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10 CFR 54

September 24, 2015
NRC-15-0081

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D C 20555-0001

References: 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

2) DTE Electric Company Letter to NRC, "Fermi 2 License Renewal Application," NRC-14-0028, dated April 24, 2014 (ML14121A554)

3) DTE Electric Company Letter to NRC, "Response to NRC Request for Additional Information for the Review of the Fermi 2 License Renewal Application – Set 13," NRC-15-0008, dated January 26, 2015 (ML15026A624)

4) DTE Electric Company Letter to NRC, "Response to NRC Request for Additional Information for the Review of the Fermi 2 License Renewal Application – Sets 23, 24, and 26," NRC-15-0031, dated April 10, 2015 (ML15110A342)

5) NRC Letter, "Fermi 2 – Issuance of Amendment Re: Spent Fuel Pool Rerack (TAC No. MA7233)," dated January 25, 2001 (ML010310205)

Subject: Fermi 2 License Renewal Application Update for the Boraflex Monitoring Program

The purpose of this letter is to provide the NRC with an update to the Fermi 2 License Renewal Application (LRA) related to the Boraflex Monitoring Program as shown in Enclosure 1.

In Reference 2, DTE Electric Company (DTE) submitted the License Renewal Application (LRA) for Fermi 2. In References 3 and 4, DTE responded to requests for additional information (RAIs) on the Boraflex Monitoring Program. Upon further discussion with the NRC staff, DTE has decided to no longer credit the Boraflex

Monitoring Program during the period of extended operation. DTE's current licensing basis includes NRC-approved License Amendment No. 141 (Reference 5) that authorizes DTE to replace Boraflex neutron-absorbing storage racks with Boral neutron-absorbing storage racks. Two phases of the replacement were completed in 2001 and 2007. The third phase, which would replace the remaining Boraflex racks with Boral racks, has not yet been implemented.

One new commitment is being made in this submittal:

> Consistent with the current licensing basis, DTE commits to implementation of the Boraflex rack replacement approved in Amendment No. 141 prior to September 20, 2024, or the end of the last refueling outage prior to March 20, 2025, whichever is later, so that the current Boraflex panels in the spent fuel pool will not be required to perform a neutron absorption function during the period of extended operation.

If, based on further analyses and subject to any necessary NRC approvals, DTE identifies an alternative to implementation of the rack replacement approved in Amendment No. 141 that can be completed in a timely manner, this commitment will be revised accordingly. As addressed in RIS 2014-06, "Consideration of Current Operating Issues and Licensing Actions in License Renewal," dated May 5, 2014, changes to the current licensing basis that occur after the renewed license is approved, may be subject to 10 CFR 54.37 (b) reporting requirements, but do not affect review of the license renewal application.

This new commitment for license renewal is provided in LRA Table A.4 Item 5, Boraflex Monitoring, as indicated in Enclosure 1.

Should you have any questions or require additional information, please contact Lynne Goodman at 734-586-1205.

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

Executed on September 24, 2015

Vito A. Kaminskas
Site Vice President
Nuclear Generation

Enclosures: 1. Fermi 2 License Renewal Application Revisions for the Boraflex Monitoring Program

cc: NRC Project Manager
NRC License Renewal Project Manager
NRC Resident Office
Reactor Projects Chief, Branch 5, Region III
Regional Administrator, Region III
Michigan Public Service Commission,
Regulated Energy Division (kindschl@michigan.gov)

Enclosure 1 to
NRC-15-0081

Fermi 2 NRC Docket No. 50-341
Operating License No. NPF-43

Fermi 2 License Renewal Application Revisions for the Boraflex Monitoring Program

Background

The Fermi 2 License Renewal Application (LRA) submitted in April 2014 included a Boraflex Monitoring Program. The Boraflex Monitoring Program described in LRA Section B.1.3 was based on NUREG-1801, Section XI.M22, Boraflex Monitoring. The program included areal B-10 density measurement testing of the spent fuel storage racks, such as BADGER testing, at a frequency of at least once every five years during the period of extended operation. As described in the "Operating Experience" subsection of LRA Section B.1.3, DTE had already performed BADGER testing in October 2013. In RAI B.1.3-1, the NRC staff requested the report documenting the October 2013 BADGER testing. DTE provided the BADGER report in response to RAI B.1.3-1 on January 26, 2015 by letter NRC-15-0008. After reviewing the BADGER report, the NRC asked follow-up RAI B.1.3-1a. DTE responded to RAI B.1.3-1a on April 10, 2015 by letter NRC-15-0031. In LRA Section B.1.3 and these RAI responses, DTE explained that the BADGER testing showed degradation of the Boraflex and described corrective actions. The NRC staff subsequently indicated that there were still questions regarding Boraflex degradation that were not resolved by the RAI responses.

Impact on LRA

As a result of the DTE commitment made in the cover letter for this enclosure, the Boraflex panels will no longer be required to perform a neutron absorption function during the period of extended operation. Therefore, DTE will not credit the Boraflex Monitoring Program during the period of extended operation. LRA Sections 2.3.3.4, 3.3.2.1.4, A.1.3, B.1.3, and LRA Tables 3.3.1 (Item 3.3.1-51), 3.3.2-4, A.4 (Item 5), B-1, B-2, and B-3 are revised to no longer credit the Boraflex Monitoring Program. All of the neutron-absorbing material that will be credited for neutron absorption during the period of extended operation will be managed by the existing Neutron-Absorbing Material Monitoring Program. For consistency with NUREG-1801 Section XI.M40, LRA Sections A.1.27 and B.1.27, and LRA Table 3.3.1 (Item 3.3.1-102) are revised to cover all neutron-absorbing material other than Boraflex (i.e. including, but not limited to, Boral). The LRA revisions associated with the changes discussed above are shown on the following pages. Additions are shown in underline and deletions are shown in strike-through. Note that previous changes made to these same LRA sections made in previous letters are not shown in underline or strike-through such that only the new changes due to the items above are shown as revisions. The LRA revisions are provided in the order that they would appear in the LRA.

2.3.3.4 **Fuel Pool Cooling and Cleanup**

Fuel Service and Handling Equipment

The fuel service and handling equipment system codes (system codes F11, F12, F13, F14, F15, F16, F17, F19) consist of equipment used for moving fuel during refueling and other outage inspections and tasks as well as spent fuel storage. With the exception of system code F16 (reactor vessel fuel storage equipment), the few components that are classified as safety-related (the RPV head strongback [system code F13] the dryer and separator sling [system code F13], and a plug for the "fuel servicing equip gamma scan collimator" [system code F11]), are not mechanical system components. (For scoping discussion of lifting devices and plugs, see Section 2.4.1, Reactor/Auxiliary Building and Primary Containment).

The purpose of the reactor vessel fuel storage equipment system (system code F16) is to provide storage for spent fuel. There are two types of high-density spent fuel storage racks (Holtec and Oat) being used. The Oat racks use Boraflex as a neutron absorber; the Holtec racks use Boral. The structural support of fuel provided by the stainless steel racks and the neutron absorption performed by Boraflex and Boral are intended functions in accordance with 10 CFR 54.4(a)(1). DTE's current licensing basis includes an NRC-approved license amendment (Amendment No. 141) that allows for replacement of the Boraflex with Boral. This modification consisted of several phases, with the final phase not yet being implemented. DTE has committed to implementation of the Boraflex rack replacement approved in Amendment No. 141 prior to September 20, 2024, or the end of the last refueling outage prior to March 20, 2025, whichever is later. Following the completion of spent fuel pool modifications prior to the period of extended operation, the current Boraflex in the spent fuel storage racks will not be credited for the intended function of neutron absorption. System code F16 also includes the nonsafety-related new fuel racks, which provide structural support for new fuel.

3.3.2.1.4 Fuel Pool Cooling and Cleanup System

Aging Management Programs

The following aging management programs manage the aging effects for the fuel pool cooling and cleanup system components.

- Bolting Integrity
- ~~Boraflex Monitoring~~
- External Surfaces Monitoring
- One-Time Inspection
- Neutron-Absorbing Material Monitoring
- Water Chemistry Control – BWR

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

Table 3.3.1: Auxiliary Systems					
Item Number	**Component**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.3.1-51	Boraflex spent fuel storage racks: neutron-absorbing sheets (PWR), spent fuel storage racks: neutron-absorbing sheets (BWR) exposed to treated borated water, treated water	Reduction of neutron-absorbing capacity due to boraflex degradation	Chapter XI.M22, "Boraflex Monitoring"	No	~~Consistent with NUREG-1801. The change in material properties and reduction of neutron-absorbing capacity of the Boraflex spent fuel storage rack neutron-absorbing sheets exposed to treated water will be managed by the Boraflex Monitoring Program.~~ This item was not used. The current Boraflex neutron-absorbing sheets exposed to treated water in the spent fuel storage racks will not be credited for neutron absorption during the period of extended operation. Therefore, the Boraflex in the spent fuel storage racks will not perform a license renewal intended function.

Table 3.3.1: Auxiliary Systems					
Item Number	**Component**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.3.1-102	Boral®; boron steel, and other materials (excluding Boraflex) spent fuel storage racks: neutron-absorbing sheets (PWR), spent fuel storage racks: neutron-absorbing sheets (BWR) exposed to treated borated water, treated water	Reduction of neutron-absorbing capacity; change in dimensions and loss of material due to effects of SFP environment	Chapter XI.M40, "Monitoring of Neutron- Absorbing Materials other than Boraflex"	No	Consistent with NUREG-1801. The change in material properties and reduction of neutron-absorbing capacity of the aluminum/boron carbide spent fuel storage rack neutron-absorbing ~~sheets~~ materials exposed to treated water will be managed by the Neutron-Absorbing Material Monitoring Program.

Table 3.3.2-4
Fuel Pool Cooling and Cleanup System
Summary of Aging Management Evaluation

Table 3.3.2-4: Fuel Pool Cooling and Cleanup System								
Component Type	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Programs**	**NUREG-1801 Item**	**Table 1 Item**	**Notes**
Neutron absorber	Neutron absorption	Aluminum/ boron carbide	Treated water (ext)	Change in material properties	Neutron-Absorbing Material Monitoring	VII.A2.AP-236	3.3.1-102	A
Neutron absorber	Neutron absorption	Aluminum/ boron carbide	Treated water (ext)	Loss of material	Neutron-Absorbing Material Monitoring	VII.A2.AP-236	3.3.1-102	A
Neutron absorber	Neutron absorption	Aluminum/ boron carbide	Treated water (ext)	Reduction in neutron absorption capacity	Neutron-Absorbing Material Monitoring	VII.A2.AP-236	3.3.1-102	A
~~Neutron absorber~~	~~Neutron absorption~~	~~Boron carbide / elastomer~~	~~Treated water (ext)~~	~~Change in material properties~~	~~Boraflex Monitoring~~	~~VII.A2.A-87~~	~~3.3.1-51~~	~~A~~
~~Neutron absorber~~	~~Neutron absorption~~	~~Boron carbide / elastomer~~	~~Treated water (ext)~~	~~Reduction in neutron absorption capacity~~	~~Boraflex Monitoring~~	~~VII.A2.A-87~~	~~3.3.1-51~~	~~A~~

A.1.3 Boraflex Monitoring Program

The Boraflex Monitoring Program is an existing program to manage the Boraflex material affixed to the spent fuel storage racks. This program is currently required by Technical Specification 5.5.13 and includes activities implemented in response to NRC GL 96-04 to assure that the required five percent sub-criticality margin is maintained. The Boraflex currently in the spent fuel racks will not be credited for neutron absorption during the period of extended operation and therefore this aging management program will not be relied upon during the period of extended operation. All of the neutron-absorbing material to be credited during the period of extended operation will be managed by the Neutron-Absorbing Material Monitoring Program in Section A.1.27.

~~The Boraflex Monitoring Program manages the aging effect of reduction in neutron-absorbing capacity (change in material properties) in the Boraflex material affixed to spent fuel racks. A monitoring program for the Boraflex panels in the spent fuel storage racks is implemented to assure that no unexpected degradation of the Boraflex material compromises the criticality analysis in support of the design of spent fuel storage racks. The program uses the RACKLIFE computer predictive code to calculate the gamma dose absorbed by and the amount of boron carbide loss from the Boraflex panels. The program includes (a) quarterly sampling and analysis for silica levels in the spent fuel pool water and trending the results by using the RACKLIFE code, (b) performing periodic physical measurements and neutron attenuation testing of surveillance coupons, and (c) areal B-10 density measurement testing of the spent fuel storage racks, such as Boron-10 Areal Density Gage for Evaluating Racks (BADGER) testing, at a frequency of at least once every five years. This program, implemented in response to NRC GL 96-04, assures that the required five percent sub-criticality margin is maintained.~~

~~The Boraflex Monitoring Program will be enhanced as follows.~~

- ~~Revise Boraflex Monitoring Program procedures to include areal B-10 density measurement testing of the spent fuel storage racks, such as BADGER testing, at a frequency of at least once every five years.~~

~~This enhancement will be implemented prior to the period of extended operation.~~

A.1.27 Neutron-Absorbing Material Monitoring Program

The Neutron-Absorbing Material Monitoring Program provides reasonable assurance that degradation of the neutron-absorbing materials (e.g. Boral) used in spent fuel pools that could compromise the criticality analysis will be detected. The program relies on periodic inspection, testing, and other monitoring activities to assure that the required five percent sub-criticality margin is maintained during the period of extended operation. The program monitors loss of material and changes in dimension, such as blisters, pits, and bulges that could result in a loss of neutron-absorbing capability. The parameters monitored include physical measurements and geometric changes in test coupons. The frequency of testing will be based on the condition of the neutron-absorbing material, justified with plant-specific and industry operating experience, prior to the period of extended operation, at a minimum of once every ten years in the period of extended operation. The approach to relating measurement results of the coupons to the spent fuel neutron-absorber materials considers the spent fuel loading strategy. In the event that a loss of neutron-absorbing capacity is anticipated based on coupon testing, additional testing will be performed to ensure the sub-criticality requirements are met.

The Neutron-Absorbing Material Monitoring Program will be enhanced as follows.

- Prior to the period of extended operation, revise Neutron-Absorbing Material Monitoring Program procedures to establish an inspection frequency, justified with plant-specific operating experience, of at least once every ten years, based on the condition of the neutron-absorbing material.
- Revise Neutron-Absorbing Material Monitoring Program procedures to perform trending of coupon testing results to determine the rate of degradation. Ensure the predicted boron-10 areal density will be sufficient to maintain the subcritical conditions required by technical specifications until the next coupon test.

Enhancements will be implemented prior to the period of extended operation.

A.4 LICENSE RENEWAL COMMITMENT LIST

No.	Program or Activity	Commitment	Implementation Schedule	Source
5	Boraflex Monitoring	~~Enhance Boraflex Monitoring Program as follows:~~ ~~a. Revise Boraflex Monitoring Program procedures to include areal B-10 density measurement testing of the spent fuel storage racks, such as BADGER testing, at a frequency of at least once every five years.~~ Implement the Boraflex rack replacement approved in Amendment No. 141 so that the current Boraflex panels in the spent fuel pool will not be required to perform a neutron absorption function during the period of extended operation.	Prior to September 20, 2024, or the end of the last refueling outage prior to March 20, 2025, whichever is later.	A.1.3

Table B-1

Aging Management Programs

Program	Section	New or Existing
Boraflex Monitoring	B.1.3	Existing*

*This existing program will not be used during the period of extended operation.

Table B-2

Fermi 2 Aging Management Program Correlation with NUREG-1801 Programs

NUREG-1801 Number	NUREG-1801 Program	Fermi 2 Program
XI.M22	Boraflex Monitoring	This NUREG-1801 program will not be credited during the period of extended operation. ~~Boraflex Monitoring~~ [B.1.3]

Table B-3

Fermi 2 Program Consistency with NUREG-1801

Program Name	NUREG-1801 Comparison			Plant-Specific
	Consistent with NUREG-1801	Programs with Enhancement	Programs with Exception to NUREG-1801	
Boraflex Monitoring*	~~X~~	~~X~~		

*This existing program will not be used during the period of extended operation.

B.1.3 BORAFLEX MONITORING

The Boraflex Monitoring Program is an existing program to manage the Boraflex material affixed to the spent fuel storage racks. This program is currently required by Technical Specification 5.5.13 and includes activities implemented in response to NRC GL 96-04 to assure that the required five percent sub-criticality margin is maintained. The Boraflex currently in the spent fuel racks will not be credited for neutron absorption during the period of extended operation and therefore this aging management program will not be relied upon during the period of extended operation. All of the neutron-absorbing material to be credited during the period of extended operation will be managed by the Neutron-Absorbing Material Monitoring Program in Section B.1.27.

~~Program Description~~

~~The Boraflex Monitoring Program manages the aging effect of reduction in neutron-absorbing capacity (change in material properties) in the Boraflex material affixed to spent fuel racks. A monitoring program for the Boraflex panels in the spent fuel storage racks is implemented to assure that no unexpected degradation of the Boraflex material compromises the criticality analysis in support of the design of spent fuel storage racks. The program uses the RACKLIFE computer predictive code to calculate the gamma dose absorbed by and the amount of boron carbide loss from the Boraflex panels. The program includes (a) quarterly sampling and analysis for silica levels in the spent fuel pool water and trending the results by using the RACKLIFE code, (b) performing periodic physical measurements and neutron attenuation testing of surveillance coupons, and (c) areal B-10 density measurement testing of the spent fuel storage racks, such as BADGER testing, at a frequency of at least once every five years. This program, implemented in response to NRC GL 96-04, assures that the required five percent sub-criticality margin is maintained.~~

~~NUREG-1801 Consistency~~

~~The Boraflex Monitoring Program, with enhancement, is consistent with the program described in NUREG-1801, Section XI.M22, Boraflex Monitoring.~~

~~Exceptions to NUREG-1801~~

~~None~~

~~Enhancements~~

~~The following enhancement will be implemented prior to the period of extended operation.~~

~~Element Affected~~	~~Enhancement~~
~~3. Parameters Monitored or Inspected~~ ~~4. Detection of Aging Effects~~ ~~5. Monitoring and Trending~~	~~Revise Boraflex Monitoring Program procedures to include areal B-10 density measurement testing of the spent fuel storage racks, such as BADGER testing, at a frequency of at least once every five years.~~

~~Operating Experience~~

~~The following examples demonstrate how the Boraflex Monitoring Program will be effective in managing the effects of aging during the period of extended operation.~~

- ~~In response to NRC IN 87-43, National Nuclear Corporation completed a "blackness test" on March 28, 1992. Approximately one-third of the Boraflex panels in the Fermi 2 spent fuel racks had developed cracks and small gaps. Slow scan test measurements provided data as to the axial distribution of gaps and the size of gaps. Both the size measurements and observed axial distribution are consistent with similar measurements in other racks of the same design at other plants. Analyses were performed to show that adequate subcritical margin was maintained.~~
- ~~NRC Generic Letter 96-04, "Boraflex Degradation in Spent Fuel Pool Storage Racks," requested evaluation of the condition of the Boraflex in the spent fuel racks. The response addressed the results of testing and committed to using RACKLIFE to model the Fermi 2 fuel racks and monitoring rack exposure and pool silica to identify degradation of Boraflex.~~
- ~~In 1998, Boraflex coupons were tested at Pennsylvania State University in accordance with Fermi 2 procedures, Technical Specifications, and UFSAR Section 9.1.2.4. This testing showed that the coupons that acquired the largest dose had more shrinkage than allowed by the acceptance criteria. The criticality analysis was updated to account for this increased shrinkage, and the UFSAR analysis on shrinkage was revised.~~
- ~~In 2009, the silica level in the spent fuel pool was found at a level above that observed in previous cycles. Preparations were initiated to perform BADGER testing, which was performed in October 2013.~~
- ~~In 2011, coupon testing was performed on four Boraflex surveillance coupons at Pennsylvania State University. All applicable test criteria for the coupons were satisfied by the coupons.~~
- ~~In 2012, NRC IN 2012-13 was reviewed regarding surveillance programs and corrective actions at Turkey Point and Peach Bottom with regards to Boraflex degradation monitoring. Based on the review, revisions were made to inputs so that RACKLIFE will provide more conservative calculations.~~
- ~~In October 2013, BADGER testing was performed on sixty Boraflex panels in the spent fuel racks. There were three panels that fell below the limit. A criticality sensitivity analysis showed margin in these panels' results to what is needed to maintain the required five percent sub-criticality margin. Actions were taken to preclude placing fuel in the cells adjacent to the three panels. A corrective action document was written to evaluate impacts of the BADGER testing results on the Boraflex Monitoring Program.~~

~~The history of identification of degradation and initiation of corrective action prior to loss of intended function, along with identification of program deficiencies and subsequent corrective actions, provide assurance that the Boraflex Monitoring Program will remain effective. The application of proven monitoring methods provides reasonable assurance that the effects of aging will be managed such that components will continue to perform their intended functions consistent with the current licensing basis through the period of extended operation.~~

~~The process for review of future plant-specific and industry operating experience for aging management programs is discussed in Section B.0.4.~~

~~**Conclusion**~~

~~The Boraflex Monitoring Program has been effective at managing the aging effect of reduction in neutron-absorbing capacity in the Boraflex material affixed to spent fuel racks. The Boraflex Monitoring Program provides reasonable assurance that effects of aging are managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis through the period of extended operation.~~

B.1.27 NEUTRON-ABSORBING MATERIAL MONITORING

Program Description

The Neutron-Absorbing Material Monitoring Program provides reasonable assurance that degradation of the neutron-absorbing materials (e.g. Boral) used in spent fuel pools that could compromise the criticality analysis will be detected. The program relies on periodic inspection, testing, and other monitoring activities to assure that the required five percent sub-criticality margin is maintained during the period of extended operation. The program monitors loss of material and changes in dimension such as blisters, pits, and bulges that could result in a loss of neutron-absorbing capability. The parameters monitored include physical measurements and geometric changes in test coupons. The frequency of testing will be based on the condition of the neutron-absorbing material, justified with plant-specific and industry operating experience, prior to the period of extended operation, at a minimum of once every ten years in the period of extended operation. The approach to relating measurement results of the coupons to the spent fuel neutron-absorber materials considers the spent fuel loading strategy. In the event that a loss of neutron-absorbing capacity is anticipated based on coupon testing, additional testing will be performed to ensure the sub-criticality requirements are met.

NUREG-1801 Consistency

The Neutron-Absorbing Material Monitoring Program, with enhancements, is consistent with the program described in NUREG-1801, Section XI.M40, Monitoring of Neutron-Absorbing Materials Other than Boraflex.

Exceptions to NUREG-1801

None

Enhancements

The following enhancements will be implemented prior to the period of extended operation.

Element Affected	Enhancement
4. Detection of Aging Effects	Prior to the period of extended operation, revise Neutron-Absorbing Material Monitoring Program procedures to establish an inspection frequency, justified with plant-specific operating experience, of at least once every ten years, based on the condition of the neutron-absorbing material.
5. Monitoring and Trending	Revise Neutron-Absorbing Material Monitoring Program procedures to perform trending of coupon testing results to determine the rate of degradation. Ensure the predicted boron-10 areal density will be sufficient to maintain the subcritical conditions required by technical specifications until the next coupon test.

Operating Experience

The following examples of operating experience demonstrate that the Neutron-Absorbing Material Monitoring Program will be effective in managing the effects of aging on the function of the neutron-absorbing materials in the spent fuel racks ~~containing Boral~~.

- In 2010, a Boral test coupon was found with numerous blisters (18 on the front side and 16 on the back side). One of the blisters on the front was 2.1 inches in diameter. Blisters can potentially result in fuel assembly binding during insertion or withdrawal from the fuel storage racks. An evaluation determined these blisters did not affect the neutron-absorbing properties of the Boral. The inspection procedure was revised to require a blister characterization if blisters are observed on the Boral coupon and to require an inspection of the Boral capsule for any deformation that would be caused by blisters.
- Based on operating experience presented at an Electric Power Research Institute (EPRI) Neutron Absorber User Group (NAUG) meeting, procedure enhancements were made in 2010 regarding Boral coupon surveillance. Also, an assessment of the blister resistance of the Boral based on testing of a coupon was performed.
- A Boral coupon test was performed in 2013 at Pennsylvania State University. Non-destructive examination was performed on coupon YD610122-1-7. The coupon was in good overall condition with several very small blisters. All acceptance criteria were met.

The history of identification of degradation and initiation of corrective action prior to loss of intended function, along with identification of program enhancements, provides assurance that the Neutron-Absorbing Material Monitoring Program will remain effective. The continued application of these proven monitoring methods provides assurance that the effects of aging will be managed such that components will continue to perform their intended functions consistent with the current licensing basis through the period of extended operation.

The process for review of future plant-specific and industry operating experience for aging management programs is discussed in Section B.0.4.

Conclusion

The Neutron-Absorbing Material Monitoring Program has been effective at ensuring that the required five percent sub-criticality margin is maintained. The Neutron-Absorbing Material Monitoring Program provides reasonable assurance that the effects of aging on the neutron-absorbing materials ~~(Boral)~~ will be managed to ensure the intended function can be maintained in accordance with the current licensing basis through the period of extended operation.