Constellation Energy
Nine Mile Point Nuclear Station

P.O. Box 63
Lycoming, New York 13093

December 21, 2004
NMP1L 1902

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 Sections 2.3.2, 2.3.4, and B2.1.32 (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.

In a letter dated November 17, 2004, the NRC requested additional information regarding the information contained in Sections 2.3.2, 2.3.4, and B2.1.32 of the License Renewal Application. The NMPNS responses to these requests for additional information are provided in Attachment 1. Attachment 2 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,

Timothy J. O'Connor
Plant General Manager

TJO/DEV/jm

A107

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

I, Timothy J. O'Connor, being duly sworn, state that I am Nine Mile Point Plant General Manager, 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 21st day of December, 2004.

WITNESS my Hand and Notarial Seal:

Lisa M. Clark
Notary Public

My Commission Expires: December 21, 2004
Date

LISA M. CLARK
Notary Public in the State of New York
Oswego County Reg. No. 01CL6029220
My Commission Expires 8/9/2005

Attachments:
1. Responses to NRC Requests for Additional Information (RAI) Regarding Sections 2.3.2, 2.3.4, and B2.1.32 of the License Renewal Application
2. 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

Sections 2.3.2, 2.3.4, and B2.1.32 of the License Renewal Application

This attachment provides Nine Mile Point Nuclear Station, LLC (NMPNS) responses to the requests for additional information contained in the NRC letter dated November 17, 2004, regarding Sections 2.3.2, 2.3.4, and B2.1.32 of the License Renewal Application (LRA). For each identified LRA section, the 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 LRA are described where appropriate. The revisions are highlighted by shading unless otherwise noted.

LRA Section 2.3.2, Engineered Safety Features Systems

RAI-3.2-1

In Table 3.2.2.A-1 of the License Renewal Application (LRA) the applicant has identified no aging effects for wrought stainless steel bolting in an air environment. The applicant is requested to discuss how cracking and loss of pre-load resulting in loss of mechanical closure integrity is managed for these bolts. In addition the applicant is requested to address how the aging effects are managed for inaccessible bolts.

Response

The wrought austenitic stainless steel bolting in an air environment in LRA Table 3.2.2.A-1 is in the NMP1 Containment Spray System. Since the environment was identified in the aging management review (AMR) as air, cracking and loss of preload were not identified as aging effects for wrought austenitic stainless steel bolting. The maximum typical operating temperature (based on the internal environments assigned to components in this system) is $< 140^{\circ}F$. Loss of preload would not typically be an aging effect requiring management for bolting in low temperature systems. NUREG-1801 only specifies loss of preload as an aging effect requiring management for components in the reactor vessel and internals and reactor coolant pressure boundary. The only mechanisms for cracking affecting wrought austenitic stainless steel bolting are stress corrosion cracking and cyclic loading (fatigue). Stress corrosion cracking and thermal fatigue are not aging effects requiring management for wrought austenitic stainless steel at temperatures less than $140^{\circ}F$. Therefore, loss of mechanical closure integrity is not an aging effect requiring management for bolting in the NMP1 Containment Spray System.

With respect to inaccessible bolts, there are no bolts in the NMP1 Containment Spray System that are inaccessible for examination. The only aging effect requiring management for any bolting in the Containment Spray System is loss of material for carbon or low alloy steel bolting, yield strengths > 100 ksi, in an air environment. This aging effect is managed by the Systems Walkdown Program (described in LRA Section B2.1.33), which performs visual examinations of accessible surfaces for loss of material. The inspection criteria of the Systems Walkdown Program require that bolted joints be inspected for corrosion of external surfaces, and will be enhanced to add inspection for evidence of leakage, which does not require the bolted joints to be disassembled. This enhancement is described in LRA Section B2.1.33 (page B-65), under the "Parameters Monitored/Inspected" heading.

RAI-3.2-2

In Table 3.2.2.A-1 of the LRA, the applicant has identified loss of material as an aging effect for carbon and low alloy steel (yield strength <100 ksi) and ductile/malleable cast iron filters/strainers in a treated water (<140°F), low flow environment. The applicant has also identified ASME Section XI ISI, one-time inspection and the water chemistry control programs for managing this aging effect. The applicant is requested to discuss (a) the periodic visual, surface, and/or volumetric examination and pressure tests for this component within the ASME Section XI ISI program (b) monitoring and controlling concentrations of known detrimental chemical species below levels known to cause degradation as they relate to carbon or low alloy steel and ductile/malleable cast iron filters in the environment identified above (c) the basis for selecting a representative sample for the one-time inspection.

Response

The carbon and low alloy steel (yield strength <100ksi) and ductile/malleable cast iron filters/strainers in a treated water (<140°F), low flow environment, in LRA Table 3.2.2.A-1, applies to the four (4) Containment Spray Pump Discharge Strainers (STR-80-09, STR-80-10, STR-80-29, and STR-80-30). The internals of these strainers were removed as part of the modification to address NRC Bulletin 96-003, "Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling-Water Reactors." Additionally, the strainer bodies are made of carbon steel such that the "ductile/malleable cast iron" component of the material description doesn't apply.

(a) These are ASME Section XI Class 2 components. As such, the bodies of the strainers are subject only to the VT-2 examination under examination category C-H, "All Pressure Retaining Components." The VT-2 examination is conducted during the system pressure test during each inspection period. VT-2 examinations are conducted to detect evidence of leakage only.

(b) LRA Table 3.2.2.A-1 indicates that the subject strainers are exposed to a treated water (temperature <140°F), low flow environment. The water source is torus water, so the environment for these strainers should have been identified as demineralized untreated water, low flow. The chemistry action levels and sampling frequencies for the torus water specified in procedure S-CTP-V666, "Auxiliary Systems Chemistry," are provided in the table below.

Parameter	Action Level 1	Sampling Frequency
Conductivity	5 μS/cm	Quarterly
Chloride/Sulfate	200 ppb	Quarterly
Total Organic Content (TOC)	1000 ppb	Quarterly

These limits are identical to those specified in Electric Power Research Institute (EPRI) TR-103515-R2, "BWR Water Chemistry Guidelines – 2000 Revision," dated February 2000.

(c) As presented in LRA Sections A1.1.28 and B2.1.20, the One-Time Inspection Program is a new aging management program (AMP) commitment for NMPNS that is to be implemented prior to the period of extended operation. This commitment was made in the original LRA submittal, as supplemented by NMPNS letter NMP1L 1880 dated October 29, 2004. As indicated in the October 29, 2004 letter, the method of selecting the representative sample will be consistent with EPRI TR-107514, "Age-Related Degradation Inspection Method and Determination."

LRA Revisions

LRA Section 3.2.2.A.1 (page 3.2-4), under the "Environments" heading, is revised to add the following environment:

"Demineralized Untreated Water, Low Flow"

LRA Table 3.2.2.A-1 is revised to reflect this change, as shown on the following page.

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
Filters/Strainers (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi)	Demineralized Untreated Water, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			Q

RAI-3.2-3

In Table 3.2.2.A-1 of the LRA the applicant has identified no aging effects for wrought stainless steel filters and strainers in a treated water (<140 °F), low flow environment. The applicant is requested to discuss the tests and inspections to assure that the treated water remains free of contaminants.

Response

As noted in LRA Table 3.2.2.A-1, the Water Chemistry Control Program is one of the AMPs credited for managing the carbon steel subcomponents associated with this component type. This NMP1 program is responsible for ensuring that treated water remains free of contaminants. The NMP1 Water Chemistry Control Program is described in LRA Section B2.1.2, as supplemented by NMPNS letter NMP1L 1880 dated October 29, 2004.

The subject filter strainers are in the Containment Spray system. The water source is torus water, so the environment for these strainers should have been identified as demineralized untreated water, low flow. The chemistry action levels and sampling frequencies for the torus water are provided in the response to RAI 3.2-2 above. These limits are identical to those specified in EPRI TR-103515-R2, "BWR Water Chemistry Guidelines – 2000 Revision," dated February 2000.

RAI-3.2-4

In Table 3.2.2.A-1 of the LRA, the applicant has identified cracking as an aging effect for wrought austenitic stainless steel flow elements and valves in a raw water environment. The applicant has proposed to manage this aging effect by the open-cycle cooling water system program. The applicant is requested to discuss the visual, VT or other inspection methods for these components. In addition the applicant is requested to discuss the frequency of these inspections, acceptance criteria and the bases thereof.

Response

LRA Table 3.2.2.A-1 is in error with respect to identifying cracking as an aging effect for wrought austenitic stainless steel components in a raw water environment. Consistent with NUREG-1801 guidelines (i.e., Item VII.C1.1-a), the aging effect for this material/environment combination should be loss of material due to pitting corrosion, crevice corrosion, microbiologically influenced corrosion, and biofouling.

LRA Table 3.2.2.A-1 correctly credits the Open-Cycle Cooling Water System (OCCWS) Program for components in a raw water environment. The current program descriptions for the OCCWS Program (LRA Sections A1.1.29 and B2.1.10) will be modified to include an enhancement to develop procedures to address loss of material for the NMP1 Containment Spray Raw Water System. The required enhancement will be implemented prior to the period of extended operation. The OCCWS Program Attribute Assessment (PAA) addresses program

implementation at NMPNS relative to the requirements of Appendix A of NUREG-1800. The OCCWS PAA is available on-site at NMPNS for review.

LRA Revisions

LRA Table 3.2.2.A-1 is revised, as shown on the following page, to remove the lines for "Cracking" of "Flow Elements" (LRA page 3.2-38) and "Valves" (LRA page 3.2-43) fabricated of wrought austenitic stainless steel in a raw water, low flow environment. Thus, only "Loss of Material" remains as an aging effect requiring management (AERM) for these components in that material/environment combination.

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
Flow Elements	PB	Wrought Austenitic Stainless Steel	Raw Water, Low Flow	Loss of Material	Open Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	C, 2

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
Valves	PB	Wrought Austenitic Stainless Steel	Raw Water, Low Flow	Loss of Material	Open Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	A

In LRA Section A.1.1.29 (page A1-13), the following is added at the end of the program description:

> "Enhancements to the Open-Cycle Cooling Water System Program are required to include development of procedures to address loss of material for the NMP1 Containment Spray System. The enhancements are scheduled for completion prior to the period of extended operation."

In LRA Section B2.1.10 (page B-24), under the "Enhancements" heading, "None" is replaced by the following:

> "Enhancements to the Open-Cycle Cooling Water System Program are required to include development of procedures to address loss of material for the NMP1 Containment Spray System. The enhancements are scheduled for completion prior to the period of extended operation."

RAI-3.2.5

In Table 3.2.2.A-1 of the LRA, the applicant has identified loss of material as an aging effect for gray cast iron pumps in a raw water environment. This aging effect is proposed to be managed by the open-cycle cooling water system program and the selective leaching of materials program. The applicant is requested to discuss (a) the visual, VT or other inspection methods for this component as well as the frequency of inspections acceptance criteria and the bases thereof (b) bases for sampling of components and the inspection method to detect selective leaching. Also indicate whether or not hardness tests would be performed.

Response

(a) For the four gray cast iron pumps of the NMP1 Containment Spray System subject to AMR, the aging effect requiring management is loss of material. The aging mechanisms to be managed by the Open-Cycle Cooling Water System Program include crevice corrosion, erosion, galvanic corrosion, general corrosion, microbiologically influenced corrosion, and pitting corrosion. This program will be enhanced to specify the inspection method (e.g. visual, VT, or other) and frequency before the period of extended operation. Sections A1.1.29 and B2.1.10 of the LRA will be revised to reflect this enhancement (see the response to RAI 3.2-4).

(b) For the four gray cast iron pumps of the NMP1 Containment Spray System subject to AMR, the pump bowls are vulnerable to the same aging mechanisms as identified in the response to Part (a) above, plus selective leaching.

As presented in LRA Sections A1.1.33 and B2.1.21, the implementation of the Selective Leaching of Materials Program is discussed in the program description for the One-Time Inspection Program (see LRA Section B2.1.20). The basis for selecting a representative sample for the one-time inspection is as follows (from LRA Section B2.1.20, as supplemented by NMPNS letter NMP1L 1880 dated October 29, 2004):

"The process for identifying the population of potentially affected components will be based upon common characteristeics of the components, such as material of construction, fabrication process, operating environment, and aging effects. From the selected population, a sample size will be determined to provide a 90 percent confidence that 90 percent of the population does not have the degradation mechanism present. This terminology and methodology are consistent with EPRI TR-107514, 'Age Related Degradation Inspection Method and Determination.'"

A determination of whether hardness tests are necessary will be made at the time of One-Time Inspection Program implementation. This is consistent with LRA Section B2.1.20 (page B-43), which states: "Inspection techniques may include a one-time visual inspection and hardness measurement."

Hardness testing will be considered as a possible inspection technique if visual examination techniques alone cannot determine if selective leaching severe enough to affect the component intended function is occurring. The use of field hardness testing will also be contingent on the accessibility of the affected component surfaces to perform the test. Hardness testing on components susceptible to selective leaching may be appropriate if the component configuration and geometry allows. Tubing and other components such as valves with complex internal geometry do not provide adequate physical access to internal surfaces requiring examination to allow accurate measurements to be made.

The Selective Leaching of Materials Program is a new program that will be developed and implemented prior to the period of extended operation. The Selective Leaching of Materials Program is addressed in the One-Time Inspection Program Attribute Assessment (PAA), which addresses program implementation at NMPNS relative to the requirements of Appendix A of NUREG-1800. The One-Time Inspection PAA is available on-site at NMPNS for review.

RAI-3.2-6

In Table 3.2.2.A-1 of the LRA, the applicant has identified loss of material as an aging effect for copper alloys (zinc <15%) valves in a wetted air (<140°F) environment. This aging effect will be managed by the open-cycle cooling water system program. The applicant is requested to discuss the visual VT or other inspection methods for this component as well as the frequency of inspections, acceptance criteria and the bases thereof. In addition the applicant is requested to provide its operating experience with these copper alloy valves in this environment.

Response

NMPNS has determined that the material/environment combination of copper alloy (zinc content ≤15%) valves in an environment of air, moisture or wetting, temperature <140°F, should have no aging effects requiring management with the exception of loss of heat transfer. Loss of heat transfer applies only to components with an intended function of heat transfer, which does not apply to the subject valves. LRA Table 3.2.2.A-1 will be revised to indicate that the line item of valves, with a material of copper alloy (zinc content ≤15%), and in an environment of air,

moisture or wetting, temperature <140°F, has no aging effects requiring management and, therefore, no AMP is required for this line item.

NMP1 has valves with a material of copper alloy (zinc content ≤15%) in an environment of raw water, low flow. NMP has significant operating experience supporting the conclusion that there are no aging effects requiring management for this material/environment combination, other than loss of heat transfer for components with a heat transfer intended function. However, the aging effect of loss of material was assigned to this material/environment combination based on data in the literature and industry experience. Therefore, copper alloy (zinc content ≤15%) valves in an environment of raw water, low flow have the aging effect of loss of material with the Open-Cycle Cooling Water Program as the AMP. A new activity under the Open-Cycle Cooling Water Program is designated to manage loss of material for these valves. This activity is also currently assigned to manage loss of material for the copper alloy (zinc content ≤15%) valves in an environment of air, moisture or wetting, temperature <140°F, which is to be changed. The new activity will manage loss of material for all components in a raw water environment in the Containment Spray System. Details of the inspections to be performed have not been determined. Inclusion of the containment spray system in the description of the scope of the Open-Cycle Cooling Water Program, and identification of this new activity as an enhancement to the Open-Cycle Cooling Water Program were inadvertently omitted from LRA Appendix A1.1.29 and B2.1.10. LRA Appendix A1.1.29 and B2.1.10 will be revised to include the Containment Spray System in the description of the scope of the program, and to describe the enhancements to develop new activities to inspect for loss of material for components in the NMP1 Containment Spray System.

LRA Revisions

See the response to RAI 3.2-4 for changes to LRA Sections A1.1.29 and B2.1.10 regarding enhancements to the Open-Cycle Cooling Water System Program.

LRA Table 3.2.2.A-1 (page 3.2-43) is revised to remove the aging effect and aging management program for Copper Alloy valves in a moist air environment, as shown on the following page.

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
Valves	PB	Copper Alloys (Zinc ≤15%)	Air with Moisture or Wetting, temperature < 140°F	None	None			None

RAI-3.2-7

In Table 3.2.2.A-2 of the LRA, the applicant has identified cracking as an aging mechanism for wrought austenitic stainless steel filters and strainers in a treated water (temperature ≥140 °F but <212 °F), low flow environment. This aging effect would be managed by the one-time inspection and the water chemistry control programs. The applicant is requested to discuss the specific tests and inspections, frequency of inspections and acceptance criteria to assure that the strainers and filters perform their intended function in the environment identified above.

Response

The components addressed by this AMR line item are the two Core Spray Pump suction strainers located in the torus. Torus water is managed under the Water Chemistry Control Program, which is described in LRA Section B2.1.2, as supplemented by NMPNS letter NMP1L 1880 dated October 29, 2004. The chemistry action levels and sampling frequencies for the torus water are provided in the response to RAI 3.2-2. These limits are identical to those specified in EPRI TR-103515-R2, "BWR Water Chemistry Guidelines – 2000 Revision."

The One-Time Inspection Program is described in LRA Section B2.1.20, as supplemented by NMPNS letter NMP1L 1880 dated October 29, 2004. The One-Time Inspection Program is a new program that will be implemented prior to the period of extended operation. As such, the procedures needed to answer this question have not yet been developed. However, the One-Time Inspection Program will be consistent with NUREG-1801, Section XI.M32 (One-Time Inspection) when implemented. The One-Time Inspection Program Attribute Assessment (PAA) addresses program implementation at NMPNS relative to the requirements of Appendix A of NUREG-1800. The One-Time Inspection PAA is available on-site at NMPNS for review.

RAI-3.2-8

In Table 3.2.2.A-2 of the LRA, the applicant has identified no aging effects for copper alloys (zinc > 15%) and aluminum bronze heat exchangers components in a lubricating oil environment. The applicant is requested to discuss its inspection and test activities to ensure that the lubricating oil remains free of contaminants and water content.

Response

Lube oil samples from the NMP1 Core Spray Pump motor cooler (i.e., heat exchanger) oil subsystems are obtained on an annual basis in accordance with site procedure N1-CTP-V520, "Lube Oil Sampling," and the oil sample results are evaluated and trended. Any indication of an anomalous condition or adverse trend will result in an investigation under the site corrective action program.

RAI-3.2-9

In Table 3.2.2.A-2 of the LRA, the applicant has indicated loss of material as an aging effect for gray cast iron piping and fittings as an aging effect in an air environment. It is proposed to manage this aging effect by the system walkdown program. Since this aging management program is applicable to accessible exterior surfaces only, the applicant is requested to discuss how degradation on inaccessible internal surfaces of piping and fittings will be managed.

Response

LRA Table 3.2.2.A-2 contains an error. On page 3.2-46, there is a line item for external aging management of gray cast iron piping. There is, in actuality, no gray cast iron piping in this system. As can be seen on page 3.2-47, there are gray cast iron pumps. The pump bowls are made of gray cast iron and are managed by the Water Chemistry Control, One-Time Inspection, and Selective Leaching Programs. There are no accessible external surfaces for these sub-components; therefore, the Systems Walkdown Program is not applicable.

LRA Table 3.2.2.A-2 will be revised to delete the line item for gray cast iron piping and fittings.

LRA Revisions

LRA Table 3.2.2.A-2 (page 3.2-46) is revised to remove the line for gray cast iron piping and fittings, as shown on the following page.

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
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.A-10	A, 4
			Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	A
			Treated Water, Temperature ≥140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.A-02	B
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.A-05	A
			Treated Water, temperature ≥140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	V.D2.1-c	3.2.1.A-16	E

RAI-3.2-10

In Table 3.2.2.A-2 of the LRA, the applicant has identified loss of material as an aging effect for gray cast iron pump components in a treated water environment (temperature ≥140 °F but ≤212 °F), low flow environment. The applicant is requested to provide (a) the basis for selecting a representative sample for the one-time inspection (b) inspection methods to detect selective leaching. Also indicate whether or not hardness tests would be performed.

Response

(a) The basis for selecting a representative sample for the one-time inspection is as follows (from LRA Section B2.1.20, as supplemented by NMPNS letter NMP1L 1880 dated October 29, 2004):

> "The process for identifying the population of potentially affected components will be based upon common characteristics of the components, such as material of construction, fabrication process, operating environment, and aging effects. From the selected population, a sample size will be determined to provide a 90 percent confidence that 90 percent of the population does not have the degradation mechanism present. This terminology and methodology are consistent with EPRI TR-107514, 'Age Related Degradation Inspection Method and Determination.'"

(b) The inspection methods used to detect selective leaching will be consistent with LRA Section B2.1.20 (page B-43), which states: "Inspection techniques may include a one-time visual inspection and hardness measurement."

Hardness testing will be considered as a possible inspection technique if visual examination techniques alone cannot determine if selective leaching severe enough to affect the component intended function is occurring. The use of field hardness testing will also be contingent on the accessibility of the affected component surfaces to perform the test. Hardness testing on components susceptible to selective leaching may be appropriate if the component configuration and geometry allows. Tubing and other components such as valves with complex internal geometry do not provide adequate physical access to internal surfaces requiring examination to allow accurate measurements to be made.

The One-Time Inspection Program, which includes the Selective Leaching of Materials Program, is a new program that will be developed and implemented prior to the period of extended operation. The One-Time Inspection Program Attribute Assessment (PAA) addresses program implementation at NMPNS relative to the requirements of Appendix A of NUREG-1800. The One-Time Inspection Program PAA is available on-site at NMPNS for review.

RAI-3.2-11

In Table 3.2.2.A-3 of the LRA, the applicant has identified cracking and loss of material for the carbon or low allow steel (yield strength >100 ksi) bolting in non-borated water environment (temperature ≥212 °F). These aging effects would be managed by the fatigue monitoring program and the ASME Section XI ISI (subsections IWB, IWC and IWD) Programs. The applicant is requested to discuss how loss of pre-load resulting in mechanical closure integrity would be managed for these bolts. In addition the applicant is requested to discuss the aging management of inaccessible bolts.

Response

The carbon or low allow steel (yield strength >100 ksi) bolting in non-borated water environment (temperature ≥ 212°F) described in LRA Table 3.2.2.A-3 consists of closure bolting in the Emergency Cooling System.

ASME Section XI requires visual (VT-1) and volumetric examination of Class 1 and 2 bolts greater than 2 inch diameter and VT-1 examination of Class 1 bolts 2 inches and less in diameter. Class 2 bolts 2 inches and less in diameter and Class 3 bolts are subject to a VT-2 examination for leakage. Joint leakage would be detected by both the VT-2 and VT-1 examinations. The VT-1 examinations would detect loss of material due to general corrosion, which is a consequence of joint leakage. Volumetric examination would detect cracking caused by stress corrosion cracking or any other mechanism, such as cyclic loading or fatigue. Note that the emergency cooling system has no bolts larger than 2 inches in diameter.

A site design specification provides guidelines for determining bolt torques, which control preloads. These guidelines are referenced in site mechanical maintenance procedures used for preventive and corrective maintenance.

There are no bolts that are inaccessible for examination. ASME Section XI allows a VT-1 examination of the bolted joint while the bolting is in-place under tension.

The LRA will be changed to credit the Fatigue Monitoring Program with managing the aging effect of cumulative fatigue damage, rather than cracking, for the bolts. This is part of a generic LRA change to replace cracking with cumulative fatigue damage as the aging effect managed by the Fatigue Monitoring Program. As such, the Fatigue Monitoring Program will no longer be credited for managing the aging effect of cracking. This change will be reflected in an LRA supplemental letter to be submitted by NMPNS by February 28, 2005.

RAI-3.2-12

In LRA Table 3.2.2.A-3 the applicant has credited the preventive maintenance program for managing the aging effects of cracking and loss of material of wrought austenitic stainless steel heat exchanger components in moist air (temperature > 140 °F) environment. The applicant is requested to provide the following information for these heat exchanger components:

(a) parameters monitored or inspected
(b) methods of detection of the aging effects
(c) frequency of inspections including monitoring and trending
(d) acceptance criteria and their bases

Response

The subject wrought austenitic stainless steel heat exchangers in a moist air (temperature ≥ 140°F) environment listed in LRA Table 3.2.2.A-3 consist of the four NMP1 Emergency Condensers. The aging effects requiring management are cracking and loss of material.

By letter NMP1L 1892 dated December 6, 2004, NMPNS submitted supplemental information related to LRA Section 3.1 which included revisions to the aging management programs for the NMP1 Emergency Condensers. Specifically, LRA Table 3.1.1.A item numbers 3.1.1.A-03 and 3.1.1.A-09 were revised to indicate that the Emergency Condensers were managed by a combination of the Water Chemistry Control, ASME Section XI Inservice Inspection (Subsections IWB, IWC and IWD) and Preventive Maintenance Programs. Continuous radioactivity monitoring of the emergency condenser vent is also provided in the Control Room. Also, a justification for not performing eddy current testing of the condenser tubes was provided. These changes will be reflected in LRA Table 3.2.2.A-3.

Since the Water Chemistry Control and ASME Section XI Programs are well established in the industry and credited in NUREG-1801, and since the NMPNS programs are consistent with the guidelines described in NUREG-1801 with justified exceptions, the four categories of information requested above will be provided for the Preventive Maintenance Program only.

(a) The Preventive Maintenance Program includes temperature monitoring of water in the emergency cooling steam and return lines adjacent to the Emergency Condensers and in the shell of the Emergency Condensers. As such, the parameters monitored are temperature of the water at the inlet and outlet of the condensers and on the shell side of the condensers.

(b) The methods of detection of the aging effects of cracking and loss of material are through the potential impacts to system temperatures. This is consistent with the guidelines provided in NUREG-1801, Volume 2, item number IV.C1.4-a.

(c) Temperature monitoring of the Emergency Condensers is conducted continuously through installed instrumentation, with local indications and alarms in the control room. Twice a year, the temperature data is collected and analyzed to determine if any detrimental effects have occurred.

(d) The temperature monitoring procedure contains separate acceptance criteria for the steam inlet piping, emergency condenser shell water, and condensate return line piping. The acceptance criteria are based upon design analyses to prevent damage to the piping and condensers.

LRA Revisions

The required changes to LRA Table 3.2.2.A-3 (pages 3.2-52 and 3.2-53) and to the Notes for Tables 3.2.2.A-1 through 3.2.2.B-6 (page 3.2-113) are shown on the following pages.

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
Heat Exchangers	HT PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥212°F, but < 482°F	Cracking, Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC and IWD) Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a, b	3.1.1.A-09	B, 16
			Treated Water or Steam, temperature ≥482°F	Cracking, Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC and IWD) Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a, b	3.1.1.A-09	B, 16
	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature ≥140°F	Cracking, Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC and IWD) Preventive Maintenance Program			G

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
Heat Exchangers (cont'd)	PB (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water, Temperature ≥140°F, but < 212°F	Cracking, Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC and IWD) Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a, b	3.1.1.A-09	B, 16
			Treated Water or Steam, temperature ≥212°F, but < 482°F	Cracking, Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC and IWD) Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a, b	3.1.1.A-09	B, 16

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
Heat Exchangers (cont'd)	PB (cont'd)	Wrought Austenitic Stainless Steel (cont'd)	Treated Water or Steam, temperature ≥482°F	Cracking, Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC and IWD) Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a, b	3.1.1.A-09	B, 16

Notes for Tables 3.2.2.A-1 through 3.2.2.B-6: (p 3.2-113)

16. This row applies to the Emergency Condensers, which feature all welded construction. These are non-Class 1 components that undergo an Inservice Inspection Testing Program pressure test and utilize a Preventive Maintenance Program procedure for temperature monitoring. Continuous radiation monitoring of the condenser vent via an installed radiation monitor is also credited. Additionally, the Water Chemistry Control Program is credited for these components.

RAI-3.2-13

In LRA Table 3.2.2.A-3 the applicant credits the system walkdown program and water chemistry control program for managing the aging effects of cracking and loss of material for non-safety related piping, fittings and equipment in treated water or steam environment (temperatures ranging from <140 °F to ≥212 °F but <482 °F), low flow environments. The applicant is requested to provide the following with respect to the system walkdown program:

(a) parameters monitored or inspected
(b) frequency of inspections and the bases thereof
(c) acceptance criteria

Response

The AMR line item identified above addresses the Emergency Cooling System drain lines outboard of the isolation valves to the main steam lines.

(a) The parameters monitored by walkdown inspections currently include:

- Surface corrosion for the "Loss of Material" aging effect of LRA Table 3.2.2.A-3
- Surface cracking, leakage, and indications of leakage for the "Cracking" aging effect of LRA Table 3.2.2.A-3

(b) The frequency of inspection of the parameters monitored for the Emergency Cooling System is once per refuel cycle. This frequency was determined to be adequate based on system operating experience since the aging effects are typically caused by aging mechanisms over the long-term. Therefore, the inspections will be able to identify and correct any adverse aging effect prior to the loss of intended function.

(c) The acceptance criterion for the system walkdown inspections is no evidence of aging. If any evidence is observed (i.e., corrosion, surface cracking, or leakage), the site corrective action program is utilized to evaluate the condition for impact on component and system functions, and to identify appropriate corrective action.

RAI-3.2-14

In LRA Table 3.2.2.A-3 the applicant indicated no aging effects for tanks made of pure aluminum alloys and aluminum alloys with manganese, magnesium and magnesium plus silicon in a treated water (temperature <140 °F) environment. The applicant is requested to provide the following information (a) ASTM designation or specific alloy content of the material (b) basis for arriving at the conclusion that no aging effects occur in this environment (for example, provide reference EPRI, or ASTM or similar documents which provide data to support this conclusion).

Response

There are two tanks in the NMP1 Emergency Cooling System that are made of aluminum alloy with magnesium in a treated water (temperature <140°F) environment. These tanks (TANK-60-

09 and TANK-60-10) provide the demineralized water make-up to the emergency condensers and are in-scope and subject to AMR.

(a) The tanks are made of wrought-aluminum alloy 5052-H34, which is essentially pure aluminum with 2.5% magnesium and 0.25% chromium.

(b) Aluminum alloyed with magnesium has good corrosion resistance in a treated water (temperature <140°F) environment and resists stress corrosion cracking. Reference Section 2.1.7 and Section 4 of Appendix A of EPRI TR-114882, "Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools," Revision 3.

RAI-3.2-15

In Table 3.2.2.A-3 of the LRA, the applicant credits ASME Section XI ISI program, one-time inspection and water chemistry control program for managing the aging effect cracking of aluminum alloy (containing copper or zinc as the primary alloying elements) valves in a treated water (temperature <140 °F) environment. The applicant is requested to provide the following information (a) ASTM designation or specific alloy content of the material (b) basis for concluding that cracking is the only aging effect in this environment. Provide EPRI, ASTM or similar documentary references which support this conclusion.

Response

There are six valves in the NMP1 Emergency Cooling System that are made of aluminum alloy (containing copper or zinc as the primary alloying elements) in a treated water (temperature <140°F) environment. These valves (BV-60-01, BV-60-02, VLV-60-07, VLV-60-08, VLV-60-11 and VLV-60-12) are in-scope and subject to AMR.

(a) The valves are made of aluminum alloy SB-26 (no grade).

(b) Aluminum alloyed with copper or zinc as the primary alloying elements is resistant to general corrosion in a treated water (temperature <140°F) environment, but is susceptible to stress corrosion cracking. Reference EPRI TR-114882, "Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools," Revision 3.

RAI-3.2-16

In Table 3.2.2.B-3 of the LRA, the applicant credits the system walkdown program for managing the loss of material aging effect of carbon or low allow steel (yield strength ≥100 ksi) and martensitic precipitation hardened and superferritic stainless steel bolting in a moist air (temperature <140 °F) environment. The applicant is requested to provide the following information (a) test or analytical data such as EPRI or ASTM documents which support the conclusion that loss of material is the only aging effect which would occur in this environment and SCC, loss of pre-load and cracking will not occur (b) inspection methods, frequency of inspections and acceptance criteria associated with the system walkdown program are equivalent to the bolting integrity program recommended in the GALL report.

Response

There is no bolting with the material/environment combinations of carbon or low allow steel (yield strength >100 ksi) and martensitic precipitation hardened and superferritic stainless steel bolting in a moist air (temperature < 140°F) environment in LRA Table 3.2.2.B-3 (NMP2 Low Pressure Core Spray Systems). However, these material/environment combinations are found in Table 3.2.2.B-1 (NMP2 Hydrogen Recombiner System), Table 3.2.2.B-2 (NMP2 High Pressure Core Spray System), and Table 3.2.2.B-6 (NMP2 Standby Gas Treatment System), with loss of material managed by the Systems Walkdown Program.

EPRI NP-5769, "Degradation and Failure of Bolting in Nuclear Power Plants," Table 1-4, lists incidents of stress corrosion cracking in nuclear power plants. For martensitic stainless steels, there are two incidents documented. One incident at LaCrosse, a BWR, involved 12% Chromium reactor vessel closure studs. Contributing factors to the failure were an aqueous environment during an outage, improper heat treatment, and galvanic action resulting from silver plating breakdown. The other incident was for Type 410 stainless steel valve studs at Rancho Seco, with improper heat treatment the only listed contributing factor. The service temperature for the valve studs was not provided. The only experience listed for precipitation hardenable bolting material is in a reactor internals environment, which is a high temperature environment.

For carbon and low alloy steel bolting with yield strength > 100 ksi, EPRI NP-5769, Table 1-4, lists numerous instances of stress corrosion cracking. Most of these incidents are in high temperature applications such as steam generator manway closure studs and main steam isolation valve studs. There were a few incidents involving carbon and low alloy steam generator and reactor vessel support anchor bolts. Contributing factors for these incidents included water leakage, excessive preload, or both.

All the incidents documented in EPRI NP-5769 for either material type involved either excessive preload or improper material and virtually all were in a wetted environment caused by active bolted joint leakage. The environment of the NMP bolts in question does not involve an active bolted joint leak. Bolting in these systems was assigned to an environment of moist air (temperature < 140°F) because some in-scope portions of these systems are located within the primary containment which has a warm, humid atmosphere where condensation can occur during shutdown. However, the bolts in these systems for which the Systems Walkdown Program has been assigned to manage loss of material are located in the Reactor Building. The NMP2 High Pressure Core Spray System has a portion of its piping inside the primary containment. However, this piping is part of the reactor coolant pressure boundary and is, therefore, included in the ASME Section XI Inservice Inspection (Subsections IWB, IWC, and IWD) Program, along with the associated closure bolting. Bolting covered by ASME Section XI is included in a different LRA Table 3.2.2.B-2 line item. The balance of the High Pressure Core Spray System piping, along with most of the piping in the other two systems (Hydrogen Recombiner and Standby Gas Treatment) is located outside primary containment. The appropriate environment for these bolts is air rather than moist air (temperature < 140°F). In an air environment, carbon or low allow steel (yield strength >100 ksi) has the aging effect of loss of material, while martensitic precipitation hardened and superferritic stainless steel have no aging effects requiring management. This change will be made for LRA Tables 3.2.2.B-1, 3.2.2.B-2, and 3.2.2.B-6.

The material specification for the bolting corresponding to the LRA line item for martensitic precipitation hardened and superferritic stainless steel bolting in moist air (temperature < 140°F) environments is ASTM A193 Grade B6, which has a minimum specified tempering temperature of 1100°F. Material with this heat treatment would have a yield strength of approximately 100 ksi. The material specification for the bolting corresponding to the LRA line items for carbon or low allow steel (yield strength >100 ksi) bolting in a moist air (temperature < 140°F) environment in LRA Tables 3.2.2.B-1, 3.2.2.B-2, and 3.2.2.B-6 is ASTM A193 Grade B7, which has a minimum tempering temperature of 1100°F. Yield strengths for Type 4140 steel bar, which is a steel grade that meets A193 chemical requirements, are below 150 ksi when tempered at 1100°F. Therefore, for both material types, the material yield strengths will not exceed 150 ksi. NUREG-1801, Section X1.M18, "Bolting Integrity," under parameters monitored/inspected, identifies that cracking must be monitored only for bolts with yield strengths exceeding 150 ksi. Therefore, the fact that cracking is not identified as an aging effect for the subject bolts is not inconsistent with NUREG-1801.

Loss of preload would not typically be an aging effect requiring management for bolting in low temperature systems. NUREG-1801 only specifies loss of preload as an aging effect requiring management for components in the reactor vessel and internals and reactor coolant pressure boundary. For closure bolting in Engineered Safety Features (ESF) systems, NUREG-1801 only addresses carbon and low alloy steel bolting in high-pressure or high temperature systems. The bolting with the material/environment combinations of carbon or low alloy steel (yield strength >100 ksi) and martensitic precipitation hardened and superferritic stainless steel bolting in a moist air (temperature < 140°F), which will be changed to air, are not in high temperature or high pressure systems. Furthermore, NUREG-1801 does not identify loss of preload even for ESF bolts in high temperature, high pressure systems. Therefore, the determination that loss of preload does not apply to the subject bolts is consistent with the GALL.

With regard to the Systems Walkdown Program, a visual inspection of the accessible external surfaces of the in-scope systems and components, including bolting, is performed at a frequency of once each refueling cycle. The acceptance criterion is no evidence of aging observed. If indications of corrosion, surface cracking, or leakage are observed, the site corrective action program is utilized to evaluate the condition for impact on component and system functions, and to identify appropriate corrective action.

The Bolting Integrity Program described in NUREG-1801, Section X1.M18, invokes ASME Section XI, IWB-2500 for Class 1 bolts and IWC-2500 for Class 2 bolts. The subject bolts are non-class bolts and are not subject to inservice inspection under ASME Section XI. Other than for bolting greater than 2 inches in diameter, ASME Section XI, IWC-2500 would require only a VT-2 examination for Class 2 bolts as part of examination category B-P, "all pressure retaining components." Therefore, visual inspections conducted under the Systems Walkdown Program would not be inferior to ASME Section XI inspections for Class 2 bolts 2 inches in diameter or less. The Bolting Integrity Program described in NUREG-1801, Section X1.M18, does not describe requirements for inspection of non-ASME bolting. Therefore, the use of the Systems Walkdown Program is equivalent to the guidance provided in NUREG-1801.

LRA Revisions

LRA Tables 3.2.2.B-1 (page 3.2-67), 3.2.2.B-2 (page 3.2-70), and 3.2.2.B-6 (page 3.2-107) are revised to change the bolting environment from "Air with Moisture or Wetting, temperature < 140°F" to "Air," as shown on the following pages.

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	Loss of Material	Systems Walkdown Program			G
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None

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	Loss of Material	Systems Walkdown Program			G
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None

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	Loss of Material	Systems Walkdown Program			G

LRA Section 2.3.4, Steam and Power Conversion Systems

RAI-3.4-1

In Table 3.4.2.A-1, the applicant has identified cracking and loss of strength as the aging effects for polymer piping and fittings in a treated water (temperature <140 °F) environment. These aging effects are proposed to be managed by the preventive maintenance program. The applicant is requested to identify (a) the specific polymeric materials for these components (b) basis for concluding that no other aging effects occur in this environment (c) specific tests and inspection methods for these components including the frequency of inspections, and (d) acceptance criteria for determining loss of strength of the polymers, and the bases thereof.

Response

There are three components in the NMP1 Condensate System that are made of an elastomer material and subject to a treated water (temperature <140°F) environment. These components are expansion joints (EXJBJ-49-08, EXJBJ-49-09 and EXJBJ-49-10) located at the suction of the Condensate Pumps.

(a) The expansion joints are made of rubber (Chlorobutyl elastomer with polyester fabric and metal reinforcement).

(b) Rubber in a treated water (temperature <140°F) environment is very resistant to wear and hardening, but is susceptible to cracking and loss of strength. Treated water can cause elastomer degradation, and hardening can occur when the water temperature increases above 130°F. This conclusion is based upon industry reports EPRI TR-114882, "Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools," Revision 3, and EPRI TR-114881, "Aging Effects for Structures and Structural Components (Structural Tools)," Revision 1.

(c) The expansion joints are currently visually inspected periodically and replaced on a five-year frequency.

(d) The Preventive Maintenance Program does not include specific acceptance criteria for the loss of strength parameter since the expansion joints are replaced on a five-year frequency. The replacement frequency, however, was determined by considering the operating conditions and environment. These same factors also contribute to loss of strength. Therefore, the current replacement frequency ensures that the expansion joints are replaced prior to their loss of intended function.

RAI-3.4-2

In Table 3.4.2.A-1, the applicant states that loss of material of gray cast iron pumps in a treated water (temperature <140 °F) environment will be managed by the one-time inspection, selective leaching of materials and water chemistry control aging management programs. The applicant is requested to discuss:

- *visual, VT or other inspection methods, frequency of inspections, acceptance criteria and the bases thereof*
- *bases for sampling of the pumps to detect selective leaching*
- *whether or not hardness tests will be performed*

Response

(a) For the gray cast iron pumps with an internal environment of treated water (temperature <140°F) (i.e., the two Condensate Transfer pumps), the aging effect requiring management is loss of material. The aging mechanisms to be managed by the One-Time Inspection Program and the Water Chemistry Control Program include crevice corrosion, general corrosion, and pitting corrosion. The One-Time Inspection Program is a new license renewal (LR) AMP commitment for NMP that is to be implemented prior to the period of extended operation. This commitment was made in the original LRA submittal, as supplemented by NMPNS letter NMP1L 1880 dated October 29, 2004. As such, program documents or procedures specific to managing the aging mechanisms (i.e. crevice corrosion, general corrosion, and pitting corrosion) that specify inspection methods and acceptance criteria for the two Condensate Transfer pumps do not currently exist. The frequency of any future inspections for the aging mechanisms of crevice corrosion, general corrosion, and pitting corrosion will be based on the findings of the One-Time Inspection Program. However, as stated in LRA Appendix B2.1.20, the One-Time Inspection Program will be implemented consistent with NUREG-1801, Section XI.M32.

(b) As presented in LRA Sections A1.1.33 and B2.1.21, the implementation of the Selective Leaching of Materials Program is discussed in the program description for the One-Time Inspection Program (see LRA Sections A1.1.28 and B2.1.20). As stated above, the One-Time Inspection Program is a new LR AMP commitment for NMP that is to be implemented prior to the period of extended operation. As such, program documents or procedures specific to managing the aging mechanism of selective leaching for the two Condensate Transfer pumps do not currently exist. However, as stated in LRA Section B2.1.21, the Selective Leaching Program will be implemented consistent with NUREG-1801, Section XI.M33.

(c) A determination of whether hardness tests are necessary will be made at the time of the One-Time Inspection Program implementation. This is consistent with LRA Section B2.1.20, which states: "Inspection techniques may include a one-time visual inspection and hardness measurement."

Hardness testing will be considered as a possible inspection technique if visual examination techniques alone cannot determine if selective leaching severe enough to affect the component intended function is occurring. The use of field hardness testing will also be contingent on the accessibility of the affected component surfaces to perform the test. Hardness testing on components susceptible to selective leaching may be appropriate if the component configuration and geometry allows. Tubing and other components such as valves with complex internal geometry do not provide adequate physical access to internal surfaces requiring examination to allow accurate measurements to be made.

RAI-3.4-3

In Table 3.4.2.A-1, the applicant has identified no aging effects for the wrought austenitic stainless steel tanks in a treated water (temperature <140 °F, low-flow) environment. The applicant is requested to provide details of how these tanks are supported and the material composition of the piping and fittings connected to the tanks. Also discuss the operating history of these tanks.

Response

The two Condensate Surge and Storage Tanks are mounted on a concrete floor in the Turbine Auxiliary Extension Building. The tanks are secured to the floor to prevent lateral movement with sixteen 2-¼ inch, equally-spaced anchor bolts on a 30'-6" diameter bolt circle, with the bolt circle being removed 3" from the outside diameter of each individual tank. Management of the aging effects for these concrete anchor bolts is addressed in LRA Table 3.5.2.C-1 (component type is "Fasteners (Carbon and Low Alloy Steel) in Air," on page 3.5-140).

The material composition of the piping and fittings attached to these two tanks is dependant on the particular line. The supply lines to the Control Rod Drive and Condensate Transfer Systems are wrought austenitic stainless steel (Seamless Stainless Steel –A376 Type 304). The supply line to the Main Condenser is aluminum alloy (Standard Aluminum Alloy Pipe ASTM B241 Alloy 3003 with H12 or H18 Temper or Alloy 6061 with T6 Temper). While wrought austenitic stainless steel piping is a component type identified in LRA Table 3.4.2.A-1, there is no piping component type identified for the Aluminum Alloy piping in Table 3.4.2.A-1. LRA Table 3.4.2.A-1 will be revised to include an aluminum alloy material for the component type of "Piping and Fittings."

The plant operating experience database was reviewed for occurrences of non-conforming conditions for the two Condensate Surge and Storage Tanks. No non-conformances were found in the site corrective action program database.

LRA Revisions

LRA Table 3.4.2.A-1 is revised to add an aluminum alloy material for the component type "Piping and Fittings," as shown on the following page.

Table 3.4.2.A-1 Steam and Power Conversion System
NMP1 Condensate and Condensate Transfer 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
Piping and Fittings	PB	Aluminum Alloy	Treated Water, Temperature < 140°F	Cracking	One-Time Inspection Program Water Chemistry Control Program			K

RAI-3.4-4

In Table 3.4.2.A-1, the applicant states that cracking in aluminum alloy (with copper or zinc) valves subjected to a treated water (temperature <140 °F) environment will be managed by one-time inspection and chemistry control programs. The applicant is requested to discuss the bases for not considering selective leaching as an aging effect. Also discuss the operating history of these valves in this environment.

Response

The basis for not including the aging effect of "selective leaching" for the material "Aluminum alloys containing copper or zinc as primary alloying elements" in an environment of treated water (temperature <140°F) is the zinc content of the valves involved. These particular valves have a zinc content of less than 15%. As such, any copper-zinc alloy material with <15% zinc is not susceptible to selective leaching. Since these valves are an aluminum alloy, however, they still would not be susceptible to selective leaching even if the zinc content was >15%.

Industry operating experience and the plant operating experience database were reviewed for instances where components of this aluminum alloy might have experienced failures due to corrosion. No such applicable failures were found in the industry information reviewed or in the plant database. A keyword search of the corrective action program database was also performed. Again, no failures due to corrosion of components fabricated of this aluminum alloy were found.

RAI-3.4-5

In Table 3.4.2.A-2, the applicant states that cracking and loss of material in carbon steel (yield strength <100 ksi) and ductile malleable cast iron bolting subjected to non-borated water (temperature ≥212 °F) environment will be managed by the fatigue monitoring and ASME Section XI ISI programs. The applicant is requested to discuss how the fatigue monitoring program would be applicable to the non-safety related bolting outside the pressure boundary to manage cracking in bolting. The fatigue monitoring program may not be adequate by itself. It is the staff's position that a bolting and torquing program is needed in addition to the fatigue monitoring program in order to identify cracking before there is loss of mechanical closure integrity and/or leakage.

Response

The LRA will be changed to credit the Fatigue Monitoring Program with managing the aging effect of cumulative fatigue damage, rather than cracking, for the bolts. This is part of a generic LRA change to replace cracking with cumulative fatigue damage as the aging effect managed by the Fatigue Monitoring Program. As such, the Fatigue Monitoring Program will no longer be credited for managing the aging effect of cracking. This change will be reflected in an LRA supplemental letter to be submitted by NMPNS by February 28, 2005.

The LRA line item for bolting, material of "Carbon Steel, Low Alloy Steel (yield strength < 100 ksi)," environment of "Closure Bolting for Non-Borated Water Systems with Operating

Temperature ≥212°F," and an aging effect of "Cracking," will be aligned with GALL Item VIII.H.2-b, "Closure Bolting in High Pressure or High-Temperature Systems (Steam and Power Conversion System)." Ductile/malleable iron will be removed from the material description since none of the bolts are actually ductile or malleable iron. The aging effect for GALL Item VIII.H.2-b is cracking due to cyclic loading and stress corrosion cracking. There is no GALL item for loss of preload of bolting in Steam and Power Conversion Systems.

Both cracking and loss of material would be managed by examinations performed under the ASME Section XI Inservice Inspection, Subsections IWB IWC and IWD Program, which are consistent with the examinations specified in GALL Section X1.M18, "Bolting Integrity Program." ASME Section XI requires VT-1 and volumetric examination of Class 1 and 2 bolts greater than 2 inches in diameter and VT-1 examination of Class 1 bolts 2 inches and less in diameter. Class 2 bolts 2 inches and less in diameter and Class 3 bolts are subject to a VT-2 examination for leakage. Joint leakage would typically occur prior to a loss of mechanical closure integrity of the bolted joint, and would be detected by both the VT-2 and VT-1 examinations. The VT-1 examinations would detect loss of material due to general corrosion which is a consequence of joint leakage. VT-2 examinations detect evidence of leakage, which would result in the condition being corrected prior to the occurrence of loss of material or cracking. For larger bolts, volumetric examination would detect cracking caused by stress corrosion cracking or any other mechanism, such as cyclic loading or fatigue, before mechanical closure integrity is lost.

A site design specification provides guidelines for determining bolt torques, which control preloads. These guidelines are referenced in site mechanical maintenance procedures used for preventive and corrective maintenance.

RAI-3.4-6

In Table 3.4.2.A-2, the applicant states that there are no aging effects associated with carbon steel and ductile and malleable cast iron flow elements, piping, fittings, pumps, and valves in a lubricating oil environment. The applicant is requested to address how it is ensured that there are no contaminants in the lubricating oil. A one-time inspection of these components may be necessary to ensure that no degradation has occurred.

Response

The specific components that fall under the component types listed above pertain to the lubricating oil subsystem for the NMP1 motor driven feedwater pumps.

Samples from the motor driven feedwater pump lube oil subsystem are obtained on a quarterly basis in accordance with Chemistry Technical Procedure N1-CTP-V520, "Lube Oil Sampling," and the oil sample results are evaluated and trended. Any indication of an anomalous condition or adverse trend will result in an investigation under the site corrective action program.

In addition, even though not credited due to the determination of a very low susceptibility of the applicable components to any aging effects (i.e., "None" in LRA Table 3.4.2.A-2) for the material/environment combination of carbon steel and ductile and malleable cast iron in lube oil,

Preventive Maintenance Program procedures provide instructions for periodically inspecting the gear box and lube oil coolers, as well as for centrifuging the oil, replenishing the oil supply, and changing out the oil filters.

Based on the oil quality controls already in place and on the feedwater pump lube oil subsystem maintenance and inspections already being performed, an additional one-time inspection of the oil subsystem components is not warranted.

RAI-3.4-7

In Table 3.4.2.A-2, the applicant states that cracking and loss of material in non-safety related piping, fittings and equipment in treated water or steam (temperature ≥212 °F but <482 °F), low flow environment will be managed by the system walkdown and water chemistry control program. The applicant is requested to address how it would be ensured that no loss of material and cracking are occurring in the interior and inaccessible surfaces since the system walkdown program only manages the degradation on accessible exterior surfaces. It is the staff's position that a one-time inspection of these components is needed for this purpose.

Response

The Systems Walkdown Program is described in LRA Section B2.1.33. The Water Chemistry Control Program is described in LRA Section B2.1.2. The Water Chemistry Control Program mitigates loss of material and cracking on the interior and inaccessible surfaces of the system. Especially for the low flow portions of the Feedwater/High Pressure Coolant Injection (HPCI) System, it was deemed that the Systems Walkdown Program would be sufficient for components subject to AMR for criterion 10 CFR 54.4(a)(2) only, to prevent these components from failing to perform their license renewal intended function to "Prevent Failure from Affecting SR Equipment." This determination was made since the Systems Walkdown Program will identify any leakage or structural challenges resulting from inspections for the aging effects of loss of material and cracking and institute corrective actions as necessary. However, since the One-Time Inspection Program is already being utilized for the other low flow portions of the Feedwater/HPCI System, it will be expanded to include the piping and components in-scope for LR and subject to AMR to meet criterion 10 CFR 54.4(a)(2) as well. The LRA will be revised to reflect this expansion of the One-Time Inspection Program.

LRA Revisions

LRA Table 3.4.2.A-2 (pages 3.4-36 and 3.4-37) is revised to add the One-Time Inspection Program for the NSR piping, fittings, and equipment of the NMP1 Feedwater/HPCI System that are subject to low flow environments as shown on the following page.

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
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water Treated Water, temperature < 140°F Treated Water, temperature < 140°F, Low Flow Treated Water, temperature ≥140°F, but < 212°F Treated Water, temperature ≥140°F, but < 212°F, Low Flow Treated Water or Steam, temperature ≥212°F, but < 482°F, Low Flow Treated Water or Steam, temperature ≥482°F, Low Flow	Cracking, Loss of Material	One Time Inspection Program Systems Walkdown Program Water Chemistry Control Program			

RAI-3.4-8

In Table 3.4.2.A-3, the applicant has identified no aging effects requiring management for carbon steel, low alloy steel (yield strength <100 ksi) and ductile/malleable cast iron piping, tanks and valves in a dried air or gas environment. The applicant is requested to address the tests and inspections which ensure that there are no contaminants and moisture in the dry air and gas.

Response

As described in LRA Section 2.3.4.A.4, the specific components being addressed in LRA Table 3.4.2.A-3 are the carbon dioxide (CO_2) storage tanks and associated piping and fittings, valves and bolting that supply the CO_2 to the fire protection system.

Since the pressurized, liquefied CO_2 flashes to a gaseous state at atmospheric pressure, the only possible way for moisture or contaminants to enter the CO_2 storage tank is during the delivery process from the CO_2 vendor's tank truck. Preventive maintenance procedures controlling this delivery process ensure that the tank fill line from the tank truck is completely purged of moisture and contaminants with CO_2 before the new supply of CO_2 is admitted to the CO_2 storage tank.

Based on this controlled process, tests and inspections of the CO_2 storage tank are not required to ensure that the dry air or gas is free of moisture or contaminants.

RAI-3.4-9

In Table 3.4.2.B-2, the applicant states that cracking and loss of strength of polymeric piping and fittings in a treated water (temperature <140 °F), low flow environment will be managed by preventive maintenance program. The applicant is requested to provide the following:

- *composition and/or mechanical and chemical properties of the polymer*
- *methods of inspection*
- *frequency of inspections and acceptance criteria and bases thereof*
- *operating history of these components*

Response

The subject elastomeric piping and fittings in a treated water (temperature <140°F), low flow environment contained in LRA Table 3.4.2.B-2 consist of expansion joints associated with piping connected to the two Condensate Storage Tanks.

(a) The composition of the elastomeric expansion joints is rubber.

(b) The methods of inspection associated with these expansion joints are visual, dimensional and durometer readings.

(c) Inspection of the expansion joints is performed every two years. Replacement of the components is scheduled for every 20 years. The acceptance criteria for the various methods are as follows.

Visual Inspection

- No excessive and deep cracking or cuts of outer cover exposing reinforcing wire, body rings or fabric.
- No blistering or local areas of deformation or ply separation.
- No leakage or weeping through bellows or at flange connections.
- No soft or gummy areas.
- No mechanical damage due to maintenance or operating activity.
- If expansion joint has a liner, liner is not damaged.
- Structural members and attachment hardware is not damaged and maintains structural integrity.

Dimensional Inspection

- Face to face dimensions are within design tolerances.

Durometer Reading

- Readings between 50 – 80 (Shur scale).

The inspections and acceptance criteria for the expansion joints are based upon approved vendor manuals.

(d) The license renewal operating experience database was reviewed for failures of any of the expansion joints associated with the two Condensate Storage Tanks. No such failures were found in this database.

In addition, the site corrective action program database was reviewed for any occurrences of non-conforming conditions associated with the expansion joints of the two Condensate Storage Tanks. One corrective action report was written as a result of the latest inspection (January 2004). This report identified signs of aging occurring but not to the extent that immediate action was necessary. The expansion joints were found to be leak-free and structurally intact.

LRA Revisions

LRA Table 3.4.2.B-2 (page 3.4-48) is revised to change the Piping and Fittings material from "Polymer" to "Elastomer," as shown on the following page.

Table 3.4.2.B-2 Steam and Power Conversion System
NMP2 Condensate 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
Piping and Fittings	NFS	Elastomer	Treated Water, temperature < 140°F, Low Flow	Cracking	Preventive Maintenance Program			J
				Loss of Strength	Preventive Maintenance Program			J

RAI-3.4-10

In Table 3.4.2.B-1, the applicant has identified no aging effects for nickel based alloy piping and fittings in an air environment. The applicant is requested to address how it would be ensured that there are no contaminants in the air which may cause degradation of nickel alloy piping and fitting.

Response

LRA Table 3.4.2.B-1 for the NMP2 Main Condenser Air Removal System does not contain any line item entries for nickel based alloy piping and fittings in an air environment. The only nickel based alloy piping and fittings addressed in LRA Section 3.4 appear in Table 3.4.2.A-4 for the NMP1 Main Steam System; specifically, the six "ADS Expansion Joint – Bellows Joint" labeled with component identification numbers of EXJBJ-66-01R through EXJBJ-66-06R on Drawing LR-18002-C, Sheet 1. NMPNS assumes that this issue pertains to these components.

These components are located in the drywell and have been conservatively identified as being subjected to an environment of "Air." During normal plant operations, however, the drywell actually has a nitrogen inerted environment. This environment ensures that there are no contaminants in the "air" that might contribute to degradation of the nickel bases alloy components.

RAI-3.4-11

In Table 3.4.2.B-2, the applicant states that cracking, hardening, shrinkage, and loss of strength of polymeric tanks in an air environment will be managed by the systems walkdown program. The applicant is requested to address the following:

- *composition and/or chemical and mechanical properties of the polymer*
- *methods of inspections and/or examination of inaccessible, interior surfaces to detect degradation since the system walkdown program manages aging effects on exterior, accessible surfaces only*
- *description of the tank support including the attachments.*
- *material of the piping and fitting connected to the tanks*

Response

(a) The component type of "Tanks" contained in LRA Table 3.4.2.B-2 (page 3.4-49) consists of the two 450,000 gallon Condensate Storage Tanks housed in the Condensate Storage Tank Building. The polymer type is fiberglass. The fiberglass is composed of Altac 382 resin. The tanks are further supported by cable made of 7/8" diameter PVC surrounding the outside diameter.

(b) The Condensate Storage Tank internals, which are subjected to an environment of "Treated Water, temperature <140°F, Low Flow," will be inspected per the One-Time Inspection Program, as indicated in LRA Table 3.4.2.B-2.

The methods of detection utilized by the One-Time Inspection Program have not been specifically determined at this time but are expected to include a visual inspection and a hardness test if appropriate. The One-Time Inspection Program is described in LRA Section B2.1.20 and will be implemented prior to the period of extended operation.

Hardness testing will be considered as a possible inspection technique if visual examination techniques alone cannot determine if selective leaching severe enough to affect the component intended function is occurring. The use of field hardness testing will also be contingent on the accessibility of the affected component surfaces to perform the test. Hardness testing on components susceptible to selective leaching may be appropriate if the component configuration and geometry allows. Tubing and other components such as valves with complex internal geometry do not provide adequate physical access to internal surfaces requiring examination to allow accurate measurements to be made.

(c) The Condensate Storage Tanks are anchored to the floor slab of the Condensate Storage Tank Building via 64 epoxy coated carbon steel clips and 1-inch diameter A307 bolting and nuts.

(d) The Condensate Storage Tanks include nozzles made of fiberglass. Connected to these nozzles are rubber expansion joints or flanges, depending upon the specific line. The piping and fittings connected to the expansion joints or flanges are made of carbon steel or stainless steel depending upon the specific line.

LRA Section B2.1.32, Preventive Maintenance Program

RAI B2.1.32-1

(A) The descriptions of several elements in AMP B2.1.32, "Preventive Maintenance Program (PMP)," are too brief and general for the staff to review the effectiveness and adequacy of the PMP. The applicant is requested to provide more specific detailed information for the following four elements of the AMP in accordance with the guidelines delineated in Appendix A of NUREG-1800.

(1) Parameters Monitored/Inspected
(2) Detection of Aging Effects
(3) Monitoring and Trending (specified schedule)
(4) Acceptance Criteria

(B) The applicant stated in the LRA that the aging effects of (1) piping and fittings in the NMP2 Control Building HVAC System (Table 3.3.2.B-9, Page 209), and (2) valves in the NMP1 Radioactive Waste System (Table 3.3.2.A-14, Page 149) are to be managed by this PMP. As an example, the applicant is requested to provide specific information related to the four elements of the PMP listed in (A) above for the management of aging effects of (1) piping and fittings, and (2) valves indicated above, to demonstrate the effectiveness and adequacy of this PMP.

Response

(A) The following provides more specific detailed information for the four elements of the Preventive Maintenance (PM) Program identified in the RAI.

(1) Parameters Monitored/Inspected

There are no prevention, mitigation, or performance monitoring activities in the PM Program credited for License Renewal. Rather, they are condition monitoring activities that inspect for visual signs of degradation or test for leaks. Surface conditions of components are monitored through visual inspection and examination for evidence of defects and age-related degradation. Components in selected portions of systems are monitored through visual inspection. The inspections detect aging effects which, if left unmanaged, would lead to degradation of the components' intended function(s). Examples of the component, type of inspections, and parameters monitored under the PM Program are as follows:

Unit	Component(s)	Inspection Type / Parameter	Parameter	Procedure
1	Fuel Pool heat exchanger tubes and tube sheets	Visual / Condition	Evidence of various forms of corrosion	N1-MMP-054-405
1	Various carbon steel valve internals and externals	Visual / Condition	Evidence of various forms of internal and/or external corrosion	N1-MMP-GEN-200
1	Reactor Building and Dry Well Sump Pump	Visual / Condition	Evidence of various forms of internal corrosion	N1-MPM-GEN-005
1	RX Building Emergency Ventilation and Control Room Emergency Ventilation Fan	Visual / Condition	Evidence of corrosion of carbon steel; cracking, hardening, shrinkage and loss of strength of polymers	N1-MPM-GEN-551
1	Unit 1 Reactor Building Charcoal Filter Housings	Visual / Condition	Evidence of general corrosion of housing internals	N1-TSP-202-001
1	13.8 & 4.16KV Motors	Visual / Condition	Presence of motor cooler fouling	S-EPM-GEN-081
2	Ventilation Heaters	Visual / Condition	Presence of general corrosion on heater internals	N2-EPM-GEN-V780

Unit	Component(s)	Inspection Type / Parameter	Parameter	Procedure
2	Unit Coolers	Visual / Condition	Inspection for fouling and various forms of corrosion	N2-EPM-GEN-V781
2	Motor Operated Actuators and Dampers	Visual / Condition	Internal inspection for general corrosion of damper and actuator	N2-EPM-GEN-V786
2	Air Handling Unit Cooling Cools	Visual / Condition & Test / Refrigerant Leakage	Inspection for signs of fouling, and testing for leakage	N2-MPM-GEN-SA562 & N2-MPM-HVC-V554

Most PM Program implementing procedures will require enhancement to include/annotate those parameters credited for aging management.

This program attribute will be consistent with the generic attribute descriptions in Appendix A of the NUREG-1800 upon program enhancements.

(2) Detection of Aging Effects

The aging effects requiring management for the components within the scope of the PM Program are detected by visual inspection and examination of surfaces of components for evidence of defects and age-related degradation. The activities that are performed to detect aging effects requiring management are identified in the specific PM procedures that perform the PM. The procedures are developed based on vendor recommendations and operating experience that forms the basis for the inspections performed and the frequency of the inspections such that aging effects are detected prior to a loss of the components' intended function(s). NMPNS administrative procedures provide for overall control of the PM Program and identification of how PMs are to be established, documented, scheduled, and optimized for the benefit of equipment and system reliability. Most PM Program procedures will require an enhancement to include/annotate the aging effect being detected.

This program attribute will be consistent with the generic attribute description in Appendix A of NUREG-1800 upon completion of program enhancements.

(3) Monitoring and Trending

The PM Program is a condition-monitoring program executed on a specified schedule. Results of the tasks performed are documented in the corresponding implementing procedures. These procedures include a review and evaluation of the results. The PM Program requires an enhancement to specifically include monitoring and trending, as appropriate, for age-related degradation.

This program attribute will be consistent with the generic attribute description in Appendix A of NUREG-1800 upon completion of program enhancements.

(4) Acceptance Criteria

Acceptance criteria for visual inspection and examination of components are provided in the PM Program implementing procedures. The acceptance criteria are related to the aging effects requiring management and are dependent on each individual inspection and examination considering the aging effect being managed. Implementing procedures will be enhanced to include more specific and detailed acceptance criteria, as appropriate.

This program attribute will be consistent with the generic attribute description in Appendix A of NUREG-1800 upon program enhancements.

(B) The specific information requested in the RAI is provided below.

<u>NMP2 Control Building HVAC System</u> (Table 3.3.2.B-9, Page 3.3-209) – Piping and Fittings

Note: The PM Program activities credited for managing the aging of the NMP2 Control Building HVAC piping and fittings are currently not incorporated in the applicable implementing procedures. As such, the following responses provide the type of information to be added to the procedures as part of the committed enhancements.

(1) Parameters Monitored/Inspected

The noted table identifies steel and polymer materials in air and raw water environments. Losses of material and elastomer degradation are the parameters to be monitored. Enhancements to the implementing procedures will be made that direct monitoring of in-scope piping and fitting components for signs of aging, such as loss of material, cracking, and deformation of polymers. These procedure enhancements will align the program with the NUREG-1800 criterion.

(2) Detection of Aging Effects

Piping and fitting components that are subject to aging management rely mainly on visual inspection and examination of surfaces to detect age related degradation. Implementing procedures will be enhanced to direct visual inspections to look for corrosion, microbiological degradation, cracking and deformation of polymer components. These procedure enhancements will align the program with the NUREG-1800 criterion.

(3) Monitoring and Trending (specified schedule)

The visual inspections to be performed will be accomplished on a specified schedule that is based upon the expected rate of aging degradation and operating experience. Since the inspections will provide mainly non-quantifiable results, specific trending of data is not applicable. Rather, the number and extent of occurrences may prove to be a

more beneficial attribute to trend. Enhancements to the implementing procedures will specify the appropriate frequency and parameters to trend. These procedure enhancements will align the program with the NUREG-1800 criterion.

(4) Acceptance Criteria

Acceptance criteria for visual inspections will be provided in each applicable implementing procedure. In general, any evidence of a degradation mechanism occurring (i.e., corrosion beginning to form; surface cracking observed) will result in the acceptance criteria not being met. A corrective action report would be initiated and the impact of the degradation would be assessed for immediate and long-term operation of the component. Enhancements to the implementing procedures will include acceptance criteria that are based upon current industry information and practices. These procedure enhancements will align the program with the NUREG-1800 criterion.

<u>NMP1 Radioactive Waste System</u> (Table 3.3.2.A-14, Page 3.3-149) – Valves

Note: The PM Program activities credited for managing the aging of the NMP1 Radioactive Waste System valves are currently not incorporated in the applicable implementing procedures. As such, the following responses provide the type of information to be added to the procedures as part of the committed enhancements.

(1) Parameters Monitored/Inspected

The noted table identifies loss of material and cracking for various steel and alloy valves in water environments. The parameters to be monitored are loss of material and cracking. Enhancements to the implementing procedures will be made to monitor/inspect for these parameters. These procedure enhancements will align the program with the NUREG-1800 criterion.

(2) Detection of Aging Effects

Valves that are subject to aging management rely mainly on visual inspection and examination of surfaces to detect age related degradation. Implementing procedures will be enhanced to direct visual inspections to look for corrosion, microbiological degradation, cracking. These procedure enhancements will align the program with the NUREG-1800 criterion.

(3) Monitoring and Trending (specified schedule)

The visual inspections to be performed will be accomplished on a specified schedule that is based upon the expected rate of aging degradation and operating experience. Since the inspections will provide mainly non-quantifiable results, specific trending of data is not applicable. Rather, the number and extent of occurrences may prove to be a more beneficial attribute to trend. Enhancements to the implementing procedures will specify the appropriate frequency and parameters to trend. These procedure enhancements will align the program with the NUREG-1800 criterion.

(4) Acceptance Criteria

Acceptance criteria for visual inspections will be provided in each applicable implementing procedure. In general, any evidence of a degradation mechanism occurring (i.e., corrosion beginning to form; surface cracking observed) will result in the acceptance criteria not being met. A corrective action report would be initiated and the impact of the degradation would be assessed for immediate and long-term operation of the component. Enhancements to the implementing procedures will include acceptance criteria that are based upon current industry information and practices. These procedure enhancements will align the program with the NUREG-1800 criterion.

RAI B2.1.32-2

The applicant states that enhancements to the PMP will be made which would revise existing procedures. These enhancements would provide the level of detail and specificity needed for staff review of the PMP. They would affect the main elements of the program including the scope, preventive actions, parameters monitored, detection of aging effects, monitoring and trending and acceptance criteria. These enhancements are scheduled to be completed prior to the period of extended operation. The staff views these as major enhancements which would require review and approval prior to implementation of the PMP. The staff therefore requests the applicant to provide a commitment that these enhancements would be completed on a schedule which would allow sufficient time for staff review and approval prior to the period of extended operation.

Response

This concern was also raised during the review of the AMPs by the NRC Audit Team. The question was AMP Issue 30 and the response provided was as follows:

> "As with any commitment NMPNS makes to the NRC, the resolution and/or implementation are subject to review by the NRC. Specifically for new aging management programs (AMP), the NRC can utilize Inspection Procedure 71003 Post-Approval Site Inspection for License Renewal, to verify that outstanding commitments have been met. This procedure also includes specific wording whereby the assistance of NRR/DRIP/RLEP can be utilized to ensure the licensee commitments have been met. Currently there is no specific notification to the NRC required when a commitment has been satisfied. Consistent with the industry, NMP would prefer that any review of new AMPs be conducted as part of the inspection process."

The commitment to enhance appropriate maintenance procedures that exist within the PM Program is made commensurate with the inclusion of statements to that effect within Appendices A and B of the LRA. Enhancements will be reviewed and approved using approved NMPNS administrative procedures. Once made, all maintenance activity enhancements will be readily available for review by the NRC prior to the period of extended operation.

ATTACHMENT 2

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
Implement an enhanced Open-Cycle Cooling Water System Program that addresses loss of material for the NMP1 Containment Spray System.	August 22, 2009
Submit LRA revisions that generically replace "cracking" with "cumulative fatigue damage" as the aging effect managed by the Fatigue Monitoring Program.	February 28, 2005