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10 CFR 50
10 CFR 51
10 CFR 54

5928-08-20208
October 30, 2008

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

Three Mile Island Nuclear Station, Unit 1.
Facility Operating License No. DPR-50
NRC Docket No.50-289

Subject: Response to NRC Request for Additional Information related to Three Mile Island Nuclear Station, Unit 1, License Renewal Application.

Reference: Letter from Mr. Jay Robinson (USNRC), to Mr. Michael P. Gallagher (AmerGen) "Request for additional information for Appendix B, Aging Management Programs, of the Three Mile Island Nuclear Station, Unit 1, License Renewal Application", dated October 7, 2008. (TAC No. MD7701)

In the referenced letter, the NRC requested additional information related to Appendix B, Aging Management Programs, of the Three Mile Island Nuclear Station, Unit 1, License Renewal Application (LRA). Enclosed are the responses to this request for additional information.

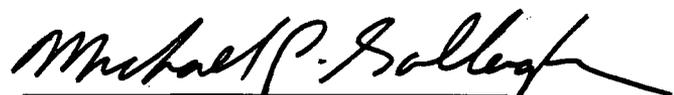
Three of our responses resulted in changes to our commitments identified in Appendix A (A.5 commitment list), of the Three Mile Island Nuclear Station, Unit 1, License Renewal Application. These commitment changes are summarized within Enclosure B, Summary of Commitments.

If you have any questions, please contact Fred Polaski, Manager License Renewal, at 610-765-5935.

I declare under penalty of perjury that the foregoing is true and correct.

Respectfully,

Executed on 10-30-2008



Michael P. Gallagher
Vice President, License Renewal
AmerGen Energy Company, LLC

A131
NRB

October 30, 2008

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Enclosure A: Response to Request for Additional Information for Appendix B, Aging Management Programs, of the Three Mile Island Nuclear Station, Unit 1, License Renewal Application.

Enclosure B: Summary of Commitments

cc: Regional Administrator, USNRC Region I, w/Enclosure
USNRC Project Manager, NRR - License Renewal, Safety, w/Enclosure
USNRC Project Manager, NRR - License Renewal, Environmental, w/o Enclosure
USNRC Project Manager, NRR - TMIGS, w/o Enclosure
USNRC Senior Resident Inspector, TMIGS, w/o Enclosure

File No. 08001

Enclosure – A

Response to Request for Additional Information for Appendix B, Aging Management Programs, of the Three Mile Island Nuclear Station, Unit 1, License Renewal Application.

Note: As a standard convention for AmerGen RAI responses, added text will be shown as ***bolded italics*** whereas deleted text will be shown as ~~strike through~~.

RAI#: B.2.1-1

LRA Sections: B.2.1.X All Sections with Exceptions and/or Enhancements
 B.3.1.X All Sections with Exceptions and/or Enhancements

Background:

Applications submitted to the Nuclear Regulatory Commission (NRC) for a renewed operating license include descriptions of various Aging Management Programs (AMPS) that may include “enhancements” and “exceptions” to one or more of the 10 program elements described in the Generic Aging Lessons Learned (GALL) Report (NUREG-1801, Rev. 1). When describing an “enhancement” or “exception”, the applicant normally links the “enhancement” or “exception” to a specific GALL Report program element.

Issue:

In the TMI-1 LRA the following AMPs described in Appendix B include “enhancements” and/or “exceptions”, but a link between the “enhancement” or “exception” and the specific GALL Program element is not provided. A link is provided, but it is provided in the applicants Program Basis Document (PBD) which is not part of the application and not submitted on the docket.

B.2.1.1	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD	Exceptions
B.2.1.2	Water Chemistry	Enhancements
B.2.1.3	Reactor Head Closure Studs	Exceptions
B.2.1.6	Flow Accelerated Corrosion	Exceptions
B.2.1.9	Open-Cycle Cooling Water System	Exceptions & Enhancements
B.2.1.10	Closed-Cycle Cooling Water System	Exceptions & Enhancements
B.2.1.11	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Enhancements
B.2.1.12	Compressed Air Monitoring	Enhancements
B.2.1.13	Fire Protection	Exceptions & Enhancements
B.2.1.14	Fire Water System	Enhancements
B.2.1.15	Aboveground Steel Tanks	Exceptions & Enhancements
B.2.1.16	Fuel Oil Chemistry	Exceptions & Enhancements
B.2.1.17	Reactor Vessel Surveillance	Enhancements
B.2.1.20	Buried Piping and Tanks Inspection	Exceptions & Enhancements
B.2.1.21	External Surfaces Monitoring	Exceptions

B.2.1.22	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	Exceptions
B.2.1.23	Lubricating Oil Analysis	Exceptions
B.2.1.24	ASME Section XI, Subsection IWE	Exceptions
B.2.1.26	ASME Section XI, Subsection IWF	Exceptions
B.2.1.28	Structures Monitoring Program	Enhancements
B.2.1.31	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Enhancements
B.2.1.33	Metal Enclosed Bus	Enhancements
B.2.1.34	Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Exceptions
B.3.1.1	Metal Fatigue of Reactor Coolant Pressure Boundary	Enhancements
B.3.1.2	Concrete Containment Tendon Prestress	Exceptions

Request:

For the AMPs in Appendix B of the LRA that have “enhancements” and/or “exceptions” (as listed in the table above), provide the applicable GALL Report AMP element the “enhancement” or “exception” is related to.

AmerGen Response

The following table provides the link between the TMI-1 LRA Appendix B “enhancement” or “exception” and the specific NUREG-1801 program elements (Element 1, “Scope of Program;” Element 2, “Preventive Actions;” Element 3, “Parameters Monitored/Inspected;” Element 4, “Detection of Aging Effects;” Element 5, “Monitoring and Trending;” Element 6, “Acceptance Criteria;” Element 7, “Corrective Actions;” Element 8, “Confirmation Process;” Element 9, “Administrative Controls;” Element 10, “Operating Experience”).

Appendix B Program #	Program name	Exceptions and/or Enhancements	Identification of Elements
B.2.1.1	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD	Exceptions	<p>The exception to code year edition has been eliminated. See AmerGen’s response to RAI # B.2.1.1-1.</p> <p>The exception to the inspection frequency applies to program elements 1, 3, 4, 5, and 6.</p>
B.2.1.2	Water Chemistry	Enhancements	The enhancement applies to program elements 1 and 5.
B.2.1.3	Reactor Head Closure Studs	Exceptions	<p>The exception to code year edition has been eliminated. See AmerGen’s response to RAI # B.2.1.3-2.</p> <p>The exception to surface examination requirements has been eliminated. See AmerGen’s response to RAI # B.2.1.3-2.</p>
B.2.1.6	Flow Accelerated Corrosion	Exceptions	The exception applies to program elements 1, 2, 4, 5, 6, and 7.
B.2.1.9	Open-Cycle Cooling Water System	Exceptions & Enhancements	<p>The exception to aging effects/mechanisms managed for circulating water piping applies to program elements 1, 3, and 4.</p> <p>The enhancement for the installation of a chemical treatment system applies to program element 1, 2, and 6.</p>

Appendix B Program #	Program name	Exceptions and/or Enhancements	Identification of Elements
B.2.1.10	Closed-Cycle Cooling Water System	Exceptions & Enhancements	The exception applies to program elements 2, 3, and 5. The enhancement for one-time inspections applies to program elements 3, 4, and 6.
B.2.1.11	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Enhancements	The enhancements for additional visual inspections apply to program elements 1 and 3. The enhancement to acceptance criteria applies to program element 6.
B.2.1.12	Compressed Air Monitoring	Enhancements	The enhancement to instrument air system quality testing applies to program elements 1, 2, and 3. The enhancement to include additional air sampling activities applies to program elements 1, 2, and 4.
B.2.1.13	Fire Protection	Exceptions & Enhancements	The exception to halon and CO2 fire suppression system test frequency applies to program elements 3 and 4. The enhancements to inspection criteria apply to program elements 3, 4, 5, and 6.
B.2.1.14	Fire Water System	Enhancements	The enhancement to include periodic wall thickness measurements applies to program elements 2, 3, 4, 5, and 6. The enhancement to include sprinkler sampling applies to program element 4.

Appendix B Program #	Program name	Exceptions and/or Enhancements	Identification of Elements
B.2.1.15	Aboveground Steel Tanks	Exceptions & Enhancements	<p>The exception to tank inspection frequency applies to program elements 1, 3, 4, and 5.</p> <p>The enhancement to include one-time thickness measurements of the bottom of the Condensate Storage Tanks applies to program elements 4, 5, and 6.</p> <p>The enhancement to include inspection of sealant between the Condensate Storage Tanks and the concrete foundations applies to program elements 3, 4, and 5.</p>
B.2.1.16	Fuel Oil Chemistry	Exceptions & Enhancements	<p>The exception to aging mechanism managed by the program applies to program elements 1, 2, 3, 4, and 5.</p> <p>The exception to the Standard Technical Specifications applies to program elements 1 and 5.</p> <p>The exception to multilevel sampling, tank bottom draining, cleaning, and internal inspection applies to program element 1.</p> <p>The exception to periodic multilevel sampling of tanks in accordance with ASTM D 4057-95 (2000) applies to program elements 1, 3, 4, and 6.</p> <p>The enhancement to include the completion of full spectrum fuel oil analysis within 31 days following the addition of new fuel oil into fuel storage tanks applies to program elements 1 and 5.</p> <p>The enhancement to include the determination of water and sediment in accordance with ASTM D1796-97 applies to program elements 1, 3, 4, and 6.</p>

Appendix B Program #	Program name	Exceptions and/or Enhancements	Identification of Elements
			<p>The enhancement to include the analysis for particulate contamination in new and stored fuel oil in accordance with modified ASTM D2276, Method A applies to program elements 1, 3, 4, and 6.</p> <p>The enhancement to include the analysis for bacteria in new and stored fuel oil applies to program element 5.</p> <p>The enhancement to include the addition of biocides, stabilizers, or corrosion inhibitors as determined by fuel oil analysis activities applies to program elements 2 and 7.</p> <p>The enhancement to include activities to periodically drain, clean, and inspect the 50,000 gallon fuel oil storage tank, the 550 gallon diesel generator day tanks, the 25,000 gallon station blackout diesel fuel storage tank, and the Diesel Fire Pump 350 gallon fuel oil storage tanks applies to program elements 2 and 4.</p> <p>The enhancement to include activities to periodically drain water and sediment from tank bottoms for the 50,000 gallon fuel oil storage tank, the 30,000 gallon diesel generator fuel storage tank, and the Diesel Fire Pump 350 gallon fuel oil storage tanks applies to program element 2.</p> <p>The enhancement to include the analysis of new oil for specific or API gravity, kinematic viscosity, and water and sediment prior to filling the 50,000 gallon fuel oil storage tank and the Diesel Fire Pump 350 gallon fuel oil storage tanks applies to program elements 1 and 5.</p> <p>The enhancement to include quarterly sampling for the 550 gallon diesel generator day tanks applies to program elements 3, 4, and 5.</p>

Appendix B Program #	Program name	Exceptions and/or Enhancements	Identification of Elements
			<p>The enhancement to include sampling of new fuel oil deliveries in accordance with ASTM D 4057-95 (2000) applies to program elements 1, 3, 4, and 6.</p> <p>The enhancement to include multilevel sampling of the Emergency Diesel Generator 30,000 gallon fuel oil storage tank and the SBO Diesel Generator 25,000 gallon fuel oil storage tank in accordance with ASTM D 4057 applies to program elements 1, 3, 4, and 6.</p> <p>The enhancement to include the use of ultrasonic techniques for determining tank bottom thicknesses should there be any evidence of loss of material found during visual inspection activities applies to program element 4.</p>
B.2.1.17	Reactor Vessel Surveillance	Enhancements	<p>The enhancement to address maintenance of the TMI-1 cavity dosimetry exchange schedule applies to program element 7.</p> <p>The enhancement to clarify that, if future plant operations exceed the limitations or bounds specified in Regulatory Position 1.3 of RG 1.99, Rev. 2, the impact of plant operation changes on the extent of reactor vessel embrittlement will be evaluated and the NRC will be notified applies to program element 8.</p>

Appendix B Program #	Program name	Exceptions and/or Enhancements	Identification of Elements
B.2.1.20	Buried Piping and Tanks Inspection	Exceptions & Enhancements	<p>The exception to include stainless steel in the buried piping program applies to program elements 1, 2 and 6.</p> <p>The exception to inspect buried piping that is not wrapped applies to program elements 1, 2 and 6.</p> <p>The exception to internally inspect and UT the buried 30,000 gallon diesel generator fuel storage tank wall applies to program elements 1, 3, 4, and 6.</p> <p>The enhancement to include at least one opportunistic or focused excavation and inspection of stainless steel piping and components prior to entering the period of extended operation, and, a focused inspection of an example of other buried materials shall be performed within ten years of entering the period of extended operation (unless an opportunistic inspection occurs within this ten-year period) applies to program elements 1, 3, 4, and 6.</p> <p>The enhancement to include an internal inspection and UT of the buried 30,000 gallon diesel generator fuel storage tank wall within the ten-year period prior to the period of extended operation, and, within ten years of entering the period of extended operation applies to program elements 1, 3, 4, and 6.</p>
B.2.1.21	External Surfaces Monitoring	Exceptions	<p>The exception to increase the scope of materials inspected and the scope of aging effects managed by the program applies to program elements 1 and 4.</p>

Appendix B Program #	Program name	Exceptions and/or Enhancements	Identification of Elements
B.2.1.22	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	Exceptions	<p>The exception to increase the scope of materials inspected by the program applies to program element 1.</p> <p>The exception to increase the scope of aging effects managed by the program applies to program elements 1, 3, 5, and 6.</p> <p>The exception to include volumetric testing to detect SCC of stainless steel components applies to program elements 1, 3, 4, and 5.</p> <p>The exception to include physical manipulation of elastomers applies to program elements 1, 3, 4, and 5.</p>
B.2.1.23	Lubricating Oil Analysis	Exceptions	The exception to flash point requirements applies to program element 3.
B.2.1.24	ASME Section XI, Subsection IWE	Exceptions	The exception to code year edition has been eliminated. See AmerGen's response to RAI # B.2.1.24-1.
B.2.1.26	ASME Section XI, Subsection IWF	Exceptions	The exception to code year edition has been eliminated. See AmerGen's response to RAI # B.2.1.26-1.

Appendix B Program #	Program name	Exceptions and/or Enhancements	Identification of Elements
B.2.1.28	Structures Monitoring Program	Enhancements	<p>The enhancement to include the Service Building, UPS Diesel Building, Mechanical Draft Cooling Tower Structures, and Miscellaneous Yard Structures applies to program element 1.</p> <p>The enhancement to monitor penetration seals applies to program elements 1 and 3.</p> <p>The enhancement to monitor the Intake Canal applies to program elements 1, 3, and 6.</p> <p>The enhancement to monitor electrical panels, junction boxes, instrument panels, and conduits applies to program element 1.</p> <p>The enhancement to monitor ground water chemistry applies to program element 4.</p> <p>The enhancement to monitor reinforced concrete submerged in raw water applies to program elements 1 and 4.</p> <p>The enhancement to monitor vibration isolators applies to program element 3.</p> <p>The enhancement to parameters monitored applies to program element 3.</p> <p>The enhancement to monitor concrete surfaces by visual inspection applies to program element 3.</p> <p>The enhancement to revise acceptance criteria applies to program element 6.</p>

Appendix B Program #	Program name	Exceptions and/or Enhancements	Identification of Elements
B.2.1.31	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Enhancements	The enhancement to existing testing practices applies to program elements 1, 3, 4, and 6.
B.2.1.33	Metal Enclosed Bus	Enhancements	The enhancements to visual inspection requirements and scope applies to program elements 1, 3, 4, and 6.
B.2.1.34	Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Exceptions	The exception applies to program elements 1, 3, 4, and 7.
B.3.1.1	Metal Fatigue of Reactor Coolant Pressure Boundary	Enhancements	The enhancements apply to program element 7.
B.3.1.2	Concrete Containment Tendon Prestress	Exceptions	The exception applies to program element 6.

RAI #: B.2.1.3-1

LRA Section: B.2.1.3. Reactor Head Closure Studs

Background:

On page B-19 of the LRA, it is stated that the program is consistent with the GALL Report with no exceptions in regards to detection of coolant leakage.

Issue:

Upon review of the PBD TM-PBD-AMP-B.2.1.3, Revision 1, "Reactor Head Closure Studs", the staff determined that "detection of coolant leakage from reactor vessel closure stud bolting" was not explicitly identified in the PBD for the GALL Report program elements, "Scope of Program" and "Detection of Aging Effects."

Request:

Clarify the above discrepancy and provide the technical basis if this is intended to be an exception.

AmerGen Response

Reactor vessel leakage detection is currently addressed in Detection of Aging Effects, Section 3.4.b and Section 3.4.f of the AMP Basis Document, TM-PBD-AMP-B.2.1.3, Reactor Head Closure Studs Program Basis Document. The Scope of the Program, Section 3.1.a of the AMP Basis Document, TM-PBD-AMP-B.2.1.3, the Detection of Aging Effects, Section 3.4.a, and the Monitoring and Trending, Section 3.5 should have included the following sentence concerning detection of coolant leakage: ***During system pressure tests, VT-2 visual techniques are employed to monitor for coolant leakage.***

RAI#: B.2.1.3-2

LRA Section: B.2.1.3 Reactor Head Closure Studs

Background:

On page B-19 of the LRA, exceptions regarding the use of the American Society of Mechanical Engineers, (ASME) Section XI, Boiler and Pressure Vessel (B&PV) code are identified. The GALL Report specifies the use of the 2001 ASME Section XI B&PV Code, including the 2002 and 2003 addenda; however, the Three Mile Island (TMI-1) current Inservice Inspection (ISI) interval is effective from April 20, 2001, through April 19, 2011, and is based on the 1995 ASME Section XI B&PV Code, including the 1996 addenda.

Issue:

Since the code edition was previously approved under 10 CFR 50.55a for this ten-year interval, the staff concluded that the stated exceptions should not be identified as such. Similarly, the staff finds that an exception is not needed for requirements found in the 2001 edition, but not in the 1995 edition of the code.

Request:

Indicate agreement or provide justification if disagreement.

AmerGen Response

Amergen concurs that a formal exception to the ASME code version listed in NUREG-1801, Revision 1 is not required since the code edition used for the program, ASME 1995 Edition including the 1996 Addenda, has been previously approved under 10 CFR 50.55a for this ten year interval.

In addition, Amergen concurs that a formal exception to the surface examination of the reactor vessel studs described in Element 4, Detection of Aging Effects for the GALL Program X1.M3, Reactor Head Closure Studs is not required. The GALL states that the Inservice Inspection (ISI) requirements are in conformance with 2001 edition of the ASME Code. The 2001 edition of the ASME Code does not require surface examination of the reactor head closure studs. The TMI-1 ISI program invokes Code Case N-652 which does not require surface examination and has been incorporated into the 2001 Edition of the ASME code. Therefore, an exception is not needed for requirements found in the 2001 edition of the ASME code.

The elimination of the exceptions results in the following change to Section B.2.1.3, page B-19:

NUREG-1801 Consistency

The Reactor Head Closure Studs Aging Management Program is consistent with NUREG-1801 Section XI.M3, Reactor Head Closure Studs, ~~with the following exceptions:~~

Exceptions to NUREG-1801

None.

- ~~• NUREG-1801, XI.M3, specifies the 2001 ASME Section XI B&PV Code, including the 2002 and 2003 Addenda. The current TMI-1 ISI Program Plan for the third ten-year inspection interval effective from April 20, 2001 through April 19, 2011, approved per 10 CFR 50.55a, is based on the 1995 ASME Section XI B&PV Code, including 1996 addenda. The next 120-month inspection interval for TMI-1 will incorporate the requirements specified in the version of the ASME Code incorporated into 10 CFR 50.55a twelve months before the start of the inspection interval.~~
- ~~• NUREG-1801, XI.M3, specifies that surface examination uses magnetic particle, liquid penetration, or eddy current examinations to indicate the presence of surface discontinuities and flaws in the reactor head closure studs. The current TMI-1 ISI program for the third interval does not require surface examination. The next 120-month inspection interval for TMI-1 will incorporate the requirements specified in the version of the ASME Code incorporated into 10 CFR 50.55a twelve months before the start of the inspection interval.~~

As a result of these deletions, the discussion for item 3.1.1-71 of Table 3.1.1 (on page 3.1-37) changes as follows:

~~Consistent with NUREG-1801, with exceptions.~~ The Reactor Head Closure Studs program, B.2.1.3, will be used to manage cracking due to stress corrosion cracking, loss of material due to wear in the high-strength low alloy steel closure head stud assembly exposed to air with borated water leakage in the Reactor Vessel.

~~Exceptions apply to the NUREG-1801 recommendations for Reactor Head Closure Studs program implementation.~~

The discussion for item 3.2.1-23 of Table 3.2.1 (on page 3.2-24) changes as follows:

~~Exceptions apply to the NUREG-1801 recommendations for External Surfaces Monitoring, Reactor Head Closure Studs, and ASME Section XI, Subsection IWE program implementation.~~

In addition, the notes for the line items in Table 3.1.2-2 that credit the Reactor Head Closure Studs Aging Management Program change to "A" notes instead of "B" notes.

RAI#: B.2.1.3-3

LRA Section: B.2.1.3 Reactor Head Closure Studs

Background:

On page B-19 of the LRA, it is stated that the Aging Management Program (AMP) is consistent with the GALL Report with no exceptions to the "preventive actions" program element. The GALL Report recommends the usage of stable lubricants which helps to reduce the possibility of stress corrosion cracking (SCC) or intergranular stress corrosion cracking (IGSCC), thus making the program effective.

Issue:

Upon inspection of the TMI-1 basis documents, it was found that Dow Corning GN Metal Assembly Spray is used as a lubricant. The specification sheet for this lubricant identifies its composition as including 14% Molybdenum Disulfide. Molybdenum Disulfide is evaluated in Electric Power Research Institute (EPRI)-NP-5769 "Degradation and Failure of Bolting in Nuclear Power Plants", as a compound that is discouraged from use. Use of this lubricant appears to be an exception to the GALL program recommendations.

Request:

Clarify this discrepancy and provide the technical basis if this is actually intended to be an exception.

AmerGen Response

The TMI-1 procedures currently specify the use of Dow Corning G-N Metal Spray as a lubricant for the Reactor Closure Studs. During the Fall 2007 refueling outage, Dow Corning G-N Metal Spray was used as a lubricant for the Reactor Head Closure Studs.

The TMI-1 Reactor Head Closure Studs are inspected in accordance with the ASME Section XI program and have acceptable inspection results to date.

The TMI-1 Reactor Head Closure Studs Program will be enhanced to select an alternate stable lubricant that is compatible with the fastener material and the environment. This enhancement will be addressed by Element 1, Scope of Program, and Element 2, Preventive Actions.

The addition of this enhancement results in the following changes:

Appendix A, Page A-4

3. Reactor Head Closure Studs (Section A.2.1.3) [Existing – ***Requires Enhancement***]

Appendix A, Page A-8

A.2.1.3 REACTOR HEAD CLOSURE STUDS

The Reactor Head Closure Studs program is an existing program that provides for condition monitoring and preventive activities to manage stud cracking and loss of material. The program is implemented through station procedures based on the examination and inspection requirements specified in ASME Section XI, Table IWB-2500-1 and preventive measures described in NRC Regulatory Guide 1.65, "Materials and Inspection for Reactor Vessel Closure Studs." ***The Reactor Head Closure Studs program will be enhanced to select an alternate stable lubricant that is compatible with the fastener material and the environment. This enhancement will be implemented prior to the period of extended operation.***

Appendix A, Page A-39, Table A.5, Commitment No. 3

No.	Program or Topic	Commitment	UFSAR Supplement Location (LRA Appendix A)	Enhancement or Implementation Schedule	Source
3.	Reactor Head Closure Studs	Existing program is credited. <i>The program will be enhanced to select an alternate stable lubricant that is compatible with the fastener material and the environment.</i>	A.2.1.3	<i>Ongoing. Prior to the Period of extended operation.</i>	Section B.2.1.3

Appendix B, Page B-19

Enhancements

~~None.~~ ***The Reactor Head Closure Studs program will be enhanced to select an alternate stable lubricant that is compatible with the fastener material and the environment. This enhancement will be implemented prior to the period of extended operation.***

RAI # B.2.1.7-1

LRA Section: B.2.1.7, Bolting Integrity

Background:

The "monitoring and trending" element as discussed on page XI M-65 of the Gall Report AMP for Bolting Integrity (XI.M18) recommends bolting connections for pressure retaining components (not covered by ASME Section XI) to be "inspected daily if leaking. If the leak rate does not increase, the inspection frequency may be decreased to biweekly or weekly".

Issue:

TMI-1 credits the corrective action program for meeting this inspection frequency, however, it was not readily apparent how this is achieved. If this recommendation is not specifically addressed in written procedures and guidance, then an exception is needed. The information on pages B-30 to B-32 of the LRA does not provide sufficient information to determine how the program satisfies the GALL Report AMP XI.M18 element "monitoring and trending".

Request:

Provide detailed plans for inspection frequency which satisfy this GALL Report element or the basis for taking an exception.

AmerGen Response

NUREG-1801, Rev. 1 Program XI.M18 element "monitoring and trending" states: "If bolting connections for pressure retaining components (not covered by ASME Section XI) is reported to be leaking, then it may be inspected daily. If the leak does not increase, the inspection frequency may be decreased to biweekly or weekly."

In the TMI LRA Section B.2.1.7, Bolting Integrity, TMI relies on the detection of visible leakage during routine observations including engineering walkdowns and equipment maintenance activities for periodic inspection of bolting, other than Class 1, 2 or 3 bolting. Once identified the leak is documented in the corrective action program. The corrective action program assigns the frequency of follow-up inspections based on an evaluation of the identified problem.

Based on the severity of the leak and the potential to impact plant operations, nuclear or industrial safety, a leak will be repaired immediately, scheduled for repair, or monitored for change. Monitoring is specified to be performed based on the results of the evaluation of the leak. If the leak rate changes (increases, decreases or stops), the monitoring frequency is re-evaluated and may be revised. TMI operating experience has not indicated a need for a set frequency (e.g., daily) of leakage inspections involving bolting.

The addition of this exception requires the following change to Section B.2.1.7 as follows:

NUREG-1801 Consistency

The Bolting Integrity aging management program is consistent with the ten elements of aging program XI.M18, "Bolting Integrity," specified in NUREG-1801 ***with the following exception:***

Exceptions to NUREG-1801

None.

For periodic inspection of bolting, other than Class 1, 2 or 3 bolting, TMI-1 uses the Corrective Action Program to document and manage those locations where leakage was identified during routine observations including engineering walkdowns and equipment maintenance activities. Based on the severity of the leak and the potential to impact plant operations, nuclear or industrial safety, a leak will be repaired immediately, scheduled for repair, or monitored for change. If the leak rate changes (increases, decreases or stops), the monitoring frequency is re-evaluated and may be revised. TMI-1 operating experience has not indicated a need for a set frequency (e.g., daily) of leakage inspections involving bolting.

This exception applies to element #5, "Monitoring and Trending" of XI.M18, Bolting Integrity.

Discussion for items 3.4.1-22 of Table 3.4.1 and 3.3.1-43 of Table 3.3.1 changes as follows:

Exceptions apply to the NUREG-1801 recommendations for External Surfaces Monitoring program ***and Bolting Integrity program*** implementation.

Discussion for items 3.1.1-52 of Table 3.1.1, 3.2.1-23 and 24 of Table 3.2.1 and 3.3.1-45 of Table 3.3.1 changes as follows:

Consistent with NUREG-1801 ***with exceptions.*** ...

Exceptions apply to the NUREG-1801 recommendations for Bolting Integrity program implementation.

As a result of this exception, the notes for line items in AMR Tables 3.x.2 that credit the Bolting Integrity aging management program change to "B" notes from "A" notes.

RAI#: B.2.1.18-1

LRA Section: B.2.1.18, One-Time Inspection

Background:

On page B-69, the LRA states that the One-Time Inspection aging management program is consistent with the elements of the Gall Report XI.M32, "One-Time Inspection," with the exception related to the use of a specific ASME Section XI edition.

Issue:

Since the code edition was previously approved under 10 CFR 50.55a for this ten-year interval, the staff concluded that the stated exceptions should not be identified as such. Similarly, the staff finds that an exception is not needed for requirements found in the 2001 edition, but not in the 1995 edition of the code.

Request:

Indicate agreement or provide justification if disagreement

AmerGen Response

Amergen concurs that a formal exception to the ASME code version listed in NUREG-1801, Revision 1 is not required since the code edition used for the program, ASME 1995 Edition including the 1996 Addenda, has been previously approved under 10 CFR 50.55a for this ten year interval.

The elimination of this exception requires the following change to Section B.2.1.18, page B-69:

NUREG-1801 Consistency

The One-Time Inspection aging management program is consistent with the ten elements of aging management program XI.M32, "One-Time Inspection," specified in NUREG-1801. ~~with the following exception:~~

Exceptions to NUREG-1801

~~**None.** NUREG-1801 specifies in XI.M32 the 2001 ASME Section XI B&PV Code, including the 2002 and 2003 Addenda for Subsections IWB, IWC, and IWD. The TMI-1 ISI Program Plan for the third ten-year inspection interval effective from April 20, 2001 through April 19, 2011, approved per 10 CFR 50.55a, is based on the 1995 ASME Section XI B&PV Code, including 1996 addenda. The next 120-month inspection interval for TMI-1 will incorporate the requirements specified in the version of the ASME Code incorporated into 10 CFR 50.55a twelve months before the start of the inspection interval.~~

As a result of this deletion, the discussion for item 3.1.1-12 of Table 3.1.1, items 3.2.1-5, 3.2.1-15, 3.2.1-49 of Table 3.2.1, items 3.3.1-3, 3.3.1-23, 3.3.1-24 of Table 3.3.1, and items 3.4.1-2, 3.4.1-3, 3.4.1-9, 3.4.1-14 and 3.4.1-15 of Table 3.4.1 changes as follows:

Consistent with NUREG-1801. ~~with exceptions.~~

~~Exceptions apply to the NUREG-1801 recommendations for One-Time Inspection Program Implementation.~~

The discussion for item 3.3.1-90 and 3.3.1-91 of Table 3.3.1 changes as follows:

Consistent with NUREG-1801. ~~with exceptions.~~

~~Exceptions involve differences from NUREG-1801 recommendations for One-Time Inspection Program application.~~

The discussion for items 3.2.1-6 and 3.2.1-9 of Table 3.2.1 and items 3.4.1-10, 3.4.1-18, 3.4.1-19 of Table 3.4.1 changes as follows:

Consistent with NUREG-1801 with exceptions.

Exceptions apply to the NUREG-1801 recommendations for ~~One-Time Inspection and~~ Lubricating Oil Analysis program implementation.

The discussion for items 3.3.1-26 and 3.3.1-33 of Table 3.3.1 changes as follows:

Consistent with NUREG-1801 with exceptions.

Exceptions apply to the NUREG-1801 recommendations for Lubricating Oil Analysis ~~and One-Time Inspection~~ program implementation.

The discussion for item 3.1.1-84 of Table 3.1.1 changes as follows:

Consistent with NUREG-1801 with exceptions.

Exceptions apply to the NUREG-1801 recommendations for ASME Section XI Inservice Inspection program, Subsections IWB, IWC, and IWD implementation ~~and the One-Time Inspection program implementation.~~

The discussion for item 3.3.1-20 of Table 3.3.1 changes as follows:

Exceptions apply to the NUREG-1801 recommendations for Fuel Oil Chemistry ~~and the One-Time Inspection~~ program implementation.

The discussion for item 3.4.1-4 of Table 3.4.1 changes as follows:

Consistent with NUREG-1801 with exceptions.

Exceptions apply to the NUREG-1801 recommendations for ~~One-Time Inspection and Closed-Cycle Cooling Water System~~ program implementation.

The discussion for item 3.4.1-6 of Table 3.4.1 changes as follows:

Consistent with NUREG-1801 ~~with exceptions~~.

~~Exceptions apply to the NUREG-1801 recommendations for One-Time Inspection Program Implementation.~~

Consistent with NUREG-1801 with exceptions.

Exceptions apply to the NUREG-1801 recommendations for ~~One-Time Inspection and Closed-Cycle Cooling Water System~~ program implementation.

The discussion for item 3.4.1-12 of Table 3.4.1 changes as follows:

Exceptions apply to the NUREG-1801 recommendations for ~~One-Time Inspection, Lubricating Oil Analysis, and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components~~ program implementation.

The discussion for item 3.4.1-16 of Table 3.4.1 changes as follows:

Consistent with NUREG-1801 with exceptions.

Exceptions apply to the NUREG-1801 recommendations for ~~One-Time Inspection and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components~~ program implementation.

In addition, the notes for the line items in Tables 3.1.2-1, 3.1.2-4, 3.2.2-2, 3.2.2-3, 3.2.2-5, 3.2.2-6, 3.3.2-2, 3.3.2-3, 3.3.2-4, 3.3.2-9, 3.3.2-12, 3.3.2-17, 3.3.2-18, 3.3.2-21, 3.3.2-24, 3.3.2-25, 3.4.2-1, 3.4.2-2, 3.4.2-3, 3.4.2-4, 3.4.2-5, 3.4.2-6, 3.4.2-7, 3.4.2-8, 3.5.2-7, 3.5.2-14, 3.5.2-17 that credit the One-Time Inspection aging management program change to "A" notes instead of "B" notes and "C" notes instead of "D" notes.

RAI # B.2.1.24-1

LRA Section: B.2.1.24, ASME Section XI, Subsection IWE

Background:

On page B-85, the LRA states that the ASME Section XI, Subsection IWE AMP is consistent with the elements of the Gall Report AMP XI.S1, "ASME Section XI, Subsection IWE", with the exception related to the use of a specific ASME Section XI edition.

Issue:

Since the code edition was previously approved under 10 CFR 50.55a for this ten-year interval, the staff concluded that the stated exceptions should not be identified as such. Similarly, the staff finds that an exception is not needed for requirements found in the 2001 edition, but not in the 1995 edition of the code.

Request:

Indicate agreement or provide justification if disagreement.

AmerGen Response

Amergen concurs that a formal exception to the ASME code version listed in NUREG-1801, Revision 1 is not required since the code edition used for the program, ASME 1992 Edition including the 1992 Addenda, has been previously approved under 10 CFR 50.55a for this ten year interval.

The elimination of this exception results in the following change to Section B.2.1.24, page B-85:

NUREG-1801 Consistency

The TMI-1 ASME Section XI, Subsection IWE aging management program is consistent with the ten elements of aging management program XI.S1, "ASME Section XI, Subsection IWE," specified in NUREG-1801. ~~with the following exception:~~

Exceptions to NUREG-1801

None.

~~NUREG-1801 evaluation is based on ASME Section XI, 2001 Edition including 2002 and 2003 Addenda. The current TMI-1 ASME Section XI, Subsection IWE program plan for the First 10-Year Inspection Interval effective from September 9, 2001 through April 19, 2011, approved per 10 CFR 50.55a, is based on ASME Section XI, 1992 Edition including 1992 addenda. The next 10-Year Inspection Interval for TMI-1 will incorporate the requirements~~

~~specified in the version of the ASME Code incorporated into 10 CFR 50.55a 12 months before the start of the inspection interval.~~

Table 3.2.1, Summary of Aging Management Evaluations for the Engineered Safety Features changes as follows:

The Discussion for Table 3.2.1, item 3.2.1-23 (on page 3.2-24) changes to:

Exceptions apply to the NUREG-1801 recommendations for External Surfaces Monitoring, **and** Reactor Head Closure Studs, ~~and ASME Section XI, Subsection IWE~~ program implementation.

Table 3.5.1, Summary of Aging Management Evaluations for Structures and Component Supports changes as follows:

The Discussion for Table 3.5.1, item 3.5.1-6 (on page 3.5-45) changes to:

Consistent with NUREG-1801 ~~with exceptions.~~

The ASME Section XI, Subsection IWE, B.2.1.24, and 10 CFR Part 50 Appendix J, B.2.1.27, will be used to manage loss of material due to general, pitting and crevice corrosion of the Reactor Building liner and integral attachments.

~~Exceptions apply to the NUREG-1801 recommendations for ASME Section XI, Subsection IWE program implementation.~~

See Subsection 3.5.2.2.1.4

The Discussion for Table 3.5.1, item 3.5.1-12 (on page 3.5-47) changes to:

Consistent with NUREG-1801 ~~with exceptions.~~ The ASME Section XI, Subsection IWE, B.2.1.24, and 10 CFR 50, Appendix J, B.2.1.27, will be used to manage cracking due to cyclic loading of steel, stainless steel elements, and dissimilar welds in penetration sleeves. However TMI-1 does not supplement the two programs to detect fine cracks.

~~Exceptions apply to the NUREG-1801 recommendations for ASME Section XI, Subsection IWE program implementation.~~

See Subsection 3.5.2.2.1.8

The Discussion for Table 3.5.1, item 3.5.1-16 (on page 3.5-48) changes to:

Consistent with NUREG-1801 ~~with exceptions.~~ The ASME Section XI, Subsection IWE, B.2.1.24, and 10 CFR Part 50 Appendix J, B.2.1.27, will be used to manage loss of sealing and leakage through containment due to deterioration of joint seals, gaskets, and moisture barrier.

~~Exceptions apply to the NUREG-1801 recommendations for ASME Section XI, Subsection IWE program implementation.~~

The Discussion for Table 3.5.1, item 3.5.1-18 (on page 3.5-49) changes to:

Consistent with NUREG-1801 ~~with exceptions~~. The ASME Section XI, Subsection IWE, B.2.1.24, and 10 CFR Part 50 Appendix J, B.2.1.27, will be used to manage loss of material due to general, pitting and crevice corrosion of Reactor Building penetration sleeves, dissimilar metal welds, personnel airlock, and equipment hatch.

~~Exceptions apply to the NUREG-1801 recommendations for ASME Section XI, Subsection IWE program implementation.~~

In addition, the notes for the line items in Table 3.5.2-14 that credit the ASME Section XI, Subsection IWE Aging Management Program change to "A" from "B" and to "C" from "D".

RAI # B.2.1.24-2

LRA Section: B.2.1.24, ASME Section XI, Subsection IWE

Background:

During the on-site audit, it was stated that the reactor building liner plate will be restored (weld repair) to its nominal plate thickness at all locations identified as below 90% before entering the extended operation period.

Request:

Confirm the information above regarding restoration of the liner and provide the proposed schedule for completion.

AmerGen Response

Prior to the period of extended operation, TMI-1 will restore the Reactor Building liner to its nominal plate thickness by weld repair for the previously identified corroded areas of the Reactor Building liner where the thickness of the base metal is reduced by more than 10% of the nominal plate thickness.

Commitment information added to Table A.5 is shown as follows:

A.5 License Renewal Commitment List

No.	Program or Topic	<u>Commitment</u>	UFSAR Supplement Location (LRA Appendix A)	Enhancement or Implementation Schedule	Source
42.	<i>Containment Liner Repair</i>	<i>Prior to the period of extended operation, TMI-1 will restore the Reactor Building liner to its nominal plate thickness by weld repair for the previously identified corroded areas of the Reactor Building liner where the thickness of the base metal is reduced by more than 10% of the nominal plate thickness.</i>	N/A	<i>Prior to the period of extended operation.</i>	N/A

RAI # B.2.1.26-1

LRA Section: B.2.1.26, ASME Section XI, Subsection IWF

Background:

On page B-94 of the LRA, it is stated that the TMI-1 ASME Section XI, Subsection IWF AMP is consistent with the GALL Report AMP XI.S3, "ASME Section XI, Subsection IWF," with the exception related to the use of a specific edition of ASME Section XI.

Issue:

Since the code edition was previously approved under 10 CFR 50.55a for this ten-year interval, the staff concluded that the stated exceptions should not be identified as such. Similarly, the staff finds that an exception is not needed for requirements found in the 2001 edition, but not in the 1995 edition of the code.

Request:

Indicate agreement or provide justification if disagreement.

AmerGen Response

Amergen concurs that a formal exception to the ASME code version listed in NUREG-1801, Revision 1 is not required since the code edition used for the program, ASME 1995 Edition including the 1996 Addenda, has been previously approved under 10 CFR 50.55a for this ten year interval.

The elimination of this exception results in the following change to Section B.2.1.26, page B-94:

NUREG-1801 Consistency

The TMI-1 ASME Section XI, Subsection IWF aging management program is an existing program that is consistent with NUREG-1801 aging management program XI.S3, ASME Section XI, Subsection IWF ~~with the exception described below.~~

Exceptions to NUREG-1801

None.

~~NUREG-1801 evaluation covers the 2001 edition including the 2002 and 2003 Addenda, as approved in 10 CFR 50.55a. The current TMI-1 ISI Program Plan for the Third Ten-Year Inspection Interval effective from April 20, 2001 through April 19, 2011, approved per 10 CFR 50.55a, is based on the 1995 ASME Section XI B&PV Code, including 1996 addenda. The next 120-month inspection interval for TMI-1 will incorporate the requirements specified in the version of the ASME Code incorporated into 10 CFR 50.55a twelve months before the start of the inspection interval.~~

Table 3.5.1, Summary of Aging Management Evaluations for Structures and Component Supports changes as follows:

The Discussion for Table 3.5.1, item 3.5.1-30 (on page 3.5-53) changes to:

Consistent with NUREG-1801 ~~with exceptions~~. The ASME Section XI, Subsection IWF program, B.2.1.26, will be used to manage lock-up due to wear for sliding supports of Main Steam relief valves, and heat exchanger supports. The Structures Monitoring Program; B.2.1.28 will be used to manage lock-up due to wear for sliding supports in floor beam seats.

~~Exceptions apply to the NUREG-1801 recommendations for ASME Section XI, Subsection IWF program implementation.~~

See Subsection 3.5.2.2.2.1.

The Discussion for Table 3.5.1, item 3.5.1-49 (on page 3.5-60) changes to:

Consistent with NUREG-1801 ~~with exceptions~~. Water Chemistry, B.2.1.2, and ASME Section XI, Subsection IWF, B.2.1.26, will be used to manage loss of material/general, pitting, and crevice corrosion for component supports in Treated Water environment.

~~Exceptions apply to the NUREG-1801 recommendations for ASME Section XI, Subsection IWF program implementation.~~

The Discussion for Table 3.5.1, item 3.5.1-53 (on page 3.5-62) changes to:

Consistent with NUREG-1801 ~~with exceptions~~. The ASME Section XI, Subsection IWF, B.2.1.26, will be used to manage loss of material due to general and pitting corrosion in Groups B1.1, B1.2, and B1.3 component supports.

~~Exceptions apply to the NUREG-1801 recommendations for ASME Section XI, Subsection IWF program implementation.~~

The Discussion for Table 3.5.1, item 3.5.1-54 (on page 3.5-62) changes to:

Consistent with NUREG-1801 ~~with exceptions~~. The ASME Section XI, Subsection IWF, B.2.1.26, will be used to manage loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads in Groups B1.1, B1.2, and B1.3 component supports.

~~Exceptions apply to the NUREG-1801 recommendations for ASME Section XI, Subsection IWF program implementation.~~

The Discussion for Table 3.5.1, item 3.5.1-56 (on page 3.5-63) changes to:

Consistent with NUREG-1801 ~~with exceptions~~. The ASME Section XI, Subsection IWF, B.2.1.26, will be used to manage loss of mechanical function in Group B1.2 sliding surfaces.

~~Exceptions apply to the NUREG-1801 recommendations for ASME Section XI,
Subsection IWF program implementation.~~

In addition, the notes for the line items in Table 3.5.2-17 that credit the ASME Section XI,
Subsection IWF Aging Management Program change to "A" from "B".

RAI # B.2.1.27-1

LRA Section: B.2.1.27, 10 CFR Part 50, Appendix J

Background:

In accordance with 10 CFR 50, Appendix J, the maximum allowable reactor building leakage rate at pressure Pa as specified in the Technical Specifications, La (percent/24 hours), should be used as a measurement for leak rate test.

Issue:

On page B-98 of the LRA, in the Operating Experience program element, Standard Cubic Centimeters per minute (SCCM) was used to report leakage test data instead of La.

Request:

Explain and provide the leak rate test results in terms of La.

AmerGen Response

The leak rate results in terms of La are listed below. These values are based on a Technical Specification value of 104,846 SCCM for 0.6 La.

	MAXPATH	Percent La
2001	40,247 SCCM	23.03%
2003	23,687 SCCM	13.56%
2005	21,712 SCCM	12.43%
2007	22,159 SCCM	12.68%

RAI # B.2.1.28-1

LRA Section: B.2.1.28, Structures Monitoring Program

Background:

On pages B-99 through B-102 of the LRA, it is not clear how the Structures Monitoring Program satisfies the GALL Report program element "Parameters Monitored/Inspected."

Issue:

The enhancements on page B-100 of the LRA do not include the frequency of periodically sampling of groundwater for pH, chloride, and sulfate concentrations.

Request:

Please, provide the time frame of the "periodic" sampling and the results for the last two samplings of groundwater.

AmerGen Response

Groundwater sampling for pH, chloride, and sulfate concentrations will be performed every 5 years during the period of extended operation. The last two groundwater samplings include one sample taken in 2007 and three taken in 2005. The associated sample results for pH, chloride, and sulfate concentrations are provided as follows:

Sample Date	6/19/2007	7/7/2005		
Location	MS-22	Well "A"	Well "B"	Well "C"
Ph	7.4	7.8	7.8	7.7
Chlorides (ppm)	58	57.3	42.4	65.5
Sulfates (ppm)	27	44.2	53.3	48.0

The above values meet the NUREG-1801 limits for non-aggressive groundwater.

RAI # B.2.1.28-2

LRA Section: B.2.1.28, Structures Monitoring Program

Background:

On pages B-99 through B-102 of the LRA, it is not clear as to how the Structures Monitoring Program satisfies the GALL Report program element "Operating Experience."

Issue:

On page B-101 of the LRA it was stated that: "Silt accumulation was observed at the discharge of the 48-inch diameter Emergency River Water Dump line. The silt covered approximately half the diameter of the pipe outlet, a condition also observed in 1999, during the baseline inspections. Engineering evaluation concluded that the discharge line remains capable of performing its intended function."

Request:

Explain the conclusion discussed above.

AmerGen Response

The engineering evaluation assumed the 48" diameter pipe was reduced to a 24" diameter for the length containing silt. The resulting head loss due to the restricted flow was determined not to affect the required flow rate and therefore the intended function for the pipe is unaffected. The analysis is conservative in that the 24" diameter assumed for the pipe length containing silt results in 1/4 of the area provided by the 48" diameter pipe vs. having 1/2 of the 48" pipe diameter actually restricted by silt.

RAI#: B.2.1.30-1

LRA Section: B.2.1.30, Electrical Cables and Connections Not Subject to 10 CFR 50.49
Environmental Qualification Requirements

Background:

On page B-106 of the LRA, the program description states that AMP B.2.1.30 is a new program and is consistent with the GALL Report AMP XI.E1. The GALL Report AMP XI.E1 states that an adverse localized environment is a condition in a limited plant area that is significantly more severe than the specified service environment for the cable.

Issue:

The LRA did not provide the criteria used to indicate how an adverse localized environment is determined.

Request:

Explain how adverse localized environment is determined based on the most limiting service environment of cables (radiation, temperature, and moisture) for inclusion within the scope of AMP B.2.1.30.

AmerGen Response

The TMI-1 B.2.1.30 Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program (AMP) implements a general area approach, that includes adverse localized environments, in lieu of determining where each cable and connection insulation material, for in scope, non-EQ circuits is located throughout the plant. TMI-1 engineering procedures specify general plant area temperature and radiation design ranges and limits. General plant area ambient temperatures range from 70 degrees F to 140 degrees F, and general plant area radiation doses range from 0 Rads to 6.57E06 Rads. These ranges and limits are used in the implementation of this AMP, including the identification of areas where adverse environments may exist. Cable and connection insulation materials that are installed at TMI-1 are controlled via TMI-1 engineering specifications and procedures. The cable and connection insulations' 60-year design limits are taken from the EPRI Plant Support Engineering: License Renewal Electrical Handbook, 1013475, Final Report, February 2007. The 60-year insulation design limits are used in conjunction with plant specific environmental design limits and plant operating experience to select general plant areas and localized areas in which to perform the visual inspections of a representative sample of cable and connection insulation. Therefore a specific limiting temperature or radiation dose is not used as exclusion criteria to eliminate plant areas from consideration for walkdown and subsequent cable and connection insulation inspections. Instead, general area walkdowns are performed. These walkdowns identify the harshest environmental conditions and potential adverse localized environments considering plant operating experience, including previous walkdown experience, radiological surveys and plant personnel knowledge and experiences. Subsequent visual cable and connection insulation inspections are performed on a representative sample of in scope cables and connections.

RAI#: B.2.1.31-1

LRA Section: B.2.1.31, Electrical Cables and Connections Not Subject to 10 CFR 50.49
Environmental Qualification Requirements Used in Instrumentation Circuits

Background:

In PBD TM-PBD-AMP-B.2.1.31, Revision 0, "Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits," it is stated that incore monitoring system circuits do not require an aging management program, and that only radiation monitoring and nuclear instrumentation are included in this program.

Issue:

The PBD did not provide sufficient discussion to explain that the incore monitoring system circuits do not require an aging management program.

Request:

Provide the technical basis for not including the incore monitoring system circuits in the scope of an AMP.

AmerGen Response

Incore Monitoring System circuits that are in scope for License Renewal are included in the Aging Management Program (AMP) B.3.1.3, Environmental Qualification (EQ) of Electrical Components. Because the Incore Monitoring System circuits that are in scope for License Renewal have their potential aging effects managed by the Environmental Qualification (EQ) of Electrical Components AMP, these circuits are not included in the scope of AMP B.2.1.31, Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits.

The plant Incore Monitoring System is part of the Nuclear Instrumentation and Incore Monitoring License Renewal System. The Nuclear Instrumentation and Incore Monitoring System is in scope for License Renewal because it performs safety-related functions, Fire Protection functions, and has components that are included in the Environmental Qualification (EQ) of Electrical Components AMP.

The plant Incore Monitoring System has one electrical, safety-related intended function, which is to monitor core temperature conditions during loss of flow or loss of coolant accidents, to warn the operator of potential fuel failure by overheating. This intended function is performed by the Backup Incore Thermocouple Readout (BIRO) portion of the plant Incore Monitoring System. In-core thermocouples of the BIRO system are credited in support of High Pressure Injection cooling, for post fire safe shutdown. The BIRO circuits that perform these 10 CFR 54.4 (a)(1) and 10 CFR 54.4 (a)(3) functions are included in the Environmental Qualification (EQ) of Electrical Components AMP. Because these circuits are included in the Environmental Qualification (EQ) of Electrical Components AMP, they are excluded from the TMI-1 Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits aging management program.

The remaining circuits of the plant Incore Monitoring System do not perform License Renewal intended functions. Therefore, these circuits are not subject to aging management review and are not included in an aging management program.

RAI#: B.2.1.32-1

**LRA Section: B.2.1.32, Inaccessible Medium Voltage Cables not Subject to 10 CFR 50.49
Environmental Qualification Requirements**

Background:

On page B-111 of the LRA, it is stated that preventive maintenance practices include semi-annual inspection of manholes. The applicant stated that the current manhole inspections will remain in effect as a preventive measure to preclude the degradation of cables.

Issue:

During the onsite audit, the staff reviewed the plant operating experience reports and noted that in PIMS completed Work Order R2116143, the applicant discovered that manholes 7A, 7B, 9A, E19, E12, E24, and T3 had submerged cables during the July 2008 inspection. Upon further review, it was discovered that over the last five years submergence of cables in water was a recurring issue. The staff conducted a walk down to confirm the effectiveness of the applicant's inspection program and found cables in manholes 7A and 7B submerged in water two weeks after the July 2008 inspection. Upon further discussion, the applicant indicated that these cables are qualified to be submerged.

Request:

1. Provide certification from the manufacturer on submergence capability of the cables, OR
2. Identify specific actions that will be taken to preclude the degradation of cables.

AmerGen Response

The TMI-1 Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program includes (1) testing of TMI's in scope, inaccessible medium voltage cables subject to significant moisture and significant voltage and (2) inspection and subsequent pumping of accumulated water found in associated in scope manholes as a preventive measure to reduce the cables' potential exposure to significant moisture.

The starting frequency of inspections for accumulated water and subsequent pumping will be every six months, in accordance with existing practices. The frequency of the inspections will be adjusted based on inspection results. This change in inspection frequency recognizes that the objective of the inspections, as a preventive action, is to keep the cables infrequently submerged, thereby minimizing their exposure to significant moisture. This change in inspection frequency also recognizes that a recurring inspection, set at the correct frequency, would result in the cables being submerged only as a result of event driven, rain and drain, type occurrences. As a limit on the amount of time between inspections, the maximum time between inspections will be no more than 2 years, which is in alignment with the recommended frequency in the NUREG-1801 AMP XI.E3.

The TMI-1 corrective action process is currently assessing questions associated with current practices and associated acceptance criteria.

Implementing this approach for manhole inspection frequency, results in the following change to TMI-1 LRA Appendix A, A.2.1.32:

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program is a new program that will be used to manage the aging effects and mechanisms of non-EQ, in scope inaccessible medium voltage cables. These cables may at times be exposed to significant moisture simultaneously with significant voltage. The TMI-1 cables in the scope of this aging management program will be tested using a proven test for detecting deterioration of the insulation system due to wetting, such as power factor, partial discharge, or polarization index, as described in EPRI TR-103834-P1-2, or other testing that is state-of-the-art at the time the test is performed. The cables will be tested once every 10 years. Manholes associated with the cables included in this aging management program will be inspected for water collection, *initially*, at least twice a year, in accordance with existing practices, and drained as required. ***The frequency will be adjusted based on inspection results recognizing that the objective of the inspections, as a preventive action, is to keep the cables infrequently submerged, thereby minimizing their exposure to significant moisture. The maximum time between inspections will be 2 years, which is in alignment with the recommended frequency in the NUREG-1801 AMP XI.E3.*** This new aging management program will be implemented prior to the period of extended operation.

Implementing this approach for manhole inspections results in the following change to TMI-1 LRA Section A.5, Item Number 32, Discussion Text:

Program is new. The program will be used to manage the aging effects and mechanisms of non-EQ, in scope inaccessible medium voltage cables. These cables may at times be exposed to significant moisture simultaneously with significant voltage. The TMI-1 cables in the scope of this aging management program will be tested using a proven test for detecting deterioration of the insulation system due to wetting, such as power factor, partial discharge, or polarization index, as described in EPRI TR-103834-P1-2, or other testing that is state-of-the-art at the time the test is performed. The cables will be tested at least once every 10 years. Manholes associated with the cables included in this aging management program will be inspected for water collection, *initially*, at least twice a year, in accordance with existing practices, and drained as required. ***The frequency will be adjusted based on inspection results recognizing that the objective of the inspections, as a preventive action, is to keep the cables infrequently submerged, thereby minimizing their exposure to significant moisture. The maximum time between inspections will be 2 years, which is in alignment with the recommended frequency in the NUREG-1801 AMP XI.E3.***

Implementing this approach for manhole inspections results in the following change to TMI-1 LRA Appendix B, Section B.2.1.32, last paragraph in Program Description:

This aging management program will also inspect manholes associated with the in scope, non-EQ, inaccessible cables subject to significant moisture and voltage, so that draining or other corrective actions can be taken. Inspections for water collection will be performed, *initially*, at a frequency of twice per year, in accordance with existing practices. The first inspections will be completed prior to the period of extended operation. ***The frequency will be adjusted based on inspection results recognizing***

that the objective of the inspections, as a preventive action, is to keep the cables infrequently submerged, thereby minimizing their exposure to significant moisture. The maximum time between inspections will be 2 years, which is in alignment with the recommended frequency in the NUREG-1801 AMP XI.E3.

RAI#: B.2.1.34-1

**LRA Section: B.2.1.34, Electrical Cable Connections Not Subject to 10 CFR 50.49
Environmental Qualification Requirements**

Background:

On page B-115 of the LRA, it is stated that the Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements AMP is consistent with the GALL Report AMP XI.E6 with exceptions.

Issue:

The LRA does not list the program elements associated with each exception or provide technical justification for each exception.

Request:

Provide justification of each exception to the GALL Report AMP XI.E6.

AmerGen Response

The TMI-1 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program (AMP) is consistent with the Generic Aging Lessons Learned (GALL) XI.E6 AMP with exceptions. The exceptions are that the TMI-1 AMP is consistent with the GALL XI.E6 AMP, as it is modified by the September 2007 draft of LR-ISG-2007-02, Changes to Generic Aging Lesson Learned (GALL) Report Aging Management Program (AMP) XI.E6, "Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements."

The following information is provided as additional information justifying the exceptions on an element by element basis.

Program Element 1, Scope of Program, of GALL AMP XI.E6 states:

"Connections associated with cables in scope of license renewal are part of this program, regardless of their association with active or passive components."

Consistent with the clarification provided in the September 2007 draft of LR-ISG-2007-02, the TMI-1 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements AMP Element 1, Scope of Program, states:

"The TMI-1 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program applies to metallic parts of non-EQ electrical connections associated with cables in scope of license renewal. In-scope connections are evaluated for applicability of this program. This includes the external cable connections terminating at an active device. This program does not include wiring connections internal to an active assembly. This program does not include the high voltage (>35 kV) switchyard connections."

Program Element 3, Parameters Monitored or Inspected, of GALL AMP XI.E6 states:

"This program will focus on the metallic parts of the connection. The monitoring includes loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation. A representative sample of electrical cable connections is tested. The following factors are to be considered for sampling: application (high, medium and low voltage), circuit loading, and location (high temperature, high humidity, vibration, etc.). The technical basis for the sample selected is to be documented."

Consistent with the clarification provided in the September 2007 draft of LR-ISG-2007-02, the TMI-1 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements AMP Element 3, Parameters Monitored or Inspected, states:

"This program will focus on the metallic parts of the connection. The monitoring includes loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation. The TMI-1 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program will perform testing of a representative sample of in scope electrical cable connections. The following factors are to be considered for sampling: application (medium and low voltage), circuit loading (high load), and location (high temperature, high humidity, vibration, etc). The technical basis for the sample selected will be documented in TM-SSBD-E6, Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Sample Basis Document."

Program Element 4, Detection of Aging Effects, of GALL AMP XI.E6 states:

"Electrical connections within the scope of license renewal will be tested at least once every 10 years. Testing may include thermography, contact resistance testing, or other appropriate testing methods. This is an adequate period to preclude failures of the electrical connections since experience has shown that aging degradation is a slow process. A 10-year testing interval will provide two data points during a 20-year period, which can be used to characterize the degradation rate. The first tests for license renewal are to be completed before the period of extended."

Consistent with the clarification provided in the September 2007 draft of LR-ISG-2007-02, the TMI-1 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements AMP Element 4, Detection of Aging Effects, states:

"A representative sample of electrical cable connections within the scope of license renewal will be tested prior to the period of extended operation to confirm there are no aging effects requiring management during the period of extended operation. The type of test or inspection to be performed will be a proven test for detecting loose connections. If thermography inspection is not possible or if results are inconclusive, the connection integrity can be confirmed by another acceptable connection integrity test method, such as contact resistance measurement. This one-time inspection program provides additional confirmation to support industry operating experience demonstrating electrical connections have not experienced a high degree of failures, and existing installation and maintenance practices are effective."

Program Element 7, Corrective Actions, of GALL AMP XI.E6 states:

"An engineering evaluation is performed when the test acceptance criteria are not met in order to ensure that the intended functions of the cable connections can be maintained consistent with the current licensing basis. Such an evaluation is to consider the significance of the test results, the operability of the component, the reportability of the event, the extent of the concern, the potential root causes for not meeting the test acceptance criteria, the corrective action necessary, and the likelihood of recurrence. When an unacceptable condition or situation is identified, a determination is made on whether the same condition or situation is applicable to other in-scope cable connections not tested. As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address the corrective actions.

Consistent with the clarification provided in the September 2007 draft of LR-ISG-2007-02, the TMI-1 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements AMP Element 7, Corrective Actions, states:

"Unacceptable indications for electrical cable connections will be subject to an engineering evaluation under the corrective action process. Such an evaluation will consider the age and operating condition and environment of the connection and changes to the one-time inspection program. When an unacceptable condition or situation is identified, potential corrective actions include sample expansion, increase in inspection frequency, and replacement or repair of the affected cable connection components.

These exceptions to the GALL Report AMP XI.E6 result in the following additional information for the TMI-1 LRA Appendix B, Section B.2.1.34 section for "Exceptions to NUREG-1801":

Differences between the GALL XI.E6 AMP and the proposed revision via the September 2007 draft of LR-ISG-2007-02, as relevant to Elements 1, 3, 4 and 7, include the following points of exception to the GALL XI.E6 AMP.

- 1 This program includes external cable connections terminating at an active device. The program does not include wiring connections internal to an active assembly. This program does not include high voltage (>35 kV) switchyard connections. (AMP Element 1, Scope of Program)***
- 2 In scope cable connections are evaluated for applicability of this program. The sample for the one-time inspection will be taken from cable connections, in scope for license renewal, that are not subject to 10 CFR 50.49 environmental qualification requirements. Factors to consider in selection of the sample include application (medium and low voltage), circuit loading (high loading), and location (high temperature, high humidity, vibration, etc.). (AMP Element 3, Parameters Monitored or Inspected)***
- 3 The TMI-1 Electrical Cable Connections Not Subject to 10CFR 50.49 Environmental Qualification Requirements aging management program is a one-time inspection, on a sampling basis. The intent of the one-time inspection is to confirm the absence of age-related degradation of cable connections (metallic parts). (Element 4, Detection of Aging Effects)***

4 Unacceptable conditions or situations that may be identified during program implementation will be evaluated via the corrective action program. (AMP Element 7, Corrective Actions)

The TMI-1 LRA Table 3.6.1, Summary of Aging Management Programs for the Electrical Components Evaluated in Chapter VI of NUREG-1801, Item Number 3.6.1-13, should have contained the following additional information in the "Discussion" column:

Consistent with NUREG-1801 **with exceptions**. The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program, B.2.1.34, will be used to manage loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation of the metallic parts of cable connections.

The TMI LRA Table 3.6.2-1, Electrical Commodities, Summary of Aging Management Evaluation, line item for Cable Connections (Metallic Parts) Notes column should be changed from "A" to "B."

RAI#: B.3.1.3-1

LRA Section: B.3.1.3-1, Environmental Qualification (EQ) of Electrical Components

Background:

In reviewing operating experience in PBD, TM-PBD-AMP-B.3.1.3, Revision 0, "Environmental Qualification (EQ) of Electrical Components", Issue Report (IR) 465770 (described on page 22) states that the feed water valve FW-V-16B/17B cabling was subject to 153.8 degrees F (68 degrees C) in the Intermediate Building.

Issue:

The EQ file ES-010T temperature for this zone is 110 degrees F which is lower than the temperature of 153.8 degrees F the cable was subjected to. The applicant concluded that there was no immediate danger of end of life.

Request:

Explain why there was no immediate danger to the end of life for this cable and how the increased temperature affected the EQ of this cable.

AmerGen Response

The Environmental Qualification binder for the cables associated with the Feed Water valves FW-V-16B and FW-V-17B was reviewed. The cables are normally de-energized 125 Vdc control cables and are conservatively qualified to 90 degrees C/198 degrees F for a 40-year plant life. Therefore, the cables are qualified, with margin, for temperatures in excess of the normal ambient conditions (110 degrees F) and with margin, for temperatures in excess of the temporary temperature excursion (153.8 degrees F) resulting from the short-term unavailability of a ventilation fan. The cables were not exposed to temperature conditions that exceeded their qualification. Additionally, cables are generically qualified with margin allowing for some fluctuation in environmental conditions without having impact to the cables' qualification. Therefore, based on the margin available in the qualification temperature, there was no immediate danger to the end of life for these cables, and there was no impact to the environmental qualification or the qualified life of these cables.

**Enclosure B
 SUMMARY OF REGULATORY COMMITMENTS**

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITTED DATE	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	PROGRAMMATIC (Yes/No)
<p>RAI #: B.2.1.3-3</p> <p>Change to TMI-1 LRA Section A.5, Table Item Number 3 as follows:</p> <p>Existing program is credited. <i>The program will be enhanced to select an alternate stable lubricant that is compatible with the fastener material and the environment.</i></p>	<p>Ongoing</p> <p><i>Prior to the Period of Extended Operation</i></p>	No	Yes
<p>RAI # B.2.1.24-2</p> <p>New item added to TMI-1 LRA Section A.5, Table Item Number 42 as follows:</p> <p><i>Containment Liner Repair</i></p> <p><i>Prior to the period of extended operation, TMI-1 will restore the Reactor Building liner to its nominal plate thickness by weld repair for the previously identified corroded areas of the Reactor Building liner where the thickness of the base metal is reduced by more than 10% of the nominal plate thickness.</i></p>	<p>Prior to the Period of Extended Operation</p>	Yes	No

**Enclosure B
 SUMMARY OF REGULATORY COMMITMENTS**

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITTED DATE	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	PROGRAMMATIC (Yes/No)
<p>RAI#: B.2.1.32-1</p> <p>Change to TMI-1 LRA Section A.5, Table Item Number 32 as follows:</p> <p>Program is new. The program will be used to manage the aging effects and mechanisms of non-EQ, in scope inaccessible medium voltage cables. These cables may at times be exposed to significant moisture simultaneously with significant voltage. The TMI-1 cables in the scope of this aging management program will be tested using a proven test for detecting deterioration of the insulation system due to wetting, such as power factor, partial discharge, or polarization index, as described in EPRI TR-103834-P1-2, or other testing that is state-of-the-art at the time the test is performed. The cables will be tested at least once every 10 years. Manholes associated with the cables included in this aging management program will be inspected for water collection, <i>initially</i>, at least twice a year, in accordance with existing practices, and drained as required. <i>The frequency will be adjusted based on inspection results recognizing that the objective of the inspections, as a preventive action, is to keep the cables infrequently submerged, thereby minimizing their exposure to significant moisture. The maximum time between inspections will be 2 years, which is in alignment with the recommended frequency in the NUREG-1801 AMP XI.E3.</i></p>	<p>Prior to the Period of Extended Operation</p>	<p>No</p>	<p>Yes</p>