Constellation Energy
Nine Mile Point Nuclear Station

P.O. Box 63
Lycoming, NY 13093

July 14, 2005
NMP1L 1958

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

SUBJECT: Nine Mile Point Units 1 and 2
Docket Nos. 50-220 and 50-410
Facility Operating License Nos. DPR-63 and NPF-69

License Renewal Application – Responses to Previously Unanswered NRC Requests for Additional Information (TAC Nos. MC3272 and MC3273)

Gentlemen:

By letter NMP1L 1962, dated July 14, 2005, Nine Mile Point Nuclear Station, LLC (NMPNS) submitted an amended License Renewal Application (LRA) and requested that the formal NRC review that was temporarily suspended recommence at the earliest time practicable. This temporary suspension was a result of our letter NMP1L 1933, dated March 3, 2005, that requested a grace period to develop and implement a recovery plan designed to address several NRC issues. The NRC granted the request in a letter dated March 7, 2005, and the recovery plan was presented to the NRC staff in a meeting held on March 30, 2005.

At the onset of the grace period, twenty-eight Requests for Additional Information (RAIs) remained unanswered. These RAIs (listed in Attachment 1) were factored into the NMPNS license renewal recovery plan and were subsequently addressed during the implementation of that plan. As appropriate, they have been incorporated into the amended LRA and are specifically referenced in the "road map" that is included with the amended LRA. The "road map" concept is explained in the cover letter for the amended LRA (NMP1L 1962) and was discussed with the NRC staff in our meeting on June 9, 2005. In addition to incorporating the results of the RAI responses in the amended LRA, we committed to send a separate letter with the responses to the unanswered RAIs. Attachment 2 to this letter contains those responses.

Any commitments associated with the information contained in this submittal have been incorporated into the amended LRA and summarized in Appendix A thereof.

If you have any questions about this submittal, please contact David Dellario, NMPNS License Renewal Project Manager, at (315) 349-7141.

Very truly yours,

James A. Spina
Vice President Nine Mile Point

JAS/JJ/sac

STATE OF NEW YORK :
: TO WIT
COUNTY OF OSWEGO :

I, James A. Spina, being duly sworn, state that I am Vice President Nine Mile Point, and that I am duly authorized to execute and file this supplemental information on behalf of Nine Mile Point Nuclear Station, LLC. To the best of my knowledge and belief, the statements contained in this submittal are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other Nine Mile Point employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.

Subscribed and sworn before me, a Notary Public in and for the State of New York and County of Oswego, this 14th day of July, 2005.

WITNESS my Hand and Notarial Seal:

SANDRA A. OSWALD
Notary Public, State of New York
No. 01OS6032276
Qualified in Oswego County
Commission Expires 10/25/05

Notary Public

My Commission Expires: 10/25/05

July 14, 2005
Date

Attachments:
1. List of Unanswered RAIs When the Grace Period Commenced
2. Responses to NRC Requests for Additional Information (RAIs)

cc: Mr. S. J. Collins, NRC Regional Administrator, Region I
Mr. G. K. Hunegs, NRC Senior Resident Inspector
Mr. T. G. Colburn, Senior Project Manager, NRR
Mr. N. B. (Tommy) Le, License Renewal Project Manager, NRR
Mr. J. P. Spath, NYSERDA

ATTACHMENT 1

Nine Mile Point Nuclear Station (NMPNS)

List of Unanswered RAIs When the Grace Period Commenced

RAI 2.1-4 (Follow-up)
RAI 2.2-3
RAI 2.3.4.A.5
RAI 2.4-1
RAI 2.5-1
RAI 2.5-2
RAI 2.5-3
RAI 3.1.1.20
RAI 3.1.121
RAI 3.1.2-20
RAI 3.1.2-21
RAI 3.1.2-22
RAI 3.1.2.C.4-1
RAI 3.2.2-20
RAI 3.2.2-21
RAI 3.4.1-20
RAI 3.5.1-20
RAI 3.6.2.C-3
RAI 4.3.1-3
RAI 4.3.3 R1
RAI 4.3.6 R1
RAI 4.6.2-1
RAI 4.6 R1
RAI 4.7.2-1 and 4.7.2-2
RAI A1.1.4-20
RAI B2.1.1-22
RAI B2.1.11-2

ATTACHMENT 2

Nine Mile Point Nuclear Station (NMPNS)

Responses to NRC Requests for Additional Information (RAIs) Related to:

LRA Section 2.1 – Scoping and Screening Methodology

LRA Section 2.2 – Plant Level Scoping Results

LRA Section 2.3.4.A.5 – T-quenchers

LRA Section 2.4 – Scoping and Screening: Structures and Component Supports

LRA Section 2.5 – Electrical and Instrumentation & Control Systems

LRA Section 3.1 – Aging Management of Reactor Vessel, Internals and Reactor Coolant Systems

LRA Section 3.2 – Aging Management of Engineered Safety Features

LRA Section 3.4 – Aging Management of Steam and Power Conversion Systems

LRA Section 3.5 – Aging Management of Structures and Component Supports

LRA Section 3.6 – Aging Management of Electrical and Instrumentation & Control Systems

LRA Section 4.3 – Time-Limited Aging Analyses – Metal Fatigue Analysis

LRA Section 4.6 – Time-Limited Aging Analyses – Containment Liner Plate, Metal Containments and Penetrations Fatigue Analysis

LRA Section 4.7 – Time-Limited Aging Analysis – Other Plant-Specific TLAAs

RAI 2.1-4 (FOLLOW-UP)

The staff requested the applicant review their 10 CFR 54.21(a)(2) evaluation to verify that the equivalent anchors and equipment within the anchor boundaries were included within scope. Specifically, with respect to NMP responses to RAI 2.1-4(a), the staff requested the applicant to verify that for systems which use plant equipment as the equivalent anchors, the equipment was included in scope. Additionally, for systems that are already in scope but which transition outside of safety-related buildings, the staff requested the applicant to verify that was also included in those cases where the equivalent anchor was located beyond the building boundary. For both cases, the staff requested the applicant to document their scoping evaluations that were used to verify these conditions.

The staff requested the applicant to provide additional information to NMP response to RAI 2.1-4(b) and identify how many non safety-related (NSR) components were excluded from scope on the use of the NSR Safety Systems and Components (SSCs) which Functionally Interact With SR SSCs' criterion. The staff requested the applicant to confirm that the criterion was not used to exclude any NSR SSCs that could inhibit a SR SSC from performing its intended functions.

Response

Summary

NMP has completed an NSR re-scoping effort utilizing the scoping criteria in NEI 95-10, Rev. 5, except those portions of NEI 95-10 with which the NRC has taken exception. NMP did not use the "NSR Safety Systems and Components (SSCs) which Functionally Interact with SR SSCs" criterion from NEI 95-10, Rev. 4, to exclude from scope any NSR SSCs that could inhibit a SR SSC from performing its intended functions. As a result of this effort, NMP now includes all NSR SSCs that are within the boundaries of the equivalent anchors (including the equivalent anchor) within the scope of LR and subject to AMR. NMP LRA Section 2.1.4.2 has been revised to describe the methodology used in the NMP NSR re-scoping effort. The documentation of evaluations identifying the NSR SSCs is contained in project files available for review at NMPNS.

Basis

As a result of the NMP scoping effort, equipment used as the equivalent anchor is considered within the scope of LR and subject to AMR. The NMP1 Service Water System includes an example of this situation in that the strainers are utilized as equivalent anchors. Also, in situations where NSR piping extends from a SR building into a NSR building before the equivalent anchor is located, the NSR piping, fittings and equipment in the NSR building up to and including the equivalent anchor are considered within the scope of LR and subject to AMR. An example is the NMP1 Condensate Transfer System where an SR/NSR interface line extends from the Turbine Building (SR) into the Waste Building (NSR).

LRA Changes:

NMP revised LRA Section 2.1.4.2, Non-Safety Related Criteria Pursuant to 10 CFR 54.4(a)(2) (Criterion 2), to provide a detailed description of the NSR scoping criteria as shown in the updated LRA roadmap.

RAI 2.2-3

In the Nine Mile Point (NMP) License Renewal Application (LRA), chapter 2 tables identifying the component types requiring an Aging management Review (AMR) for the various systems, the applicant has on several occasions listed "NSR piping, fittings, and equipment" as a component type. This component type is introduced to incorporate the results from 10 CFR 54.4(a)(2) scoping, and is described in the system description sections as "NSR piping fittings and equipment containing liquid" in the buildings that are identified in each LRA section. The System, Structure, and Component (SSC's) making up this component type thus vary from system to system.

The License Renewal regulation, 10 CFR 54.21(a)(1), requires the applicant to identify and list structures and components subject to an AMR. Standard Review Plan-LR (NUREG-1800) Section 2.3.1 states that for a mechanical system that is within the scope of license renewal, the applicant should identify the portions of the system that perform an intended function. The applicant may identify these particular portions of the system in a marked-up P&ID or other media. Industry Guidance NEI 95-10, Rev. 5, Appendix F, Section 6 states that the results from the application of this methodology (referring to industry 54.4(a)(2) methodology) should be plant specific (commodity lists, component lists, or boundary drawings, etc.), and included in the LRA.
The information provided in the NMP LRA does not satisfy the above regulation since component type "NSR piping, fittings, and equipment" do not identify and list the specific structures and components subject to AMR. Furthermore, while the licensee identifies building in which the piping and equipment are located, it is unclear to the staff as to what portion of the system is subject to AMR.

For the LRA sections that includes "piping fittings, and equipment" as a "component type," please list the specific SSCs which comprise the "piping fittings, and equipment" component type. Also, clearly identify what portion of the system being included in the scope as result of 10CFR54.4(a)(2) are subject to AMR. For example in LRA section 2.3.3.A.10, it is indicated that "The components subject to AMR include the NSR piping, fittings, and equipment containing liquid in the Reactor Building." If all the system components located in the building is being included in scope please indicate so in the statement identifying the components subject to AMR (i.e. includes all "piping fittings, and equipment containing liquid in the Reactor Building.) Justification should be provided for all exclusions.

The above stated issues are applicable to the following LRA Sections that the staff had noted during the staff's review of the LRA's BOP section:

2.3.3.A.3	*2.3.3.A.10*	*2.3.3.A.12*	*2.3.3.A.17*	*2.3.3.A.19*	*2.3.3.A.20*
2.3.3.A.21	*2.3.3.A.22*	*2.3.3.A.23*	*2.3.3.A.25*	*2.3.3.B.8*	*2.3.3.B.11*
2.3.3.B.14	*2.3.3.B.16*	*2.3.3.B.17*	*2.3.3.B.18*	*2.3.3.B.21*	*2.3.3.B.23*
2.3.3.B.25	*2.3.3.B.26*	*2.3.3.B.27*	*2.3.3.B.28*	*2.3.4.A.1*	*2.3.4.A.3*
2.3.4.A.5	*2.3.4.B.1*	*2.3.4.B.2*	*2.3.4.B.3*	*2.3.4.B.4*	*2.3.4.B.5*

However, please note that the above RAI also has a more global implication, in that, the use of "NSR piping, fittings, and equipment" as component type impacts all of the scoping review sections, not only for BOP's SSCs in the LRA, but this component type "NSR piping, fittings, and equipment" is also used in other sections of the NMP LRA; and thus should be addressed accordingly.

Response

Summary

NMP has revised the LRA sections and tables listed below to identify each NSR system or NSR portion of a SR system that is within scope. In conjunction with this change, the specific NSR component types and intended function(s) have been identified and are now consistent with the standardized list of intended functions in NUREG-1800 and NEI 95-10. The applicable aging management program that will be used during the period of extended operation is also identified. The component type "NSR Piping, fittings, and equipment" and its associated intended function of "Prevent Failure from Affecting SR Equipment" are no longer used in the NMP LRA. In conjunction with this change and as described in the follow-up response to RAI 3.1.2.C.4-1, use of the designator "Any" to identify a component's material is no longer used in the NMP LRA.

Basis

Each NSR system, or NSR portion of a SR system, has been reevaluated as part of the NMP recovery effort. This reevaluation included identification of specific NSR component materials and environments and these details were incorporated into the NSR IPA results in the LRA. The scoping and screening sections listed in the RAI have been revised. Additionally, the following sections have also been revised:

2.3.1.A.3	2.3.1.A.4	2.3.1.A.5	2.3.1.B.4	2.3.1.B.5	2.3.2.A.4
2.3.2.B.3	2.3.2.B.4	2.3.2.B.6	2.3.2.B.7	2.3.3.A.9	2.3.3.A.16
2.3.3.B.4	2.3.3.B.13	2.0-1	2.3.2.B.8		

The following AMR tables have also been revised to eliminate "NSR piping, fittings, and equipment" as a component type:

3.1.2.A-3	3.1.2.A-4	3.1.2.A-5	3.1.2.B-4	3.1.2.B-5	3.2.2.A-3
3.2.2..B-2	3.2.2.B-3	3.2.2.B-4	3.2.2.B-5	3.3.2.A-2	3.3.2.A-8
3.3.2.A-9	3.3.2.A-11	3.3.2.A-14	3.3.2.A-15	3.3.2.A-17	3.3.2.A-18
3.3.2.A-19	3.3.2.A-20	3.3.2.A-21	3.3.2.A-22	3.3.2.B.4	3.3.2.B-8
3.3.2.B-11	3.3.2.B-13	3.3.2.B-14	3.3.2.B-16	3.3.2.B-17	3.3.2.B-18
3.3.2.B-21	3.3.2.B-22	3.3.2.B-24	3.3.2.B-25	3.3.2.B-26	3.3.2.B-27
3.4.2.A-1	3.4.2.A-2	3.4.2.A-4	3.4.2.B-1	3.4.2.B-2	3.4.2.B-3
3.4.2.B-4	3.4.2.B-5				

LRA Revisions

Each LRA section or table identified in the RAI and the RAI response has been revised as described above and as shown in the updated LRA roadmap.

RAI 2.3.4.A.5

In LRA Section 2.3.4.A.5, NMP1 Main Steam System, the applicant states that the discharge piping and valves from the electromatic relief valves to the torus are also included within this system, but does not specifically state that it ends at the T-quenchers.

Where as for NMP2, in LRA Table 2.3.4.B.4-1, the applicant specifically states that the intended functions on the T-quencher is the pressure boundary.

1. *Please provide information to clarify in what component, or commodity group in the Scoping and Screening evaluations on the LRA, the T-quenchers were evaluated. On page 22479 of the statements of consideration, Federal Register/Volume 60, No 80,/Monday, May 8. 1995 / Rules and Regulations, it expressly implies that a component should be scoped and screened before deciding the appropriate AMP or TLAA.*

2. *Please provide information to clarify the component, or commodity group in Section 3.1 of the LRA in which the T-quenchers were evaluated.*

3. *Please provide information to clarify if the following aging effect/mechanism in the T-quenchers were considered:*
   blow holes due to crud blockage were considered, and
   the degradation of the dissimilar welds attaching the T-quenchers to the vent lines, and structural supports were considered.

Response

<u>Summary</u>

(Items 1 and 2) The NMP1 components that are equivalent in to the NMP2 T-quenchers are the NMP1 Y-quenchers. The NMP1 Y-quenchers were included within the scope of LR and are subject to AMR. However, instead of being specifically addressed as they were for NMP2, the NMP1 Y-quenchers were included within the component type "Piping and Fittings" in LRA Tables 2.3.4.A.5-1 and 3.4.2.A-4. Therefore, the LRA was revised to specifically identify the NMP1 Y-quenchers consistent with the approach used for the NMP2 T-quenchers. In conjunction with this change, Tables 3.2.1.A, 3.2.1.B, and 3.4.2.B-4 were also revised to better identify and detail the AMR results for both the NMP1 Y-quenchers and NMP2 T-quenchers.

(Item 3) The aging effects addressed are consistent with GALL Report Item V.D2.1-e, for carbon steel piping and fittings in demineralized water for the Automatic Depressurization System. The applicable AERM/mechanisms are Loss of Material/General, pitting, and crevice corrosion. Structural supports are addressed generically in the Component Supports commodity group, which is addressed in LRA Sections 2.4.C.1 and 3.5.2.C.1.

Basis

The NMP1 Y-quenchers were addressed in LRA Tables 2.3.4.A.5-1 and 3.4.2.A-4 under the component type "Piping and Fittings." In the AMR table, they were addressed as carbon steel, low alloy steel (yield strength <100 ksi) piping and fittings in a demineralized, untreated water, low flow environment. This line item will be moved from the "Piping and Fittings" component type to a new component type, "Y-quenchers." The original AMR results for the applicable components did not include reference in the "Table 1 Item" column of Table 3.4.2.A-4 to Item "3.2.1.A-05" in addition to "3.2.1.A-03" like it should have. Item 3.2.1.A-03 is specific to the loss of material mechanism of general corrosion and Item 3.2.1.A-05 is specific to the loss of material mechanisms of pitting and crevice corrosion.

Additionally, as a result of the extent of condition evaluation for this RAI, the "Discussion" column of NMP2 Table 3.4.2.B Item 3.4.2.B-05 was revised to include specific reference to the T-quenchers. The NMP2 Table 3.4.2.B-4 line item for the T-quenchers is also revised to include the applicable references to GALL Report Item "V.D2.1-e" in the "NUREG-1801 Volume 2 Item" column and to Table 3.2.1.B Item "3.2.1.B-05" in the "Table 1 Item" column. Only Table 3.2.1.B item 3.2.1.B-05 applies to the NMP2 T-quenchers since they are fabricated of stainless steel. Item 3.2.1.B-03 is specific to the loss of material mechanism of general corrosion which is not applicable to stainless steel. The loss of material mechanisms of pitting and crevice corrosion that are specific to Item 3.2.1.B-05 are applicable to stainless steel. The reference in the "Notes" column of Table 3.4.2.B-4 to "H, 4" was revised to "A" since the AMR of the T-quenchers is now consistent with the GALL Report.

Crud blockage of the blow holes was not considered because it is not identified as an aging effect/mechanism by the GALL Report for Automatic Depressurization System piping and fittings. The supports and inclusive welds for the Y-quenchers are addressed as part of the Component Supports commodity group evaluation similar to all other piping supports and their inclusive welds.

Conclusion

The electromatic relief valve's discharge piping has been moved from the "Piping and Fittings" component type to the "Y-quencher" component type and the AMR results for the applicable NMP1 ERV discharge piping have not changed. They have just been relocated and a reference in Table 3.4.2.A-4 to Item 3.2.1.A-05 has been added to the "Table 1 Item" column for the "Y-quencher" component type.

LRA Revisions

LRA Table 2.3.4.A.5-1 was revised to include the component type "Y-quenchers" with "Pressure Boundary" as the intended function.

LRA Table 3.2.1.A, Items 3.2.1.A-03 and -05 were revised to include the ERV Y-quenchers.

LRA Table 3.4.2.A-4 was revised to move the Y-quenchers from the "Piping and Fittings" component type to the new "Y-quenchers" component type and to add the reference to Table 1 Item "3.2.1.A-05" to the "Table 1 Item" column.

LRA Table 3.2.1.B, Item 3.2.1.B-05 was revised to include the SRV T-quenchers.

LRA Table 3.4.2.B-4 was revised to add the references to GALL Report Items. Also, the "Notes" column entry changed from "H, 14" to "A."

LRA Section 3 tables were revised accordingly as shown in the updated LRA roadmap.

RAI 2.4-1

In its RAI letter dated December 9, 2004 (Accession No. ML043500176), the staff asked the applicant to provide justification for not including a number of structural components that are needed to be in the scope of license renewal. By letter dated January 10, 2005 (Accession No. ML050190295), the applicant responded that the structures and components identified in the RAI are covered under any of the items related to their material of construction, and environment to which they are subjected to. Such a process for scoping and screening is not acceptable.

The staff deems that for an acceptable scoping and screening in a license renewal process, the Material and Environment description, such as, Carbon and Low Alloy Steel in Air, is a part of the aging management review that should be in Section 3.5 of the LRA. As required by 10 CFR 54.21, LRA Table 2.4 should include all the structures and components that are to be in the scope of license renewal pursuant to 10 CFR 54.4, together with their intended functions. The applicant's method of scoping structures and components is non-specificity and ambiguity.

The above staff's Followup Item is applicable to applicant's responses to RAIs 2.4.A-1 through 2.4.A-7 and 2.4.B-1 through 2.4.B-7. Please provide additional information to include all the structures and components that are required to be in the scope of license renewal and revise all Tables for Section 2.4 of the LRA for both NMP units accordingly.

Response

<u>Summary</u>

NMP agrees that the methodology used to present the civil/structural scoping and screening results did not present the detail needed to identify which components/component types were included for each structure or civil/structural system. In general, the more generic approach of listing material and environment groups was used. Each of the Section 2.4 scoping and screening results tables have been revised to provide the required detail.

<u>Basis</u>

To improve clarity and remove the non-specificity from Section 2.4, all tables in Section 2.4 were revised to include recognizable components/component types. Specifically, an additional column that lists specific components/component types was added to each of the Section 2.4 tables. The columns that listed the material/environment groups was retained and matched to the components/component types in the new column. This method, in addition to providing clarity in the form of component types, provides a direct link to the respective aging management review (AMR) tables in LRA Section 3.5.

Additionally, the intended functions in the Section 2.4 tables (that are carried through to the Section 3.5 AMR tables) have been changed to reflect standardized LR intended functions from NUREG-1800 and NEI 95-10. These intended function changes have been captured in LRA Section 2.0.

Conclusion

Each of the scoping and screening results tables in Section 2.4 now include a column which lists specific components/component types, a column which lists the matching material/environment group for those components/component types, and the intended functions performed by each of the components. With these changes, for each Section 2.4 table, the combination of the information from the component/component type column and the matching material/environment group column, when linked to the material/environment group in the respective Section 3.5 table, provides the AMR results for each component/component type.

LRA Revisions

LRA Section 2.4 tables and some of the text was revised to include specific components as shown in the updated LRA roadmap.

LRA Section 3.5 tables were updated based on the changes made to their respective Section 2.4 tables as shown in the updated LRA roadmap.

RAI 2.5-1

LRA Section 2.5, Table 2.5.C.4-1 does not include the transmission connections in the AMR. Please provide information to clarify why transmission connections are not included with transmission conductors as per requirements of 10 CFR 54.21(a)1 and (a)2.

Response

Summary

Table 2.5.C.4-1 of LRA Section 2.5 did not include transmission connectors because of an omission in the original application and a related RAI.

Basis

In RAI 3.6.2.C-9, the NRC staff noted that LRA Table 3.6.2.C-4 did not include the results of the aging management review (AMR) of transmission conductor connectors. The NPM response to RAI 3.6.2.C-9, provided in letter NMP1L 1912, dated January 10, 2005, revised LRA Table 3.6.2.C-4 (page 3.6-13) to add the AMR results for transmission conductor connectors; however, the corresponding change to LRA Table 2.5.C.4-1 was overlooked at that time. LRA Section 2.5.C.4 and Table 2.5.C.4-1 were revised to add transmission conductor connectors.

LRA Revisions

LRA Section 2.5.C.4, Description, was revised as shown in the updated LRA roadmap.

LRA Table 2.5.C.4-1 was revised to add Transmission Conductor Connectors, as shown in the updated LRA roadmap.

RAI 2.5-2

In the LRA, the applicant does not identify uninsulated ground conductors as within the scope of license renewal and require an AMR. Please provide information to explain why the uninsulated ground conductors are not in scope of license renewal as per requirements of 10 CFR.54.21(a)1 and (a)2.

Response

Summary

The results of plant level scoping for the grounding systems and a review of applicable industry guidance and precedence determined that the uninsulated ground conductors do not perform a license renewal intended function. Therefore, they are not within the scope of license renewal. Uninsulated ground conductors do not meet any of the scoping criteria specified in 10 CFR 54.4.

LRA Table 2.2-2, which summarizes the NMP2 plant level scoping results, currently identifies the NMP2 Grounding System as not being within the scope of license renewal. For NMP1, the Grounding System was considered during the plant level scoping but was inadvertently omitted from Table 2.2-1. LRA Table 2.2-1 was revised to add an entry for the NMP1 Grounding System.

Basis

The uninsulated ground conductors (e.g., copper cable, copper bar, and steel bar) are part of the NMP1 and NMP2 Grounding Systems that constitute an integral ground grid system intended to provide a common electrical ground reference. The common electrical ground reference enhances the capability of the electrical system to withstand disturbances (e.g., electrical faults or lightning surges) which enhances equipment and personnel protection. These uninsulated ground conductors are isolated or insulated from the electrical operating circuits.

For both NMP1 and NMP2, no failures of uninsulated ground conductors are discussed in the UFSAR and no failures of insulated ground conductors due to aging have been identified in the corrective action program. The uninsulated ground conductors do not perform a safety-related function described in 10 CFR 54.4(a)(1) and are not relied upon to perform a function that demonstrates compliance with the applicable regulated events identified in 10 CFR 54.4(a)(3). Therefore, there are no failures of uninsulated ground conductors, which are required to be considered, that could prevent satisfactory accomplishment of the functions identified in 54.4(a)(1) and uninsulated ground conductors do not meet the criteria of 54.4(a)(3).

The License Renewal Electrical Handbook, EPRI 1003057 dated December 2001, provides guidance for the application of the criteria of 54.4(a)(2) to uninsulated ground conductors. The EPRI 1003057 scoping evaluation for uninsulated ground conductors concludes that uninsulated ground conductor failures meet the attributes for a hypothetical failure as discussed in Section III.c.(iii) of the Statements of Consideration (SOC) to 10 CFR 54. Therefore, uninsulated ground conductor failures are hypothetical and, per the SOC guidance, are not required to be considered.

This is consistent with Draft Safety Evaluation Report Related to the License Renewal of Arkansas Nuclear One, Unit 2 (ADAMS Accession No. ML043200228) (page 2-120), in which the NRC staff concluded that the passive electrical commodity of uninsulated ground conductors do not meet the 10 CFR 54.4(a)(2) scoping criteria. Based on design and functional similarities in plant grounding systems and the guidance provided in EPRI 1003057, the conclusion that uninsulated ground conductors do not meet the 10 CFR 54.4(a)(2) scoping criterion is also applicable to the NMP1 and NMP2 grounding systems.

Based on the discussion above, uninsulated ground conductors do not meet the license renewal scoping criteria specified in 10 CFR 54.4(a)(1), (a)(2), or (a)(3). Therefore, uninsulated ground conductors do not meet any of the scoping criteria specified in 10 CFR 54.4.

<u>LRA Revisions</u>

LRA Table 2.2-1 (page 2.2-6) was revised to include the NMP1 Grounding System and identify that it is not within the scope of license renewal as shown in the updated LRA roadmap.

RAI 2.5-3

Interim Staff Guidance (ISG)-2, "NRC Staff Position on License Renewal Rule (10 CFR 54.4) As It Relates to the Station Blackout Rule (10 CFR 50.63)," states, in part, that "The offsite power systems consist of a transmission system (grid) component that provides a source of power and a plant system component that connects the power source to a plant's onsite electrical distribution systems which power safety equipment. For the purpose 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."

A. *Please provide a detail description of the NMP recovery path and discuss how the recovery path is consistent with scoping and screen results described in Section 2.5 of the LRA. Also, please provide a one line diagram with redline showing the recovery path of Station Blackout (SBO).*

B. *Please identify the location of each commodity group component in the recovery path circuits. Do the SBO recovery path circuits include the control circuit wiring that is associated with the power circuits shown on the drawings? If not, please explain why. Are there any underground (both outside and inside) power circuits used in the SBO recovery paths? If so, were they identified as requiring an AMR? If not, please explain why?*

Response

Summary

Diagrams of the NMP1 and NMP2 offsite circuits with the SBO path shown in bold are attached. These diagrams correspond to the descriptions of the SBO recovery path provided below. The identification of each commodity group component, as requested in Item B of the RAI, is included in the unit specific Part A response.

Part A

The following is a detailed description of the Station Blackout (SBO) recovery path for each Nine Mile Point unit.

NMP1

The NMP1 SBO recovery path is illustrated on the attached one-line diagram. It starts in the 115 kilovolt (kV) switchyard at the connection points to the grid from two independent offsite sources. These sources are Line 1 (disconnect switch 13/509 and circuit breaker R10) and Line 4 (disconnect switch 43/519 and circuit breaker R40). Power is distributed via disconnect switches, switchyard distribution bus, and overhead transmission conductors to the two 115 kV-to-4.16 kV reserve transformers, 101 South (Line 4) and 101 North (Line1).

The 4.16 kV reserve transformer secondary power from transformer 101 South is distributed to 4.16 kV Alternating Current (AC) breaker R1013 via a non-segregated bus duct system. Breaker R1013 connects to the 4.16 kV AC emergency power board 103 via a multi-conductor power cable.

The 4.16 kV reserve transformer secondary power from transformer 101 North is distributed to 4.16 kV AC breaker R1012 via a non-segregated bus duct system. Breaker R1012 connects to the 4.16 kV AC emergency power board 102 via a multi-conductor power cable.

Power boards 102 and 103 are the 4.16 kV AC safety-related emergency power boards to which emergency diesel generators 102 and 103, respectively, can be connected.

The NMP1 SBO recovery path described above is consistent with the scoping and screening results in LRA Section 2.5, as discussed below.

- LRA Section 2.5.A.5, "NMP1 4.16 kV AC Electrical Distribution System," states that the system includes the 115 kV / 4.16 kV reserve transformers, 4.16 kV AC power boards and 4.16 kV AC power distribution circuit breakers. This includes the following SBO components: reserve transformers 101 North and 101 South, breakers R1013 and R1012, and power boards 102 and 103.

- LRA Section 2.5.A.6, "NMP1 115 kV AC Electrical Distribution System," states that the electric grid provides power for the system, and that the 115 kV AC system includes two redundant and independent trains containing disconnect switches, breakers, and distribution bus. The trains are redundant and independent with the exception of tie-disconnect switch 8106/518, which ties the Line 1 and Line 4 power sources together during normal operation. This includes the following SBO components. Disconnect switches 13/509, 43/519, 178/525, 169/515, 8106/518 breakers R10, R40 and the distribution bus.

- LRA Section 2.5.C.1, "Cables and Connectors," identifies cables on a plant-wide basis, including accessible and inaccessible medium voltage cables. Cables and connectors in the SBO recovery path are included in this electrical commodity. This includes the SBO cables and connectors from breaker R1013/161 to power board 103 and from breaker R1012/151 to power board 102.

- LRA Section 2.5.C.2, "Non-Segregated/Switchyard Bus," identifies the switchyard bus, the non-segregated bus, and insulators as subject to aging management review (AMR). This includes the following SBO components. The 115 kV switchyard bus and non-segregated bus from reserve transformer 101N to breaker R1012/151 and from reserve transformer 101S to breaker R1013/161.

- LRA Section 2.5.C.4, "Switchyard Components," identifies the components subject to AMR within the switchyard as the transmission conductors and the associated insulators and connections. Cables, connectors, insulators, and bus bars are evaluated in their respective commodity groups. This includes SBO transmission conductors, insulators and connectors from the 115 kV switchyard to reserve transformers 101North and 101 South.

NMP2

The NMP2 SBO recovery path is illustrated on the attached one-line diagram. It starts at the Scriba Station Switchyard (115 kV AC portion) at the connection points to the grid at disconnect switch 51 associated with circuit breaker R50 (Line 5) and at disconnect switch 61 associated with circuit breaker R60 (Line 6). Power is transmitted from the Scriba Station over the two independent overhead transmission lines, Line 5 and Line 6, to the NMP2 115 kV switchyard. Power is distributed in the NMP2 115 kV switchyard via disconnect switches, switchyard distribution bus, and overhead transmission conductors to the two 115 kV-to-4.16 kV reserve transformers 2RTX-XSR1A (Line 5) and 2RTX-XSR1B (Line 6). The reserve transformer 2RTX-XSR1A tertiary winding 4.16 kV output power is distributed to 4.16 kV switchgear breaker 2NNS-SWG016-2 via a non-segregated bus duct system and then distributed from 2NNS-SWG016-2 to safety-related emergency switchgear 2ENS*SWG101-13 feeder breaker via multi-conductor power cables.

The reserve transformer 2RTX-XSR1B tertiary winding 4.16 kV output power is distributed to 4.16 kV switchgear breaker 2NNS-SWG017-2 via a non-segregated bus duct system and then distributed from 2NNS-SWG017-2 to switchgear safety-related emergency 2ENS*SWG103-4 feeder breaker via multi-conductor power cables.

The NMP2 SBO recovery path described above is consistent with the scoping and screening results described in LRA Section 2.5, as discussed below.

- LRA Section 2.5.B.2, "NMP2 4.16 kV AC Electrical Distribution System," describes the normal distribution portion of the 4.16 kV system as consisting of switchgear busses and associated breakers. The emergency distribution portion of the 4.16 kV AC system consists of busses powered from offsite via the Reserve Station Service Transformers System. This includes the following SBO components. Breakers 2NNS-SWG016-2, 2NNS-SWG017-2 and switchgear feeder breakers 2ENS*SWG101-13 and 2ENS*SWG103-4.

- LRA Section 2.5.B.21, "NMP2 Reserve Station Service Transformers System," states that the system steps down the 115 kV offsite power to the NMP2 4.16 kV AC electrical distribution system. The system consists of transformers and their associated support components: cables, raceways, switches, relays, and meters. This includes the following SBO components. Reserve transformers 2RTX-XSR1A and 2RTX-XSR1B.

- LRA Section 2.5.B.29, "NMP2 Switchyard System," describes the 115 kV switchyard support systems as including the 115 kV Switchyard substation (Scriba), the 115 kV switchyard substation (NMP2) and the 115 kV transmission lines. The 115 kV switchyard support systems include the 115 kV switchyard equipment and their support components from the offsite power supplies to the reserve station transformers. This includes the following SBO components. Scriba Switchyard disconnect switches 51, 61; breakers R50, R60; overhead transmission lines 5 and 6; NMP2 switchyard disconnect switches 2YUL-MDS1, 2YUL-MDS2; circuit switches 2YUC-MDS3, 2YUC-MDS4 and overhead transmission lines from circuit switches 2YUC-MDS3, 2YUC-MDS4 to reserve station transformers 2RTX-XSR1A and 2RTX-XSR1B.

- LRA Section 2.5.C.1, "Cables and Connectors," identifies cables on a plant-wide basis, including accessible and inaccessible medium voltage cables. Cables and connectors in the SBO recovery path are included in this electrical commodity. This includes SBO cables and connectors from breakers 2NNS-SWG016-2 and 2NNS-SWG017-2 to switchgear 2ENS*SWG101 and 2ENS*SWG103.

- LRA Section 2.5.C.2, "Non-Segregated/Switchyard Bus," identifies the switchyard bus, the non-segregated bus, and insulators as subject to AMR review. This includes the following SBO components. Scriba switchyard (115 kV) bus, NMP2 115 kV switchyard bus and non-segregated bus from reserve 2RTX-XSR1A to 2NNS-SWG016-2 and from reserve transformer 2RTX-XSR1B to 2NNS-SWG017-2.

- LRA Section 2.5.C.4, "Switchyard Components," identifies the components subject to aging management review (AMR) within the switchyard as the transmission conductors and the insulators and connectors associated with them. Cables, connectors, and bus bars are evaluated in their respective commodity groups. This includes SBO transmission conductors, insulators and connectors from 115 kV Scriba switchyard (lines 5 and 6) to the NMP2 115 kV switchyard and from the NMP2 115 kV switchyard to the reserve transformers 2RTX-XSR1A and 2RTX-XSR1B.

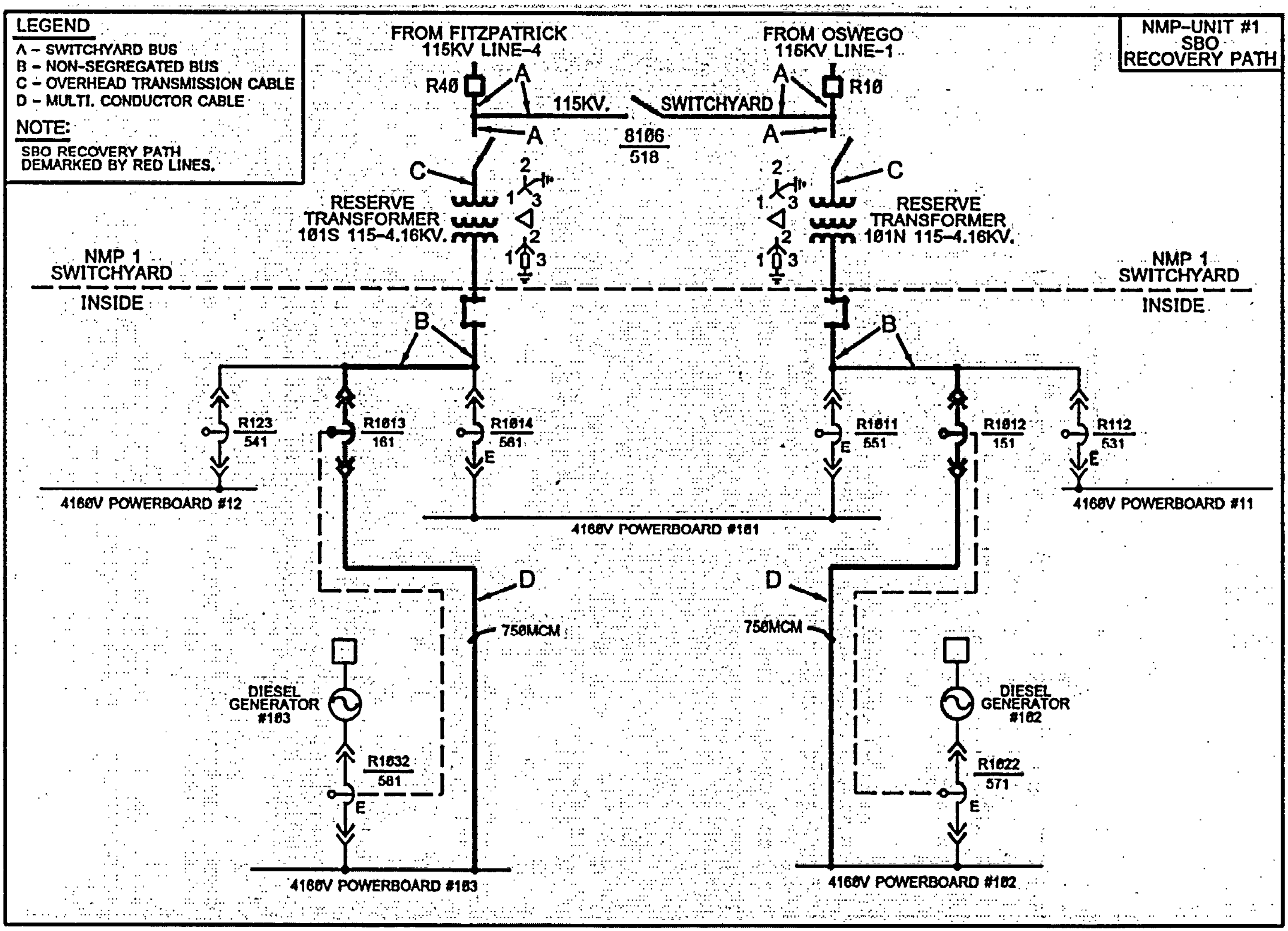
Part B

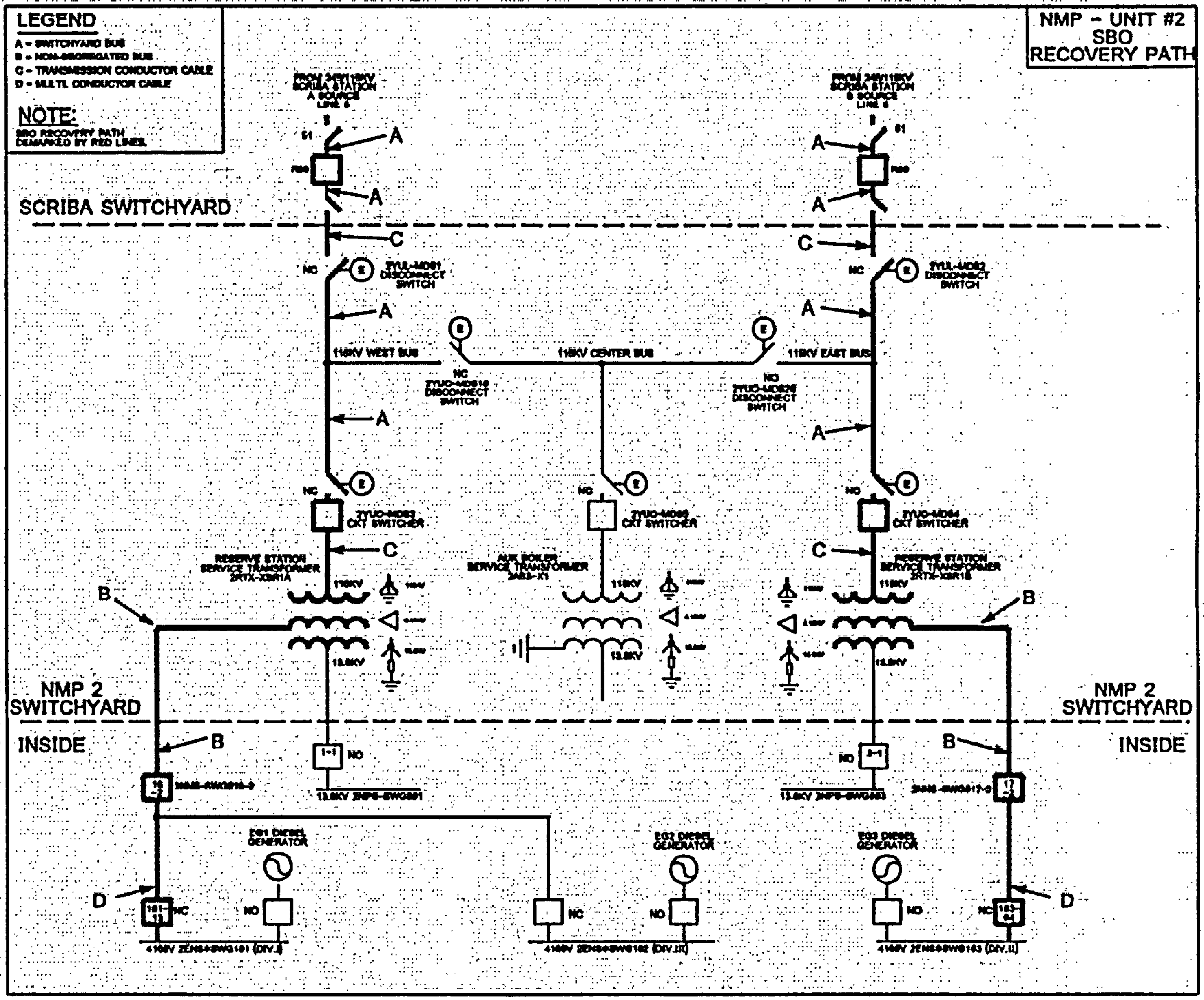
The commodity group component types in the NMP1 and NMP2 SBO recovery path circuits are identified on the attached one line diagrams. These commodity group component types are switchyard bus, non-segregated bus, overhead transmission conductor and multiple conductor cable.

The control circuit wiring associated with the NMP1 and NMP2 SBO recovery path circuits is included in the electrical commodity group of Cables and Connectors (LRA Section 2.5.C.1).

There are no underground 115 kV or 4.16 kV AC power circuits (either outside or inside) in the NMP1 and NMP2 SBO recovery paths. There are partially inaccessible power circuits (4.16 kV non-segregated busses and power cables) routed in non-segregated bus duct, tray or conduit that connect the 4.16 kV normal power source to the safety-related emergency power boards/switchgear. These non-segregated busses and power cables are subject to AMR, as identified in LRA Sections 2.5.C.1, "Cables and Connectors," and 2.5.C.2, "Non-Segregated/Switchyard Bus."

There are, however, low voltage control cables associated with the SBO recovery path circuits that are installed in underground duct banks and conduits. The cables associated with these control circuits are subject to AMR and are included in the electrical commodity group of Cables and Connectors (LRA Section 2.5.C.1).


LEGEND
A - SWITCHYARD BUS
B - NON-SEGREGATED BUS
C - OVERHEAD TRANSMISSION CABLE
D - MULTI. CONDUCTOR CABLE
NOTE:
SBO RECOVERY PATH
DEMARKED BY RED LINES.
FROM FITZPATRICK
115KV LINE-4
FROM OSWEGO
115KV LINE-1
NMP-UNIT #1
SBO
RECOVERY PATH
R40
R10
115KV.
SWITCHYARD
8106
518
RESERVE
TRANSFORMER
101S 115-4.16KV.
RESERVE
TRANSFORMER
101N 115-4.16KV.
NMP 1
SWITCHYARD
INSIDE
R123
541
R1013
161
R1014
561
R1011
551
R1012
151
R112
531
4160V POWERBOARD #12
4160V POWERBOARD #11
4160V POWERBOARD #161
750MCM
DIESEL
GENERATOR
#103
DIESEL
GENERATOR
#102
R1032
581
R1022
571
4160V POWERBOARD #103
4160V POWERBOARD #102


LEGEND
A = SWITCHYARD BUS
B = NON-SEGREGATED BUS
C = TRANSMISSION CONDUCTOR CABLE
D = MULTI CONDUCTOR CABLE
NOTE:
SBO RECOVERY PATH DEMARKED BY RED LINES.
NMP - UNIT #2
SBO
RECOVERY PATH
SCRIBA SWITCHYARD
NMP 2
SWITCHYARD
INSIDE
NMP 2
SWITCHYARD
INSIDE
115KV WEST BUS
115KV CENTER BUS
115KV EAST BUS
DISCONNECT SWITCH
CKT SWITCHER
RESERVE STATION SERVICE TRANSFORMER
AUX BOILER SERVICE TRANSFORMER
115KV
13.8KV
EG1 DIESEL GENERATOR
EG2 DIESEL GENERATOR
EG3 DIESEL GENERATOR
NC
NO
A
B
C
D

RAI 3.1.1-20

In Table 3.1.1.B, Item 3.1.1.B-27 of LRA supplement dated December 6, 2004, the applicant credits NMP AMP B2.1.1, " ASME Section XI ISI (Subsections IWB/IWC/IWD) Program," to manage cracking of the feedwater nozzle. The applicant also states that feedwater nozzles employ the improved interference fit (triple-sleeve) sparger design that was generically approved by the NRC, as documented in NUREG-0619. Therefore, the augmented inspections required by GALL AMP XI.M5, "Feedwater Nozzle," are not required.

However, Table 2 of NUREG-0619, Rev 1, recommends the following for the triple-sleeve sparger design: (1) UT every 2 refueling outages, (2) visual inspection every 4 refueling outages, and (3) PT every 9 refueling outage or 135 startup/shutdown cycles. Please address the discrepancy.

Response

Summary

The basis for the NMP position that the inspection and frequency requirements for feedwater nozzles and spargers in Table 2 of NUREG-0619, Rev 1, are not applicable to either NMP1 or NMP2 is found in GE-NE-523-A71-0594-A, "Alternate BWR Feedwater Nozzle Inspection Requirements," May 2000 (GE-NE-523) and the associated NRC Safety Evaluation (SE). NMP feedwater nozzles are inspected in accordance with recommendations in GE-NE-523-A71-0594-A, "Alternate BWR Feedwater Nozzle Inspection Requirements," May 2000. This approach is consistent with NUREG 1801 (GALL), Program XI.M5, BWR Feedwater Nozzle, which references GE-NE-523-A71-0594.

Basis

GE-NE-523 authorizes elimination of liquid penetrant inspections required by Table 2 of NUREG-0619 because of the increased effectiveness of ultrasonic inspection techniques currently used to satisfy ASME Section XI requirements. GE-NE-523 also authorizes elimination of inspections more frequent than currently needed to satisfy ASME Section XI requirements based on verification of the adequacy of the inspection frequency using crack growth predictions based on fracture mechanics analysis. Specifically, paragraph 2 of Section 6.3 of GE-NE-523 specifies that adoption of Section XI, Appendix VIII, allows elimination of the inspection and frequency requirements in NUREG-0619, Table 2, and GE-NE-523, Table 6-1, except for plants using interference fit spargers, in which case, the requirements in GE-NE-523, Table 6-1, are still applicable.

For NMP1, an NRC Safety Evaluation (SE) dated February 5, 1999 (TAC NO. M89792) originally authorized NMP1 to perform feedwater nozzle inspections using the recommendations in GE-NE-523-A71-0594 subject to restrictions identified in an NRC SE dated June 5, 1998. Subsequently, GE-NE-523-A71-0594-A was issued in May 2000. The NMP1 ASME Section XI Program is already in compliance with Appendix VIII. Therefore, as specified in paragraph 2 of Section 6.3 of GE-NE-523, the inspection requirements for feedwater nozzles in NUREG-0619,

Table 2, and the alternate supplemental requirements in GE-NE-523, Table 6-1, are no longer applicable to NMP1.

For NMP2, GE-NE-523-A71-0594-A and the associated NRC SE are applicable. The NMP2 ASME Section XI Program is already in compliance with Appendix VIII. Therefore, as specified in paragraph 2 of Section 6.3 of GE-NE-523, the inspection requirements for feedwater nozzles in NUREG-0619, Table 2, are no longer applicable to NMP2. However, NMP2 feedwater nozzles employ the improved interference fit (triple-sleeve) sparger design. Therefore, as specified in paragraph 2 of Section 6.3 of GE-NE-523, the inspection frequencies specified in GE-NE-523, Table 6-1, for a "Triple sleeve, double piston ring, unclad nozzle" are still applicable. Specifically, GE-NE-523, Table 6-1, identifies a "UT inspection interval factor" that must be used in conjunction with crack growth predictions to verify that the UT inspection frequency specified for ASME Section XI is adequate for a plant with an interference fit sparger. Additionally, GE-NE-523, Table 6-1, maintains the requirement in NUREG-0619 for a visual inspection of the sparger (i.e., flow holes and welds in sparger arms and sparger tees) every fourth refueling outage for plants with interference fit, triple sleeve, double piston ring, unclad nozzles such as NMP2. Feedwater sparger visual examinations are conducted in accordance with ASME Section XI, Examination Category B-N-1, once each inspection period.

Note that NUREG 1801 (GALL), Program XI.M5, BWR Feedwater Nozzle, references GE-NE-523-A71-0594, Revision 1, "Alternate BWR Feedwater Nozzle Inspection Requirements," August 1999. GE-NE-523-A71-0594-A, Revision 1, May 2000, is the same document that was re-issued to include the NRC SE. Therefore, use of the approved version of GE-NE-523-A71-0594 is not an exception to the GALL.

LRA Revisions

NMP revised LRA Section B2.1.5, BWR Feedwater Nozzle Program, to include a description of the discussion above and identify and justify any resulting exceptions to NUREG-1801 Program XI.M5, Feedwater Nozzle.

(Note that the following changes are identical to changes described in response to RAI 3.1.2-21.)

For NMP1, the LRA was revised to remove changes to Table 3.1.1.A, Item 3.1.1.A-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, provided in the LRA supplement dated February 11, 2005. Instead, NMP replaced the existing statement in the discussion column of Table 3.1.1.A, Item 3.1.1.A-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, as shown in the updated LRA roadmap.

Additionally the "CRDRL Nozzle Program" was added for NMP1 in Section 3.1.2.A.1, "NMP1 Reactor Pressure Vessel" under the heading "Aging Management Programs" as shown in the updated LRA roadmap.

For NMP2, the LRA was revised to remove changes to Table 3.1.1.B, Item 3.1.1.B-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, provided in the LRA supplement dated February 11, 2005. Instead, NMP replaced the existing statement in the discussion column of Table 3.1.1.B, Item 3.1.1.B-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, as shown in the updated LRA roadmap.

RAI 3.1.1-21

In Table 3.1.1.A, Item 3.1.1.A-27 of LRA supplement dated February 11, 2005, the applicant credits NMP AMP B2.1.1, "ASME Section XI ISI (Subsections IWB/IWC/IWD) Program," to manage cracking for the control rod return drive line nozzle. Please provide information regarding the scope and the techniques of inspections, applied methods, repairs, inspection frequency, and any other relevant information related to the identification of the aging effects for the control rod return line nozzles at NMP1.

Response

For NMP1, NMP has reviewed its existing program for the NMP1 control rod drive return line (CRDRL) nozzle and determined that the effectiveness of this program for managing the aging effects on the CRDRL nozzle could be summarized more efficiently by comparing the existing program with NUREG-1801 (GALL), Program XI.M6, "BWR Control Rod Drive Return Line Nozzle." Therefore, NMP has revised the LRA to add a new Aging Management Program (AMP), LRA Section B2.1.37, CRDRL Nozzle Program, which compares the NMP1 CRDRL nozzle program to GALL Program XI.M6. Additionally, NMP has revised LRA Table 3.1.1.A, Item 3.1.1.A-27, Feedwater and CRD Return Line Nozzles, to state that NMP1 manages aging effects of the CRD return line nozzle under a program that conforms to NUREG-1801, Program XI.M6, as described in LRA Section B2.1.37. Since LRA Table 3.1.1.A, Item 3.1.1.A-27, also addresses NMP1 feedwater nozzles, it also states that NMP1 manages aging effects of the feedwater nozzles under a program that conforms to NUREG-1801, Program XI.M5, Feedwater Nozzles, as described in LRA Section B2.1.5.

The new LRA Section, B2.1.37 describes the existing NMP1 CRDRL Nozzle Program and identifies and justifies differences between the existing NMP CRDRL nozzle program and GALL Program XI.M6 (i.e., exceptions to the GALL). LRA Section B2.1.37 also states that no enhancements to the existing NMP1 Program are needed to make the program conform to GALL Program XI.M6. The NMP statement that the existing CRDRL nozzle program conforms to GALL Program XI.M6 with exceptions that are described and justified provides all necessary information regarding the scope, techniques of inspections, applied methods, repairs, inspection frequency, and other relevant information related to the identification of the aging effects for the control rod return line nozzles at NMP1.

For NMP2, aging management activities for the NMP2 CRDRL nozzle, which is capped, will continue to be controlled in accordance with the program described in LRA Section B2.1.1. Justification for including the NMP2 CRDRL nozzle under the "ASME Section XI ISI Program," (LRA Appendix B, Section B2.1.1) instead of the CRDRL Nozzle Program (LRA Appendix B, Section B2.1.37), is provided in LRA Appendix B, Section B2.1.37.

LRA Revisions

NMP revised the LRA to add Appendix B, Section B2.1.37, BWR Control Rod Drive Return Line (CRDRL) Nozzle Program, which describes the NMP1 CRDRL nozzle program and identifies and justifies differences between this existing program and GALL Program XI.M6, "BWR Control Rod Drive Return Line Nozzle."

(Note that the following changes are identical to changes described in response to RAI 3.1.1-20.)

For NMP1, NMP revised the LRA to remove changes to Table 3.1.1.A, Item 3.1.1.A-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, provided in the LRA supplement dated February 11, 2005. Instead, NMP replaced the existing statement in the discussion column of Table 3.1.1.A, Item 3.1.1.A-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, as shown in the updated LRA roadmap.

Additionally the "CRDRL Nozzle Program" was added for NMP1 in Section 3.1.2.A.1, "NMP1 Reactor Pressure Vessel" under the heading "Aging Management Programs" as shown in the updated LRA roadmap.

For NMP2, NMP revised the LRA to remove changes to Table 3.1.1.B, Item 3.1.1.B-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, provided in the LRA supplement dated February 11, 2005. Instead, NMP replaced the existing statement in the discussion column of Table 3.1.1.B, Item 3.1.1.B-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, as shown in the updated LRA roadmap.

Additionally, in LRA Section 3.1.2.A.1, "NMP1 Reactor Pressure Vessel" under the "Aging Management Programs" heading, the "CRDRL Nozzle Program" was added.

RAI 3.1.2-20

In LRA Table 3.1.2.A, the applicant credits NMP AMP B3.2, "Fatigue Monitoring Program", to manage cumulative fatigue damage. Fatigue monitoring program is an acceptable option under 10 CFR 54.21(c)(1)(iii) to evaluate metal fatigue for the reactor coolant pressure boundary, under TLAA. The GALL Report states that if the applicant selects this option, no further evaluation is recommended for license renewal.

However, in LRA Table 3.1.1.A, Item 3.1.1.A-01, the applicant states that in addition to the cumulative fatigue damage, TLAA is further evaluated in Section 4.3. Please clarify the difference between LRA Table 3.1.2.A and LRA Table 3.1.1.A.

Note: This RAI applies to Engineered Safety Features, Auxiliary, and Steam and Power Conversion systems for both Units.

Response

As a result of several AMR Audit issues, LRA Supplemental letters dated December 6, 2004 (addressed Table 3.1), and February 4, 2005 (addressed Tables 3.2, 3.3, and 3.4) changed the aging effect of "Cracking," that was associated with the Fatigue Monitoring Program, to the aging effect of "Cumulative Fatigue Damage." Because thermal fatigue is addressed in the LRA as a TLAA, the applicable aging management tables' entries in the Aging Management Program columns should have read, "TLAA, evaluated in accordance with 10 CFR 54.21(c)" instead of "Fatigue Monitoring Program." The disposition of all the metal fatigue TLAAs described in LRA Section 4.3 is in accordance with 10 CFR 54.21(c)(1)(iii); i.e., the aging effect of "Cumulative Fatigue Damage" will be adequately managed during the period of extended operation by the Fatigue Monitoring Program.

<u>LRA Revisions</u>

All line items listing the aging effect of cumulative fatigue damage with "Fatigue Monitoring Program" credited as the applicable aging management program will be changed to credit "TLAA, evaluated in accordance with 10 CFR 54.21(c)" in the "Aging Management Program" column, rather than the "Fatigue Monitoring Program."

This change applies to the following LRA Tables:

3.1.2.A-1	3.2.2.A-2	3.3.2.A-18
3.1.2.A-2	3.2.2.A-3	3.3.2.A-20
3.1.2.A-3	3.2.2.B-2	3.3.2.B-24
3.1.2.A-4	3.2.2.B-3	3.4.2.A-2
3.1.2.B-1	3.2.2.B-4	3.4.2.A-4
3.1.2.B-2	3.2.2.B-5	3.4.2.B-3
3.1.2.B-3	3.3.2.A-10	3.4.2.B-4
3.1.2.B-4	3.3.2.A-15	
3.1.2.B-5	3.3.2.A-17	

Additionally, the wording in Tables 3.1.1.A, 3.1.1.B, 3.2.1.A, and 3.2.1.B was modified for those line items discussing cumulative fatigue damage. The sentence "The TLAA is further evaluated in Section 4.3" was changed to "Fatigue is addressed as a TLAA in Section 4.3."

As a result of the performance of a review for extent of condition, there were component types revised to include the aging effect of "Cumulative Fatigue Damage." New line items were added to the applicable tables for those components including: Condensing Chambers, Piping and Fittings, and Restriction Orifices in Table 3.1.2.B-3; Nickel Based Alloy Piping and Fittings in Table 3.1.2.B-4; Piping and Fittings in Table 3.1.2.B-5; Wrought Austenitic Stainless Steel Valves in Table 3.2.2.A-2; Wrought Austenitic Stainless Steel Valves in Table 3.2.2.A-17; and Piping and Fittings and Valves in Table 3.3.2.B-30.

Further, the Fatigue Monitoring Program was removed from the list of aging management programs contained under the Aging Management Program heading of each of the following LRA Sections:

3.1.2.A.1	3.1.2.B.5	3.3.2.A.13
3.1.2.A.2	3.2.2.A.3	3.3.2.A.15
3.1.2.A.3	3.2.2.B.2	3.3.2.B.24
3.1.2.A.4	3.2.2.B.3	3.2.2.B.30
3.1.2.A.5	3.2.2.B.4	3.4.2.A.2
3.1.2.B.1	3.2.2.B.5	3.4.2.A.4
3.1.2.B.2	3.3.2.A.5	3.4.2.B.3
3.1.2.B.3	3.3.2.A.10	3.4.2.B.4
3.1.2.B.4	3.3.2.A.12	

RAI 3.1.2-21

In LRA Table 3.1.2.A-1, the applicant credits NMP AMP B2.1.1, "ASME Section XI ISI (Subsections IWB/IWC/IWD) Program," to manage cracking for feedwater sparger thermal sleeves. The staff noted that the feedwater sparger thermal sleeve, which is a pipe within a pipe and not a pressure boundary component. Therefore, the ASME Section XI ISI can not be used to inspect the thermal sleeve. Please provide an explanation of how the feedwater sparger thermal sleeve is managed by NMP AMP B2.1.1.

Response

Summary

NMP agrees that the thermal sleeves in the feedwater nozzles are not pressure boundary components and cannot be examined ultrasonically from the nozzle outer diameter under the AMP B2.1.1, ASME Section XI (Subsections IWB, IWC, and IWD) Inservice Inspection Program. NMP feedwater nozzles, including thermal sleeves, are inspected in accordance with recommendations in GE-NE-523-A71-0594-A, "Alternate BWR Feedwater Nozzle Inspection Requirements," May 2000. This approach is consistent with NUREG 1801 (GALL), Program XI.M5, BWR Feedwater Nozzle, which references GE-NE-523-A71-0594.

Basis

The thermal sleeves and feedwater sparger are integral parts of a feedwater nozzle assembly that is designed to prevent feedwater nozzle cracking by minimizing nozzle temperature fluctuations. Minimum requirements for BWR feedwater nozzle assembly design, system operation, and enhanced inspection requirements are presented in NUREG 0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking," November 1980. NUREG-0619 requirements address the entire feedwater nozzle assembly which includes the thermal sleeves and sparger.

NUREG-0619 recommendations for the design of feedwater nozzle/thermal sleeve/sparger assemblies have been implemented at both NMP1 and NMP2. NUREG-0619 recommendations that inspection requirements and frequencies for feedwater nozzle assemblies exceed ASME Section XI, Subsection IWB, requirements have been superseded by recommendations in GE-NE-523-A71-0594-A, "Alternate BWR Feedwater Nozzle Inspection Requirements," May 2000 (GE-NE-523).

As explained in NUREG-0619 and GALL Program XI.M5, the recommendations in NUREG-0619 for the design of feedwater nozzle/thermal sleeve/sparger assembly, operating procedures and support system modifications are effective in minimizing the potential for feedwater nozzle cracking. Additionally, a program that addresses the detection and sizing of cracks by ISI in accordance with ASME Section XI, Subsection IWB, and the recommendation of GE NE-523-A71-0594 provides a high degree of assurance that aging effects will be discovered and repaired before the loss of the pressure boundary function of the feedwater nozzles. NMP1 and NMP2 compliance with the requirements in GE NE-523-A71-0594 are addressed in the response to RAI 3.1.1-20 and LRA Section B2.1.5, BWR Feedwater Nozzle Program.

NMP has reviewed its existing programs for the NMP1 and NMP2 feedwater nozzles and determined that the effectiveness of this program for managing the aging effects on feedwater nozzles (including thermal sleeves) could be summarized more efficiently by comparing the existing program with NUREG-1801 (GALL), Program XI.M5, "BWR Feedwater Nozzle." Therefore, NMP has revised the LRA to reference LRA Section B2.1.5, BWR Feedwater Nozzle Program, as the aging management program for feedwater nozzles including the thermal sleeves and spargers. The NMP LRA will continue to credit the Water Chemistry Program as an additional program for managing the effects of aging for the feedwater nozzle thermal sleeves.

Because the intended function of the feedwater thermal sleeve was identified as a pressure boundary instead of structural support, NMP reviewed the intended functions assigned for all thermal sleeves. Thermal sleeves had the intended functions listed as 'pressure boundary' or 'thermal shielding' or both. The LRA was revised to list 'structural support' as the intended function of all thermal sleeves because the design purpose is to protect the associated nozzle from thermal stresses resulting from transients. This classification is consistent with the latest industry precedent. The intended function of the thermal sleeve in the NMP2 CRDRL, which is cut and capped, is also listed as 'structural support' because maintaining the structural integrity of that thermal sleeve is necessary to avoid generating a loose part.

The NMP extent of condition review of treatment of thermal sleeves in the LRA identified two other discrepancies. The LRA supplement dated December 6, 2004, incorrectly identified the material used in the NMP1 CRDRL nozzle thermal sleeve as carbon steel clad with stainless steel. The correct material for the NMP1 CRDRL thermal sleeve is Type 316 stainless steel. Also, the BWR Control Rod Drive Return Line Nozzle Program, described in LRA Section B2.1.37, has been added as a program credited with managing cracking of the CRDRL nozzle thermal sleeve. Additionally, the LRA supplement dated December 6, 2004, incorrectly listed the NMP2 feedwater nozzles as having a nickel-based alloy thermal sleeve extension. The NMP2 feedwater nozzle thermal sleeves are fabricated from type 316L stainless steel and the sparger is fabricated from Type 304L stainless steel. The aging effect of cracking due to the mechanism stress corrosion cracking is identified for the thermal sleeve. The LRA was revised to correct these discrepancies.

LRA Revisions

NMP made the following changes to the NMP LRA to incorporate the changes described above:

Tables 2.3.1.A.1-1 and 2.3.1.B.1.1, Reactor Pressure Vessel Scoping and Screening, were revised to list "Structural Support" as the intended function for all thermal sleeves.

Table 3.1.2.A-1, Reactor Vessel, Internals, and Reactor Coolant System – NMP1 Reactor pressure Vessel – Summary of Aging Effects, for component type "Thermal Sleeves" was revised as follows:

For cracking of the feedwater nozzle thermal sleeves, identified by plant specific note #6, the AMP referenced was changed to "BWR Feedwater Nozzle Program" and the associated NUREG-801, Volume 2 Item, was changed to IV.A1.4-a.

The Industry Note for this item was changed from "D" to "E" to indicate that a different AMP is credited than that referenced by NUREG-1801 AMP.

The material of the CRDRL nozzle thermal sleeve, indicated by plant-specific note #58, is changed from "Carbon or Low-Alloy-Steel (Yield Strength <100 ksi) Clad with Stainless", to "Wrought Austenitic Stainless Steel." The CRDRL Nozzle Program is added as an additional aging management program for cracking of the CRDRL thermal sleeve. Industry Note "E" is added.

The plant specific note, #6, for this item was revised to state "Feedwater nozzle thermal sleeves are not identified in NUREG-1801 for this GALL row number."

The NUREG-1801, Volume 2 Item, column for "Fatigue Monitoring Program" was changed from "IV.B1.4-b" to "IV.A.1.4-b" to correct a typographical error.

Table 3.1.1.A, NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems, item Number 3.1.1A-32, was revised to delete the discussion concerning feedwater sparger thermal sleeves.

NMP revised LRA Section B2.1.5, BWR Feedwater Nozzle Program, to include a description of the discussion above and identify and justify any resulting exceptions to NUREG-1801 Program XI.M5, Feedwater Nozzle.

For NMP Unit 1, NMP revised the LRA to remove changes to Table 3.1.1.A, Item 3.1.1.A-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, provided in the LRA supplement dated February 11, 2005. Instead, NMP replaced the existing statement in the discussion column of Table 3.1.1.A, Item 3.1.1.A-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, as shown in the updated LRA roadmap.

Additionally the "CRDRL Nozzle Program" was added for NMP1 in Section 3.1.2.A.1, "NMP1 Reactor Pressure Vessel" under the heading "Aging Management Programs" as shown in the updated LRA roadmap.

For NMP2, the LRA was revised to remove changes to Table 3.1.1.B, Item 3.1.1.B-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, provided in the LRA supplement dated February 11, 2005. Instead, NMP replaced the existing statement in the discussion column of Table 3.1.1.B, Item 3.1.1.B-27, Feedwater and Control Rod Drive (CRD) Return Line Nozzles, as shown in the updated LRA roadmap.

Additionally for NMP1 in Section 3.1.2.A.1, "NMP1 Reactor Pressure Vessel" under the heading "Aging Management Programs," the "CRDRL Nozzle Program" was added.

Table 3.1.2.B-1 was revised to add the BWR Feedwater Nozzle Program as an AMP credited with managing cracking for the feedwater nozzle thermal sleeve, denoted by plant specific note 6 (formerly note 60).

A new line item is created for the CRD return line thermal sleeves, now denoted by plant-specific note 58, for which cracking will continue to be managed solely by the Water Chemistry Control Program.

The line item for nickel-based alloy thermal sleeves with cracking managed only by the Water Chemistry Control Program, denoted by old plant-specific note #58, is deleted. This line item was for feedwater nozzle thermal sleeve extensions which do not exist in the current design.

The Jet Pump (Recirculation Inlet Nozzle) thermal sleeves were formerly included in the Reactor Vessel Internals AMR Table. However, consistent with other nozzle thermal sleeves, these are more appropriately included with the Reactor Vessel AMR. Plant-specific note 67, for the recirculation inlet nozzle (jet pump) thermal sleeves, is added to the line items for cracking of wrought austenitic stainless steel thermal sleeves, managed by the BWRVIP and Water Chemistry Control Programs, and cumulative fatigue damage for wrought austenitic stainless steel thermal sleeves in Table 3.1.2.B-1. The line item in Table 3.1.2.B-2 for the Jet Pump thermal sleeves is deleted.

RAI 3.1.2-22

In LRA Table 3.1.2.B-1, the applicant credits NMP AMP B2.1.1, "ASME Section XI ISI (Subsections IWB/IWC/IWD) Program," to manage cracking for vessel welds (including attachment welds). Please clarify why the NMP AMP B.2.1.8, "BWR Vessel Internal Program" is not credited for this item, as recommended by the GALL Report.

Response

The line item, Vessel Welds (including attachment welds), in LRA Table 3.1.2.B-1 that credits NMP AMP B2.1.1, "ASME Section XI ISI (Subsections IWB/IWC/IWD) Program," refers to a nickel-based alloy weld with an intended function of Structural Support (SFS) and references GALL Report Item IV.A1.2e. This line item is for a structural weld overlay applied as a repair to one NMP2 feedwater nozzle (N4D) and was not intended for a vessel internal attachment weld. This weld, therefore, does not fall within the scope of the BWR Vessel ID Attachment Welds Program, which applies only to internal vessel attachment welds. The LRA and the revised Table 3.1 forwarded by LRA Supplemental Letter 1892, dated December 6, 2004, indicated that aging of this component was managed by the "ASME Section XI ISI (Subsections IWB/IWC/IWD) Program." However, NMP has re-evaluated this item and determined that aging of this component is more appropriately managed by the "BWR Stress Corrosion Cracking Program," since the weld overlay is inspected in accordance with the requirements for an IGSCC Category E Weldment per Generic Letter 88-01, Supplement 1.

<u>LRA Revisions</u>

LRA Tables 3.1.1.B and 3.1.2.B-1 were revised to show that the aging effect of "Cracking" for nickel-based alloy welds, with an intended function of SFS (Structural Support), will be managed by the "BWR Stress Corrosion Cracking Program." Also, GALL Report Item IV.A1.2e is not appropriate for the weld overlay since this GALL Report Item is for internal vessel attachment welds only. The weld overlay component was reassigned to GALL Report Item IV.A1.4-a, crack initiation and growth of nozzle safe ends. A numbered note was added to clarify that this line item is for the N4D feedwater nozzle weld overlay.

RAI 3.1.2.C.4-1

Related to LRA Tables 3.1.2.A.4 and 3.1.2.B.4 for NMP1 and NMP2 Reactor Recirculation System NSR piping, fittings, and equipment:

In LRA Tables 3.1.2.A-4 and 3.1.2.B-4 for NMP1 and NMP2 Reactor Recirculation System NSR piping, fittings, and equipment, the use of the term "Any" material does not identify the aging effect and the corresponding aging management program. Please revise the Tables to identify the specific material for the NSR piping, fittings, and equipment at both NMP1 and NMP2, the exposed environment, the aging effect and the applicable AMP to remain consistent with the balance of the components.

Response

Summary

NMP has revised the LRA to eliminate "Any" as the material for components. This change was made in conjunction with changes described in the response to RAI 2.2-3 that included identification of specific component materials and environments and incorporation of these details into the LRA. Additionally, the component type "NSR Piping, fittings, and equipment" and its associated intended function of "Prevent Failure from Affecting SR Equipment" are no longer used in the NMP LRA.

Basis

Consistent with the response to RAI 2.2-3, the following AMR tables have been revised such that the material "Any" has been removed and the component type (NSR and SR) materials of fabrication are identified:

3.1.2.A-3	3.1.2.A-4	3.1.2.A-5	3.1.2.B-4	3.1.2.B-5	3.2.2.A-3
3.2.2.B-2	3.2.2.B-3	3.2.2.B-4	3.2.2.B-5	3.3.2.A-2	3.3.2.A-8
3.3.2.A-9	3.3.2.A-11	3.3.2.A-14	3.3.2.A-15	3.3.2.A-17	3.3.2.A-18
3.3.2.A-19	3.3.2.A-20	3.3.2.A-21	3.3.2.A-22	3.3.2.B.4	3.3.2.B-8
3.3.2.B-11	3.3.2.B-13	3.3.2.B-14	3.3.2.B-16	3.3.2.B-17	3.3.2.B-18
3.3.2.B-21	3.3.2.B-22	3.3.2.B-24	3.3.2.B-25	3.3.2.B-26	3.3.2.B-27
3.4.2.A-1	3.4.2.A-2	3.4.2.A-4	3.4.2.B-1	3.4.2.B-2	3.4.2.B-3
3.4.2.B-4	3.4.2.B-5				

Additionally, the material "Any (this applies to NSR piping, fittings, and equipment)" has been removed from the listing under the "Materials" heading for the following LRA sections:

3.1.2.A.3	3.1.2.A.4	3.1.2.A.5	3.1.2.B.4	3.1.2.B.5	3.2.2.A.3
3.2.2.B.2	3.2.2.B.3	3.2.2.B.4	3.2.2.B.5	3.3.2.A.2	3.3.2.A.8
3.3.2.A.9	3.3.2.A.11	3.3.2.A.14	3.3.2.A.15	3.3.2.A.17	3.3.2.A.18
3.3.2.A.19	3.3.2.A.20	3.3.2.A.21	3.3.2.A.22	3.3.2.B.4	3.3.2.B.8
3.3.2.B.11	3.3.2.B.13	3.3.2.B.14	3.3.2.B.16	3.3.2.B.17	3.3.2.B.18
3.3.2.B.21	3.3.2.B.22	3.3.2.B.24	3.3.2.B.25	3.3.2.B.26	3.3.2.B.27

3.4.2.A.1	3.4.2.A.2	3.4.2.A.4	3.4.2.B.1	3.4.2.B.2	3.4.2.B.3
3.4.2.B.4	3.4.2.B.5				

<u>LRA Revisions</u>

Each of the Type 2 AMR tables listed in the RAI was revised to remove the component type "NSR Piping, fittings, and equipment," its associated intended function of "PFASRE," and its material identification as "Any." Each table is further revised to incorporate the results of the NSR Re-scoping effort for the applicable system's NSR components.

Each of the LRA sections listed in the RAI was revised to remove the material "Any (this applies to NSR piping, fittings, and equipment)" from the listing under the "Materials" heading.

RAI 3.2.2-20

In Table 3.2.2.A-1 of the LRA, the applicant credits NMP AMP B2.1.1, "ASME Section XI ISI (Subsections IWB/IWC/IWD) Program" and NMP AMP B2.1.20, "One-Time Inspection Program," to manage loss of material for carbon/low alloy/stainless steel components. Please provide explanation on how these components are managed by NMP AMP B2.1.1. Please also identify the specific section of the ASME Section XI Code that addresses loss of material for internal and external surface of components.

Response

Summary

NMP has reviewed LRA Sections 3.2, 3.3, and 3.4 and identified and corrected the aging management programs for components which incorrectly credited the ASME Section XI ISI (Subsections IWB/IWC/IWD) Program with managing "Loss of Material."

Basis

Pressure retaining components for which ASME Section XI, Subsection IWB-2500 (1989 edition, no addenda), requires internal visual (VT-3) examinations that would detect loss of material include Class 1 pumps (examination category B-L-2), Class 1 valves (examination category B-M-2), the reactor vessel interior (examination category B-N-1), and reactor vessel interior attachments (examination category B-N-2). Crediting ASME Section XI ISI (Subsections IWB/IWC/IWD) Program for managing "Loss of Material" is appropriate for components falling into these examination categories. Components listed in Table 3.2.2.A-1 that credit the ASME Section XI (Subsections IWB/IWC/IWD) Program with managing "Loss of Material" also credit the One-Time Inspection program and, in some cases, the Water Chemistry Control Program.

ASME Section XI does not require any examinations that would detect internal loss of material for piping. Visual (VT-2) examinations conducted during system pressure tests performed on ASME components would detect loss of material that resulted in through-wall penetration; however, it is preferable to detect loss of material before the pressure boundary function is compromised. Therefore, NMP does not credit system pressure tests for managing the "Loss of Material" aging effect for piping.

For the specific example of the NMP1 Containment Spray System (CSS), the ASME Section XI, Subsections IWC-2500 and IWD-2500, do not require either wall thickness measurements or internal visual examinations for any Class 2 and 3 components (the CSS does not have any Class 1 components. Therefore, ASME Section XI, Subsections IWC-2500 and IWD-2500 should not have been credited for managing "Loss of Material." The One-Time Inspection Program and the Water Chemistry Control Program, where applicable, are now credited with managing "Loss of Material" for components in the NMP1 Containment Spray System.

LRA Revisions

The following LRA tables are revised to delete the ASME Section XI ISI (Subsections IWB/IWC/IWD) Program from the "Aging Management Program" column:

3.1.2.A-4	3.2.2.A-1
3.1.2.A-5	3.2.2.A-2
3.1.2.B-3	3.2.2.A-3
3.1.2.B-5	3.3.2.B-24

Additionally, the wording was changed in line items that discussed use of the ASME Section XI ISI (Subsections IWB/IWC/IWD) Program for managing: Loss of Material" in Tables 3.2.1.A and 3.3.1.A for consistency with the table changes listed above.

Further, the ASME Section XI ISI (Subsections IWB/IWC/IWD) Program was deleted from the list of programs under the Aging Management Programs heading in LRA Section 3.2.2.A.1.

RAI 3.2.2-21

In Table 3.2.2.A-3, of LRA supplement dated February 4, 2005, the applicant does not address inspection activity under ASME Section XI program to manage the aging effect of cracking for the NMP1 Emergency Cooling System Heat Exchangers. This issue has been identified as item 137 of the AMR audit (Accession No. ML050660377). During the audits, the applicant committed to revise LRA to close this issue in its supplement. Please provide a response to Audit item 137 of the AMR audit.

Response

Summary

NMP has revised the LRA to address inspection activity under ASME Section XI program and other programs to manage the aging effect of cracking and loss of material for the NMP1 Emergency Cooling System Heat Exchangers as described below. LRA Supplemental Letter 1923, dated February 4, 2005, for the NMP1 Emergency Condensers inadvertently omitted the required changes that were described in the response to RAI 3.2-12 in LRA Supplemental Letter 1902, dated December 21, 2004.

Basis

The NMP1 Emergency Cooling System Heat Exchangers are ASME Class 2 on the tube side and Class 3 on the shell side. The EC heat exchanger components that are subject to cracking include the tubing inner and outer diameter, the shell, the tubesheet inner and outer surface, and the channel head. The ASME Section XI Inservice Inspection (Subsections IWB, IWC, and IWD) Program (GALL Report Section XI.M1) is credited for managing the aging effect of cracking.

The EC tube side, which is ASME Class 2, is also subject to a system inservice pressure test under the NMP1 Inservice Pressure Testing Program Plan. The tubes are not accessible for direct visual examination during the pressure test. VT-2 visual examination of the heat exchanger endbells and accessible shell surfaces is performed during the pressure test in accordance with IWA-5240. The EC shell is ASME Class 3 and is subject to a functional test under the Inservice Pressure Testing Program. The NMP1 Inservice Pressure Testing Program is evaluated as part of the ASME Section XI (Subsections IWB/IWC/IWD) Program for the purpose of license renewal.

For additional verification that a tube leak does not exist, NMP1 will implement an online tube leakage test. The test will be performed by isolating the makeup and drain valves to the emergency condenser tube side, and monitoring the shell side level for 24 to 48 hours to ensure the water level is not increasing. A water level increase on the shell side during the test would indicate tube leakage. The online test will be incorporated as a new activity in the Preventive Maintenance Program. The new activity will be implemented prior to the period of extended operation.

The Preventive Maintenance Program is also credited because it includes the temperature monitoring performed on the Emergency Cooling System, including the heat exchangers.

The responses to RAIs 3.2-12 and 3.1.2.C.4-6, forwarded by letters dated December 21, 2004 and January 3, 2005, indicated that shell side temperature monitoring and continuous radiation monitoring were credited for managing the aging effects of cracking and loss of material for the emergency condensers. Although these activities would detect tube leakage, they would not detect loss of material or cracking of the emergency condenser shell side components prior to a loss of intended function. Therefore, these activities will be supplemented by a visual inspection for cracking and loss of material of the accessible outer surfaces of the peripheral tubes, tube sheet, and emergency condenser shell. This activity will be incorporated into the Preventive Maintenance Program.

RAI 3.4.1-20

In Table 3.4.1.A, Item 3.4.1.A-7 of LRA supplement dated February 4, 2005, the applicant does not address loss of material due to general, pitting, and crevice corrosion for carbon steel piping and valve bodies. This issue has been identified as item 218 of AMR Audit (Accession No. ML050660377). During the audits, the applicant agreed that the discussion in LRA Item 3.4.1.A-7 is incorrect and committed to revise LRA to close this issue in its supplement. Please provide a response to Audit item 218 of the AMR audit.

Response

NMP revised LRA Table 3.4.1.A, Item 3.4.1.A-07, Carbon steel piping and valve bodies in main steam system, to indicate that the aging effect (i.e., loss of material due to pitting and crevice corrosion) is managed by the water chemistry program. The Discussion column for Item 3.4.1.A-07 was revised to read, "Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). NMP1 also credits the One-Time Inspection Program (Appendix B2.1.20), in addition to the Water Chemistry Program, for small bore piping and valves in a treated water environment." This change makes NMP1 consistent with NMP2, Table 3.4.1.B, Item 3.4.1.B-07.

<u>LRA Revision</u>

LRA Table 3.4.1.A, Item 3.4.1.A-07, was revised as shown in the updated LRA roadmap.

RAI 3.5.1-20

In LRA Supplement, dated February 4, 2005, the applicant does not address aging effect of loss of leak tightness for NMP2. This issue has been identified as item 43 of the AMR audit (Accession No. ML050660377). During the audits, the applicant committed to review the NMP 2's hatch design and will revise either the LRA Table 3.5.1.B or 3.5.2.B-1. Please provide a response to Audit item 43 of the AMR audit.

Response

Summary

NMP reviewed the design of the NMP1 and NMP2 primary containment hatches and revised LRA Table 3.5.2.B-1 to add the aging effect, "Loss of Leak Tightness," for the component types "Airlocks" and "Hatches." The material for these components is "Carbon/Low Alloy Steel (Yield Strength < 100 ksi)" and the environment is "Air, Relative Motion Between Components." This change makes the NMP2 LRA consistent with the GALL Report. The NMP1 LRA already included "Loss of Leak Tightness" consistent with the GALL Report.

An extent of condition evaluation identified that the aging effect, "Loss of Sealing; Leakage through Containment," for the polymeric components in the airlocks and hatches needed to added to the LRA for both NMP1 and NMP2. This evaluation also determined that a line item for "Hatches" in the environment of "Air, relative motion between components" needed to be added to NMP1 Table 3.5.2.A-1 to address an access hatch in the drywell.

Basis

GALL Report Table II.B.4 includes "Loss of Leak Tightness" as an aging effect for GALL Report Item II.B4.2-b (i.e., locks, hinges, and closure mechanisms for personnel airlocks; equipment hatches, and CRD hatches). The aging mechanism for this GALL Report item is "Mechanical Wear of Locks, Hinges, and Closure Mechanisms." The corresponding components in LRA Table 3.5.2.B-1 are carbon steel hatches and airlocks in the environment "Air, relative motion between components." These components have the aging effect, "Loss of Leak Tightness," from loss of material due to wear.

GALL Report Table II.B.4 also indicates "Loss of Sealing" as an aging effect for item II.B4.3-a, "Seals, gaskets, and moisture barriers (caulking, flashing and other sealants)" due to "Deterioration of Seals, Gaskets, and Moisture Barriers." The equivalent component in the LRA was "Polymer in Air" for the Primary Containment Building. This item was split into "Seals and Gaskets" and "Moisture Barriers" to be consistent with the GALL Report

For GALL Report Item II.B4.3-a, the NMP LRA identified the aging effects "Cracking," "Hardening and Shrinkage," and "Loss of Strength" rather than "Loss of Sealing." To be consistent with the GALL Report, the aging effect that affects the intended function of the seals and gaskets is "Loss of Sealing;" therefore, "Loss of Sealing" will replace the former aging effects.

The GALL Report recommends that the "Loss of Sealing" aging effect be managed by the ASME Section XI, Subsection IWE Program and the 10 CFR 50, Appendix J Program. For NMP1 and NMP2, the ASME Section XI Inservice Inspection (Subsection IWE) Program is in accordance with the 1998 edition of ASME Section XI, which does not require examinations of polymeric components other than moisture barriers. Therefore, for seals and gaskets, the ASME Section XI Inservice Inspection (Subsection IWE) Program cannot be credited with managing "Loss of Sealing." For this reason, the former component category "Polymer in Air" must be subdivided into the components "Seals and Gaskets", and "Moisture Barriers."

NMP1 has one "Moisture Barrier" in its Containment design and NMP2 has none; therefore, "Moisture Barriers" will only be added for NMP1. The 10 CFR 50 Appendix J program will be credited with managing "Loss of Sealing" for "Seals and Gaskets." In conjunction with this change, the 10 CFR 50 Appendix J Program and the ASME Section XI Inservice Inspection (Subsection IWE) Program will be credited with managing "Loss of Sealing" for "Moisture Barriers" for NMP1.

<u>LRA Revisions</u>

LRA Sections 2.4.A.1 and 2.4.B.1 were revised to include the component types "Polymer in Air" with new component types "Seals and Gaskets" and "Moisture Barriers" to be consistent with GALL Report Item II.B4.3-a. This change was incorporated with the structural re-scoping in response to RAI 2.4-1.

LRA Table 3.5.2.B-1 was revised to add the aging effect of "Loss of Leak Tightness" for the component types "Airlocks" and "Hatches" with the material "Carbon/Low Alloy Steel (Yield Strength < 100 ksi)" and the environment "Air, Relative Motion Between Components," to be consistent with GALL Report Item II.B4.2-b.

For NMP1, in Table 3.5.2.A-1, the component type "Polymer in Air" was changed to "Seals and Gaskets" and "Moisture Barriers," both with the material "Polymer" and the environment "Air." The aging effect of "Loss of Sealing" was added for the component types "Seals and Gaskets" and "Moisture Barriers" aligning with GALL Report Item II.B4.3-a. Also for NMP1, in Table 3.5.2.A-1, the component type "Hatches" in the environment of "Air, relative motion between components" was added consistent with what is shown for NMP2 in Table 3.5.2.B-1.

For NMP2, in Table 3.5.2.B-1, the component type "Polymer in Air" was changed to the component type "Seals and Gaskets" with the material "Polymer" and the environment "Air." The aging effect of "Loss of Sealing" was added for the component type "Seals and Gaskets" aligning it with GALL Report Item II.B4.3-a.

The aging effects "Cracking", "Hardening and Shrinkage", and "Loss of Strength", were removed for both "Seals and Gaskets" and "Moisture Barriers." For "Airlocks" and "Hatches," the "Loss of Leak Tightness" aging effect is managed by the 10 CFR 50, Appendix J Program. The 10 CFR 50, Appendix J Program was credited for managing "Loss of Sealing" for the component type "Seals and Gaskets." The 10 CFR 50, Appendix J Program and the ASME

Section XI, Inservice Inspection (Subsection IWE) Program were credited with managing "Loss of Sealing" of "Moisture Barriers." LRA Sections 3.5.A.1 and 3.5.B.1were revised to add "Loss of Sealing" under the "Aging Effects" heading and remove the aging effect of "Hardening and Shrinkage."

To be consistent with the aging effect in air for "Seals and Gaskets" as incorporated by this RAI response for the Containment structures, the same conversion of "Polymer in Air" was applied to the other structures that have applicable "Seals and Gaskets."

RAI 3.6.2.C-3

Table 3.6.2.C-1 of the LRA supplemental letter dated October 29, 2004, indicates that loss of electrical continuity and/or loss of insulation resistance are significant aging effects for fuse blocks. This table also indicates that there will be a loss of electrical continuity when copper, brass, steel, or alloy (the material from which fuse blocks are, in part, constructed) are subjected to an adverse localized environment caused by heat and radiation that is significantly more severe than the specified service conditions for fuse blocks. It is not clear to the staff how the adverse localized environment will have a significant aging effect on copper, brass, steel, or alloy (the material from which fuse blocks, in part, are constructed). Please clarify NMP's conclusion and provide additional information regarding aging management program for managing aging effects of fuse blocks in the adverse localized environment so they can perform their intended function as per 10 CFR 54.21 (a)(1).

Response

Summary

Fuse holders that are subject to AMR will be managed for aging consistent NUREG-1801 and currently proposed industry guidance.

The insulator portion of fuse holders will be managed by a program that is consistent with GALL Report XI.E1 Program for Electrical Cables and Connections. The insulation material in an adverse localized environment will be managed for the applicable stressors. Fuse holder insulators in an air environment experience no stressors and do not require aging management.

The electrical conductor portion of fuse holders will be managed by the Fuse Holder Inspection (FHI) Program. The metal clamps in an air environment will be managed for the applicable stressors that could cause a loss of electrical continuity.

Basis

NMP has concluded that the metallic clamp of a fuse holder could experience a loss of electrical continuity due to aging stressors in an air environment. The aging stressors that could result in a loss of electrical continuity include: (1) thermal fatigue in the form of high resistance caused by ohmic heating, thermal cycling or electrical transients, and (2) mechanical fatigue caused by frequent manipulation of the fuse itself, vibration, chemical contamination, corrosion, or oxidation. These aging stressors are normally not significant since they are accounted for in the design of electrical circuits under the specified service conditions. However, if the combination of stressors and environment result in unexpected operational conditions, degradation of the metallic clamps could occur. Therefore, NMP concluded that the metallic clamps of fuse holders could experience aging effects requiring management.

NMP will implement the FHI Program as described in LRA Section B2.1.35. It will employ testing methods that are sufficient to detect the aging stressors listed above. These test methods may include thermography, contact resistance testing, or other appropriate testing that may be proven at the time of implementation. The testing will be conducted on a 10-year frequency, with the first tests performed prior to entering the period of extended operation. The 10-year frequency is an adequate period to preclude failures of the fuse holders since experience has shown that aging degradation is a slow process. A 10-year frequency will provide two data points during a 20-year period, which can be used to characterize the degradation rate. The acceptance criteria for the test will correspond to the test method employed. Any unacceptable conditions will be processed in accordance with the corrective action program for proper evaluation and resolution. The FHI Program is a new program for NMP that will be implemented prior to the period of extended operation and will ensure that fuse holders will perform their intended function for the period of extended operation.

LRA Revisions

LRA Section 2.5.C.1, under the heading "Description," was changed from "fuse blocks" to "fuse holders."

LRA Table 2.5.C.1-1 was revised to reflect the resolution of AMR Audit Item 32 (see LRA Supplemental Letter NMP1L 1880), this RAI response for AMR Inspection Item 107, and the removal of inaccessible medium voltage cables.

LRA Section 3.6.2.1.1, was revised to change the material "Copper, Brass, Steel, or Alloy (Fuse Holders) to "Copper Alloy (clamp)" and add "Insulator Materials." Under the heading "Environment" the LRA was revised to add "Adverse localized environment caused by heat, radiation, or moisture in the presence of oxygen." Under the "Aging Management Programs" heading, the LRA was revised to add the "Fuse Holder Inspection Program." The LRA was revised to delete a paragraph from the end of Section 3.6.2.1.1: "Additionally, NMPNS now credits the Fuse Holder Inspection Program for identifying potential age-related degradation for fuse holders."

Table 3.6.2.C-1 was revised to accurately represent the aging management of fuse holders as shown as shown in the updated LRA roadmap. Additionally, Note 4 from the "Notes for Tables 3.6.2.C-1 through 3.6.2.C-3" was revised and Note 7 was added.

RAI 4.3.1-3

(Part 1) *The applicant's December 6, 2004, response to RAI 4.3.1-3 was not clear regarding how fatigue usage prior to the year 2000 was considered in the NMP1 fatigue evaluations. The staff requested the applicant to provide details regarding how the number of cycles experienced prior to year 2000 were accounted for in the fatigue evaluations.*

(Part 2) *For Section 4.3.4 of the LRA discussing non-ASME Class 1 piping, the staff also requested the applicant to explain why the Fatigue Monitoring Program (FMP) is relied on to manage piping systems governed by the 7,000 cycle design limit.*

Response

Part 1: Fatigue Usage Prior to Year 2000

RPV transients contributing to fatigue usage are tracked by the Fatigue Monitoring Program (FMP) described in LRA Section B3.2. The FMP monitors operating transients, calculates the associated fatigue usage factors (CUFs) and, when necessary, initiates actions to ensure that the design limit on fatigue usage is not exceeded. Prior to year 2000, the NMP1 FMP tracked only those transient cycles considered most significant for RPV fatigue (i.e., the first seven transients listed in Table 4.3-1). Additionally, because the NMP1 RPV stress analysis assumed that the feedwater nozzles were the bounding locations for RPV nozzle fatigue, tracking the number of transients that affected other RPV nozzles (i.e., the last seven transients listed in Table 4.3-1) was not initiated until the year 2000.

In the year 2000, it was discovered that transients potentially affecting the reactor recirculation nozzles (N1 & N2) (i.e., the last seven transients listed in Table 4.3-1) had not been accounted for in the original fatigue calculations. Subsequent analysis determined that two of these events (i.e., Emergency Condenser (EC) initiation on an isolated loop and EC initiation on an idle loop) were bounding. The contribution to CUF from the other five transients was determined to be insignificant in comparison to the EC initiation transients. Additionally, based on the assumption of 30 EC initiations on an isolated loop or 30 EC initiations on an idle loop during the 40 year life of the plant (i.e., number shown as the 'Design Cycles Analyzed' in Table 4.3-1), the analysis determined the CUF was 0.065 for the N1 nozzle bounding location (nozzle forging) and 0.005 for the N2 nozzle bounding location (nozzle safe end). These results are reported in LRA Table 4.3-3. Both of these values were acceptable because the allowable CUF is 0.8

Using the linear extrapolation method and acceptance criteria described in LRA Section 4.3, NMP concluded that a 40 year CUF of 0.065 for the N1 nozzle and a 40 year CUF of 0.005 for the N2 nozzle provides a high degree of assurance that the CUF will remain well within the acceptable limit described in LRA Section 4.3 when the CUF is extrapolated for a plant life of 60 years.

The assumption of 30 EC initiations on an isolated loop and 30 EC initiations on an idle loop during the 40 year life of the plant (i.e., number shown as the 'Design Cycles Analyzed' in Table 4.3-1) was believed to be very conservative and was based on engineering judgment.

As a result of this RAI, NMP1 reviewed operating history to establish the estimate of the number of EC initiations on an isolated loop or EC initiations on an idle loop that occurred from the beginning of startup testing until January 1, 2000. This review required a number of assumptions about plant performance. The most conservative of these assumptions is that all EC initiations involved an idle or isolated recirculation loop. However, the majority of the EC initiations would have occurred in an operating loop, a less severe transient. Another assumption is that EC initiation would have occurred whenever Main Steam Isolation Valve (MSIV) isolation occurred and that MSIV isolation occurred for 10% of the total number of reactor scrams during commercial operation. Operating experience indicates that this assumption is also conservative.

Using the assumptions above, it is estimate that 11 unplanned EC initiations (10% of 107 scrams) occurred since the start of commercial operation. The 34 scrams logged during startup testing in 1969 and 1970 were not counted because most of these scrams were initiated from low power and it is unlikely that 10% of these scrams would have caused an MSIV isolation.

EC initiations also occurred to satisfy technical specifications surveillance requirements (SRs) and startup testing requirements. The ECs were operated for SR testing 6 times since the start of commercial operation in 1980 and twice for SR testing and once for startup testing prior to the start of commercial operation. Therefore, 9 EC initiations were recorded for testing.

As a result of this review of operating history, it is estimated that 20 EC initiations (11 following MSIV isolations + 9 for testing) occurred during the first 30 years of plant life (i.e., prior to January 1, 2000). Based on a linear extrapolation, 20 events in the first 30 years of operation would result in an estimate of less than 27 events in the first 40 of operation. Therefore, the estimates of 30 EC initiations on an isolated loop or 30 EC initiations on an idle loop used in LRA Table 4.3-1 is considered to be very conservative.

As noted earlier, the contribution to recirculation nozzle CUF from the other five recirculation loop transients listed on Table 4.3-1 was determined to be insignificant in comparison to the EC initiation transients. Therefore, the values listed for 'Design Cycles Analyzed' in Table 4.3-1 were based on conservative engineering judgments and not a detailed evaluation of operating history. However, as stated in LRA Section B3.2, Fatigue Monitoring Program, and LRA Section 4.3, Metal Fatigue Analysis, NMP intends to install the EPRI FatiguePro software that will automatically count all relevant design cycles for the N1 and N2 nozzles. To establish the baseline, the number of events for the bounding EC actuations estimated above will be used. Additionally, estimates based on a review of operating history similar to that used for EC initiation will be reconstituted for the other five non-bounding events to determine an appropriate starting point (baseline CUF) for the N1 and N2 nozzles.

LRA Revisions

NMP revised LRA Table 4.3-1, Transient Monitoring Data for NMP1, to provide a better description of the sources and uses of data consistent with the response to this RAI.

Part 2: Reliance on the FMP

In the second part of this request for additional information, NMP was requested to explain why the FMP is relied upon to manage piping systems governed by the 7,000 cycle design limit, which is discussed in Section 4.3.4 of the LRA.

As described in Section 4.3.4 of the LRA, the NMP1 piping was originally designed and constructed in accordance with the ASA B31.1 piping code. Therefore, there is no governing fatigue analysis from which to base fatigue monitoring of relevant piping components. As explained in LRA Section 4.3.4, the stress range reduction factor of 1.0 (based on 7000 cycles), is expected to remain valid for the period of extended operation for most or all of B31.1 piping systems.

Although there is no explicit licensing basis requirement to monitor fatigue usage in piping systems at NMP1, NMP is electing to perform additional monitoring of selected ASME Section XI, Class 1 piping components to provide a greater degree of assurance that NMP1 piping systems meet requirements throughout the period of extended operation. This monitoring is intended to address license renewal issues associated with fatigue adequacy of the piping for the period of extended operation including the 7,000 cycle limit imposed by the B31.1 design methodology.

EPRI Report No. TR-102901, "Fatigue Comparison of Piping Designed to ANSI B31.1 and ASME Section III, Class 1 Rules," dated December 1993, describes an evaluation of piping designed to B31.1 against the requirements from ASME Section III, Class 1, and provides the following conclusions:

a) Fatigue usage for Class 1 piping systems designed prior to 1980 is very conservative compared to the fatigue usage computed using the current version of the ASME Code for Class 1 Components.

b) Piping systems designed to the requirements of B31.1 are adequate for continued service in nuclear plants.

c) A limited number of regions that experience severe thermal transients or material discontinuities may indicate higher fatigue usage when evaluated by conventional ASME Code, Section III, Class 1 methods. These components are easily identifiable by the controlling parameters such as significant thermal transients or structural or material discontinuities.

Based on the above, NMP intends to perform further evaluation of Class1 piping for certain limited fatigue-sensitive areas in applicable piping systems as part of the NMP FMP development. The piping systems selected include feedwater/high pressure coolant injection, core spray, reactor water cleanup, reactor recirculation, and associated shutdown cooling lines.

Fatigue analyses of the applicable lines from the above systems will be used to select critical piping locations for inclusion in the NMP FMP. CUF values will be determined for the selected critical piping locations and these locations will be monitored vs. allowable CUF as a part of the NMP FMP. This will assure that the acceptable fatigue limits are maintained over the life of the plant. This additional monitoring is intended to also satisfy the 7,000 cycle limit associated with the B31.1 piping design.

RAI 4.3.3 R1

From the review of LRA Section 4.3.3, it was not clear to the staff how the NMP1 Control Rod Drive Return Line (CRDRL) flaw growth analysis was dispositioned for the period of extended operation. Please provide detailed information to explain how the CRDRL flaw growth analysis was dispositioned for the proposed period of extended operation.

Response

The CRDRL nozzle flaw growth analysis is not used to demonstrate safe operation of the CRDRL nozzle through the period of extended operation, but is instead being used to demonstrate the adequacy of the CRDL inspection frequency. The analysis is an element of the CRDRL Nozzle Fatigue and Cracking Analyses for NMP1" (Reference 1) and its disposition (Reference 2) is consistent with that of the overall TLAA, which is adequately managed in accordance with 10 CFR 54.21(c)(1)(iii) by the BWR CRDRL Nozzle Program.

The original CRDRL nozzle flaw growth analysis was performed in 1994 to support the use of enhanced ultrasonic examination on a 10-year interval as an alternative to NUREG-0619 which required a dye penetrant (PT) examination every sixth refueling outage or 90 startup/shutdown cycles, whichever comes first. The original analysis demonstrated that a 0.25 inch crack would grow to a maximum depth of 0.40 inches in 40 years. A disposition to this analysis was performed in 2003 to evaluate the effect on the original analysis of an increase in control rod drive return flow rate (from 35 to 72 gallons per minute) and a lower temperature (50°F vs. 70°F) in the transient stress analysis. The disposition considered the actual recorded transient cycles since the last dye penetrant (PT) examination in 1995, plus the estimated transient cycles through the end of the current license period plus the 20-year period of extended operation.

The disposition predicted that the final flaw size at the end of the period of extended operation would be 0.493 inches, which is below the ASME Section XI allowable value of 0.50 inches; however, NMP is not relying on the crack growth analysis to demonstrate the acceptability of the CRDRL nozzle for the life of the plant. NMP made a commitment to the NRC to ultrasonically inspect the CRDRL nozzles during each ten year inservice inspection interval using an enhanced ultrasonic examination technique. Ultrasonic examinations of the CRDRL nozzle inner radius performed during refueling outages #15 in 1999 and #18 in 2005 found no indications. The enhanced ultrasonic examination technique utilized has been demonstrated to be capable of reliably detecting 0.25 inch depth flaws. Continued acceptability of the CRDRL nozzle is demonstrated by the periodic UT inspections to verify the nozzle is free of cracks.

The fracture mechanics analysis is, thus, not being relied upon to demonstrate safe operation of the CRDRL nozzle until the end of plant life, but is being used to demonstrate the adequacy of the inspection frequency for the component. The analysis is an element of the "Control Rod Drive Return Line (CRDRL) Nozzle Fatigue and Cracking Analyses for NMP1" (Reference 1) and its disposition (Reference 2) is consistent with that of the overall TLAA, which is adequately managed in accordance with 10 CFR 54.21(c)(1)(iii).

References

1. Calculation S0-VESSEL-M020 Rev. 0, Dated 4/5/1994
2. Calculation S0-VESSEL-M020 Rev. 0, Disposition 00A, Dated 11/12/03

RAI 4.3.6 R1

From the review of LRA Table 4.3-6 Note 2, it appears that the NMP1 tie rod repair is only good for 25 years. Please provide additional information to discuss if the NMP1 tie rods will be replaced after 25 years service.

Response

Summary

The 25 year life for the tie rods used for the repair of the NMP1 core shroud was chosen at the time of installation based on the original license expiration plus ten years. The 25 year life was not based on a design limitation relative to any specific component of the tie rod assembly. The design limits potentially affected by aging are fatigue and the effects of fluence. The peak fatigue usage for 60 years of operation has been determined to be 0.0194, which is negligible. The fluence level at the end of the period of extended operation is below the threshold for adversely impacting the material properties of the tie rod components. Based on these evaluations, NMP does not foresee any need to replace the tie rods.

Basis

The peak fatigue usage for any part of the tie rods or their attachment points to the reactor is 0.0081 for 25 years. A simple linear projection of this value for a 60-year life yields a peak fatigue usage of 0.0194. Use of a 60 year projection is conservative because the tie rods were installed in 1995 and the period of extended operation for NMP1 will end in 2029, a period of only 34 years. Therefore, fatigue of the both the tie rod components and associated reactor vessel and internals is expected to be negligible during the period of extended operation.

In addition to fatigue, the tie rods' 25 year life considered the effects of fluence on the tie rod components. The original design analysis considered the effects of irradiation relaxation based on the fluence on the materials at end of life. The end of life fluence applied was the radiation limit contained in the NMP1 UFSAR. The fluence estimates for the tie rods based on the current RG 1.190 vessel and shroud neutron transport methods show that the maximum fluence level at the end of the current license plus 20 year period of extended operation remains below the threshold for impacting the material properties of the tie rod components. The design selection and controls for the tie rods were the same as those used for the design of a standard forty year plant life. Additionally, there is no design limitation, relative to material anomalies such as creep or radiation degradation, in the equipment or the installation that puts a specific limit on how long the tie rods can be used.

The tie rod fluence is monitored and updated using the RG 1.190 fluence methods applied to monitor the core shroud at NMP. The NMP1 BWRVIP manages the effects of fluence by analysis and inspection. The NMP tie rod inspection program will detect any loss of preload conditions with the potential to impact the tie rod operability (i.e., creation of gaps). Therefore, fluence is not a limiting factor for the tie rods. Additionally, since the fluence evaluation is a qualitative assessment, the potential effects of fluence on the tie rod components do not meet the criteria for inclusion as a TLAA. Based on this evaluation, the NMP1 tie rods will not be replaced after 25 years of operation and will be managed for aging as addressed in LRA Section 4.3.5.

LRA Revisions

LRA Section 4.3.5 was revised to include the tie rods in the summary description in which the RVI components with fatigue analyses are listed, and to discuss the tie rod fatigue usage in Note 2 of Table 4.3-6. Appendix A1.2.2.4 is also revised to include the tie rods in the list of components evaluated for fatigue.

RAI 4.6.2-1

The applicant's December 6, 2004, response to RAI 4.6.2-1 did not explain why the estimated fatigue usage for NMP1 torus attached piping is conservative given that the number of past Safety Relief Valve (SRV) actions is unknown. The staff requested the applicant to provide details on how many design transients have been experienced and to explain why the number of design transients assumed in the fatigue evaluation are bounding given that SRV actuations have not been tracked.

Response

NMP1 overpressure protection is provided by 9 safety valves mounted on the reactor vessel head and 6 solenoid-actuated electromatic relief valves (ERVs) mounted on the main steam lines upstream of the MSIVs. The ERVs are designed to limit overpressure to below the lowest setpoint of the safety valves for events of moderate frequency (e.g., MSIV closure with scram). Because the NMP1 ERVs perform a function similar to that performed by the combined safety/relief valves (SRVs) on later model BWRs, generic issues applicable to SRVs on later model BWRs are typically applicable to the NMP1 ERVs and the NMP1 ERVs are sometimes referred to as SRVs. LRA Section 4.6.2 and the following discussion both address the NMP1 ERVs.

The number of ERV actuations to date ant NMP1 has been estimated to be approximately 370 based on information from: (1) NRC correspondence related to relief valve operation; (2) NMP1 operating reports (annual and monthly); and, (3) NMP1 Licensee Event Reports (LERs) since the NRC requirement to report scrams went into effect. This response also corrects the design number of ERV actuations provided to the NRC staff in the original response to RAI 4.6.2-1 (Reference 1). It has been determined that the correct design number of ERV actuations for NMP1 is 500 vs. the value of 900 provided in that response. Additionally, it has been estimated that the number of ERV actuations that could occur for the 60 years of operation, including the period of extended operation, is approximately 520. The details pertaining to this information are included in the attached LRA section revisions.

ERV actuations have, historically, not been tracked and, until now, have not been a transient that has been required to be tracked through the Fatigue Monitoring Program. Since the design number of actuations is now projected to be challenged, the tracking of NMP1 ERV actuations is being added to the Fatigue Monitoring Program. As a result, the disposition of the Torus Attached Piping TLAA has been changed from §54.21(c)(1)(ii) – The analyses have been projected to the end of the period of extended operation, to §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation. Going forward, ERV lifts will be counted to ensure that they do not exceed the NMP1 design number of these transients. If the monitoring of ERV lifts predicts that the design transient limit will be challenged, corrective action will be taken sufficiently prior to that eventuality to either perform detailed analyses of the selected locations to ensure that the locations will not exceed a CUF of 1 or replace the piping at the affected locations, as necessary.

LRA Revisions

LRA Sections 4.6.2, A1.1.16, A.1.2.4.2, and B3.2 were revised consistent with the changes described above as shown in the updated LRA roadmap.

RAI 4.6 R1

From the review of LRA Section 4.6, it appears that this section of the LRA did not address containment penetrations (e.g., drywell penetrations and others) for either NMP1 or NMP2 in the NMP LRA, as per 10 CFR 54.21(a)(1) and 10 CFR 54.21(a)(2). Please provide detailed information to justify why containment penetrations are not discussed for NMP1 or NMP2 in the NMP LRA.

Response

Summary

An independent review of the NMP LRA and NMP containment penetration related documentation determined that containment penetrations should be a Time-Limited Aging Analysis (TLAA), as defined in 10 CFR 54.3. The evaluations of the NMP1 and NMP2 containment penetration TLAAs have been incorporated in the updated NMP LRA as new Section 4.6.5. The NMP1 containment penetration TLAAs are projected to the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii) and the NMP2 containment penetration TLAAs are managed by the Fatigue Monitoring Program (FMP) in accordance with 10 CFR 54.21(c)(1)(iii).

Basis

See new LRA Section 4.6.5 for the bases of the above summary.

LRA Changes

A new section 4.6.5, "Fatigue of Containment Penetrations," and the following reference were added to the LRA.

1. Letter from Niagara Mohawk Power Corporation to U.S. Nuclear Regulatory Commission, dated May 22, 1984, forwarding the "Plant Unique Analysis Report of the Torus Attached Piping for Nine Mile Point Unit 1 Nuclear Generating Station."

Table 4.1-1, Time-Limited Aging Analyses Applicable to NMPNS, was revised to include new LRA Section 4.6.5.

RAI 4.7.2-1 AND 4.7.2-2

By letter dated December 21, 2004 (Accession No. ML043650003), the staff requested the applicant to provide additional details on how the corrosion rate for plant operation was determined. In its response dated, January 14, 2005, the applicant responded that the MSIV bodies are inspected via the Inservice Inspection Program (ISI) in accordance with the ASME Code, Section XI, and that actual measurements are neither required nor taken. In addition, the 0.13 mils/year corrosion rate is based on piping upstream of the MSIVs modeled by the Flow-Accelerated Corrosion (FAC) Program predictive computer model (CHECWORKS). The applicant notes that due to this low corrosion rate, this location would not be identified as a critical area for inspection. Since the largest contributor to the wear rate is based on the FAC predictive model, the staff requests the applicant to provide and discuss any inspection results supporting the assertion that the wear rate of 0.13 mils/year for the MSIV is appropriate considering that the piping, upon which this corrosion rate is based, is not identified as a critical area for inspection.

Note: The NRC staff also indicted via e-mail that they would like NMP to discuss why MSIV wall thickness was not identified as a TLAA for NMP1.

Response

<u>Summary</u>

The NMP LRA already identifies the FAC Program, described in LRA Section B2.1.9, as the aging management program for the NMP1 and NMP2 Main Steam Systems, including the MSIVs. Therefore, main steam system and MSIV wall thinning is managed by an ongoing monitoring and trending program that is consistent with NUREG-1801, Section XI.M17, Flow Accelerated Corrosion. Typically, the main steam system is not identified as a critical area for inspection because the anticipated wear rates due to FAC are low.

NMP's election to use the FAC Program for ongoing monitoring and trending of main steam system and MSIV wall thinning is a conservative approach because the TLAA calculation, described in LRA Section 4.7.2, predicted that the NMP2 MSIV corrosion allowance is sufficient to support operation throughout the period of extended operation. NMP has re-evaluated the assumptions used in the TLAA calculation and, as described below, concluded these assumptions are valid.

The NMP FAC Program is an existing program that is consistent with NUREG-1801, Section XI.M17, Flow Accelerated Corrosion, without any exceptions or required enhancements. NMP incorporated Main Steam System piping components for NMP1 and NMP2 into the FAC Program with baseline thickness measurements completed during the most recent refueling outages (i.e., 3/05 for NMP1 and 3/04 for NMP2). The baseline measurements did not identify any significant wall thinning in any part of the main steam system.

NMP recognizes that referencing 10 CFR 54.21(c)(1)(i) (i.e., analysis remains valid for the period of extended operation) as the disposition for the TLAA associated with the NMP2 MSIV corrosion allowance is not consistent with the assignment of the FAC Program for managing aging for the main steam system. Therefore, NMP has revised LRA Section 4.7.2, the TLAA for the NMP2 MSIV corrosion allowance, to change the disposition from 10 CFR 54.21(c)(1)(i) to 10 CFR 54.21(c)(1)(iii) (i.e., the effects of aging on the intended function(s) will be adequately managed for the period of extended operation). This change will clarify that the calculation used to disposition the TLAA is not the sole basis for the conclusion that the MSIV corrosion allowance is adequate.

Basis

NMP LRA Section 4.7.2 and the original response to this RAI have already described the calculation used to predict NMP2 MSIV wall thinning. This calculation predicted that the combined effects of exposure to treated water, air, and FAC will consume only 21% of the 0.120 inch MSIV corrosion allowance over the projected 60 year life of the plant. This calculation assumed corrosion rates and durations as follows: 0.0033 inches per year for 4.6 years of exposure to air, 0.0050 inches per year for 0.66 years of exposure to treated water; and, 0.00013 inches per year for 54.7 years for FAC. LRA Section 4.7.2 stated that the estimated corrosion rate for FAC (i.e., 0.0013 inches per year) was based on modeling done to support implementation of the CHECWORKS software. The modeling predicted that average wear rates due to FAC for representative components in the main steam system would be in the range of 0.00009 to 0.0013 inches per year during plant operation based on a steam quality of 99.9%.

NMP recognizes that the prediction of a 0.00013 inch per year wear rate due to FAC is based on a steam quality of 99.9% and includes uncertainty. However, the calculation described in NMP LRA Section 4.7.2 can be extrapolated to show that the NMP2 MSIV corrosion allowance will be sufficient to support 60 years of operation even if the FAC wear rate is increased by more than 1400% (i.e., from 0.000130 inches per year to 0.00185 inches per year). These observations, coupled with the periodic wall thinning measurements of representative Main Steam System components that will be performed and evaluated under the NMP FAC Program, creates a high degree of assurance that unacceptable wall thinning in the NMP2 main steam system will either not occur or be detected and corrected in a timely manner.

The NMP1 licensing basis did not specify a corrosion allowance for the NMP1 MSIVs. Therefore, the NMP LRA did not evaluate the NMP1 MSIV corrosion allowance as a TLAA. The NMP1 MSIV purchase specification indicates that a corrosion allowance of 0.088 inches was added to the MSIV wall thickness specified by the ASME code and that the anticipated service life of the valve was 40 years. However, service conditions and materials for NMP1 and NMP2 MSIVs are essentially identical. Therefore, the substantial margin provided by the 0.088 inch corrosion allowance, coupled with the periodic wall thinning measurements that will be performed and evaluated under the NMP FAC Program, creates a high degree of assurance that unacceptable wall thinning in the NMP1 main steam system will either not occur or be detected and corrected in a timely manner.

NMP wishes to clarify that the FAC Program will not require direct measurement of MSIV wall thickness. Non-parallel inner and outer surfaces throughout the MSIV body and surface irregularities due to casting make accurate and repeatable measurements of MSIV wall thickness difficult. The inability to make accurate and repeatable measurements of wall thickness makes the MSIVs unsuitable for trending under the FAC Program. Therefore, consistent with industry practice, the NMP FAC program applies guidelines for selecting representative components and uses periodic measurements of these representative components to predict wear in main steam system components such as the MSIVs.

As stated in LRA Section B2.1.9, the NMP FAC Program is consistent with guidelines for an effective FAC program presented in EPRI Report NSAC-202L-R2 and implements the recommendations in NRC Generic Letter 89-08, Erosion/Corrosion Induced Pipe Wall Thinning. The NMP FAC Program also addresses the actions recommended in NRC Bulletin 87-01 and Information Notice 91-18.

LRA Revisions

In LRA Table 4.1-1, the listing for the MSIV for corrosion allowance was revised to reference Disposition Category §54.21(c)(1)(iii).

LRA Section 4.7.2 was revised to reflect the change in disposition for the TLAA for TLAA "Main Steam Isolation Valve Corrosion Allowance" and to include the additional information included in this response. The reference to Reference 4.8-70 is deleted.

The proposed USAR supplement describing this TLAA in LRA Appendix A2.2.5.2 was also changed.

RAI A1.1.4-20

In Page A1-2 of LRA, the applicant indicates that ASME Section XI (IWB/C/D) program takes exception with the risk-informed requirements of ASME Code Case N–578-1, implemented for examination of welds in Class 1 and 2 piping as approved by the NRC in plant-specific exemptions. The staff noted that ASME Code Case N–578-1 is approved only for the current inspection interval and therefore, Code Case N–578-1 exemption cannot be used for the period of extended operation. Please provide clarification regarding this item for the period of extend operation. This request applies to both NMP1 and NMP2.

Response

The Risk-Informed In-Service Inspection (RI-ISI) Program is an alternative to the ASME Code Section XI examination requirements for Code Class 1 and 2 piping welds, as allowed by 10 CFR 50.55a(a)(3)(i). The RI-ISI Program utilizes the Electric Power Research Institute (EPRI) Methodology (EPRI-TR-112657, Revision B-A) and is implemented in accordance with ASME Code Case N 578-1. The NMP RI-ISI Program for the current inspection interval was addressed in a Safety Evaluation Report dated September 2, 2002..

Code Case N 578-1 is only authorized for use at NMP for the current inspection interval, just as the current ISI Program, the current RI-ISI Program and the 1989 Edition of Section XI are also only applicable for the current inspection interval.

The current ISI Program, the applicable ASME Section XI Code Edition/Addenda of Section XI, ASME Code Cases, and the alternate RI-ISI Program are required to be submitted to, and approved by the NRC every 10 years. The NMP requirements for the period of extended operation will be in accordance with 10 CFR 50.55a(g)(4)(ii), which mandates the use of the latest Section XI Edition and Addenda in effect 12 months prior to the start of the inspection interval, as modified by optional code cases listed in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability," and NRC staff approval of certain requests for relief.

RAI B2.1.1-22

As a resolution to Audit Item 100 (Accession No. ML050660377), the applicant indicated that it will credit NMP AMP B2.1.6, "BWR Stress Corrosion Cracking Program," to manage intergranular stress corrosion cracking for stainless steel piping components instead of crediting NMP AMP B2.1.1, "ASME Section XI ISI (Subsections IWB/IWC/IWD) Program." However, in reviewing the applicant's LRA supplements, the staff noted that the applicant has not thoroughly apply this resolution toward all the applicable sections of the LRA. Please review the LRA to ensure that this resolution is applied to all the appropriate sections of the LRA.

Response

Summary

NMP reviewed Section 3.1 from the supplemental letter dated December 6, 2004, and Sections 3.2, 3.3, and 3.4 from the supplemental letter dated February 23, 2005, and concluded that the BWR Stress Corrosion Cracking Program is credited appropriately in Section 3.1. Sections 3.2, 3.3, and 3.4 have been revised to ensure that the BWR Stress Corrosion Cracking Program is credited where appropriate.

Basis

Table 3.2

For Engineered Safety Features (ESF) Systems, GALL Volume 1, Table 2 "Summary of Aging Management Programs for the Engineered Safety Features Evaluated in Chapter V of the GALL Report" lists the GALL Items V.D2.1-c and V.D2.3-c, as being managed by the BWR SCC Program. The LRA Supplemental Letter dated February 4, 2005, incorrectly credited ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program for managing cracking of components corresponding to these GALL numbers for several systems.

NMP1 ESF systems that have piping and valves with components corresponding to these GALL items are the Reactor Core Spray System (Table 3.2.2.A-2) and the Emergency Cooling System (Table 3.2.2.A-3). These items should credit the BWR Stress Corrosion Cracking Program for management of cracking.

The only NMP2 ESF system that has components corresponding to GALL Items V.D2.1-c and V.D2.3-c is the Residual Heat Removal System (Table 3.2.2.B-5). These items should credit the BWR Stress Corrosion Cracking Program for managing cracking.

Table 3.3

GALL Volume 1 Table 3 lists items VII.E4.1-c and VII.E4.3-a (components in older BWR shutdown cooling system) as items that should credit the BWR Stress Corrosion Cracking Program; however, no components were identified in the LRA as aligning to these components. However, NMP1 and NMP2 auxiliary system components were aligned instead with reactor coolant pressure boundary GALL Items I IV.C1.1-f or V.C1.3-c, and therefore should credit the BWR Stress Corrosion Cracking Program for managing cracking due to SCC.

The NMP1 auxiliary systems that have components that should credit the BWR SCC Program are the Shutdown Cooling System (Table 3.3.2.A-20) and the Reactor Water Cleanup System. The AMR for these systems found the only stainless steel components that have the aging effect of cracking due to SCC are cast austenitic stainless steel valves in an environment of Treated Water or Steam, temperature ≥ 482°F. The AMR determined piping in these systems did not have cracking due to SCC as an aging/effect mechanism; therefore, the LRA does not credit the BWR SCC Program for managing aging of any piping. The AMR did not find SCC to be an aging mechanism for stainless steel piping because the temperature for this system is generally 125°F or below, except for the 24 hours after initiation of shutdown cooling when the temperature is being reduced from 350°F to 125°F. However, the NMP1 ISI Program does examine piping welds in this system in accordance with BWR Stress Corrosion Cracking Program (GL 88-01, BWRVIP-75) criteria based on a conservative interpretation of the requirement that all piping with service temperatures of 200°F or greater be included.

The NMP1 Reactor Water Cleanup System (Table 3.3.2.A-17) has stainless steel piping and valves inboard of the second isolation valve. This piping is considered part of the reactor coolant pressure boundary for which the BWR Stress Corrosion Cracking Program should have been credited for managing cracking. The NMP2 Reactor Water Cleanup System (Table 3.3.2.B-24) also has stainless steel piping inboard of the second isolation valve. This piping is also considered part of the reactor coolant pressure boundary and should credit the BWR Stress Corrosion Cracking Program for managing cracking. Note that the Reactor Water Cleanup System Program is credited for managing cracking of stainless steel piping and components outboard of the second isolation valve in the NMP1 Reactor Water Cleanup System. The NMP2 Reactor Water Cleanup System AMR found no components susceptible to cracking other than those that are considered part of the reactor coolant pressure boundary; therefore, the Reactor Water Cleanup Program is not credited with managing cracking at NMP2.

Table 3.4

There are no NMP1 or NMP2 steam and power conversion system components subject to AMR that have piping examined under the BWR SCC Program.

<u>Category A Welds</u>

Several NMP1 and NMP2 systems have welds that were classified as Category A welds by the criteria of Generic Letter 88-01 and BWRVIP-75. Category A welds are those with no known cracks and are made entirely of IGSCC-resistant materials or have been solution heat treated after welding. These welds have a low probability of experiencing IGSCC. The inspection of Category A welds at NMP1 and NMP2 has been incorporated into the Alternative Risk-Informed Inservice Inspection (RI-ISI) Programs for NMP1 and NMP2. However, NMP considers cracking of components with Category A welds due to stress corrosion cracking to be managed by the BWR Stress Corrosion Cracking Program because these components comply with the preventive action attribute of the BWR Stress Corrosion Cracking Program, and because incorporation of these components into the RI-ISI program is an alternative approved by the NRC staff. Systems having Category A welds are NMP1 Reactor Recirculation, NMP1 Emergency Cooling, NMP1 Reactor Water Cleanup, NMP2 Reactor Coolant, and NMP2 Residual Heat Removal. (Note: Corrected line items for the NMP1 Reactor Recirculation System and NMP2 Reactor Coolant Systems were included in the letter dated December 6, 2004.)

LRA Revisions

The following LRA Tables were revised to credit the BWR Stress Corrosion Cracking Program for managing cracking, replacing the ASME Section XI (Subsections IWB, IWC, and IWD) Inservice Inspection Program:

3.2.2.A-2 3.2.2.A-3 3.2.2.B-5 3.3.2.A-17 3.3.2.A-20 3.3.2.B-24.

Additionally, LRA Tables 3.2.1.A and 3.2.1.B line items 3.2.1.A-16 and 3.2.1.B-16 are revised to remove the justification for crediting the ASME Section XI (Subsections IWB, IWC, and IWD) Inservice Inspection Program in lieu of the BWR Stress Corrosion Cracking Program and to reference Appendix B2.1.6 instead of B2.1.1.

Further, the following LRA sections were revised to add the BWR Stress Corrosion Cracking program to the list of applicable aging management programs:

3.2.2.A.2 3.2.2.A.3 3.2.2.B.5 3.3.2.A.17 3.3.2.A.20 3.3.2.B.24.

RAI B2.1.11-2

For the preventive actions element, the enhancements to this program include sampling frequencies for Control Room Chilled Water at NMP1 and expanded periodic checks of NMP2 CCCW Systems consistent with the guidelines of EPRI TR-107396. In its response, the applicant indicated that except for the NMP2 Control Building Ventilation Chilled Water (HVK) System, chemistry sampling on the close-cycle portion of systems that may introduce raw water is currently performed either quarterly or more frequently. In addition, the applicant indicates that sampling of the NMP2 HVK system is included in the enhancements identified for this program. Please clarify if the HVK system included in the enhanced program is at NMP1 (as stated in the LRA) or NMP2 (as stated in its response to the staff's RAI)

Response

The enhancement to establish sampling frequencies for the Control Building Chilled Water System (HVK) is applicable to NMP2 only. LRA Appendix B2.1.11 erroneously identified this enhancement as applicable to NMP1. Appendix B2.1.11 has been revised to correct this error.

<u>LRA Revisions</u>

LRA Appendix B2.1.11 was revised to indicate that the enhancement for establishing sampling frequencies for the Control Building Chilled Water System is applicable to NMP2. This enhancement is now identified as applicable to the "Monitoring and Trending" attribute rather than the "Preventive Actions" attribute.