Constellation Energy
Nine Mile Point Nuclear Station

P.O. Box 63
Lycoming, New York 13093

January 20, 2005
NMP1L 1919

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 NRC Requests for Additional Information Regarding Aging Management of Bolting (TAC Nos. MC3272 and MC3273)

Gentlemen:

By letter dated May 26, 2004, Nine Mile Point Nuclear Station, LLC (NMPNS) submitted an application to renew the operating licenses for Nine Mile Point Units 1 and 2. The aging management review results for the Reactor Vessel, Internals, and Reactor Coolant Systems (Section 3.1 of the License Renewal Application) were subsequently revised in NMPNS supplemental letter NMP1L 1892 dated December 6, 2004.

In a letter dated December 21, 2004, the NRC requested additional information regarding the aging management review of bolting associated with the Reactor Vessel, Internals, and Reactor Coolant Systems, as well as other plant systems addressed in Sections 3.2, 3.3, 3.4, and 3.5 of the License Renewal Application. The NMPNS responses to these requests for additional information are provided in Attachments 1 through 4. Attachment 5 provides a list of the regulatory commitments associated with this submittal.

If you have any questions about this submittal, please contact Peter Mazzaferro, NMPNS License Renewal Project Manager, at (315) 349-1019.

Very truly yours,

James A. Spina
Vice President Nine Mile Point

JAS/DEV/jm

A107

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 20th day of January, 2005.

WITNESS my Hand and Notarial Seal:

Sandra A. Oswald
Notary Public

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

My Commission Expires:

1/20/05
Date

Attachments:
1. Responses to NRC Requests for Additional Information (RAI) Regarding Aging Management of Bolting
2. Revisions to LRA Section 3 Tables Regarding Aging Management of Bolting
3. New LRA Sections A1.1.38 and A2.1.37, Bolting Integrity Program
4. New LRA Section B2.1.36, Bolting Integrity Program
5. List of Regulatory Commitments

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

ATTACHMENT 1

Nine Mile Point Nuclear Station

Responses to NRC Requests for Additional Information (RAI)

Regarding Aging Management of Bolting

This attachment provides the Nine Mile Point Nuclear Station, LLC (NMPNS) responses to the requests for additional information contained in the NRC letter dated December 21, 2004, regarding aging management of bolting. Each NRC RAI is repeated, followed by the NMPNS response for Nine Mile Point Unit 1 (NMP1) and/or Nine Mile Point Unit 2 (NMP2), as applicable. Revisions to the License Renewal Application (LRA) are described where appropriate. The revisions are highlighted by shading unless otherwise noted.

Note: Section, table, and page numbers cited for LRA Section 3.1 refer to the revised version of LRA Section 3.1 that was submitted by NMPNS letter NMP1L 1892, dated December 6, 2004.

RAI T3.1-1

In LRA Tables 3.1.1A&B, items 3.1.1.A&B-26, the applicant credited the Inservice Inspection (ISI) IWB/C/D Program for bolting management. The GALL recommended the use of XI.M18, "Bolting Integrity Program," for managing of aging effects for safety-related bolts. The bolting integrity program described in XI.M18 relies on the NRC recommendations and guidelines for comprehensive bolting integrity programs that are delineated in NUREG-1339. The XI.M18 program also relies on the industry's technical basis for the program and guidelines for material selection and testing, bolting preload control, inservice inspection (ISI), use of lubricant and sealant, plant operation and maintenance, and evaluation of structural integrity of bolted joints, as outlined in EPRI NP-5679, with exception noted in NUREG-1339. The ISI program only addressed one task described in the Bolting Integrity program. Please provide information to explain how the remaining of all other tasks of the XI.M18 program are addressed by NMP1 and NMP2.

Response

NMPNS has reevaluated its position regarding the treatment of closure bolting for NMP1 and NMP2 and is revising the credited aging management program from the ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program to the Bolting Integrity Program. The Bolting Integrity Program is being added to the LRA in the applicable sections and tables in Section 3 as well as Appendices A and B.

The Bolting Integrity Program is consistent with NUREG-1801, Section XI.M18, with exceptions and enhancements. One exception is that the NMPNS program does not include

structural bolting within its scope since aging of this bolting will be managed under the Structures Monitoring Program (LRA Section B2.1.28) and the ASME Section XI Inservice Inspection (Subsection IWF) Program (LRA Section B2.1.25). The other exception is that monitoring of identified leakage from pressure retaining components (not covered by ASME Section XI) will be performed on a frequency considering the safety significance of the leaking component and the radiological conditions in the vicinity of the component. The enhancements to the Bolting Integrity Program include revisions to the implementing procedures to: (1) more clearly restrict the use of lubricants containing molybdenum disulfide; (2) clearly restrict the use of high-strength (≥150 ksi yield strength) bolts to only those applications that require it; (3) reference the evaluation method in Electric Power Research Institute (EPRI) NP-5769, Volume 2, as an acceptable method for assuring integrity of bolting material in component support applications; and (4) reference the EPRI reports (NP-5769 and TR-104213) and NUREG-1339 as source documents for the implementing procedures, as appropriate. More information on the Bolting Integrity Program is being added to the LRA in new Sections A1.1.38, A2.1.37, and B2.1.36.

LRA Revisions

Applicable sections in LRA Section 3 are revised to add the Bolting Integrity Program as an aging management program, as identified in the response to RAIs T3.1-2 and T3.1-3 below.

Applicable tables in LRA Section 3 are revised to identify the Bolting Integrity Program as the aging management program for bolting, as shown in Attachment 2.

New LRA Sections A1.1.38 and A2.1.37, and new Section B2.1.36, are added to describe the Bolting Integrity Program. These new LRA sections are shown in Attachments 3 and 4.

RAI T3.1-2

In Tables 3.1.1.A&B, 3.1.2.A&B of the LRA supplemental letter dated December 6,2004, the applicant did not address aging effect of crack initiation and growth for closure bolting (see pages 3.1-26, -36, -54, -57, -88, and -94) due to cyclic loading and/or stress corrosion cracking (SCC), which is identified in GALL. Please provide information to explain why the aging effect of cracking was not addressed for the above item.

Response

This question refers to closure bolting in the Reactor Vessel Instrumentation System (LRA Table 3.1.2.A-3 (page 3.1-54) for NMP1 and Table 3.1.2.B-3 (page 3.1-88) for NMP2) and the Reactor Recirculation System (Table 3.1.2.A-4 (page 3.1-57) for NMP1 and Table 3.1.2.B-4 (page 3.1-94) for NMP2). These items are aligned with NUREG-1801 Items IV.C1.3-e, IV.C1.3-f, and IV.C1.3-g, corresponding to the aging effects/mechanisms of loss of material, loss of preload/stress relaxation, and cumulative fatigue damage, respectively, for reactor coolant pressure boundary valve closure bolting. Additionally, for the NMP1 and NMP2 Reactor Recirculation Systems, these items are aligned with NUREG-1801 Items IV.C1.2-d, IV.C1.2-e, and IV.C1.2-f, corresponding to the aging effects/mechanisms of loss of material, loss of

preload/stress relaxation, and cumulative fatigue damage, respectively, for recirculation pump closure bolting. NUREG-1801 does not identify crack initiation and growth due to cyclic loading or stress corrosion cracking for boiling water reactor (BWR) reactor coolant pressure boundary valve or recirculation pump closure bolting. The NMPNS results are, therefore, consistent with NUREG-1801.

The Aging Effect/Mechanism description provided for Item 3.1.1.A-26 in LRA Table 3.1.1.A (page 3.1-26), and for Item 3.1.1.B-26 in LRA Table 3.1.1.B (page 3.1-36), is generic wording taken from NUREG-1801, Volume 1, Table 1, line 26 (hence the -26 item number in LRA Tables 3.1.1.A and 3.1.1.B). The NUREG-1801, Volume 1, Table 1 line item associated with the Bolting Integrity Program (first line item on page 10 of NUREG-1801, Volume 1) captures both BWR and pressurized water reactor (PWR) aging mechanisms to be managed by this program, but not all of the aging effects listed are applicable to BWRs. Specifically, the aging effect of crack initiation and growth is applicable to PWRs because the materials listed for the applicable PWR item numbers (i.e., IV.C2.3-e, IV.C2.4-e, and IV.C2.5-n) apply to high strength steel bolting materials specific to PWRs. These NUREG-1801 item numbers do not apply to BWRs.

The aging management program for the subject closure bolting, for the aging effects of loss of material and loss of preload, is changed from the currently identified aging management program to the Bolting Integrity Program. The Bolting Integrity Program is consistent with NUREG-1801, Volume 2, Section X1.M18, with respect to closure bolting, with exceptions and enhancements (see the response to RAI T3.1-1 above).

LRA Revisions

The Bolting Integrity Program is added under the "Aging Management Programs" heading for the systems addressed in the following sections of LRA Section 3.1, "Aging Management of Reactor Vessel, Internals, and Reactor Coolant Systems:"

- 3.1.2.A.3 Reactor Pressure Vessel Instrumentation System (page 3.1-8)
- 3.1.2.A.4 Reactor Recirculation System (page 3.1-9)
- 3.1.2.B.3 Reactor Pressure Vessel Instrumentation System (page 3.1-15)
- 3.1.2.B.4 Reactor Recirculation System (page 3.1-16)

Corresponding changes are incorporated for LRA Tables 3.1.1.A (page 3.1-26), 3.1.1.B (page 3.1-36), 3.1.2.A-3 (page 3.1-54), 3.1.2.A-4 (page 3.1-57), 3.1.2.B-3 (page 3.1-88), and 3.1.2.B-4 (page 3.1-94), as shown in Attachment 2.

RAI T3.1-3

In Tables 3.2.1.A&B of the LRA supplemental letter dated December 6, 2004, the applicant stated that loss of material (due to general corrosion, crack initiation and growth, and cyclic loading and/or stress corrosion cracking (SCC)) is not applicable for closure bolting items 3.2.1.A&B-18. The applicant further stated that the above loss of material aging effect is not applicable to closure bolting in high-pressure or high temperature systems because NUREG-

1801, Volume 2, stated that the causal mechanisms for loss of material include leaking fluid; whereas, the NMP environment for bolting does not assume leakage. The staff disagrees with NMP's assessment because operating experience from the industry indicated that leakage occurs. Please provide aging management for potential loss of material due to general corrosion, crack initiation and growth, and cyclic loading and/or stress corrosion cracking (SCC) for these closure bolting items.

This RAI also applies to closure bolting items identified in Sections 3.3, 3.4, and 3.5 of the LRA. Please provide the applicable aging management accordingly.

Response

NMPNS has reevaluated its position regarding the treatment of closure bolting at NMP1 and NMP2 and is revising the applicable environments, aging effects requiring management (AERM) and associated aging management programs (AMP). The revisions make the NMPNS position consistent with the guidance provided in NUREG-1801. Specifically, the environment for high-pressure or high-temperature systems will include leaking fluid. The AERMs will include loss of material due to general corrosion, and crack initiation and growth due to cyclic loading and/or stress corrosion cracking, and the credited AMP will be the Bolting Integrity Program.

The revisions to the original LRA, dated May 26, 2004, for each of the applicable sections are described below. Associated revisions to the tables in LRA Sections 3.2, 3.3, 3.4, and 3.5 are shown in Attachment 2.

LRA Section 3.2.2 and Associated Tables

For LRA Table 3.2.1.A (page 3.2-27), Item 3.2.1.A-18, and Table 3.2.1.B (page 3.2-35), Item 3.2.1.B-18, the Discussion column is revised to state that the AMP will be consistent with NUREG-1801, with exceptions. These line items correspond to NUREG-1801, Volume 2, Item Numbers V.E.2-a and V.E.2-b, for the AERMs of loss of material and crack initiation and growth of closure bolting in high-pressure or high- temperature systems.

For high-pressure or high-temperature systems (or portions of systems thereof), the bolting environment described as "Closure Bolting for Non-Borated Water Systems with Operating Temperatures ≥212°F," is changed to "Closure Bolting for Non-Borated Water Systems with Operating Temperatures ≥212°F, Leaking Fluid." This change is incorporated under the "Environments" heading in the following sections of LRA Section 3.2, "Aging Management of Engineered Safety Features:"

- 3.2.2.A.3 Emergency Cooling System (page 3.2-7)
- 3.2.2.B.2 High Pressure Core Spray System (page 3.2-10)
- 3.2.2.B.3 Low Pressure Core Spray System (page 3.2-11)
- 3.2.2.B.4 Reactor Core Isolation Cooling System (page 3.2-13)
- 3.2.2.B.5 Residual Heat Removal System (page 3.2-15)

New items corresponding to NUREG-1801, Volume 2, Item V.E.2-b, "Crack initiation and growth/Cyclic loading, stress corrosion cracking," for carbon or low alloy steel closure bolting in high-pressure or high-temperature systems are added for each closure bolting item in Section 3.2 "Table 2s," with the environment as described above. For closure bolting in low-pressure and low-temperature systems (or portions of systems thereof), the environment will remain "Air" or "Air With Moisture or Wetting, Temperature <140°F."

The Bolting Integrity Program is assigned as the aging management program for the aging effect of crack initiation and growth due to cyclic loading or stress corrosion cracking. Additionally, the Bolting Integrity Program replaces the Systems Walkdown Program as the assigned aging management program for loss of material for bolts with an environment description of "Air" or "Air With Moisture or Wetting, Temperature <140°F," in LRA Tables 3.2.2.A and 3.2.2.B. The Bolting Integrity Program is consistent with NUREG-1801, Volume 2, Section X1.M18, with exceptions (not related to pressure retaining bolting) and enhancements (see the response to RAI T3.1-1 above). Thus, the Bolting Integrity Program is added under the "Aging Management Programs" heading for the systems addressed in the following sections of LRA Section 3.2:

- 3.2.2.A.1 Containment Spray System (page 3.2-5)
- 3.2.2.A.2 Core Spray System (page 3.2-7)
- 3.2.2.A.3 Emergency Cooling System (page 3.2-8)
- 3.2.2.B.1 Hydrogen Recombiner System (page 3.2-9)
- 3.2.2.B.2 High Pressure Core Spray System (page 3.2-10)
- 3.2.2.B.3 Low Pressure Core Spray System (page 3.2-12)
- 3.2.2.B.4 Reactor Core Isolation Cooling System (page 3.2-14)
- 3.2.2.B.5 Residual Heat Removal System (page 3.2-16)
- 3.2.2.B.6 Standby Gas Treatment System (page 3.2-17)

LRA Section 3.3 and Associated Tables

Bolting components in Section 3.3 are in auxiliary systems. The majority of these bolting components are in "Air", or "Air, Moisture or Wetting, Temperature <140°F." These are low-pressure and low-temperature environments. The NUREG-1801, Volume 2, items for auxiliary systems closure bolting are VII.I.2-a and VII.I.2-b, which have the component description "Closure Bolting in High Pressure or High Temperature Systems" and have an environment described as "Air, Moisture, Humidity, and Leaking Fluid." The auxiliary systems at NMP1 and NMP2 are typically low-pressure, low temperature systems and do not exactly fit the description of NUREG-1801, Volume 2, Items VII.I.2-a and VII.I.2-b. However, portions of the Reactor Water Cleanup Systems, the Liquid Poison System (NMP1) and the Standby Liquid Control System (NMP2) have a high-pressure or high-temperature environment; therefore, a new bolting component is added for closure bolting in the high temperature portions of these systems. These bolting components have the aging effect of crack initiation and growth (due to cyclic loading or stress corrosion cracking). The assigned aging management program for all bolting components in LRA Section 3.3 is changed to the Bolting Integrity Program. Thus, the Bolting Integrity Program is added under the "Aging Management Programs" heading for the systems addressed in the following sections of LRA Section 3.3:

- 3.3.2.A.3 Compressed Air Systems (page 3.3-14)
- 3.3.2.A.4 Containment Systems (page 3.3-15)
- 3.3.2.A.5 Control Room HVAC System (page 3.3-17)
- 3.3.2.A.7 Emergency Diesel Generator System (page 3.3-19)
- 3.3.2.A.8 Fire Detection and Protection System (page 3.3-21)
- 3.3.2.A.10 Liquid Poison System (page 3.3-23)
- 3.3.2.A.14 Radioactive Waste System (page 3.3-27)
- 3.3.2.A.16 Reactor Building HVAC System (page 3.3-30)
- 3.3.2.A.17 Reactor Water Cleanup System (page 3.3-32)
- 3.3.2.A.19 Service Water System (page 3.3-34)
- 3.3.2.A.23 Turbine Building HVAC System (page 3.3-39)
- 3.3.2.B.1 Air Startup Standby Diesel Generator System (page 3.3-41)
- 3.3.2.B.2 Alternate Decay Heat Removal System (page 3.3-42)
- 3.3.2.B.5 Compressed Air Systems (page 3.3-46)
- 3.3.2.B.6 Containment Atmosphere Monitoring System (page 3.3-47)
- 3.3.2.B.13 Fire Detection and Protection System (page 3.3-54)
- 3.3.2.B.14 Floor and Equipment Drains System (page 3.3-56)
- 3.3.2.B.23 Reactor Building HVAC System (page 3.3-64)
- 3.3.2.B.24 Reactor Water Cleanup System (page 3.3-66)
- 3.3.2.B.26 Service Water System (page 3.3-68)
- 3.3.2.B.28 Standby Diesel Generator Fuel Oil System (page 3.3-70)
- 3.3.2.B.29 Standby Diesel Generator Protection (Generator) System (page 3.3-71)
- 3.3.2.B.30 Standby Liquid Control System (page 3.3-73)

LRA Sections 3.3.2.A.10 (pages 3.3-22 and 23) and 3.3.2.B.30 (page 3.3-73) are revised as follows:

(1) Under the "Materials" header, "Carbon or Low Alloy Steel (Yield Strength $\geq$100 ksi)" is added.

(2) Under the "Environments" header, "Air" and "Closure Bolting for Non-Borated Water Systems with Operating Temperatures $\geq$212°F, Leaking Fluid" are added.

(3) Under the "Aging Effects Requiring Management" header, "Cumulative Fatigue Damage" is added.

LRA Sections 3.3.2.A.17 and 3.3.2.B.24 are revised as follows:

(1) Under the "Environments" header, "Closure Bolting for Non-Borated Water Systems with Operating Temperatures $\geq$212°F, Leaking Fluid" is added.

(2) Under the "Aging Effects Requiring Management" header, "Cumulative Fatigue Damage" is added.

LRA Section 3.4 and Associated Tables

Bolting components in LRA Section 3.4 are in steam and power conversion systems. The corresponding NUREG-1801, Volume 2, items are VIII.H.2-a and VIII.H.2-b, for the aging effects of loss of material and crack initiation and growth (due to cyclic loading or stress corrosion cracking), with the component description "Closure Bolting in High Pressure or High Temperature Systems," and the environment description "Air, Moisture, Humidity, and Leaking Fluid." NMP1 and NMP2 bolting components in steam and power conversion systems were assigned to the environments "Closure Bolting for Non-Borated Water Systems with Operating Temperatures ≥212°F," with the exception of bolting for the Main Generator and Auxiliaries System in which the bolting was assigned to an environment of "Air." LRA Section 3.4 is revised to change the environment description of bolting components from "Closure Bolting for Non-Borated Water Systems with Operating Temperatures ≥212°F," to "Closure Bolting for Non-Borated Water Systems with Operating Temperatures ≥212°F, Leaking Fluid." This change is incorporated under the "Environments" heading in the following sections of LRA Section 3.4:

- 3.4.2.A.2 Feedwater/High Pressure Coolant Injection System (page 3.4-6)
- 3.4.2.A.4 Main Steam System (page 3.4-9)
- 3.4.2.B.3 Feedwater System (page 3.4-13)
- 3.4.2.B.4 Main Steam System (page 3.4-15)

The additional aging effect of crack initiation and growth (due to cyclic loading or stress corrosion cracking) corresponding to NUREG-1801, Volume 2, Item VIII.H.2-b, is identified, and the loss of material aging effect is aligned to NUREG-1801, Volume 2, Item VIII.H.2-a. The Bolting Integrity Program is the aging management program for both aging mechanisms. The bolting in the Main Generator and Auxiliaries System in which the environment is "Air," does not have the aging effect of crack initiation and growth assigned; however, the currently assigned aging management program is replaced with the Bolting Integrity Program. Thus, the Bolting Integrity Program is added under the "Aging Management Programs" heading for the systems addressed in the following sections of LRA Section 3.4:

- 3.4.2.A.2 Feedwater/High Pressure Coolant Injection System (page 3.4-7)
- 3.4.2.A.3 Main Generator and Auxiliary System (page 3.4-8)
- 3.4.2.A.4 Main Steam System (page 3.4-10)
- 3.4.2.B.3 Feedwater System (page 3.4-14)
- 3.4.2.B.4 Main Steam System (page 3.4-16)

LRA Section 3.5 and Associated Tables

LRA Section 3.5 pertains to structures and component supports. NUREG-1801, Volume 2, Item III.B.1.1.2-a, for "High strength bolting for NSSS component supports," is the only structural or component support bolting item in NUREG-1801 with an aging effect of cracking caused solely by the mechanism of stress corrosion cracking (SCC). The environment for this component is described as "inside containment" and the material is low alloy steel, yield strength >150 ksi. NUREG-1801 recommends the Bolting Integrity Program be assigned as the aging management

program for this item. The corresponding item in NUREG -1801, Volume 1, Table 5, "Summary of Aging Management Programs for the Structures and Component Supports Evaluated in Chapters II and III of the GALL Report," is crack initiation and growth due to SCC of Group B1.1, high strength low-alloy bolts in component supports. For those situations, a separate line item in LRA Tables 3.5.2.A and 3.5.2.B is added for high-strength bolting (yield strength ≥150 ksi) in component supports, and the Bolting Integrity Program is added under the "Aging Management Programs" heading for LRA Section 3.5.2.C.1, "Component Supports" (page 3.5-38).

Note that the NMPNS Bolting Integrity Program will not include structural bolting (other than high-strength nuclear steam supply system (NSSS) component support bolting) within the program scope. Aging of these bolts will be managed under the ASME Section XI Inservice Inspection (Subsection IWF) and Structures Monitoring Programs described in LRA Sections B2.1.25 and B2.1.28, respectively.

Other Associated LRA Revisions

In LRA Table 2.3.3.A.11-1 (page 2.3-84) for the NMP1 Liquid Poison System, and in Table 2.3.3.B.31-1 (page 2.3-183) for the NMP2 Standby Liquid Control System, the Component Type "Bolting," with an Intended Function of "Pressure Boundary" is added.

ATTACHMENT 2

Nine Mile Point Nuclear Station

Revisions to LRA Section 3 Tables Regarding Aging Management of Bolting

LRA Table Number	LRA Page Number
3.1.1.A	3.1-26
3.1.1.B	3.1-36
3.1.2.A-3	3.1-54
3.1.2.A-4	3.1-57
3.1.2.B-3	3.1-88
3.1.2.B-4	3.1-94
3.2.1.A	3.2-27
3.2.1.B	3.2-35
3.2.2.A-1	3.2-36
3.2.2.A-2	3.2-44
3.2.2.A-3	3.2-52
3.2.2.B-1	3.2-67
3.2.2.B-2	3.2-70, 71
3.2.2.B-3	3.2-77
3.2.2.B-4	3.2-85, 86
3.2.2.B-5	3.2-98, 99
3.2.2.B-6	3.2-107
3.3.1.A	3.3-85
3.3.1.B	3.3-99
3.3.2.A-3	3.3-104
3.3.2.A-4	3.3-113
3.3.2.A-5	3.3-118
3.3.2.A-7	3.3-124
3.3.2.A-8	3.3-134
3.3.2.A-10	3.3-141
3.3.2.A-14	3.3-147
3.3.2.A-16	3.3-159
3.3.2.A-17	3.3-162
3.3.2.A-19	3.3-173
3.3.2.A-23	3.3-188
3.3.2.B-1	3.3-191
3.3.2.B-2	3.3-194
3.3.2.B-5	3.3-197

LRA Table Number	LRA Page Number
3.3.2.B-6	3.3-200
3.3.2.B-13	3.3-215
3.3.2.B-14	3.3-223
3.3.2.B-23	3.3-241
3.3.2.B-24	3.3-245
3.3.2.B-26	3.3-257
3.3.2.B-28	3.3-265
3.3.2.B-29	3.3-269
3.3.2.B-30	3.3-273
3.4.1.A	3.4-20
3.4.1.B	3.4-23
3.4.2.A-2	3.4-33
3.4.2.A-3	3.4-42
3.4.2.A-4	3.4-43
3.4.2.B-3	3.4-50
3.4.2.B-4	3.4-54
3.5.1.A	3.5-52
3.5.1.B	3.5-65
3.5.2.C-1	3.5-141

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-26	Reactor coolant pressure boundary (RCPB) valve closure bolting, manway and holding bolting, and closure bolting in high- pressure and high-temperature systems	Loss of material due to wear; loss of preload due to stress relaxation; crack initiation and growth due to cyclic loading and/or SCC	Bolting integrity	No	Consistent with NUREG-1801, with the following exceptions: • Not applicable for pressurizer bolting because this component does not exist at NMP1.

Table 3.1.1.B NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-26	Reactor coolant pressure boundary (RCPB) valve closure bolting, manway and holding bolting, and closure bolting in high- pressure and high-temperature systems	Loss of material due to wear; loss of preload due to stress relaxation; crack initiation and growth due to cyclic loading and/or SCC	Bolting integrity	No	Consistent with NUREG-1801, with the following exceptions: • Not applicable for pressurizer bolting because this component does not exist at NMP2.

Table 3.1.2.A-3 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Vessel Instrumentation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Closure Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F	Cumulative Fatigue Damage	Fatigue Monitoring Program	IV.C1.3-g	3.1.1.A-01	A
				Loss of Material	Bolting Integrity Program	IV.C1.3-e	3.1.1.A-26	E
				Loss of Preload	Bolting Integrity Program	IV.C1.3-f	3.1.1.A-26	E

Table 3.1.2.A-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Closure Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F	Cumulative Fatigue Damage	Fatigue Monitoring Program	IV.C1.2-f	3.1.1.A-01	A
						IV.C1.3-g	3.1.1.A-01	A
				Loss of Material	Bolting Integrity Program	IV.C1.2-d	3.1.1.A-26	E
						IV.C1.3-e	3.1.1.A-26	E
				Loss of Preload	Bolting Integrity Program	IV.C1.2-e	3.1.1.A-26	E
						IV.C1.3-f	3.1.1.A-26	E

Table 3.1.2.B-3 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Instrumentation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Closure Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cumulative Fatigue Damage	Fatigue Monitoring Program	IV.C1.3-g	3.1.1.B-01	A
				Loss of Material	Bolting Integrity Program	IV.C1.3-e	3.1.1.B-26	E
				Loss of Preload	Bolting Integrity Program	IV.C1.3-f	3.1.1.B-26	E
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cumulative Fatigue Damage	Fatigue Monitoring Program	IV.C1.3-g	3.1.1.B-01	A
				Cracking	Bolting Integrity Program			H, 43
				Loss of Material	Bolting Integrity Program	IV.C1.3-e	3.1.1.B-26	E
				Loss of Preload	Bolting Integrity Program	IV.C1.3-f	3.1.1.B-26	H

Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Closure Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F	Cumulative Fatigue Damage	Fatigue Monitoring Program	IV.C1.2-f	3.1.1.B-01	A
						IV.C1.3-g	3.1.1.B-01	A
				Loss of Material	Bolting Integrity Program	IV.C1.2-d	3.1.1.B-26	E
						IV.C1.3-e	3.1.1.B-26	E
				Loss of Preload	Bolting Integrity Program	IV.C1.2-e	3.1.1.A-26	E
						IV.C1.3-f	3.1.1.A-26	E
		Wrought Austenitic Stainless Steel	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F	Cumulative Fatigue Damage	Fatigue Monitoring Program			F
				Loss of Preload	Bolting Integrity Program	IV.C1.2-e	3.1.1.A-26	H

Table 3.2.1.A NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-18011

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.A-18	Closure bolting in high-pressure or high-temperature systems	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC	Bolting integrity	No	Consistent with NUREG-1801, Volume 2 with the exceptions noted in Appendix B2.1.36.

Table 3.2.1.B NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-18011

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.B-18	Closure bolting in high-pressure or high-temperature systems	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC	Bolting integrity	No	Consistent with NUREG-1801, Volume 2 with the exceptions noted in Appendix B2.1.36.

Table 3.2.2.A-1 Engineered Safety Features Systems
NMP1 Containment Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.A-10	E, 22
		Wrought Austenitic Stainless Steel	Air	None	None			None

Table 3.2.2.A-2 Engineered Safety Features Systems
NMP1 Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.A-10	E, 22
		Wrought Austenitic Stainless Steel	Air	None	None			None

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	V.E.2-b	3.2.1.A-18	B
				Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.A-18	B

Table 3.2.2.B-1 Engineered Safety Features Systems
NMP2 Hydrogen Recombiner System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air with Moisture or Wetting, temperature <140°F	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.B-10	E, 22
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air with Moisture or Wetting, temperature <140°F	Loss of Material	Bolting Integrity Program			K

Table 3.2.2.B-2 Engineered Safety Features Systems
NMP2 High Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air with Moisture or Wetting, temperature <140°F	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.B-10	E, 22
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	V.E.2-b	3.2.1.B-18	B
				Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.B-18	B
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air with Moisture or Wetting, temperature <140°F	Loss of Material	Bolting Integrity Program			K
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program			K
				Loss of Material	Bolting Integrity Program			K

Table 3.2.2.B-3 Engineered Safety Features Systems
NMP2 Low Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	V.E.2-b	3.2.1.B-18	B
				Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.B-18	B
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program			K
				Loss of Material	Bolting Integrity Program			K

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air with Moisture or Wetting, temperature ≥140°F	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.B-10	E, 22
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	V.E.2-b	3.2.1.B-18	B
				Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.B-18	B
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air with Moisture or Wetting, temperature ≥140°F	Cracking	Bolting Integrity Program			K
				Loss of Material	Bolting Integrity Program			K
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program			K
				Loss of Material	Bolting Integrity Program			K

Table 3.2.2.B-5 Engineered Safety Features Systems
NMP2 Residual Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air with Moisture or Wetting, temperature ≥140°F	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.B-10	E, 22
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	V.E.2-b	3.2.1.B-18	B
				Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1.B-18	B
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air with Moisture or Wetting, temperature ≥140°F	Cracking	Bolting Integrity Program			K
				Loss of Material	Bolting Integrity Program			K
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program			K
				Loss of Material	Bolting Integrity Program			K

Table 3.2.2.B-6 Engineered Safety Features Systems
NMP2 Standby Gas Treatment System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air with Moisture or Wetting, temperature <140°F	Loss of Material	Bolting Integrity Program	V.E.1-b	3.2.1.B-10	E, 22
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air with Moisture or Wetting, temperature <140°F	Loss of Material	Bolting Integrity Program			K

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-24	Closure bolting	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and SCC	Bolting integrity	No	Consistent with NUREG-1801, Volume 2 with the exceptions noted in Appendix B2.1.36.

Table 3.3.1.B NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-24	Closure bolting	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and SCC	Bolting integrity	No	Consistent with NUREG-1801, Volume 2 with the exceptions noted in Appendix B2.1.36.

Table 3.3.2.A-3 Auxiliary Systems
NMP1 Compressed – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.D.1-a	3.3.1.A-19	E; 14
		Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.D.1-a	3.3.1.A-19	E

Table 3.3.2.A-4 Auxiliary Systems
NMP1 Containment Systems – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	D, 5

Table 3.3.2.A-5 Auxiliary Systems
NMP1 Control Room HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.F1.1-a	3.3.1.A-05	E

Table 3.3.2.A-7 Auxiliary Systems
NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	D, 5

Table 3.3.2.A-8 Auxiliary Systems
NMP1 Fire Detection and Protection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	NFS	Carbon or Low Alloy Steel (Yield Strength <100 Ksi	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	D, 5

Table 3.3.2.A-10 Engineered Safety Features Systems
NMP1 Liquid Poison System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	D, 5
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	VII.I.2-b	3.2.1.A-24	B
				Loss of Material	Bolting Integrity Program	VII.I.2-a	3.2.1.A-24	B

Table 3.3.2.A-14 Auxiliary Systems
NMP1 Radioactive Waste System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	D, 5

Table 3.3.2.A-16 Auxiliary Systems
NMP1 Reactor Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.F2.1-a	3.3.1.A-05	B

Table 3.3.2.A-17 Auxiliary Systems
NMP1 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	D, 5
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	VII.I.2-b	3.2.1.A-24	B
				Loss of Material	Bolting Integrity Program	VII.I.2-a	3.2.1.A-24	B

Table 3.3.2.A-19 Auxiliary Systems
NMP1 Service Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	D, 5

Table 3.3.2.A-23 Auxiliary Systems
NMP1 Turbine Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	NFS, PB	Carbon or Low Alloy Steel (Yield Strength <100 Ksi	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.A-05	D, 5

Table 3.3.2.B-1 Auxiliary Systems
NMP2 Air Startup Standby Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength <100 Ksi	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	D, 5

Table 3.3.2.B-2 Auxiliary Systems
NMP2 Alternate Decay Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	D, 5

Table 3.3.2.B-5 Auxiliary Systems
NMP2 Compressed Air Systems – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.D.2-a	3.3.1.B-19	E
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None

Table 3.3.2.B-6 Auxiliary Systems
NMP2 Containment Atmosphere Monitoring System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air, Moisture or Wetting, temperature ≥140°F	Cracking	Bolting Integrity Program			K
				Loss of Material	Bolting Integrity Program			K

Table 3.3.2.B-13 Auxiliary Systems
NMP2 Fire Detection and Protection System– Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	NFS	Carbon or Low Alloy Steel (Yield Strength <100 Ksi	Air, Moisture or Wetting, temperature <140°F	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	D, 5
		Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	D, 5
			Air, Moisture or Wetting, temperature <140°F	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	D, 5

Table 3.3.2.B-14 Auxiliary Systems
NMP2 Floor and Equipment Drains System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	NFS	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	D, 5
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None

Table 3.3.2.B-23 Auxiliary Systems
NMP2 Reactor Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.F2.1-a	3.3.1.B-05	B
		Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.F2.1-a	3.3.1.B-05	B

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	D, 5
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F; Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	VII.I.2-b	3.2.1.B-24	B
				Loss of Material	Bolting Integrity Program	VII.I.2-a	3.2.1.B-24	B
		Wrought Austenitic Stainless Steel	Air	None	None			None

Table 3.3.2.B-26 Auxiliary Systems
NMP2 Service Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	D, 5

Table 3.3.2.B-28 Auxiliary Systems
NMP2 Standby Diesel Generator Fuel Oil System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	D, 5

Table 3.3.2.B-29 Auxiliary Systems
NMP2 Standby Diesel Generator Protection (Generator) System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	D, 5

Table 3.2.2.B-30 Engineered Safety Features Systems
NMP2 Standby Liquid Control System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VII.I.1-b	3.3.1.B-05	D, 5
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F; Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	VII.I.2-b	3.2.1.B-24	B
				Loss of Material	Bolting Integrity Program	VII.I.2-a	3.2.1.B-24	B

Table 3.4.1.A NMP1 Summary of Aging Management Programs for the Steam and Power Conversion Systems Evaluated in Chapter VIII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1.A-08	Closure bolting in high-pressure or high-temperature systems	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC.	Bolting integrity	No	Consistent with NUREG-1801, Volume 2 with the exceptions noted in Appendix B2.1.36.

Table 3.4.1.B NMP1 Summary of Aging Management Programs for the Steam and Power Conversion Systems Evaluated in Chapter VIII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1.B-08	Closure bolting in high-pressure or high-temperature systems	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC.	Bolting integrity	No	Consistent with NUREG-1801, Volume 2 with the exceptions noted in Appendix B2.1.36.

Table 3.4.2.A-2 Steam and Power Conversion System
NMP1 Feedwater/High Pressure Coolant Injection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	B
				Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	B
	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	B
				Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	B

Table 3.4.2.A-3 Steam and Power Conversion System
NMP1 Main Generator and Auxiliary System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	NFS	Carbon Steel, Low Alloy Steel (Yield Strength <100 Ksi)	Air	Loss of Material	Bolting Integrity Program	VIII.H.1-b	3.4.1.A-05	D, 11

Table 3.4.2.A-4 Steam and Power Conversion System
NMP1 Main Steam System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon Steel, Low Alloy Steel (Yield Strength ≥100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	B
				Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	B

Table 3.4.2.B-3 Steam and Power Conversion System
NMP2 Feedwater System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon Steel, Low Alloy Steel (Yield Strength <100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	B
				Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	B

Table 3.4.2.B-4 Steam and Power Conversion System
NMP2 Main Steam System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon Steel, Low Alloy Steel (Yield Strength <100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F, Leaking Fluid	Cumulative Fatigue Damage	Fatigue Monitoring Program			G
				Cracking	Bolting Integrity Program	VIII.H.2-b	3.4.1.A-08	B
				Loss of Material	Bolting Integrity Program	VIII.H.2-a	3.4.1.A-08	B

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Component Supports					
3.5.1.A-33	Group B1.1: high strength low-alloy bolts	Crack initiation and growth due to SCC	Bolting integrity	No	Consistent with NUREG-1801, Volume 2 with the exceptions noted in Appendix B2.1.36.

Table 3.5.1.B NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Component Supports					
3.5.1.B-33	Group B1.1: high strength low-alloy bolts	Crack initiation and growth due to SCC	Bolting integrity	No	Consistent with NUREG-1801, Volume 2 with the exceptions noted in Appendix B2.1.36.

Table 3.5.2.C-1 Structures and Component Supports
Component Supports – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Cracking	Bolting Integrity Program	III.B1.1.2-a	3.5.1.A-33 3.5.1.B-33	B
	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength ≥100 Ksi)	Air	Loss of Material	ASME Section XI Inservice Inspection (Subsection IWF) Program	III.B1.1.1-a III.B1.2.1-a III.B1.3.1-a	3.5.1.A-32 3.5.1.B-32	B
					Structures Monitoring Program	III.B4.1-a III.B5.1-a	3.5.1.A-29 3.5.1.B-29	A

ATTACHMENT 3

Nine Mile Point Nuclear Station

New LRA Sections A1.1.38 and A2.1.37, Bolting Integrity Program

- Revise Table of Contents page A-ii to add new Section A1.1.38, Bolting Integrity Program.
- Revise Table of Contents page A-iv to add new Section A2.1.37, Bolting Integrity Program.
- Add new Sections A1.1.38 and A2.1.37, Bolting Integrity Program, as shown on the following pages.

A1.1.38 Bolting Integrity Program

The Bolting Integrity Program manages aging effects due to loss of preload, cracking and loss of material of bolting within the scope of license renewal including safety-related bolting, high-strength bolting for NSSS component supports, and bolting for other pressure retaining components. Program activities include material selection and testing, bolting preload control, inservice inspection, plant operation and maintenance, and evaluation of the structural integrity of bolted joints. This program implements the guidance contained in EPRI Reports NP-5769, as modified by NUREG-1339, and TR-104213 except as stated below.

The Bolting Integrity Program takes exceptions to NUREG-1801, Section XI.M18 (Bolting Integrity) under the scope and monitoring attributes. Specifically, this program does not include structural bolting since this category of bolting is adequately managed by the ASME Section XI Inservice Inspection (Subsection IWF) Program (Section A1.1.3) and Structures Monitoring Program (Section A1.1.34). With respect to the monitoring attribute, the frequency of monitoring a leak from bolting for pressure retaining components (not covered by ASME Section XI) will be based upon the safety significance of the component and the radiological conditions in the vicinity of the component.

Enhancements to the Bolting Integrity Program include the following revisions to existing activities that are credited for license renewal:

- Clearly restrict the use of lubricants containing molybdenum disulfide for bolting applications.
- Clearly restrict the use of high-strength ($\geq$150 ksi yield strength) bolting material to only those applications that require it.
- Reference the evaluation method for assuring integrity of bolting material in component support applications from EPRI NP-5769 as an acceptable method in the design process.
- Update implementing procedures to include EPRI Reports NP-5769 and TR-104213 and NUREG-1339 as reference documents, as appropriate.

Enhancements are scheduled for completion prior to the period of extended operation.

A2.1.37 Bolting Integrity Program

The Bolting Integrity Program manages aging effects due to loss of preload, cracking and loss of material of bolting within the scope of license renewal including safety-related bolting, high-strength bolting for NSSS component supports, and bolting for other pressure retaining components. Program activities include material selection and testing, bolting preload control, inservice inspection, plant operation and maintenance, and evaluation of the structural integrity of bolted joints. This program implements the guidance contained in EPRI Reports NP-5769, as modified by NUREG-1339, and TR-104213 except as stated below.

The Bolting Integrity Program takes exceptions to NUREG-1801, Section XI.M18 (Bolting Integrity) under the scope and monitoring attributes. Specifically, this program does not include structural bolting since this category of bolting is adequately managed by the ASME Section XI Inservice Inspection (Subsection IWF) Program (Section A2.1.3) and Structures Monitoring Program (Section A2.1.34). With respect to the monitoring attribute, the frequency of monitoring a leak from bolting for pressure retaining components (not covered by ASME Section XI) will be based upon the safety significance of the component and the radiological conditions in the vicinity of the component.

Enhancements to the Bolting Integrity Program include the following revisions to existing activities that are credited for license renewal:

- Clearly restrict the use of lubricants containing molybdenum disulfide for bolting applications.
- Clearly restrict the use of high-strength ($\geq$150 ksi yield strength) bolting material to only those applications that require it.
- Reference the evaluation method for assuring integrity of bolting material in component support applications from EPRI NP-5769 as an acceptable method in the design process.
- Update implementing procedures to include EPRI Reports NP-5769 and TR-104213 and NUREG-1339 as reference documents, as appropriate.

Enhancements are scheduled for completion prior to the period of extended operation.

ATTACHMENT 4

Nine Mile Point Nuclear Station

New LRA Section B2.1.36, Bolting Integrity Program

- Revise Table of Contents page B-ii to add new Section B2.1.36, Bolting Integrity Program.
- Revise Section B1.5 (page B-5), "Aging Management Programs," to add:

  "36. Bolting Integrity Program (Section B2.1.36) [Existing]."

- Revise Section B2.0 (page B-8), "Aging Management Programs," to replace "Not applicable" with the Bolting Integrity Program in the "Nine Mile Point Program" column for NUREG-1801 Number XI.M18, as follows:

NUREG-1801 NUMBER	NUREG-1801 PROGRAM	NINE MILE POINT PROGRAM
XI.M18	Bolting Integrity	Bolting Integrity Program (Section B2.1.36)

- Add new Section B2.1.36, Bolting Integrity Program, as shown on the following pages.

B2.1.36 Bolting Integrity Program

The Bolting Integrity Program manages aging effects due to loss of preload, cracking and loss of material of bolting within the scope of license renewal including safety-related bolting, high-strength bolting for NSSS component supports, and bolting for other pressure retaining components. Program activities include material selection and testing, bolting preload control, inservice inspection, plant operation and maintenance, and evaluation of the structural integrity of bolted joints. This program implements the guidance contained in EPRI Reports NP-5769, as modified by NUREG-1339, and TR-104213 except as stated below.

NUREG-1801 Consistency

The Bolting Integrity Program is an existing program that takes exceptions to certain NUREG-1801, Section X1.M18 (Bolting Integrity) evaluation elements (Reference 2), and requires enhancements to be consistent with others.

Exceptions to NUREG-1801

The program described in NUREG-1801, Section X1.M18, includes structural bolting within the scope of the program and recommends that leaks in bolted joints for pressure retaining components (not covered by ASME Section XI) be inspected daily. The scope of the Bolting Integrity program in NUREG-1801 primarily applies to the ASME code piping and components including high strength bolting used in NSSS component supports where the actual yield strength is greater than 150 ksi (NUREG-1801 item number III.B.1.1.2-a). Other structural bolting used in supports, including expansion and anchor bolts, are managed under the ASME Section XI Inservice Inspection (Subsection IWF) Program (LRA Section B2.1.25) or the Structures Monitoring Program (LRA Section B2.1.28) in accordance with NUREG-1801. The inspection frequency of leaks in bolting for non-ASME pressure retaining components will be determined based upon the safety significance and radiological conditions of the leaking component. In maintaining radiological exposure as low as reasonably achievable (ALARA), NMP will balance the safety significance of the leak with the expected personnel exposure to determine the proper leak inspection frequency.

Program Elements Affected

- **Scope of Program**

  Structural bolting used in supports, including expansion and anchor bolts, are managed under the ASME Section XI Inservice Inspection (Subsection IWF) Program (LRA Section B2.1.25) or the Structures Monitoring Program (LRA Section B2.1.28) in accordance with NUREG-1801.

- **Monitoring and Trending**

  The frequency of inspection for leaks in bolting for non-ASME pressure retaining components will be determined based upon the safety significance and radiological conditions of the leaking component.

Enhancements

Enhancements to the Bolting Integrity Program include revisions to existing activities that are credited for license renewal to ensure the applicable aging effects are discovered and evaluated.

Program Elements Affected

Revise applicable existing documents to ensure that the documents address the following elements:

- **Scope**

  The method for structural integrity evaluation of bolting material in component support applications described in EPRI NP-5769, Volume 2, Section 11, will be referenced as an acceptable method for evaluating the integrity of all bolting (with suitable modifications). The applicable documents will be updated to reference EPRI NP-5769 and NUREG-1339 for safety-related bolting, and EPRI TR-104213 for non-safety-related bolting.

- **Preventive Actions**

  Revise the applicable documents to restrict the use of lubricants containing molybdenum disulfide for bolting applications. Also, revise the applicable documents to restrict the use of high strength ($\geq$150 ksi yield strength) bolting material to only those applications that require it.

Enhancements are scheduled for completion prior to the period of extended operation.

Operating Experience

NMPNS has reviewed both industry and plant-specific operating experience related to the Bolting Integrity Program and is aware of the types of bolting issues that have been reported and documented in the industry. The lessons learned from the industry experiences have been incorporated into the NMPNS bolting practices such that this program has adequately detected bolting integrity issues and has been effective in correcting issues prior to the loss of intended function. This program is continually adjusted to account for industry experience and research. As additional operating experience is obtained, lessons learned will be used to adjust this program as needed.

Conclusion

The Bolting Integrity Program has been effective in managing the aging effects of bolting within the scope of license renewal including safety-related bolting, high strength bolting for NSSS component supports, and bolting for other pressure retaining components.

Therefore, there is reasonable assurance that aging effects will be managed by the implementation of the Bolting Integrity Program such that SSCs WSLR will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

ATTACHMENT 5

List of Regulatory Commitments

The following table identifies those actions committed to by Nine Mile Point Nuclear Station, LLC (NMPNS) in this submittal. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

REGULATORY COMMITMENT	DUE DATE
Enhance the Bolting Integrity Program and implementing procedures to: (1) more clearly restrict the use of lubricants containing molybdenum disulfide; (2) clearly restrict the use of high-strength (≥150 ksi yield strength) bolts to only those applications that require it; (3) reference the evaluation method in Electric Power Research Institute (EPRI) NP-5769, Volume 2, as an acceptable method for assuring integrity of bolting material in component support applications; and (4) reference the EPRI reports (NP-5769 and TR-104213) and NUREG-1339 as source documents for the implementing procedures, as appropriate.	NMP1: August 22, 2009 NMP2: October 31, 2026