable since refueling cavity, fuel transfer canal and spent fuel pool treated borated water temperatures do not exceed a limiting temperature of 140 degrees F. Pitting is not applicable since chloride, fluoride, and sulfate concentrations do not exceed 150 ppb. The Water Chemistry Program is credited with managing the aging effect loss of material due to crevice corrosion for the spent fuel pool liner, transfer canal liner, refueling cavity liner, fuel handling system components, spent fuel storage racks and miscellaneous supports.

Sequence number: 5
Author:
Date: 7/28/2009 11:08:43 AM
"Also" should be deleted since only the Structures Monitoring Program is credited for cracking due to SCC and pitting corrosion.

Sequence number: 6
Author:
Date: 7/29/2009 8:04:04 AM
Suggest replacing with "stainless steel sump liners for the aging effects cracking due to stress corrosion cracking and loss of material due to pitting and crevice corrosions rather than the Water Chemistry Program since water quality in the sumps is not routinely monitored." This better reflects information in Table 3.5.1, item 3.5.1-46.

The staff reviewed the AMR results lines referenced to Note E and plant-specific Note 16. The staff determined that the component type, material, environment, and aging effect are consistent with the corresponding line of the GALL Report; however, where the GALL Report recommends AMP XI.M2, "Water Chemistry Program," the applicant has additionally proposed using the Structures Monitoring Program. The GALL Report line item referenced is stainless steel sump liners, and the GALL Report recommends AMP XI.M2. The applicant stated that the AMR result line items that reference LRA Table 3.5.1 item 3.5.1-46 is also located in the treated borated water areas subject to cracking and loss of material due to pitting and crevice corrosion, and the Structures Monitoring Program was also credited. Since the Water Chemistry Program and Structures Monitoring Program are performing visual inspections on a periodic basis to manage cracking and loss of material due to pitting and crevice corrosion, the staff finds the applicant's additional use of the Structures Monitoring Program to be acceptable.

On the basis of its review of AMR result lines as described in the preceding paragraphs and its comparison of the applicant's results to corresponding recommendations in the GALL Report, the staff finds that the applicant addressed the AERM adequately.

3.5.2.1.5 Loss of Material Due to General (steel only), Pitting and Crevice Corrosion.

In the discussion section of LRA Table 3.5.1, item 3.5.1-47, the applicant stated that loss of material due to general (steel only)/pitting and crevice corrosion is managed by RG 1.127 Inspection of Water Control Structures Associated with Nuclear Power Plants. The applicant stated that the Structures Monitoring Program will also be used to manage the aging effect/mechanism in areas subject to loss of material due to general (steel only)/pitting and crevice corrosion. During the review, the staff noted that for the AMR results line pointing to Table 3.5.1, item 3.5.1-47, for two groups the applicant included a reference to Note E and plant-specific Notes 3, 4, and 31, which state "Aging mechanism(s) not in NUREG-1801," "The component is buried and inaccessible for examination. The Structures Monitoring Program requires examination of buried structural members whenever the surrounding soil is excavated. Observed condition of excavated members is used as a basis for evaluating the condition of inaccessible structural members," and "The Bolting Integrity Program provides preventive measures and maintenance practices for structural bolting."

The staff reviewed the AMR results lines referenced to Note E, plant-specific Note 3, 4, and 31, and determined that the component type, material, environment, and aging effect are consistent with the corresponding line of the GALL Report; however, where the GALL Report recommends AMP XI.S7, "RG 1.127 Inspection of Water Control Structures Associated with Nuclear Power Plants," the applicant has additionally proposed using the Structures Monitoring Program. The GALL Report line item referenced is steel only, and therefore, the GALL Report recommends AMP XI.S7. The applicant stated that the AMR result line items that reference LRA table 3.5.1 item 3.5.1-47 is also located in the groundwater/soil environment areas subject to loss of material due to general, and therefore, the Structures Monitoring Program was also credited. Since the RG 1.127 Inspection of Water Control Structures Associated with Nuclear Power Plants and Structures Monitoring Program are performing visual inspections whenever the surrounding soil is excavated, the staff finds the applicant's additional use of the Structures Monitoring Program to be acceptable.

Page: 569

Sequence number: 1
Author:
Date: 7/22/2009 8:48:32 AM
This should read, "...general, pitting, crevice and microbiologically influenced corrosion, and ..."

Cracking due to Stress Corrosion Cracking (SCC). LRA section 3.5.2.2.1.7 states that PINGP OE has shown no age-related issues on bellow replacement and industry OE has identified cracks in the bellows, but not the weld metal. The LRA further states that the penetration bellow assembly welds are located in a sheltered, non-corrosive environment, where temperatures are not expected to exceed threshold limits for SCC. Since the environment is not corrosive and the temperature does not exceed limits, the LRA states that the components do not require additional inspections and the aging effects can be adequately managed under (1) ASME Section XI, Subsection IWE and 10 CFR 50 Appendix J Programs.

The staff reviewed LRA Section 3.5.2.2.1.7 against the criteria in SRP-LR Section 3.5.2.2.1.7 which states that SCC of stainless steel penetration sleeves and dissimilar metal welds can occur in all types of PWR and BWR containments. Additional examinations or evaluations may need to be implemented to detect these aging effects.

GALL Report item II.A3-2 states that SCC may cause aging effects if the material is not shielded from a corrosive environment. Chapter IX.D of the GALL Report also states that SCC very rarely occurs in austenitic stainless steels below,140 °F and the observed instances of SCC below 140 °F occurred in an environment with significant presence of contaminants. The staff is not clear what temperature and chemical elements these components have experienced. Therefore, RAI 3.5.2.2-2 dated December 18, 2008, was issued to ask the applicant to (1) provide the history of the highest temperature that stainless steel penetration sleeves, penetration bellows, and dissimilar metal welds have experienced, and (2) demonstrate that chemical elements that would support SCC have been monitored or measured to ensure a non-aggressive chemical environment.

In its response to RAI 3.5.2.2-2, dated January 20, 2009, the applicant stated that the components are located inside the shield building in an air indoor environment which is not corrosive. The applicant further stated that the PINGP indoor environment is not corrosive based on the following facts: (1) the plant draws its cooling water from the Mississippi River, a fresh water source, so it is not exposed to a salt air/water environment, and (2) the air quality around the plant is better than the established National Ambient Air Quality Standards for the six criteria pollutants. The applicant stated that SCC requires simultaneous action of a corrosive environment and temperatures in excess of 140 °F, and since the environment was not corrosive the elements were not susceptible to SCC.

The staff reviewed the applicant's response to RAI 3.5.2.2-2 and agreed that the components are not exposed to a corrosive environment. On the basis of its review, the staff determines that additional inspections of stainless steel penetration sleeves, penetration bellows, and dissimilar metal welds is not applicable to PINGP because the conditions necessary for SCC, both high temperature (>140 °F) and exposure to a corrosive environment, do not exist simultaneously.

Cracking due to Cyclic Loading. The PINGP containment penetrations that experience significant cyclic loading have fatigue analyses that are evaluated as TLAAs. SER Section 4.6 "Containment and Penetration Fatigue Analysis" documents the staff's review of the applicant's evaluation of these TLAAs.

Loss of Material (Scaling, Cracking, and Spalling) Due to Freeze–Thaw. LRA Section 3.5.2.2.1.9 states that loss of material due to freeze-thaw is not applicable to the unreinforced

Page: 574

Sequence number: 1
Author:
Date: 7/22/2009 11:11:52 AM
Should acknowledge that the Fire Protection Program is also credited since these components act as fire barriers.

concrete below containment since the concrete is not exposed to outdoor air or groundwater/soil environments.

The staff reviewed LRA Section 3.5.2.2.1.9 against the criteria in SRP-LR Section 3.5.2.2.1.9 which recommends further evaluation of loss of material due to freeze-thaw for plants with concrete containments located in moderate to severe weathering conditions.

The staff finds acceptable the applicant's evaluation that this aging effect is not applicable to the unreinforced concrete below the free standing steel containment because the concrete will not be subjected to freeze-thaw cycles since it is not exposed to outdoor air.

Cracking Due to Expansion and Reaction with Aggregate, and Increase in Porosity and Permeability, Due to Leaching of Calcium Hydroxide. LRA Section 3.5.2.2.1.10 states that PINGP has no ASME Section III, Division 2 Class CC concrete subject to IWL in-service inspection requirements. The free standing steel containment (i.e. Reactor Containment Vessel) is supported by unreinforced concrete, but this concrete does not serve a pressure retaining function. The LRA also states that leaching of calcium hydroxide for the unreinforced concrete beneath containment is not applicable since it is not exposed to flowing water or a head of standing water. The LRA further states that cracking due to reactions with aggregate and increases in porosity of this unreinforced concrete are managed by the Structures Monitoring Program.

The staff reviewed LRA Section 3.5.2.2.1.10 against the criteria in SRP-LR Section 3.5.2.2.1.10 which states that cracking due to expansion and reaction with aggregate, and increase in porosity and permeability due to leaching of calcium hydroxide could occur in concrete elements of concrete and steel containments. The GALL Report recommends further evaluation if concrete was not constructed in accordance with the recommendations in ACI 201.2R-77.

The staff confirmed that no PINGP containment concrete serves a pressure retaining function. Therefore, the concrete does not need to be evaluated in this section. SER Section 3.5.2.2.2.2 documents the staff's review of the applicant's evaluation of cracking due to expansion and reaction with aggregate, and increase in porosity and permeability due to leaching of calcium hydroxide. The staff confirmed that aggregate reaction aging effects for the unreinforced concrete are managed by the Structures Monitoring Program. The staff's review of the Structures Monitoring Program is documented in SER Section 3.0.3.2.17

Based on the programs and analyses discussed above, the staff concludes that the applicant has met the criteria of SRP-LR Section 3.5.2.2.1. For those line items that apply to LRA Section 3.5.2.2.1, the staff determines that the LRA is consistent with the GALL Report and the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.5.2.2.2 Safety-Related and Other Structures and Component Supports

The staff reviewed LRA Section 3.5.2.2.2 against the criteria in SRP-LR Section 3.5.2.2.2, which addresses several areas:

Page: 575

Sequence number: 1
Author:
Date: 7/27/2009 11:42:00 AM
Suggest adding "for leaching of calcium hydroxide since it is not exposed to flowing water or a head of standing water." after "section"

For two component types, the applicant proposed to assign aluminum and stainless steel Table 1 line item 3.5.1-50 (III.B2-7) material, to the aging affect none and aging management program none. These line items reference Note I and plant-specific Note 13 and Note 14, which state "Aluminum roof hatch (hatch over concrete roof plug) is not susceptible to aging since the PINGP air outdoor environment is non-aggressive and dissimilar metal hatch connections are not used," and "NUREG-1801 line item includes the aging effect loss of material due to pitting and crevice corrosion where applicable. Loss of material due to pitting and crevice corrosion is not applicable at PINGP since the air outdoor environment does not contain aggressive contaminants and is not continuously wetted," respectively. [The staff reviewed the LRA, license design basis documents, EPRI 1002950 Structural Tools, revision 1, August 2003, and the GALL Report and found that 1ese materials do not perform or support any license renewal intended functions that satisfy the scoping criteria of 10 CFR 54.4(a). Therefore, aging management for these materials is not required.]

For one component type, the applicant proposed to manage roofing material, aging affect separation, environmental degradation, water in-leakage/weathering, by using the Structures Monitoring Program. The staff's review of the Structures Monitoring Program is documented in SER Section 3.0.3.2.17. These line items reference Note J and plant-specific Note 6, which states "Roofing components are not provided in NUREG-1801. PINGP plant-specific evaluation source document ACI 349.3R provided aging effects for roofing to include separation, environmental degradation, water in-leakage due to weathering." The staff finds that the credited AMP is appropriate because the Structures Monitoring Program performs visual inspections on a periodic basis to manage roofing material, aging affect separation, environmental degradation, and water in-leakage/weathering. Since the applicant has committed to an appropriate AMP for the period of extended operation, the staff finds these AMR results to be acceptable.

For one component type, the applicant proposed to manage ceramic (breakaway door pins) material, aging affect none and none for aging management. These line items reference Note J and plant-specific Note 9, which states "PINGP plant-specific evaluation did not identify any aging effect or mechanism for this material/environment combination." The staff reviewed the LRA, license design basis documents, EPRI 1002950 Structural Tools, revision 1, August 2003, and the GALL Report and found that 2ese materials do not perform or support any license renewal intended functions that satisfy the scoping criteria of 10 CFR 54.4(a). Therefore, aging management for these materials is not required.

For the remaining one component type, the applicant proposed to manage wood (new fuel rack base support system) material, aging affect none and none for aging management. These line items reference Note J and plant-specific Note 12, which states "The PINGP new fuel pit bottom contains a layer of sand approximately 2 feet 3 inches thick topped with a 9 inches thick concrete slab that incorporates water stops. Wood planking is placed on top of the concrete slab at locations that correspond with the fuel racks. A concrete enclosure covers the new fuel pit. Since the wood planking is treated wood and is located in an air indoor environment, no aging effects are applicable." The staff reviewed the LRA, license design basis documents, EPRI 1002950 Structural Tools, revision 1, August 2003, and the GALL Report and found that 3ese materials do not perform or support any license renewal intended functions that satisfy the

Page: 589

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Author:
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Suggest changing to, "the component, material, environment combination is not susceptible to this aging effect." As written, this incorrectly implies that the components need not be in scope.

Sequence number: 2
Author:
Date: 7/22/2009 1:25:21 PM
Should read "the material, environment combination is not susceptible to any aging effect." See comment above.

Sequence number: 3
Author:
Date: 7/22/2009 1:29:35 PM
Should read "the material, environment combination is not susceptible to any aging effect." See comment above.

1coping criteria of 10 CFR 54.4(a). Therefore, aging management for these materials is not required.

On the basis of its review, the staff finds that the applicant has appropriately evaluated the AMR results of material, environment, AERM, and AMP combinations not evaluated in the GALL Report. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.5.2.3.2 Component Supports - Summary of Aging Management Review – LRA Table 3.5.2-2

The staff reviewed LRA Table 3.5.2-2, which summarizes the results of AMR evaluations for the component supports component groups.

In LRA Table 3.5.2-2, the applicant identified 104 unique component/material/environment/aging effect/AMP groups for the Component Supports. Seventy seven have AMR results consistent with the GALL Report, as identified by reference to Notes A through E. The staff confirmed that the references to Table 1 and GALL Report line items are applicable.

For one component type, the applicant proposed to manage reinforced concrete material, aging affect reduction in concrete anchor capacity due to local concrete degradation/service-induced cracking or other concrete aging mechanisms, by using the RG 1.127, Inspection of Water Control Structures Associated with Nuclear Power Plants Program. The staff's review of the RG 1.127, Inspection of Water Control Structures Associated with Nuclear Power Plants Program is documented in SER Section 3.0.3.2.14. This line item references Note G and plant-specific Note 5, which states "SSC submerged in river (raw) water and accessible for diver examinations are identified as being in groundwater/soil (accessible) environment." The staff finds that the credited AMP is appropriate because the RG 1.127, Inspection of Water Control Structures Associated with Nuclear Power Plants Program performs visual inspections on a periodic basis to manage reinforced concrete material, aging affect reduction in concrete anchor capacity due to local concrete degradation/service-induced cracking or other concrete aging mechanisms. Since the applicant has committed to an appropriate AMP for the period of extended operation, the staff finds these AMR results to be acceptable.

For two component types, the applicant state that aluminum, stainless steel (conduits, lighting fixtures, etc.) material have no aging affect none and require no aging management. These line items reference Note J and plant-specific Note 14, which states "NUREG-1801 line item includes the aging effect loss of material due to pitting and crevice corrosion where applicable. Loss of material due to pitting and crevice corrosion is not applicable at PINGP since the air outdoor environment does not contain aggressive contaminants and is not continuously wetted." The staff reviewed the LRA, license design basis documents, EPRI 1002950 Structural Tools, revision 1, August 2003, and the GALL Report and found that 2ese materials do not perform or support any license renewal intended functions that satisfy the scoping criteria of 10 CFR 54.4(a). Therefore, aging management for these materials is not required.

For the remaining twenty four component types, the applicant state that aluminum and stainless steel insulation materials have no aging affect and require no aging management. These line items reference Note J and plant-specific Note 32, which states, "A review of PINGP operating

Page: 590

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Date: 7/22/2009 1:30:14 PM
continuation of comment from previous page.

Sequence number: 2
Author:
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Should read, "the component, material, and environment combinations are not susceptible to any aging effect." See comment above

experience confirms that insulation failures have not adversely impacted the satisfactory accomplishment of a safety-related intended function. Therefore, based upon the material, environment, and OE, the insulation is not expected to degrade, and an AMP is not required." The staff reviewed the LRA, license design basis documents, EPRI 1002950 Structural Tools, revision 1, August 2003, and the GALL Report and found that these materials do not perform or support any license renewal intended functions that satisfy the scoping criteria of 10 CFR 54.4(a). Therefore, aging management for these materials is not required.

On the basis of its review, the staff finds that the applicant has appropriately evaluated the AMR results of material, environment, AERM, and AMP combinations not evaluated in the GALL Report. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.5.2.3.3 Cranes, Heavy Loads, Fuel Handling - Summary of Aging Management Review – LRA Table 3.5.2-3

The staff reviewed LRA Table 3.5.2-3, which summarizes the results of AMR evaluations for the cranes, heavy loads, and fuel handling component groups.

In LRA Table 3.5.2-3, the applicant identified 8 unique component/material/environment/aging effect/AMP groups for the Cranes, Heavy Loads, Fuel Handling. All eight have AMR results consistent with the GALL Report, as identified by reference to Notes A through E. The staff confirmed that the references to Table 1 and GALL Volume II line items are applicable.

On the basis of its review, the staff finds that the applicant has appropriately evaluated the AMR results of material, environment, AERM, and AMP combinations for the Cranes, Heavy Loads, Fuel Handling not evaluated in the GALL Report. The staff finds that the applicant has assured that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.5.2.3.4 D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building – Summary of Aging Management - LRA Table 3.5.2-4

The staff reviewed LRA Table 3.5.2-4 which summarizes the results of AMR evaluations for the D5/D6 diesel generator building and underground storage vault, fuel oil transfer house, old service building, and new service building component groups.

In LRA Table 3.5.2-4, the applicant identified 39 unique component/material/environment/aging effect/AMP groups for the D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building. Thirty six have AMR results consistent with the GALL Report, as identified by reference to Notes A through E. The staff confirmed that the references to Table 1 and GALL Volume II line items are applicable.

For one component type, the applicant proposed to manage aluminum (seismic gap covers at NSB and DGB) material, in an air-outdoor environment with an aging affect of loss of

Page: 591

Sequence number: 1
Author:
Date: 7/22/2009 1:38:05 PM
Should read, "the component, material, and environment combination is not susceptible to any aging effect." See comment above

SECTION 4

TIME-LIMITED AGING ANALYSES

4.1 Identification of Time-Limited Aging Analyses

This section of the safety evaluation report (SER) addresses the identification of time-limited aging analyses (TLAAs). In Sections 4.2 through 4.7 of the license renewal application (LRA), Northern States Power, a Minnesota Corporation (NSPM or the applicant) addressed the TLAAs for Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2. SER Sections 4.2 through 4.8 document the review of the TLAAs by the staff of the United States (US) Nuclear Regulatory Commission (NRC) (the staff).

TLAAs are certain plant-specific safety analyses that involve time-limited assumptions defined by the current operating term. Pursuant to Title 10, Section 54.21(c)(1), of the Code of Federal Regulations (10 CFR 54.21(c)(1)), applicants must list TLAAs as defined in 10 CFR 54.3. In addition, pursuant to 10 CFR 54.21(c)(2), applicants must list plant-specific exemptions granted under 10 CFR 50.12 based on TLAAs. For any such exemptions, the applicant must evaluate and justify the continuation of the exemptions for the period of extended operation.

4.1.1 Summary of Technical Information in the Application

To identify the TLAAs, the applicant evaluated calculations for PINGP Units 1 and 2 against the six criteria specified in 10 CFR 54.3. The applicant indicated that it has identified the calculations that met the six criteria by searching the current licensing basis (CLB). 1 he CLB includes the updated final safety analysis report (UFSAR), engineering calculations, technical reports, engineering work requests, licensing correspondence, and applicable vendor reports. In LRA Table 4.1-1, "Time-Limited Aging Analyses," the applicant listed the applicable TLAAs:

- reactor vessel neutron embrittlement
- metal fatigue
- environmental qualification analyses of electrical equipment
- containment and penetration fatigue analyses
- reactor coolant system piping leak-before-break analyses
- reactor vessel underclad cracking
- reactor coolant pump flywheel
- fatigue analysis of cranes
- probability of damage to safeguards equipment from turbine missiles

Pursuant to 10 CFR 54.21(c)(2), the applicant stated that it did not identify 2 xemptions granted under 10 CFR 50.12 based on TLAAs as defined in 10 CFR 54.3.

Page: 611

Sequence number: 1
Author:
Date: 7/29/2009 8:04:26 AM
This statement gives a definition of CLB that is much broader than the regulation. This statement was not in a PINGP submittal.

Suggest using something similar to Section 4.1.1.2 of the PINGP LRA, which states: The CLB documents were searched to determine if any potential TLAAs not previously identified by the industry search may exist for PINGP. The following documents were searched electronically for typical keywords which are indicative of a discussion of a TLAA:

- **USAR**
- **Technical Specifications**
- **NRC Safety Evaluation Reports (SERs)**
- **Docketed Correspondence**
- **NRC Regulatory Commitments and Requirements.**

Sequence number: 2
Author:
Date: 7/29/2009 8:04:28 AM
Suggest that the words "applicable to the period of extended operation" be inserted after "Pursuant to 10 CFR 54.21(c)(2), the applicant stated that it did not identify exemptions...". This would better reflect the discussion provided in Section 4.1.2 of the PINGP LRA.

(5) involve conclusions, or provide the basis for conclusions, related to the capability of the system, structure, and component to perform its intended functions, as described in 10 CFR 54.4(b)

(6) are contained or incorporated by reference in the CLB

The applicant reviewed the list of common TLAAs in NUREG-1800, Revision 1, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR), dated September 2005. The applicant listed TLAAs applicable to PINGP in LRA Tables 4.1-1.

As required by 10 CFR 54.21(c)(2), the applicant must list all exemptions granted in accordance with 10 CFR 50.12, based on TLAAs, and evaluated and justified for continuation through the period of extended operation. The LRA states that each active exemption was reviewed to determine whether it was based on a TLAA. The applicant did not identify any TLAA-based exemptions. Based on the information provided by the applicant regarding the process used to identify these exemptions and its results, the staff concludes, in accordance with 10 CFR 54.21(c)(2), that there are no TLAA-based exemptions justified for continuation through period of extended operation.

4.1.2.1 Staff Evaluation of the Applicant's LRA Amendment to Delete LRA Section 4.7.5, Probability of Damage to Safeguards Equipment from Turbine Missiles, From the Scope of the LRA

LRA Section 4.7.5, Probability of Damage to Safeguards Equipment from Turbine Missiles, provides the applicant's original TLAA assessment for the PINGP probabilistic failure analysis for the turbine rotors and blades (henceforth Turbine Missile Analysis). The staff noted that in this section of the LRA, the applicant referred to the following documents in the CLB to support its TLAA basis under TLAA acceptance criterion in 10 CFR 54.21(c)(1)(i): (1) NUREG-0800 Chapter 3.5.3, "Barrier Design Procedures," (2) Section UFSAR Section 12.2.7, (3) UFSAR Section 11.2.3.2, (4) UFSAR Figure 12.2-38, and (5) WCAP-11525, (6) the staff's safety evaluation on PINGP turbine stop valve, governor valve, and intercept valves testing frequencies and safety evaluation on WCAP-11525, which were issued in license amendment 86 for Unit 1 operating license DPR-42 and license amendment 79 for Unit 2 operating license DPR-50, dated February 7, 1989.

Chapter 3.5.1.3 of the Standard Review Plan for the Review of Safety Analysis Results for Nuclear Power Plants (SRP-SAR), Revision 3, provides the NRC most recent guidance for performing probabilistic turbine missile analysis for turbine rotor and blade failure that are used to demonstrate compliance with the requirements of 10 CFR Part 50, Appendix A, "General Design Criteria" (GDC), GDC No. 4, Environmental and Dynamic Effects Design Bases, or similar design bases for plants that were licensed prior to the staff's development of the GDC. The staff noted that, consistent with this guidance, the applicant established that the probabilistic analysis for these components is calculated in accordance with the following equation:

$P_4 = P_1 \times P_2 \times P_3$

Page: 613

Sequence number: 1
Author:
Date: 7/29/2009 8:04:31 AM
Suggest this be revised to more closely reflect the PINGP LRA content.

Per Section 4.1.2 of PINGP LRA, The TLAA-related exemption that was identified is an exemption to the ASME Code, Section XI, Appendix G, relative to the use of Code Case N-514 for determining the overpressure protection system pressure setpoint. No additional exemptions based on TLAAs were identified. Nuclear Code Case N-514 has been incorporated into ASME Section XI, Appendix G, and this exemption will not be required for the period of extended operation when the Pressure-Temperature limits are updated.

Alternatively, insert the words "applicable to the period of extended operation" after "The applicant did not identify any TLAA-based exemptions". The sentence would read: "The applicant did not identify any TLAA-based exemptions applicable to the period of extended operation."

period that is less than the current life of the plant. Based on this review, the staff finds that the Turbine Missile Analysis does not need to be identified as a TLAA for the LRA because the probabilistic failure analysis for the PINGP turbine rotors and blades (as given in WCAP-11525) is not based on an analysis that is defined by the life of the plant. The staff verified that in the applicant's letter of April 6, 2009, the applicant made the appropriate amendments of the LRA. This include deleting LRA Section 4.7.5 and UFSAR Section A4.9 from the scope of the LRA and making appropriate changes to Sections 3.4, 4.1 and 4.7 of the application. Based on this review, the staff concludes that the applicant has provided an acceptable basis for the concluding that the Turbine Missile Analysis does not need to be identified as a TLAA for this LRA and for deleting this analysis from the scope of the LRA.

4.1.3 Conclusion

On the basis of its review, the staff concludes that the applicant has provided an acceptable list of TLAAs, as required by 10 CFR 54.21(c)(1). The staff confirmed, as required by 10 CFR 54.21(c)(2), that no exemption to 10 CFR 50.12 had been granted based on a TLAA.

4.2 Reactor Vessel Neutron Embrittlement

Neutron embrittlement is a significant aging mechanism for all reactor pressure vessel (RPV) steels that are exposed to neutron fluence greater than 1017 n/cm2 (E>1.0 MeV). During plant operation, neutrons from the fuel in the core irradiate the RPV walls and consequently change the material properties of the RPV steel. The most pronounced changes are observed in the fracture toughness of the RPV steel. Fracture toughness is a measure of a material's resistance to crack propagation in response to stress fields. A reduction in fracture toughness of the steel due to irradiation is referred to as neutron embrittlement. As the neutron fluence level experienced by the RPV increases over time, the RPV steel fracture toughness decreases. The most significant level of neutron embrittlement typically occurs around the section of the RPV wall that is closest to the fuel assemblies and is exposed to neutron fluence greater than 1017 n/cm2 (E>1.0 MeV). This section of the RPV wall is referred to as the RPV beltline region.

Pursuant to 10 CFR 54.21(c)(1)(ii), the applicant has updated the analyses for the RPV neutron embrittlement TLAAs from the initial 40-year license to address the additional 20 years of operation (i.e., 60 years) of both PINGP, Units 1 and 2.

4.2.1 Reactor Vessel Fluence

4.2.1.1 Summary of Technical Information in the Application

LRA Section 4.2.1 summarizes the evaluation of reactor vessel fluence for the period of extend operation. The applicant stated that the fast neutron exposure parameters were determined for PINGP using the methodologies discussed in WCAP-14040-NP-A, Revision 4, "Methodology Used to Develop Cold Overpressure Mitigating Systems Setpoints and RCS Heatup and Cooldown Limit Curves" (Reference 95).

The applicant stated that the present fluence values are based on 54 effective full-power years (EFPY) of operation, incorporate the operating history of the plant, and project the implementation of a measurement uncertainty recapture power uprate. The 54 EFPY projection is expected to bound the plant operation at a capacity factor for both units of 90 percent, which

Page: 616

Sequence number: 1
Author:
Date: 7/29/2009 8:04:33 AM
Suggest considering a revision to this sentence. Refer to related Comment on p. 4-3.

Alternatively, insert the words "applicable to the period of extended operation" after "..., that no exemption to 10 CFR 50.12...". The sentence would read: "The staff confirmed, as required by
10 CFR 54.21(c)(2), that no exemption to 10 CFR 50.12 applicable to the period of extended operation had been granted based on a TLAA."

4.2.4.2 Staff Evaluation

The staff reviewed LRA Section 4.2.4 to verify, pursuant to 10 CFR 54.21(c)(1)(ii), that the analysis has been projected to the end of the period of extended operation.

10 CFR 50.60 provides acceptance criteria for fracture prevention measures for light water nuclear power reactors for normal operation by invoking the application of Appendices G and H of 10 CFR Part 50. Appendix G of 10 CFR Part 50 provides the P-T limit requirements and references ASME Code, Section XI, Appendix G as the methodology adopted to obtain minimum acceptable values for P-T limits. Calculated P-T limits for a given RPV must be at least as conservative as the limits obtained by following the methods of analysis and margins of safety of Appendix G of Section XI of the ASME Code. RPV P-T limits and minimum temperature requirements in accordance with 10 CFR Part 50, Appendix G are defined by operating condition, vessel pressure, presence of fuel in the vessel, and core criticality. The minimum temperature requirements pertain to the limiting material, which is the material in either the closure flange or the beltline region with the highest ART.

Calculation of ART values for the RPV beltline materials is accomplished by following the guidance in RG 1.99, Rev 2. The calculated ART value is the sum of the initial RT_{NDT}, predicted radiation-induced ΔRT_{NDT}, and a margin term to account for uncertainties in the values of initial RT_{NDT}, copper and nickel contents, fluence, and the calculation procedures. The evaluation for the ART values are performed at the 1/4T and 3/4T wall locations of each beltline material using the neutron values at the 1/4 T and 3/4 T wall locations along respectively, with CFs determined from Tables 1 and 2 in RG 1.99, Revision 2. The applicant did not provide ART values for all beltline materials in their LRA. Therefore, the staff issued RAI 4.2.4 in a letter November 4, 2008, which requested the applicant to provide ART values for all the RPV beltline materials for PINGP, Units 1 and 2.

In letter dated November 12, 2008, the applicant submitted to the NRC the ART values of all the beltline materials as requested in RAI 4.2.4. The ART values were calculated using the methodology prescribed in RG 1.99, Rev 2. These results show that the RPV limiting beltline material is the circumferential weld–nozzle shell forging B-to-intermediate shell forging C for PINGP, Unit 1 and circumferential weld–nozzle shell forging B-to-intermediate shell forging C for PINGP, Unit 2. The staff verified the calculated ART values submitted by the applicant and confirmed the appropriateness of these calculated values. The staff also compared the calculated 54 EFPY ART values for the above RPV limiting materials for PINGP, Unit 1 and 2, respectively, to the corresponding PINGP PTLR 35 EFPY ART values. Based on this comparison, the staff finds the applicant's estimation that there will be sufficient margin to conduct plant heatups and cooldowns through the extended period of operation to be acceptable. In addition, the applicant states that the P-T limit curves for PINGP, Units 1 and 2 will continue to be updated, as required by Appendix G of 10 CFR Part 50 or as operational needs dictate. Also, these required updates of the P-T limit curves will be adequately managed for the period of extended operation, by the Reactor Vessel Surveillance Program, consistent with 10 CFR 54.21 (c)(1)(iii).

With each revision of the P-T limit curves, the OPPS limits must also be re-evaluated because calculation of new OPPS limits are considered part of the development of the P-T limit curves. The applicant has determined that the PINGP, Unit 1 and 2 OPPS enable temperatures using the NRC-approved methodology presented in topical report WCAP-14040-NP-A, Rev. 2 with the

Page: 624

Sequence number: 1
Author:
Date: 7/29/2009 8:04:39 AM
T 54.21(c)(1)(iii) states that the condition will be adequately managed for the period of extended operation, not that "the analysis has been projected ...." PINGP only utilized 54.21 (c)(1)(iii) for P-T limits. SER Conclusion (Section 4.2.4.4) references (iii) only.

(3) PINGP has acquired records of major thermal events such as heatup, cooldown and reactor trip transients confirming that the P-T values experienced by the PINGP structural components are bounded by those of the design transients.

(4) PINGP has developed a CAP which initiates and determines appropriate actions to be taken if abnormal situations should occur.

(5) The operational procedures that PINGP adopts for the transient events tracking are consistent with the GALL Report and conservative to ensure a valid cycle-based fatigue management program.

Therefore, the staff's concern described in part (a) of RAI 4.3.1-1 is resolved. Part (b) of RAI 4.3.1-1 requested the applicant to provide the histograms of the PINGP heatup and cooldown transients. The applicant provided the histograms for these two transients, as shown in the following pages.

The staff reviewed these histograms and found that the transientoccurrence rates (both heatup and cooldown) are quite constant for Unit 1 since 1980 and for Unit 2 since 1983. This means that for the past 25 years, the PINGP (Units 1 and 2) plant operation has been quite steady. The applicant made its cycle projections based on the slope of a straight line connecting the time of the plant startup (1973 for Unit 1 and 1974 for Unit 2) and the last data point, 2008. It is clear from Figures 4.3-1 and 4.3-2, that the slope used by the applicant for making cycle projections is significantly greater than that of the average of the past 25 years. As expected, the slopes of event occurrence (i.e., the rates) during the first few years (5 to 7 years) are higher than the averages for both heatups and cooldowns. This means that the basis of projections that the applicant used is conservative and therefore, the staff found it to be acceptable.

Based on its review, the staff's concern on the transient event monitoring is resolved because the applicant provided the information requested and the information validates the PINGP fatigue management program and the applicant's assumption for the number and severity of transients.

Page: 629

Sequence number: 1
Author:
Date: 7/30/2009 8:51:48 AM

This does not correctly describe the methodology used. The projection was made by doubling the actual number of cycles accrued as of 9/30/06, using the maximum from either unit. This methodology is explained correctly on pp. 4-16 & 4-17 of SER.

accordance with ASME Code Section III using the values of six stress components except for those of the surge line hot leg nozzle safe end and the charging nozzles. For these two locations, the applicant indicates that new analyses in accordance with ASME NB procedures are in the process and the new results will be reported as an amendment to the PINGP LRA. As a result of this RAI, the applicant added a new item in its License Renewal Commitment, No. 36. The staff notes that the corrective actions taken by the applicant in response to this RAI are consistent with the aging management program requirements described in the GALL Report. Therefore, the staff's concern in RAI 4.3.1.1-1 is resolved.

The staff reviewed the new commitment, License Renewal Commitment No. 36, and the updated Commitments No. 33 and 35 as described below. The LRA states that upon the staff review and approval, the final commitments will be incorporated into the UFSAR.

The staff noted that pursuant to commitment 36 (1) PINGP will re-evaluate fatigue usage using the well-established ASME III NB guidelines for the pressurizer surge line hot leg nozzle and the charging nozzle which were previously evaluated using the simplified method in FatiguePro; (2) PINGP will remove any reference to "stress-based fatigue monitoring." The staff found the commitment acceptable because this commitment will ensure that all PINGP fatigue analyses will use six stress components and therefore consistent with ASME Code Section III. This commitment was completed and provided to the staff by letter dated April 28, 2009. The staff's review of the applicant's April 28, 2009 submission is discussed in Section 4.3.3.1 and 4.3.3.2.

The staff reviewed the updated License Renewal Commitment 33 and found it acceptable because, pursuant to the SRP-LR and GALL Reports, it commits to address the effects of the coolant environment on component fatigue life for the six NUREG/CR-6260 locations (or components) applicable to PINGP. License Renewal Commitment 33 also includes a provision stating that corrective action will be taken before a cumulative fatigue usage factor exceeds 1.0 or a design basis transient cycle limit is exceeded. 1 The staff reviewed the LRA and confirmed, that PINGP has a corrective action program (CAP) for the safety classification of the structure or component and that the CAP requirements are established to meet the requirements of the NMC Quality Assurance Topical Report and 10 CFR 50, Appendix B. Based on its review, the staff found License Renewal Commitment 33 acceptable because it is consistent with the SRP-LR, the GALL Reports and 10 CFR 50 Appendix B. License Renewal Commitment 33 also implements the well-established ASME Code III NB-3200 method to perform fatigue evaluation in lieu of the simplified method indicated in the original version of the commitment. Therefore, License Renewal Commitment 33 is acceptable.

The staff reviewed the updated License Renewal Commitment 35 and found it acceptable 2 because it is a direct response to NRC Bulletin 88-11, which describes conditions that may affect compliance with the requirements in 10 CFR 50.55a. Commitment 35 also implements the well-established ASME Code III NB-3200 method to perform fatigue evaluation in lieu of the simplified method indicated in the original version of the commitment. Therefore, License Renewal Commitment 35 is acceptable.

4.3.1.2.3 UFSAR Supplement

LRA Section A4.2 summarizes the transients data, including transient names/types, design cycles and 60-year cycle projections, and concluded that the CUF for the Class 1 components based on those transients will remain valid for the period of the extended operation.

Page: 634

Sequence number: 1
Author:
Date: 7/27/2009 9:32:37 AM
It is not clear what the intent of this sentence is; the discussion of safety classification appears incorrect. CAP is not for safety classification; but is used to document and resolve issues.

Sequence number: 2
Author:
Subject: Highlight
Date: 7/27/2009 9:34:36 AM
Commitment 35 was not made as a result of NRCB 88-11, but as a result of a Westinghouse Owners Group Program discussed in WCAP-14574, LR Evaluation: Aging Management Evaluation for Pressurizers. NRCB 88-11 has been closed out for PINGP.

Refer to Section 5.1 of NRC Safety Evaluation for WCAP-14574 (WCAP-14574-A).

extended operation, and that the analyses include insurge/outsurge and other transient loads not considered in the current licensing basis.

The applicant indicates that PINGP will perform a fatigue evaluation of pressurizer and surge line locations affected by insurge/outsurge transients. This evaluation will determine the CUF from past operation, accounting for the periods of both "Water Solid" and "Standard Steam Bubble" operating strategies, and will project the CUF of selected locations into the renewed license term. The applicant also indicates that if applicable, the analysis results will be incorporated into the Metal Fatigue of Reactor Coolant Pressure Boundary Program. The applicant indicates that these analyses will be completed prior to the period of the extended operation.

The applicant further indicates that the Metal Fatigue of Reactor Coolant Pressure Boundary Program will be enhanced to include monitoring of the pressurizer heater penetration, pressurizer surge nozzle, surge line elbow, and hot leg surge nozzle to monitor the effects of insurge/outsurge transients. The applicant states that with this enhancement, the program will manage metal fatigue of the pressurizer due to insurge/outsurge transients in accordance with 10 CFR 54.21(c)(1)(iii).

The applicant notes that the current plant operating practices mitigate insurge/outsurge effects in the pressurizer through continuous spray during heatup and cooldown transients. The applicant notes that this method maintains a small flow from the pressurizer to the hot leg during these transients, thus resulting in a uniform fluid temperature below the pressurizer heaters and in the upper portion of the surge line that prevent thermal stratification. The applicant further notes that, plant heatup and cooldown procedures have adopted, in 1991, the Westinghouse Modified Operating Procedure (MOP). This procedure uses the "Water Solid" method for heatups and cooldowns to reduce the magnitude of resulting insurge/outsurge temperature transients at the pressurizer. The applicant also notes that prior to 1991, heatups and cooldowns used the "Standard Steam Bubble" method, which have resulted in larger temperature transients and higher fatigue usage.

4.3.1.4.2 Staff Evaluation

The staff reviewed LRA Section 4.3.1.3, pursuant to 10 CFR 54.21(c)(1)(iii), to verify that metal fatigue in the pressurizer lower head region will be adequately managed during the period of the extended operation. The staff reviewed LRA Section 4.3.1.3, pursuant to 10 CFR 54.21(c)(1)(i), to verify that metal fatigue in the pressurizer upper head region will be adequately managed during the period of the extended operation.

The applicant lists the CUF values of the PINGP Units 1 and 2 pressurizers in LRA Table 4.3-5 and claims that the fatigue requirements for these components will be satisfied during the period of the extended operation pursuant to 10 CFR 54.21(c)(1)(i). The applicant determined this because according to LRA Table 4.3-1, the projected 60-year transient cycles are bounded by the cycles used in the original design calculations. The staff found this claim to be premature because, per Note 1 associated with LRA Table 4.3-5, neither the effects of LWR environment nor the effects of insurge/outsurge and thermal stratification have been included in the CUF results shown in LRA Table 4.3-5. 1herefore, the LRA Table 4.3-5 CUF values are not valid for the lower head and surge nozzle region. Namely, of the 8 locations listed in LRA Table 4.3-5, 2e pressurizer surge nozzle, lower head, and instrument nozzle (the one on the lower head

Page: 638

Sequence number: 1
Author:
Date: 7/29/2009 8:04:49 AM

As stated, the PZR CUF values in this table are from the original design reports (analysis of record), which did not include environmental fatigue and thermal stratification.

Recommend restating this sentence to read: "Therefore, the LRA Table 4.3-5 CUF values for the pressurizer lower head and surge nozzle region do not remain valid for the period of extended operation."

Note that CUF values for the PZR lower head will be updated as appropriate per the fatigue evaluation performed in accordance with Commitment No. 35. This is stated on pp. 4-23 & 4-30 of the SER.

Also, as stated in PINGP LRA Section 4.3.1.6 (p. 4.3-16), "Pressurizer Surge Line Piping: In response to NRC Bulletin 88-11, ASME B&PV Code Section III, Subsection NB, 1986 Edition, was used to re-evaluate the pressurizer surge line (including hot leg nozzle and pressurizer surge nozzle) to include the effects of thermal stratification. NRC Bulletin 88-11 addresses potential thermal stresses associated with thermal stratification experienced by the pressurizer surge line."

Sequence number: 2
Author:
Date: 7/27/2009 9:47:32 AM

The PZR surge nozzle was re-evaluated per NRCB 88-11. This is discussed in Section 4.3.1.6 of the LRA and Section 4.3.1.7.2 of the SER. In Section 4.3.1.7.2 of the SER (pp. 4-39, 4-40), the staff concludes that fatigue of the surge line piping may be dispositioned per (i), which is contrary to the statement made here. This sentence should be revised for consistency.

side) may not be dispositioned to 10 CFR 54.21(c)(1)(i). Instead, these locations should be managed in accordance with 10 CFR 54.21(c)(1)(iii) under the PINGP Metal Fatigue of Reactor Coolant Pressure Boundary Program to ensure the intended functions of the pressurizers maintained during the period of extended operation.

LRA Section 4.3.1.3 describes common practices that the current operating plants used to mitigate the effects of the insurge/outsurge transients on the pressurizer and the surge line. Although pressurizer is identified in NUREG/CR-6260 as one of the sample components considered for reactor water environment effects on fatigue life, evaluation of the environmentally-assisted fatigue is separately reported in LRA Section 4.3.3.

The staff notes that since thermal events on the pressurizer and the surge line were unknown to the nuclear industry until issuance of NRC Bulletins 88-08 and 88-11, the likelihood that associated data be available to support fatigue evaluations on stratification and insurge/outsurge events prior to the Bulletin 88-08 issuance seems quite low. Therefore, the staff issued RAI 4.3.1.3-1 in a letter dated December 10, 2008. The staff asked the applicant how did it reconstruct the cycles that occurred before the date of issuance of Bulletin 88-11 to support its TLAA calculations, and to provide the dates when events tracking began.

In its response to RAI 4.3.1.3-1, dated January 9, 2009, the applicant states that the dominant event cycles that contribute to fatigue in the surge line analyses are the heatups and cooldowns that include stratification and striping in the pressurizer surge line. The applicant also states that surge line temperature transients during heatup and cooldown are characterized in WCAP-12839 and WCAP-12639 by maximum system differential temperatures between the pressurizer water and RCS hot leg that occur over five RCS temperature ranges. The applicant states that the system differential temperature ranges were used to define the stratification and the insurge/outsurge events for the purpose of the analyses.

The applicant states that the PINGP Pressurizer-water-to-RCS-hot-leg differential temperature data were recorded since the initial plant operation (1973 for Unit 1, and 1974 for Unit 2). The applicant also states that upon completion of the pressurizer surge line thermal stratification analyses in the early 1990s, PINGP continued to monitor temperature differentials between the pressurizer water and RCS hot leg as required by the Metal Fatigue of Reactor Coolant Pressure Boundary Program to ensure that plant operation is within the bounds of the pressurizer surge line transient definitions contained in WCAP-12839 and WCAP-12639.

In the RAI response, the applicant also indicates the number of plant heatups and cooldowns are limited to 200 by design and the 60-year projection is approximately 125 cycles, as shown in LRA Table 4.3-1.

The staff summarizes its review of the applicant response to RAI 4.3.1.3-1, as follows:

- The surge line stratification and the insurge/outsurge events are predominated by the plant heatups and cooldowns.
- The surge line stratification and the insurge/outsurge events are defined by the system differential temperature ranges.
- The surge line temperature transients during heatup and cooldown are characterized in WCAP-12839 and WCAP-12639 by the maximum system differential temperatures

Page: 639

Sequence number: 1
Author:
Date: 7/27/2009 9:49:06 AM
This should be clarified. The PINGP LRA cites (i) and (iii) for all PZR and surge line locations.

(TLAA). Therefore, the staff issued RAI 4.3.1.4-2, in a letter dated December 10, 2008, asking the applicant to explain and clarify.

In its response to RAI 4.3.1.4-2, dated January 9, 2009, the applicant states that the Steam Generator Fatigue and Fracture Mechanics Evaluation of Feedwater Inlet Nozzle discussion was conservatively included in LRA Section 4.3.1.4 even though the analysis did not meet all six criteria in 10 CFR 54.3(a) for defining a TLAA. In particular, the applicant indicates that the analysis did not meet criterion (3) in that it did not "involve time-limited assumptions defined by the current operating term, for example, 40 years."

The applicant further states that the crack growth analysis does not provide a basis for demonstrating that a known flaw is acceptable for continued operation for the life of the plant, and the analysis simply defined an appropriate examination frequency that is based on a postulated flaw of a certain size. The applicant also states that since the crack growth analysis is not managing an actual (existing) crack and the analysis was not performed for the service life of the component (i.e., 40 years), this evaluation is not a TLAA.

The applicant further states that NSPM monitors the Unit 2 feedwater nozzle to pipe transition forging welds for evidence of cracking using ultrasonic inspection through owner-elected examinations maintained within the PINGP ASME Code Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. These periodic examinations ensure that the feedwater nozzle region remains free of cracks.

As a result, NSPM determined that the discussions about the flaw evaluation should be removed from the LRA and provided the change in the January 9, 2009 response letter.

On the basis of its review described above, the staff found the applicant's response to RAI 4.3.1.4-2 acceptable because there was no actual flaw found in the Unit 2 SG feedwater inlet nozzle and the applicant made the necessary clarification that it does not meet the TLAA criteria. Instead, the applicant will monitor the Unit 2 SG feedwater nozzle to pipe transition forging welds for evidence of cracking using ultrasonic inspection through owner elected examinations maintained within the PINGP ASME Code Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

4.3.1.5.3 UFSAR Supplement

LRA Section A4.2 summarizes the transients data, including transient names/types, design cycles and 60-year projections, and concluded that the CUF for the SG locations based on those transients will remain valid for the period of the extended operation.

On the basis of the review of the UFSAR supplement, the staff concludes that the summary description of the applicant's actions to address fatigue analyses for SG locations is adequate.

4.3.1.5.4 . Conclusion

Based on the review of the LRA, the staff found that the applicant has demonstrated conformance to 10 CFR 54.21(c)(1)(i) for the steam generators. However, for Unit 2 SG tubes, the TLAA is pursuant to 10 CFR 54.21(c)(1)(ii) and for Unit 2 SG FW nozzle, the TLAA is pursuant to 10 CFR 54.21(c)(1)(iii). The staff also concludes that the UFSAR supplement

Page: 645

Sequence number: 1
Author:
Date: 7/27/2009 9:57:42 AM
Conclusion should be revised for accuracy. As described in NSPM Response to RAI 4.3.1.4-2 and discussed above, the U2 SG FW Nozzle flaw evaluation is not a TLAA.

support its application for license renewal. The applicant also states that NUREG/CR-6260 identified locations of interest for consideration of environmental effects. The staff notes that NUREG/CR-6260 (entitled: "Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components") contains a list of sample locations which have been evaluated for the effects of LWR environments on fatigue. The list includes older and newer vintages of both BWR and PWR nuclear power plants of B&W, CE, GE, and Westinghouse designs. The applicant indicates that Section 5.5 of NUREG/CR-6260 is intended for older vintage Westinghouse plants, which is applicable to PINGP, and the corresponding PINGP locations are as follows:

- Reactor vessel shell and lower head
- Reactor vessel inlet and outlet nozzles
- Pressurizer surge line (hot leg nozzle safe end)
- RCS piping charging system nozzle
- RCS piping safety injection accumulator nozzle
- RHR Class 1 piping tee

The applicant indicates that it performed EAF evaluations for all six NUREG/CR-6260 locations listed above in accordance with the guidelines provided in NUREG/CR-5704 for austenitic stainless steels and NUREG/CR-6583 for carbon steels and low-alloy steels.

The applicant indicates that of the 6 NUREG/CR-6260 locations, the design basis cumulative usage factors for the reactor vessel shell and lower head, and the reactor vessel inlet and outlet nozzles are reported in LRA Section 4.3.1.1. The CUF calculated in response to NRC Bulletin 88-11 are reported in LRA Section 4.3.1.6 for the pressurizer surge line piping (including the hot leg surge nozzles). The applicant determined that for the pressurizer surge line, the limiting location is at the safe end connected to the hot leg nozzle.

The applicant indicates that since the PINGP primary Class 1 piping NUREG/CR-6260 locations are designed in accordance with B31.1.0, explicit fatigue analyses were not required. To support the LRA, the applicant performed fatigue analyses for the charging system nozzle, safety injection accumulator nozzle, the RHR Class 1 piping tee, and the pressurizer surge line hot leg nozzle.

The applicant indicates that it performed fatigue usage evaluations for the safety injection accumulator nozzle and the RHR Class 1 piping tee in accordance with ASME Code Section III, 1989 Edition guidelines, with 1989 Addenda, and the results are shown in the amended LRA Table 4.3-8. The applicant indicates that the transients applicable to these locations include inadvertent RCS depressurization, inadvertent accumulator blowdown, RHR operation during plant cooldown, RCS refueling, high head safety injection, and Operational Basis Earthquake (OBE).

The applicant indicates that fatigue evaluations for the charging system nozzle and surge line hot leg nozzle were calculated using ASME Code Section III, 2001 Edition with 2003 Addenda based on NSSS design transients shown in LRA Table 4.3-1. The applicant states that in addition to the bounding NSSS design transients, other types of transients that are applicable to these components were also included in the fatigue evaluations. Namely, for the charging nozzle, these include inadvertent RCS depressurization, inadvertent auxiliary spray actuation, excessive feedwater flow, RCS refueling, and OBE. For the surge line hot leg nozzle, these

Page: 653

Sequence number: 1
Author:
Date: 7/27/2009 10:14:08 AM
This was not the applicant's determination. The quote from the PINGP LRA is as follows: The limiting pressurizer surge line location reported in NUREG/CR-6260 is at the safe end connected to the hot leg nozzle.

include inadvertent RCS depressurization, inadvertent auxiliary spray actuation, control rod drop, excessive feedwater flow, RCS refueling, and OBE. The applicant further indicates that for the charging nozzle, additional transients including charging/letdown system flow shutoff and flow change transients were used. The applicant indicates that these two transients were derived based on a standard set of Westinghouse design transients for auxiliary systems, modified for the expected number of occurrences at 60 years. The applicant indicates that the cycles of all the transients used for the fatigue evaluations for these components were the expected number of cycles at 60 years.

Based on the results shown in the amended LRA Table 4.3-8, the applicant concluded that the EAFs for all amended LRA Table 4.3-8 locations have been projected to the end of the period of extended operation, pursuant to 10 CFR 54.21(c)(1)(ii). Bound by License Renewal Commitment No. 33, the applicant stated that EAF at all NUREG/CR-6260 locations will be managed using cycle-based fatigue monitoring under the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii). All transients and revised cycle limits used for the fatigue evaluation will be included in the Metal Fatigue of Reactor Coolant Pressure Boundary Program.

4.3.3.2 Staff Evaluation

The staff reviewed LRA Section 4.3.2, pursuant to 10 CFR 54.21(c)(1)(ii), to verify that the analyses have been projected to the period of the extended operation.

In its review, the staff noticed a footnote for LRA Table 4.3-8 states that the results for the pressurizer surge line hot leg nozzle safe end and for the charging system nozzle were from stress-based fatigue usage calculation. During the audit, the staff confirmed that "stress-based fatigue usage calculation" meant fatigue usage evaluations were performed by EPRI owned software named FatiguePro. The staff notes that FatiguePro takes a simplified approach in the fatigue usage calculation, and does not take all six stress components into consideration. The staff notes that FatiguePro is not endorsed by NC staff as it does not produce the six individual stress components needed to support the ASME Code Section III fatigue analysis method. Therefore, the staff issued RAI 4.3.1.1-1 in a letter dated December 10, 2008. In this RAI, the staff asked the applicant why simplified transient fatigue evlauation methodology is still being used. In a letter dated January 9, 2009, the applicant provided its response to this RAI as well as a commitment (Commitment No. 36) to perform Code compliant fatigue calculations stated in the response. In this response, the applicant stated that ASME Code (Subsection NB) compliant fatigue calculations are in process for these two locations and the revised CUFs results (unadjusted and adjusted for environmental effects) will be reported as an amendment to the PINGP LRA. The commitment was completed and provided to the staff by letter dated April 28, 2009.

In SER Section 4.3.1.1.2, the staff provided the complete detail on RAI 4.3.1.1-1 applicant response to this RAI, and the staff evaluation of the response. On April 28, 2009, the applicant provided the result of the revised fatigue analysis in a letter titled "Supplemental Information Closing License Renewal Commitment Number 36 Regarding Application for Renewed Operating Licenses,"

In reviewing the April 28, 2009 letter, the staff determined several areas that need clarification. In a teleconference on May 4, 2009, the applicant agreed to supplement the LRA to provide

Page: 654

Sequence number: 1
Author:
Date: 7/27/2009 10:15:29 AM
Should insert "cycle counting or" before "cycle-based" for accuracy

the EQ program manages the aging effects to meet the requirements delineated in 10 CFR 50.49.

The staff conducted an audit of the information provided in Section B3.1 of the LRA and program basis documents. On the basis of its audit, the staff finds that the EQ program, which the applicant claimed to be consistent with the GALL program X.E1, "Environment Qualification of Electrical Components," is consistent with EQ program in the GALL report. Therefore, the staff finds that the EQ program is capable of programmatically managing the qualified life of components within the scope of the program for license renewal. The continued implementation of the EQ program provides assurance that the aging effects will be managed and that components within the scope of the EQ program will continue to perform their intended functions for the period of extended operation.

4.4.3 UFSAR Supplement

1 LRA section A3.1, the applicant provided the UFSAR supplement containing a summary description of environmental qualification of electrical equipment. This summary description is not consistent with that in Table 4.4.2 of SRP-LR as it does not contain reanalysis attributes. Reanalysis must address attributes of analytical methods, data collection and reduction methods, underlying assumptions, acceptance criteria, corrective actions if acceptance criteria are not met and the period of time prior to the end of qualified life when the reanalysis will be completed. In a letter dated November 5, 2008, the staff issued RAI B.3.1-3, requesting the applicant to revise the UFSAR supplement description to include these reanalysis attributes. In response to the staff's request. In a letter dated December 5, 2008, the applicant revised LRA Section A3.1, Environmental Qualification of Electrical Components program, on Page A-17 the following paragraph was added to the end of the existing program description, to read as follows:

> "Reanalysis is an acceptable alternative for extending the qualified life of an EQ component. Important attributes of a reanalysis include analytical methods, data collection and reduction methods, underlying assumptions, acceptance criteria and corrective actions (if acceptance criteria are not met."

The reanalysis is required when qualification time limits are approached, whether during the initial 40-year license term or the period of extended operation.

The staff finds the applicant's response acceptable because the information in the UFSAR supplement, as supplemented by the information in the applicant's response to RAI B3.1-3, is an adequate summary description of the program, as required by 10 CFR 54.21(d), and this summary description is consistent with that in Table 4.4.2 of SRP-LR.

4.4.4 Conclusion

On the basis of its review, the staff concludes that the applicant has demonstrated that, for environmental qualification of electrical equipment, the effects of aging on the intended function(s) will be adequately managed for the period of extended operation, pursuant to 10 CFR 54.21(c)(1)(iii). The staff also concludes that the UFSAR supplement contains an appropriate summary description of the TLAA evaluation, as required by 10 CFR 54.21(d).

Page: 659

Sequence number: 1
Author:
Date: 7/27/2009 10:24:36 AM
The TLAA Summary of the Environmental Qualification of Electrical Equipment to be incorporated in the PINGP USAR is provided in LRA Section A4.3. This should also be discussed here.

analyses of CASS in the primary loop fittings. The pipe straight sections are made from forgings. The NRC approved the application of the LBB methodology to PINGP Unit 1 primary loop piping in 1986. The NRC approved the Unit 1 surge line LBB analysis in September 1992. The applicant included the time-related assumptions in the thermal aging of CASS large bore main coolant piping and in the fatigue crack growth analyses of both large bore primary coolant piping and the surge line.

In 1986, the applicant performed LBB analyses for the Unit 2 primary loop piping. The results of the analyses are documented in WCAP-10928-NP for the main coolant piping. WCAP-10928-NP established the methodology to evaluate thermal aging fracture toughness properties for LBB analyses of CASS in the primary loop pipe and fittings. The NRC approved the application of the LBB methodology to PINGP Unit 2 in 1986. The time-related assumptions include the following two analysis considerations: the thermal aging of CASS and the fatigue crack growth analysis.

The first analysis consideration in WCAP-10640-NP and WCAP-10928-NP that could be influenced by plant operating time is the material properties of CASS used in the pipe fittings. Thermal aging causes an elevation in the yield strength of CASS and a decrease in fracture toughness, the decrease being proportional to the level of ferrite in the material. Thermal aging in CASS will continue until a saturation or fully aged point is reached. WCAP-10640-NP, WCAP-10928-NP, and WCAP-10930-NP address the fracture toughness properties of statically cast CF8M stainless steel. Specifically, fully aged fracture toughness values were used to conservatively calculate the JIC values for the cast pipe and fittings. The applicant stated that as the LBB evaluations for both Units use fully aged fracture toughness properties, the thermal embrittlement analyses do not have a material property time-dependency and are not considered TLAAs.

The second analysis consideration that could be influenced by time is the accumulation of actual fatigue transient cycles used in WCAP-10640-NP, WCAP-12876-NP, and WCAP-10928-NP. The applicant developed fatigue crack growth rate laws in a PWR environment based on available industry literature. The applicant evaluated the crack growth for all normal, upset, and test reactor vessel fatigue transients. The applicant noted that these design transients have not been changed or increased for license renewal as discussed in Section 4.3 of the LRA.

4.7.1.2 Staff Evaluation

Pursuant to 10 CFR 54.21(c)(1)(i), the staff reviewed LRA Section 4.7.1 to verify that the LBB analyses for the main coolant loop piping remain valid for the period of extended operation. Pursuant to 10 CFR 54.21(c)(1)(iii), the staff verified that the effects of aging on the intended function of the main coolant piping will be adequately managed for the period of extended operation.

The TLAA concerns are thermal aging of the CASS material and fatigue crack growth analyses of the subject piping because these two issues are time-dependent. By letter dated November 20, 2008, the staff raised issues related to the applicant's TLAA of the LBB analyses in LRA Section 4.7.1 and requested additional information. By letter dated December 11, 2008, the applicant provided its response to the staff's RAI on Section 4.7.1. The technical issues related to the TLAA evaluation of the LBB analyses are as follows.

Page: 663

Sequence number: 1
Author:
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This is an important consideration that should also be addressed in the Staff Evaluation section.
See related comment on page 4-55.

To mitigate the effects of PWSCC on the Unit 2 pressurizer surge nozzle weld, a full structural weld overlay (FSWOL) on the pressurizer surge nozzle-to-safe end dissimilar metal and safe end-to-reducer stainless steel butt welds was recently installed during the PINGP Unit 2 refueling outage (2R25). The NRC authorized the installation of the FSWOL in a letter dated June 15, 2008 [ADAMS Accession No. ML081360646].

The applicant ultrasonically examined the PINGP Unit 2 pressurizer surge nozzle-to-safe end weld in November 2006 per ASME Code Section XI, Appendix VIII, Supplement 10. The examination met the ASME Code Section XI and EPRI MRP-139, "Primary System Piping Butt Weld Inspection and Evaluation Guidelines" requirements for examination coverage. No PWSCC indications were detected.

The applicant also ultrasonically examined the Unit 2 surge nozzle-to-safe end dissimilar metal weld in September 2008, prior to installation of the full structural weld overlay (FSWOL). The examinations were performed in accordance with the qualification requirements of ASME Code Section XI, Appendix VIII, Supplement 10. No recordable indications were identified.

In October 2008, following installation of the FSWOL, the applicant ultrasonically examined the new overlay weld and the nozzle-to-safe end dissimilar metal weld. One hundred percent of the Code required volume was inspected during the examinations. The ultrasonic test (UT) resulted in no recordable indications.

Although the Unit 2 surge line has not been approved for LBB application and, therefore, is not part of the TLAA evaluation, the staff notes that the applicant has mitigated the potential for PWSCC of the nozzle-to-safe end dissimilar metal weld with a weld overlay. The applicant has inspected the subject weld in accordance with the NRC approved Alternative Request 2-RR-4-8. Therefore, the issue of PWSCC of the Alloy 82/182 dissimilar metal welds is closed.

1 RAI 4.7.1-5, the staff stated that the applicant discusses AMP B2.1.39, Thermal Aging Embrittlement of CASS, in Appendix B of the LRA. However, Section 4.7.1 of the LRA does not mention this AMP to manage the LBB piping that is made of CASS. The staff asked the applicant to discuss how CASS material of the LBB piping will be managed because AMP B.2.1.41 does not seem to be used to monitor the CASS components in the LBB piping systems for thermal aging embrittlement.

In response to RAI 4.7.1-5, the applicant stated that as specified in PINGP LRA Table 3.1.2-2, the Thermal Aging Embrittlement of CASS Program manages reduction of fracture toughness due to thermal aging embrittlement of CASS piping and fittings in the RCS piping. This is consistent with NUREG-1801, Line Item IV.C2-4. The Unit 1 and 2 RCS piping and fittings constructed of ASTM A351, CF8M material, are included in the scope of AMP B2.1.39.

The staff finds that the applicant does use AMP B2.1.39, Thermal Aging Embrittlement of CASS Program, which is consistent with the same program in NUREG-1801, to monitor the CASS components in the LBB piping system. Therefore, this issue is closed. The discussion below provides more details on the CASS component program.

In RAI 4.7.1-6, the staff noted that by letter dated May 19, 2000, the NRC forwarded to the Nuclear Energy Institute an evaluation of thermal aging embrittlement of CASS components [ADAMS Accession No. ML003717179]. In the NRC's evaluation, the staff provided its positions

Page: 665

Sequence number: 1
Author:
Date: 7/27/2009 10:59:02 AM

This discussion is relevant to the program, but is not relevant to the TLAA. As discussed in the comment on page 4-53 above, fully aged fracture toughness was used, so the thermal embrittlement analyses do not have a time-dependent material property, and are not TLAAs. The highlighted text on pages 4-55 through 57 is more appropriate for the AMP evaluation than the TLAA evaluation.

on aging management of CASS components. The staff asked the applicant to address how the CASS components in the LBB piping at both units satisfy the staff positions in its evaluation dated May 19, 2000.

In response to RAI 4.7.1-6, the applicant stated that as described in its May 19, 2000 letter, the staff's position on thermal aging embrittlement in primary system CASS components has been incorporated in NUREG-1801, Chapter XI, Program XI.M12, Thermal Aging Embrittlement of CASS. The program includes (a) determination of the susceptibility of CASS components to thermal aging embrittlement, and (b) for potentially susceptible components, aging management is accomplished through either enhanced volumetric examination or plant- or component-specific flaw tolerance evaluation.

As shown in LRA Table 3.1.2-2, PINGP relies on the Thermal Aging Embrittlement of CASS Program to manage the reduction of fracture toughness in CASS RCS piping and fittings. As described in LRA Section B2.1.39, the PINGP Thermal Aging Embrittlement of CASS Program is a new program that will be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M12, Thermal Aging Embrittlement of CASS.

The PINGP Thermal Aging Embrittlement of CASS Program scope includes the following CASS piping components which have been approved for LBB:

- Unit 1 large bore primary coolant piping fittings (elbows), which are constructed of statically cast ASTM A351, Type CF8M material
- Unit 2 large bore primary coolant piping (straight sections), which is constructed of centrifugally cast ASTM A351, Type CF8M material
- Unit 2 large bore primary coolant piping fittings (elbows), which are constructed of statically cast ASTM A351, Type CF8M material

The PINGP Thermal Aging Embrittlement of CASS Program includes a determination of the susceptibility of CASS components to thermal aging embrittlement based on casting method, molybdenum content, and percent ferrite. After applying the screening criteria specified in Section 3 of the May 19, 2000 letter and NUREG-1801, XI.M12, Element 1, the following CASS components, in the scope of the CASS aging management program, were determined to be potentially susceptible to thermal aging embrittlement:

A segment of straight RCS piping is potentially susceptible to thermal aging embrittlement due to its high molybdenum content and ferrite content which exceeds 20 percent by weight:

Unit 2 RCS 27.5-inch inside diameter cold leg piping in Loop A, Heat Number C-1737

The following RCS fittings are potentially susceptible to thermal aging embrittlement due to their high molybdenum content and ferrite content which exceeds 14 percent by weight:

- Unit 1 RCS 27.5-inch inside diameter, 35 degree Elbow, Heat No. 33676
- Unit 1 RCS 31.0-inch inside diameter, 90 degree Elbow w/Splitter, Heat No. 13704
- Unit 1 RCS 31.0-inch inside diameter, 90 degree Elbow w/Splitter, Heat No. 19114
- Unit 2 RCS 27.5-inch inside diameter, 35 degree Elbow, Heat No. 37758-2

Page: 666

Sequence number: 1
Author:
Date: 7/27/2009 11:01:52 AM
Continuation of comment on page 4-55

1. Unit 2 RCS 31.0-inch inside diameter, 40 degree Elbow, Heat No. 38992-3
2. Unit 2 RCS 31.0-inch inside diameter, 90 degree Elbow, Heat No. 392312

For the CASS components determined to be potentially susceptible to thermal aging embrittlement, in accordance with criteria specified in Section 3.0 of the May 19, 2000 letter and in NUREG-1801, XI.M12, Elements 3 and 4, the PINGP CASS aging management program will provide enhanced volumetric examinations to detect and size cracks, or component-specific flaw tolerance evaluations will be performed. The PINGP CASS aging management program will provide enhanced volumetric examinations on the base metal determined to be limiting due to applied stress, operating time, and environmental considerations, using examination methods that meet the criteria of ASME Code Section XI, Appendix VIII. Alternatively, component-specific flaw tolerance evaluations will be performed using specific geometry and applied stress to demonstrate that the thermally-embrittled material has adequate toughness. Per NUREG-1801, XI.M12, Element 5, the PINGP CASS Program will incorporate the inspection schedule of IWB-2400 or IWC-2400 for potentially susceptible CASS components using ASME examination methods for the detection of cracking. Alternatively, component-specific flaw tolerance evaluations will be performed. Consistent with the criteria specified in Section 3.0 of the May 19, 2000 letter and in NUREG-1801, XI.M12, Element 6, flaws detected in CASS components will be evaluated in accordance with the applicable procedures of IWB-3500 or IWC-3500 in Section XI of the ASME Code. Alternatively, flaw tolerance evaluation for components with ferrite content up to 25 percent will be performed according to the principles associated with IWB-3640 procedures for submerged arc welds disregarding the ASME Code restriction of 20 percent ferrite in IWB-3641(b)(1). PINGP does not have RCS CASS piping with greater than 25 percent ferrite. Per NUREG-1801, XI.M12, Element 7, repair and replacement of CASS components will be performed in accordance with the requirements of ASME Code Section XI, Subsection IWA-4000.

The staff finds that the applicant's Thermal Aging Embrittlement of CASS Program is consistent with the staff's guidance in its May 19, 2000 letter and NUREG-1801. Therefore, the applicant's management of the thermal aging of the CASS component is acceptable.

In RAI 4.7.1-7, the staff asked the applicant whether the current fatigue crack growth analyses are performed for 60 years. In response to RAI 4.7.1-7, the applicant clarified that as reported in Section 6.0 of WCAP-10640-NP and WCAP-10639-P (for Unit 1) and WCAP-10928-NP and WCAP-10929-P (for Unit 2), the purpose of the fatigue crack growth analyses for the primary coolant loop piping was to determine the sensitivity of the piping to the presence of small cracks. For the Unit 1 and Unit 2 large primary loop piping, a finite element stress analysis was completed for one of the highest-stressed cross sections of a plant typical in geometry and operational characteristics to any Westinghouse PWR system, such as PINGP Units 1 and 2. Crack growths calculated in the selected region are representative of the entire primary loop. All normal, upset, and test conditions were considered, and circumferentially oriented surface flaws were postulated in the region, assuming the flaw was located in three different locations of the pipe. Fatigue crack growth rate laws were used. The results of fatigue crack growth at 40 years for semi-elliptical surface flaws of circumferential orientation and various depths show that crack growth is very small at all three locations.

The TLAAs associated with the fatigue crack growth analyses are the normal, upset, and test conditions (i.e., NSSS design transients) that were used to calculate fatigue crack growth at 40 years. These design transients have not been changed or increased for license renewal as

Page: 667

Sequence number: 1
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Date: 7/27/2009 11:02:17 AM
Continuation of comment on page 4-55

4.7.2.2 Staff Evaluation

The staff reviewed LRA Section 4.7.2 to verify, pursuant to 10 CFR 54.21(c)(1)(1) that the analysis has been projected to the end of the period of extended operation. Intergranular separations (underclad cracking) in low alloy steel heat-affected zones (HAZ) under austenitic stainless steel weld claddings were first identified in 1970 and were reported to occur in only SA-508 Class 2 RPV forgings manufactured to a coarse grain practice and clad by high-heat-input submerged arc processes. This type of underclad cracking is known as reheat cracking due to the cracking resulting from post-weld heat treatment of single-layer austenitic stainless steel cladding that was deposited using high-heat input welding processes. Another type of underclad cracking is identified as cold cracking and has occurred in SA-508 Class 3 forgings after deposition of the second and third layers of austenitic stainless steel cladding, where neither pre-heating nor post-heating was applied during the cladding procedure. The cold cracking was determined to be attributable to residual stresses near the yield strength in the weld metal or base metal interface after cladding deposition, combined with a crack-sensitive microstructure in the HAZ and high levels of diffusible hydrogen in the austenitic stainless steel or Inconel weld metals. Both these types of cracking underneath the RPV cladding are relevant to PINGP, Units 1 and 2. Hence, LRA section 4.7.2 of the PINGP LRA addresses the TLAA of the RPV underclad cracking for the extended period of operation.

WCAP-15338 contains an analysis of underclad cracking and the subsequent growth of these cracks with time in the RPV steel. The WOG concluded that the evaluation contained in this report may be used to demonstrate that fatigue growth of the subject flaws is insignificant over 60 years and the presence of the underclad cracks are of no concern relative to the structural integrity of the RPV. The staff issued a SER dated September 25, 2002 for WCAP-15338 and concluded that Westinghouse's methodology in performing the flaw evaluation is consistent with well-established flaw evaluation procedures and criteria in the ASME Code and, therefore, is adequate. In addition, the staff concluded that any WOG plant may reference WCAP-15338 in a LRA to satisfy the requirements of 10 CFR 54.21(c)(1) for demonstrating the appropriate findings regarding evaluation of TLAA for the RPV components for the period of extended operation.

However, in order for a license renewal applicant to reference the WCAP-15338 report when considering the TLAA of RPV underclad cracking, the applicant must complete the following action items:

- The license renewal applicant is to verify that its plant is bounded by the WCAP-15338 report. Specifically, the renewal applicant is to indicate whether or not the number of design cycles and transients assumed in the WCAP-15338 analysis bounds the number of cycles for 60 years of operation of its RPV.
- Section 54.21(d) of 10 CFR requires that an UFSAR supplement for the facility contains a summary description of the programs and activities for managing the effects of aging and the evaluation of TLAA for the period of extended operation. Those applicants for license renewal referencing the WCAP-15338 report for the RPV components shall ensure that the evaluation of the TLAA is summarily described in the UFSAR supplement.

Page: 670

Sequence number: 1
Author:
Date: 7/27/2009 11:06:21 AM
The PINGP LRA states (i) in that the WCAP analysis remains valid for the PEO.

The applicant has referenced WCAP-15338 in LRA Section 4.7.2 and states that both the above action items pertaining to license renewal TLAA of RPV underclad cracking are satisfied. PINGP is a 2-loop plant, thus for action item 1, the applicant provided the design cycles and transients for PINGP, Units 1 and 2 in Table 4.1-8 of the PINGP UFSAR and LRA Table 4.3-1 and concluded that the number of these design cycles and transients is less than the number of design cycles and transients used in the WCAP-15338 report analysis. However, WCAP-15338 does not explicitly state the number of design cycles and transients used in the analysis. Therefore, the staff issued RAI 4.7.2 in a letter dated November 4, 2008, requesting the applicant to provide the bounding number of design cycles and transients that were used in the WCAP-15338 report analysis. The applicant submitted a response to RAI 4.7.2 in a letter dated November 12, 2008 to the NRC, wherein the applicant provided the number of design cycles and transients that were used in the WCAP-15338 report analysis. Specifically, the applicant stated that the number of design cycles used in the fatigue crack growth evaluation is reported in a table on page 9-10 of WCAP-15338-A, where WCAP-15338-A is the accepted version of the WCAP-15338 report. Based on 60 years of plant operation, the projected number of design cycles and transients expected to be experienced by PINGP, Units 1 and 2 as shown in Table 4.3-1 of the LRA are bounded by the number of design cycles and transients assumed in the WCAP-15388-A analysis as given in the table of page 9-10 of the WCAP-15388-A report. Therefore, the staff confirms that the requirements of action item 1 are satisfied.

For action item 2, PINGP provided a summary description of the RPV underclad cracking TLAA evaluation in its UFSAR supplement, which is contained in Appendix A4.6 of the LRA. Therefore action item 2 above is also satisfied.

4.7.2.3 UFSAR Supplement

The applicant provided an UFSAR supplement summary description of its TLAA evaluation of the RPV underclad cracking in LRA Appendix A4.6. On the basis of its review of the UFSAR supplement, the staff concludes that the summary description of the applicant's actions to address the RPV underclad cracking TLAA is adequate.

4.7.2.4 Conclusion

Based on the staff's review as discussed in the above evaluation, the staff concludes that the applicant has demonstrated, pursuant to 10 CFR 54.21(c)(1)(ii), that the RPV underclad cracking TLAA has been projected to the end of the period of extended operation. The staff also concludes that the UFSAR supplement contains an appropriate summary description of the TLAA evaluation, as required by 10 CFR 54.21(d).

4.7.3 Reactor Coolant Pump Flywheel

4.7.3.1 Summary of Technical Information in Application

Section 4.7.3 of LRA addresses the TLAA of the reactor coolant pump flywheel. Specifically, the applicant has addressed the effect of fatigue crack initiation and growth in the flywheel bore keyway from stresses due to starting the motor. The applicant has referenced the analysis contained in topical report WCAP-15666, "Extension of Reactor Coolant Pump Motor Flywheel Examination," which evaluates the fatigue crack initiation and growth in reactor coolant pump

Page: 671

Sequence number: 1
Author:
Date: 7/29/2009 8:05:38 AM
TPINGP LRA Section 4.7.2, states that this result demonstrates that the analysis of underclad cracking for PINGP remains valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

APPENDIX A

PINGP UNIT 1 AND UNIT 2 LICENSE RENEWAL COMMITMENTS

During the review of the Prairie Island Nuclear Generating Plant (PINGP) Unit 1 and Unit 2, license renewal application (LRA) by the staff of the United States (US) Nuclear Regulatory Commission (NRC) (the staff), the applicant made commitments related to aging management programs (AMPs) to manage aging effects for structures and components.

The following table lists these commitments along with the implementation schedules and sources for each commitment.

Table 1.1 PINGP License Renewal Commitments

APPENDIX A: PINGP LICENSE RENEWAL COMMITMENTS			
Commitment Number	**Commitment**	**FSAR Supplement Section/ LRA Section**	**Enhancement or Implementation Schedule**
1	Each year, following the submittal of the PINGP License Renewal Application and at least three months before the scheduled completion of the NRC review, NMC will submit amendments to the PINGP application pursuant to 10 CFR 54.21(b). These revisions will identify any changes to the Current Licensing Basis that materially affect the contents of the License Renewal Application, including the UFSAR supplements.	1.4	1 months after LRA submittal date and at least 3 months before completion of NRC review.
2	Following the issuance of the renewed operating license, the summary descriptions of aging management programs and TLAAs provided in Appendix A, and the final list of License Renewal commitments, will be incorporated into the PINGP UFSAR as part of a periodic UFSAR update in accordance with 10 CFR 50.71(e). Other changes to specific sections of the PINGP UFSAR necessary to reflect a renewed operating license will also be addressed at that time.	A1.0	First UFSAR update in accordance with 10 CFR 50.71(e) following issuance of renewed operating licenses
3	An Aboveground Steel Tanks Program will be implemented. Program features will be as described in LRA Section B2.1.2.	B2.1.2	U1 - 8/9/2013 U2 - 10/29/2014
4	Procedures for the conduct of inspections in the External Surfaces Monitoring Program, Structures Monitoring Program, Buried Piping and Tanks Inspection Program, and the RG 1.127 Inspection of Water-Control Structures Associated with Nuclear Power Plants Program will be enhanced to include guidance for visual inspections of installed bolting.	B2.1.6	U1 - 8/9/2013 U2 - 10/29/2014
5	A Buried Piping and Tanks Inspection Program will be implemented. Program features will be as described in LRA Section B2.1.8.	B2.1.8	U1 - 8/9/2013 U2 - 10/29/2014

Page: 679

Sequence number: 1
Author:
Date: 7/29/2009 8:06:11 AM
TAnnual update was submitted in letter dated 4/13/09. This item should be shown as complete in final SER.

APPENDIX A: PINGP LICENSE RENEWAL COMMITMENTS			
21	Number Not Used [Deleted by Applicant in a letter Dated 3/27/2009]		
22	Number Not Used [Deleted by Applicant in a letter Dated 127/2009]		
23	A One-Time Inspection Program will be completed. Program features will be as described in LRA Section B2.1.29.	B2.1.29	U1 - 8/9/2013 U2 - 10/29/2014
24	A One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program will be completed. Program features will be as described in LRA Section B2.1.30.	B2.1.30	U1 - 8/9/2013 U2 - 10/29/2014
25	2or the PWR Vessel Internals Program, PINGP commits to the following activities for managing the aging of reactor vessel internals components: · Participate in the industry programs for investigating and managing aging effects on reactor internals; · Evaluate and implement the results of the industry programs as applicable to the reactor internals; and · Upon completion of these programs, but not less than 24 months before entering the period of extended operation, submit an inspection plan for reactor internals to the NRC for review and approval.	B2.1.32	U1 - 8/9/2011 U2 - 10/29/2012
26	The Reactor Head Closure Studs Program will be enhanced to incorporate controls that ensure that any future procurement of reactor head closure studs will be in accordance with the material and inspection guidance provided in NRC Regulatory Guide 1.65.	B2.1.33	U1 - 8/9/2013 U2 - 10/29/2014
27	The Reactor Vessel Surveillance Program will be enhanced as follows: · A requirement will be added to ensure that all withdrawn and tested surveillance capsules, not discarded as of August 31, 2000, are placed in storage for possible future reconstitution and use. · A requirement will be added to ensure that in the event spare capsules are withdrawn, the untested capsules are placed in storage and maintained for future insertion.	B2.1.34	U1 - 8/9/2013 U2 - 10/29/2014

Page: 683

Sequence number: 1
Author:
Date: 7/29/2009 8:06:21 AM
T Letter date is incorrect. This was deleted in NSPM letter dated 4/13/2009

Sequence number: 2
Author:
Date: 7/29/2009 8:06:30 AM
T Commitment text is not the latest. This commitment was revised in NSPM letter dated 5/12/09, and revised again in NSPM letter dated 6/24/09

APPENDIX A: PINGP LICENSE RENEWAL COMMITMENTS			
41	During the first refueling outage following refueling cavity leak repairs in each Unit (scheduled for refueling outages 1R26 and 2R26), concrete will be removed from the sump C pit to expose an area of the containment vessel bottom head. Visual examination and ultrasonic thickness measurement will be performed on the portions of the containment vessels exposed by the excavations. An assessment of the condition of exposed concrete and rebar will also be performed. Degradation observed in the exposed containment vessel, concrete or rebar will be entered into the Corrective Action Program and evaluated for impact on structural integrity and identification of additional actions that may be warranted. [Added in letter dated 4/6/09 in response to Follow Up RAI B2.1.38]	B2.1.38	U1 - 8/9/2013 U2 - 10/29/2014
42	During the two consecutive refueling outages following refueling cavity leak repairs in each Unit (scheduled for refueling outages 1R26 and 2R26), visual inspections will be performed of the areas where reactor cavity leakage had been observed previously to confirm that leakage has been resolved. The inspection results will be documented. If refueling cavity leakage is again identified, the issue will be entered into the Corrective Action Program and evaluated for identification of additional actions to mitigate leakage and monitor the condition of the containment vessel and internal structures. [Added in letter dated 4/6/09 in response to Follow Up RAI B2.1.38]	B2.1.38	U1 - 8/9/2013 U2 - 10/29/2014
43	Preventive maintenance requirements will be implemented to require periodic replacement of rubber flexible hoses in the Diesel Generators and Support System that are exposed to fuel oil or lubricating oil internal environments. [Added in letter dated 4/6/09 in response to RAI 3.3.2-8-1]	Table 3.3.2-8	U1 - 8/9/2013 U2 - 10/29/2014

Page: 688

Sequence number: 1
Author:
Date: 7/29/2009 8:06:37 AM
Commitment is not the latest version. Commitment was further revised in NSPM letter dated 6/5/09.

APPENDIX B

CHRONOLOGY

This appendix lists chronologically the licensing correspondence between the staff of the U.S. Nuclear Regulatory Commission (NRC) (the staff) and Northern States Power Company, a Minnesota Corporation, (NSPM or the applicant). This appendix also lists other correspondence concerning the staff's review of the Prairie Island Nuclear Generating Plant, Units 1 and 2, license renewal application (LRA) (Docket Nos. 50-282 and 50-306).

APPENDIX B: CHRONOLOGY	
Date	Subject
4/11/2008	Letter from Nuclear Management Co LLC to NRC, Prairie Island, Units 1 and 2 - Application for Renewed Operating Licenses to be Extended 20 Years Beyond Current Expiration Dates (ADAMS Accession No. ML081130666)
11/2008	Letter from Nuclear Management Co LLC to NRC, Prairie Island, Units 1 and 2 - Application for Renewed Operating Licenses, Technical and Administrative Information (ADAMS Accession No. ML081130673)
4/11/2008	Letter from Nuclear Management Co LLC to NRC, Prairie Island Nuclear Generating Plant, Units 1 and 2 - Supporting Information for NRC Review of Application for Renewed Operating Licenses (ADAMS Accession No. ML081140720)
4/16/2008	Letter from Northern States Power Co Nuclear Management Co LLC to NRC, Prairie Island, Units 1 & 2, and Monticello, Application for Order and Conforming License Amendments to Transfer Operating Authority Under Facility Operating Licenses (ADAMS Accession No. ML081090353)
4/28/2008	Letter from NRC to Nuclear Management Co LLC, Receipt and Availability of the LRA for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML081050091)
4/28/2008	Federal Register Notice, Receipt and Availability of the LRA for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML081050100)
30/2008	Letter from Nuclear Management Co LLC to NRC, Prairie Island, Units 1 and 2 - Applicant's Environmental Report - Operating License Renewal Stage, Appendix E, Table of Contents through Section 2.0, "Site and Environmental Interfaces" (ADAMS Accession No. ML081130677)
30/2008	Letter from Nuclear Management Co LLC to NRC, Prairie Island, Units 1 and 2 - Applicant's Environmental Report - Operating License Renewal Stage, Appendix E, Section 3.0, "Proposed Action," through Section 9.0, "Status of Compliance" (ADAMS Accession No. ML081130681)

Page: 690

Sequence number: 1
Author:
Date: 7/21/2009 3:24:38 PM
This is not a separate letter. This is the LRA attached to ML081130666

Sequence number: 2
Author:
Date: 7/21/2009 3:25:05 PM
This is not a separate letter. This is part of 4/11/09 LRA transmittal.

Sequence number: 3
Author:
Date: 7/21/2009 3:25:41 PM
This is not a separate letter. This was submitted as part of 4/11/09 LRA transmittal.

APPENDIX B: CHRONOLOGY	
1 30/2008	Letter from Nuclear Management Co LLC to NRC, Prairie Island, Units 1 and 2 - Applicant's Environmental Report - Operating License Renewal Stage, Appendix E, Attachment A, "NRC NEPA Issues for License Renewal of Nuclear Power Plants," through Attachment F, "Severe Accident Mitigation Alternatives" (ADAMS Accession No. ML081130684)
5/6/2008	Federal Register Notice, Prairie Island, FRN - Notice of Receipt and Availability of Application for Renewal of Prairie Island Nuclear Generating Plant - 73 FR 25034 (ADAMS Accession No. ML083500086)
5/13/2008	Press Release-08-093: License Renewal Application for Prairie Island Nuclear Plant Available for Public Inspection (ADAMS Accession No. ML081340103)
5/16/2008	Letter from Nuclear Management Co LLC to NRC, Prairie Island, Units 1 and 2, Supplemental Information Regarding Application for Renewed Operating Licenses (ADAMS Accession No. ML081400797)
5/19/2008	Letter from NRC to Nuclear Management Co LLC, Receipt and Availability of the License Renewal Application for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML081330711)
2 19/2008	Federal Register Notice, Notice of Receipt and Availability of Application for Renewal of Prairie Island Nuclear Generating Plant, Units 1 and 2.Notice of Receipt and Availability of Application for Renewal of Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML081330712)
5/30/2008	Letter from Nuclear Management Co LLC to NRC, Prairie Island, Units 1 and 2 - Revised Boundary Drawings to Support NRC Review of Application for Renewed Operating Licenses (ADAMS Accession No. ML081560697)
6/10/2008	Federal Register Notice, Notice of Acceptance for Docketing of the Application and Notice of Opportunity for Hearing Regarding Renewal of Facility Operating License Nos. DPR-42 and DPR-60 for an Additional 20-year Period (ADAMS Accession No. ML081370294)
6/17/2008	Federal Register Notice, Prairie Island, FRN - Notice of Acceptance for Docketing of Application and Notice of Opportunity for Hearing Re Renewal of License - 73 FR 34335 (ADAMS Accession No. ML083500089)
6/26/2008	Federal Register, Notice of Intent To Prepare an Environmental Impact Statement and Conduct Scoping Process For License Renewal For The Prairie Island Nuclear Generating Plant Units 1 & 2 (TAC Nos. MD8528, MD8529) (ADAMS Accession No. ML081620382)
3 15/2008	Federal Register Notice, Prairie Island Nuclear Generating Plant, Units 1 and 2-Notice of Intent (TAC Nos. (MD8528 and MD8529) (ML081970679)

Page: 691

Sequence number: 1
Author:
Date: 7/29/2009 8:06:50 AM
This is not a separate letter. This is part of 4/11/09 LRA transmittal.

Sequence number: 2
Author:
Date: 7/29/2009 8:06:58 AM
This is a correction to notice of receipt and availability - not the notice itself. The notice was in 73FR30423 dated May 27, 2009. Notice should be listed separately.

Sequence number: 3
Author:
Date: 7/29/2009 8:07:06 AM
This is not a Federal Register Notice, but a letter indicating NRC's intent to publish one. FRN was published 7/22/08.

APPENDIX B: CHRONOLOGY	
7/22/2008	Federal Register Notice, Prairie Island, FRN - Notice of Intent to Prepare and EIS and Conduct Scoping - 73 FR 42628 (ADAMS Accession No. ML083500090)
7/30/2008	Transcript of Prairie Island License Renewal Public Scoping Meeting on 07/30/2008 - Afternoon Session, Pp. 1-44 (ADAMS Accession No. ML082470336)
7/30/2008	Prairie Island License Renewal Public Scoping Meeting Transcript: Evening Session, July 30, 2008, Pages 1-79 (ADAMS Accession No. ML082490514)
9/8/2008	Prairie Island, License Renewal Environmental Report Additional Information, Documents Requested During NRC Environmental Review, Surface Water, Binder 2 of 3 (ADAMS Accession No. ML083120222)
9/8/2008	Prairie Island, License Renewal Environmental Report Additional Information, Documents Requested During NRC Environmental Review, Surface Water, Binder 1 of 3 (ADAMS Accession No. ML083120223)
9/8/2008	Prairie Island, License Renewal Environmental Report Additional Information, Documents Requested During NRC Environmental Review, Socioeconomics, Binder 1 of 1 (ADAMS Accession No. ML083120226)
9/8/2008	Prairie Island, License Renewal Environmental Report Additional Information, Documents Requested During NRC Environmental Review, Groundwater Resources, Binder 1 of 1 (ADAMS Accession No. ML083120227)
9/8/2008	Prairie Island, License Renewal Environmental Report Additional Information, Documents Requested During NRC Environmental Review, Terrestrial Ecology, Binder 1 of 1 (ADAMS Accession No. ML083120228)
9/18/2008	Prairie Island, License Renewal Environmental Report Additional Information, Documents Requested During NRC Environmental Review, Environmental Health & Waste Issues, Binder 1 of 1 (ADAMS Accession No. ML083120229)
1[illegible]26/2008	Letter from Northern States Power Co to NRC, Prairie Island Nuclear Generating Plant Units 1 and 2, Submittal of Documents for Public Disclosure as Requested During NRC License Renewal Environmental Audit (ADAMS Accession No. ML083120218)
10/23/2008	Letter from NRC to Nuclear Management Co LLC, Review of the Prairie Island Nuclear Generating Plant Units 1 & 2, License Renewal Application (Tac Nos. MD8513 and MD8514) (ADAMS Accession No. ML082950551)
11/4/2008	Letter from NRC to Northern States Power Co, Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant Units 1 & 2, License Renewal Application (ADAMS Accession No. ML082970818)

Page: 692

Sequence number: 1
Author:
Date: 7/30/2009 8:36:59 AM
There are two additional letters submitting environmental information that should be listed: 9/26/08 submitting confidential documents and 9/29/08 submitting archaeological documents.

APPENDIX B: CHRONOLOGY	
11/5/2008	Letter from NRC to Northern States Power Co Nuclear Management Co, LLC, Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant Units 1 & 2, License Renewal Application (TAC Nos. MD8513 and MD8514) (ADAMS Accession No. ML082830947)
11/6/2008	Letter from NRC to Nuclear Management Co LLC, Prairie Island, Units 1 & 2, Information Request For NRC License Renewal Inspection (ADAMS Accession No. ML083110863)
11/12/2008	Letter Northern States Power Co to NRC, Prairie Island Nuclear Generating Units 1 and 2, Responses to NRC Requests for Additional Information Dated November 4, 2008 Regarding Application for Renewed Operating Licenses (ADAMS Accession No. ML083370202)
11/19/2008	Letter from NRC to Northern States Power Co, Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant, Units 1 & 2, License Renewal Application (TAC Nos. MD8513 and MD8514) (ADAMS Accession No. ML083010585)
11/19/2008	Letter from NRC to Northern States Power Co, Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant, Units 1 & 2, License Renewal Application (TAC Nos. MD8513 and MD8514) (ADAMS Accession No. ML083180394)
1/19/2008	Letter from NRC to Northern States Power Co, Request for Additional Information License Renewal Application, Prairie Island Nuclear Generating Plant, Units 1 & 2 (ADAMS Accession No. ML083240032)
11/20/2008	Letter from NRC to Northern States Power Co, Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant Units 1 & 2, License Renewal Application (TAC Nos. MD8513 and MD8514) (ADAMS Accession No. ML083180962)
2/20/2008	Letter from NRC to Northern States Power Co, Request for Additional Information, Prairie Island Units 1 & 2 License Renewal Application, Sections 4.7.1 and 2.5 (ADAMS Accession No. ML083181015)
11/21/2008	Letter from Northern States Power Co to NRC, Prairie Island, Units 1 and 2, Responses to NRC Requests for Additional Information Dated October 23, 2008, Regarding Application for Renewed Operating Licenses (ADAMS Accession No. ML083370505)
11/25/2008	Letter from NRC to Northern States Power Co, Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant Units 1 & 2, License Renewal Application (TAC Nos. MD8513 and MD8514) (ADAMS Accession No. ML083180558)

Page: 693

Sequence number: 1
Author:
Date: 7/29/2009 8:07:24 AM
This is not a letter. It is the attachment to ML083180394

Sequence number: 2
Author:
Date: 7/29/2009 8:07:31 AM
This is not a letter. It is the attachment to ML083180962

APPENDIX B: CHRONOLOGY	
12/1/2008	Letter from NRC to Northern States Power Co, Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant, Units 1 & 2, License Renewal Application (TAC Nos. MD8513 and MD8514) RAI 2.4.1-1, 2.4.3-1, 2.4.7-1, 2.4.7-2, 2.4.8-1, 2.4.11-1 (ADAMS Accession No. ML083250716)
12/2/2008	Letter from NRC to Northern States Power Co, Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant, Units 1 & 2, License Renewal Application (TAC Nos. MD8513 and MD8514) (ADAMS Accession No. ML083310078)
12/5/2008	Letter from NRC to Northern States Power Co, Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant, Units 1 & 2, License Renewal Application (TAC MD8513 and MD8514). RAIB2.1.3-1; B2.1.27-1; B2.1.8-1; B2.1.8-2; B2.1.8-3; B2.1.8-4; B2.1.19-1; B2.1.19-2; B2.1.19-3 (ADAMS Accession No. ML083250720)
12/10/2008	Letter from NRC to Northern States Power Co, Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant Units 1 & 2, License Renewal Application (TAC Nos. MD8513 and MD8514) (ADAMS Accession No. ML083010561)
12/11/2008	Letter from Northern States Power Co to NRC, Prairie Island, Units 1 and 2 - Responses to NRC Requests for Additional Information Dated November 19, 2008 Regarding Application for Renewed Operating Licenses (ADAMS Accession No. ML083650032)
12/11/2008	Letter from Northern States Power Co to NRC, Prairie Island, Units 1 and 2, Responses to NRC Requests for Additional Information Dated November 20, 2008 Regarding Application for Renewed Operating Licenses (ADAMS Accession No. ML083650035)
12/11/2008	Letter from Northern States Power Co to NRC, Prairie Island, Units 1 and 2, Responses to NRC Requests for Additional Information Dated November 25, 2008, Regarding Application for Renewed Operating Licenses (ADAMS Accession No. ML083650036)
12/11/2008	Letter from Northern States Power Co to NRC, Prairie Island, Units 1 and 2, Responses to NRC Requests for Additional Information Dated December 1, 2008 Regarding Application for Renewed Operating Licenses (ADAMS Accession No. ML083650037)
12/16/2008	Letter from NRC to Northern States Power Co, Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant, Units 1 & 2, License Renewal Application (TAC MD8513 and MD8514) (ADAMS Accession No. ML083250329)
12/18/2008	Letter from NRC to Northern States Power Co, Request for Additional Information for The Review of The Prairie Island Nuclear Generating Plant, Units 1 & 2, License Renewal Application (TAC Nos. MD8513 and MD8514) (ADAMS Accession No. ML083170561);

Page: 694

Sequence number: 1
Author:
Date: 7/29/2009 8:07:42 AM
There is also a 12/5/08 letter from NSPM to NRC that should be listed. Letter responds to NRC RAI letter dated 11/5/08.

Sequence number: 2
Author:
Date: 7/29/2009 8:07:50 AM
This is not a letter. This is the enclosure to NRC letter of 12/18/08.

APPENDIX B: CHRONOLOGY	
1/27/2009	Letter from NRC to Northern States Power Co, 08/18/08 - 08/22/08 Summary of Site Audit Related to the Review of the License Renewal Application for Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML083440479)
1/27/2009	Letter from Northern States Power Co to NRC, Prairie Island, Units 1 and 2, and Monticello, Northern States Power Company - Minnesota Confirmation of Compliance with Confirmation Order EA-06-178 (ADAMS Accession No. ML090270795).
2/3/2009	Letter from NRC to Northern States Power Co, Public Exit Meeting for an NRC License Renewal Inspection (ML090350405)
2/3/2009	02/03/2009-Summary of Telephone Conference Between NRC and Prairie Island Nuclear Generating Plant, Concerning Requests for Additional Information Pertaining to License Renewal Application (ADAMS Accession No. ML090860064)
2/4/2009	12/03/08 Summary of Telephone Conference Call Held Between NRC & Northern States Power Co, Concerning Follow-Up Question Pertaining to the PINGS, Units 1& 2, License Renewal Environmental Review and Site Audit (ADAMS Accession No. ML090060852)
2/6/2009	Letter from Northern States Power Co to NRC, Prairie Island, Units 1 and 2, Submittal of Supplemental Information Regarding Application for Renewed Operating Licenses (ADAMS Accession No. ML090510148)
2/9/2009	Letter from Northern States Power Co to NRC, Prairie Island, Unit 1 & 2, Response to Request for Additional Information Regarding License Amendment Request for Technical Specifications Changes to Allow Use of Westinghouse 0.422-Inch OD 14x14 Vantage+ Fuel (ADAMS Accession No. ML090410508)
2/10/2009	02/10/2009 Meeting Summary, Telephone Conference Call Between the NRC and Prairie Island, Concerning Requests for Additional Information Pertaining to the Prairie Island Units 1 and 2, License Renewal Application (ADAMS Accession No. ML090860063)
2/11/2009	Press Release-III-09-003: NRC to Discuss Results of License Renewal Inspection for Prairie Island Nuclear Power Plant (ADAMS Accession No. ML090420533)
2/11/2009	02/11/09 Summary of Telephone Conference Call Between NRC and Prairie Island Nuclear Generating Plant, Concerning Requests for Additional Information Pertaining to License Renewal Application (ADAMS Accession No. ML090860062)
2/20/2009	Letter from NRC, to Northern States Power Co, Request for Additional Information For Prairie Island Nuclear Generating Units 1 and 2, License Renewal Application (Tac Nos. MD8513 and MD8514) (ADAMS Accession No. ML090340684)

Page: 696

Sequence number: 1
Author:
Date: 7/29/2009 8:07:58 AM
This letter is not related to License Renewal

Sequence number: 2
Author:
Date: 7/29/2009 8:08:06 AM
This letter is not related to License Renewal

APPENDIX B: CHRONOLOGY	
4/13/2009	Letter from Northern States Power Co to NRC, Prairie Island, Units 1 and 2, Supplemental Information Regarding Application for Renewed Operating Licenses (ADAMS Accession No. ML091110323)
4/13/2009	Letter from Northern States Power Co to NRC, Prairie Island, Units 1 and 2, Annual Update (Revision) of Application for Renewed Operating Licenses (ADAMS Accession No. ML091110324)
4/21/2009	Letter from NRC to Northern States Power Co, Scoping and Screening Audit Summary Regarding the Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application (ADAMS Accession No. ML083300107)
4/21/2009	Letter from NRC to Northern States Power Co, Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application, Safety Audit Report (TAC MD8513 and MD8514) (ADAMS Accession No. ML090850009)
4/28/2009	Letter from Northern States Power Co to NRC, Supplemental Information Closing License Renewal Commitment Number 36 Regarding Application for Renewed Operating License (ADAMS Accession No. ML091190418)
5/8/2009	Letter from Northern States Power Co to NRC, Supplemental Information Regarding Application for Renewed Operating License (ADAMS Accession No. ML091390294)
5/29/2009	03/30/09 Summary of Telephone Conference Call Held Between NRC and Prairie Island, Concerning Request for Additional Information Pertaining to the Prairie Island Units 1 and 2 (ADAMS Accession No. ML091180290)
129/2009	04/15/09 Summary of Telephone Conference Call Held Between NRC and Prairie Island, Concerning Request for Additional Information Pertaining to the Prairie Island Units 1 and 2 (ADAMS Accession No. ML091170124)

Page: 698

Sequence number: 1
Author:
Date: 7/29/2009 7:28:12 AM
Additional correspondence to be listed includes NRC letters of 6/4/09 and 6/10/09, and NSPM letters of 5/12/09, 6/5/09, 6/24/09 and 6/24/09.

	APPENDIX D: PINGP References
40	GALL Report and Section A.1.2.3.10 of the "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants"
41	Generic Letter (GL) 80-113, "Control of Heavy Loads," December 22, 1980
42	Generic Letter (GL) 92-01, "Reactor Vessel Structural Integrity," November 10, 1999 (ADAMS Accession No. ML993330371)
43	Generic Letter 96-04, Boraflex Degradation in Spent Fuel Pool Storage Racks
44	Generic Letter 9706, "Degradation of Steam Generator Internals"
45	Generic Safety Issue (GSI)-78, "Monitoring of Fatigue Transient Limits for Reactor Coolant System"
46	GL 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors"
47	GL 89-13, "Service Water System Problems Affecting Safety-Related Equipment" July 18, 1989
48	GL 89-13, Supplement 1, "Service Water System Problems Affecting Safety-Related Components", April 4, 1990
49	GSI-166, "Adequacy of Fatigue Life of Metal Components"
50	GSI-190, "Fatigue Evaluation of Metal Components for 60-Year Plant Life"
51	GSI-191, "Assessment of Debris Accumulation on PWR Sump Performance."
52	Letter from Christopher I. Grimes, U.S. Nuclear Regulatory Commission, License Renewal and Standardization Branch, to Douglas J. Walters, Nuclear Energy Institute, License Renewal Issue No. 98-0030, Thermal Aging Embrittlement of Cast Stainless Steel Components, May 19, 2000, (ADAMS Accession No. ML003717179).
53	Letter from William H. Bateman, NRC to Alex Marion, Nuclear Energy Institute, Subject: "NEI 97-06, Steam Generator Program Guidelines, Revision 2," dated October 3, 2005
54	Lois, Lambros, US Nuclear Regulatory Commission, Memorandum to Wetzel, Beth A., "Prairie Island Units 1 and 2: Fluence Evaluation for Pressure-Temperature Limits," Dockets 50-282 and 50-306, March 23, 1998
55	McLane, V., et al., "ENDF/B-VI: Evaluated Nuclear Data Library for Nuclear Science and Technology," December 1996.
56	NEI 9706, "Steam Generator Program Guidance," Rev. 2
57	Northern States Power, "Prairie Island Nuclear Generating Plant Application for Renewed Operating License," Dockets 50-282 and 50-306, April 15, 2008.
58	NRC Bulletin 2003-02, "Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity," 8/21/2003
59	NRC Bulletin 2004-01, "Inspection of Alloy 82/182/600 Materials used in the Fabrication of Pressurizer Penetrations and Steam Piping Connections at Pressurized-Water Reactors," May 28, 2004
60	NRC Bulletin 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems," June 22, 1988

Page: 705

Sequence number: 1
Author:
Date: 7/29/2009 8:08:20 AM
Date should be April 11, 2008