Entergy Operations, Inc.
17265 River Road
Killona, LA 70057-3093
Tel 504 739 6685
Fax 504 739 6698
jjarrel@entergy.com

John P. Jarrell III
Regulatory Assurance Manager
Waterford 3

W3F1-2015-0052

July 9, 2015

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Subject: Waterford Steam Electric Station, Unit 3 Response to Request for Additional Information Regarding Reactor Vessel Internals Aging Management Program
Waterford Steam Electric Station, Unit 3 (Waterford 3)
Docket No. 50-382
License No. NPF-38

References:

1. Entergy Letter W3F1-2013-0070, Submittal of Reactor Vessel Internals Aging Management Program Consistent with MRP-227-A, dated December 16, 2013. (ADAMS Accession No. ML13352A041)
2. Letter from NRC, Request for Additional Information Regarding the Reactor Vessel Internals Aging Management Program (TAC No. MF3247), dated October 21, 2014. (ADAMS Accession No. ML14232A023)
3. Entergy Letter W3F1-2015-0005, Response to Request for Additional Information Regarding Reactor Vessel Internals Aging Management Program, dated January 19, 2015 (ADAMS Accession No. ML15019A026)

Dear Sir or Madam:

In letter dated December 16, 2013 (Reference 1), Entergy Operations, Inc. (Entergy) submitted a request for the NRC to review Waterford 3's Reactor Vessel Aging Management Program (AMP) developed to implement MRP-227-A, Rev 0.

In letter dated October 21, 2014 (Reference 2), NRC requested Entergy to provide additional information to support review of the Reactor Vessel Internals Aging Management Program. This letter provides the response to RAI 1 in Attachment 1 and 2.

In letter dated January 19, 2015 (Reference 3) Waterford Steam Electric Station, Unit 3 responded to RAI 1 and RAI 3 with a commitment to provide results of the aging management review and the inspection plan on the components identified in RAI 1 response by July 10, 2015. This letter provides additional results needed to complete the response to RAI 1 in Attachment 1 and 2.

This correspondence contains no commitments. If you have any questions or require additional information, please contact the Regulatory Assurance Manager, John Jarrell, at 504-739-6685.

Sincerely,

JPJ/SWM/JRM

Attachments:

1. RESPONSE SUMMARY OF RAI 1 (TAC No.MF3247)

2. PWROG-15045-NP Appendix A (TAC No.MF3247) RAI 1 *NON – PROPRIETARY*

cc: Mr. Marc L. Dapas, Regional Administrator
U.S. NRC, Region IV
RidsRgn4MailCenter@nrc.gov

U.S. NRC Project Manager for Waterford 3
Michael.Orenak@nrc.gov

U.S. NRC Senior Resident Inspector for Waterford 3
Frances.Ramirez@nrc.gov
Chris.Speer@nrc.gov
Thomas.Sullivan@nrc.gov

Attachment 1 to

W3F1-2015-0052

Waterford 3 Response to Request for Additional Information

(TAC No.MF3247)

RAI-1: Historically, the following materials used in the PWR Reactor Vessel Internals (RVI) components are known to be susceptible to some of the aging degradation mechanisms that are identified in the MRP-227-A report. In this context, the U. S. Nuclear Regulatory Commission (NRC) staff requests that the licensee provide a list of any additional RVI components (not listed in MRP-227-A and MRP-191, Revision 0) that are manufactured from the following materials. If any of these materials is identified as an additional RVI component at WF3, identify the aging effect/mechanism combination to which the material is susceptible, and the type of aging management that will be implemented on these components.

Nickel base alloys—Inconel 600; Weld Metals—Alloy 82 and 182;

1. Alloy X-750,
2. Stainless steel type 347 material (excluding baffle-former bolts),
3. Precipitation hardened (PH) stainless steel materials—17-4 and 15-5,
4. Type 431 stainless steel material,
5. Alloy A-286, ASTM A 453 Grade 660, Condition A or B.

Response to RAI-1

The following table identifies the nickel base alloy WF3 RVI components not listed in MRP-227 or MRP-191, aging effect, mechanism, and aging management. The type of aging management that will be implemented on the nickel alloy components was determined by a Westinghouse expert panel.

Component Type	Aging Effect	Aging Mechanism	Aging Management
Core support barrel assembly (snubber assembly shims and pins)	Cracking	SCC	Does not require additional aging management beyond that included in MRP-227-A
	Loss of material	Pitting and crevce	
	Loss of material	wear	
	Reduction in Fracture Toughness	Irradiation embrittlement	

Component Type	**Aging Effect**	**Aging Mechanism**	**Aging Management**
Core support barrel assembly (snubber assembly bolts)	Cracking	SCC	Covered under the Waterford 3 ASME Section XI In-Service Inspection Program
	Loss of material	Pitting and crevce	
	Loss of preload	Irradiation-induced stress relaxation	
	Reduction in Fracture Toughness	Irradiation embrittlement	
ICI thimble tube coupling	Cracking	SCC	Does not require additional aging management beyond that included in MRP-227-A
	Loss of material	Pitting and crevce	
	Reduction in Fracture Toughness	Irradiation embrittlement	

See Attachment 2 for more discussion

Attachment 2 to

W3F1-2015-0052

PWROG-15045-NP Appendix A (TAC No.MF3247) RAI 1

NON – PROPRIETARY

P R E S S U R I Z E D   W A T E R   R E A C T O R   O W N E R S   G R O U P

PWROG-15045-NP
Revision 0

WESTINGHOUSE NON-PROPRIETARY CLASS 3

Entergy *South, Waterford* 3 Summary Report Applicant/Licensee Action Items 1, 2, and 7

Materials Committee

PA-MSC-0983, Revision 1, Tasks 3, 4, and 5

June 11, 2015

Westinghouse

PWROG-15045-NP
Revision 0

Entergy South, Waterford 3 Summary Report Applicant/Licensee Action Items 1, 2, and 7

PA-MSC-0983, Revision 1, Tasks 3, 4, and 5

Micah C. Bowen*
Reactor Internals Design and Analysis II

June 11, 2015

Verifier: Joshua K. McKinley*
Reactor Internals Aging Management

Approved: Patricia C. Paesano*, Manager
Reactor Internals Aging Management

Approved: James P. Molkenthin*, Program Director
PWR Owners Group PMO

*Electronically approved records are authenticated in the electronic document management system.

Westinghouse Electric Company LLC
1000 Westinghouse Drive
Cranberry Township, PA 16066, USA

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TABLE OF CONTENTS

LIST OF TABLES

1 PURPOSE AND BACKGROUND

The scope of this effort was authorized by Entergy South through Pressurized Water Reactor Owners Group (PWROG) Project Authorization PA-MSC-0983, Revision 1, Tasks 3, 4, and 5.

Entergy South has prepared an aging management program (AMP) [8] according to the requirements in MRP-227, Revision 0 [2] for the Waterford 3 reactor vessel internals (RVI). As a result of the U.S. Nuclear Regulatory Commission's (NRC's) review of MRP-227, Revision 0 [2] and subsequent Safety Evaluation (SE), Revision 1, additional requirements have been specified in MRP-227-A [3]. Entergy South has contracted Westinghouse through the PWROG Project Authorization PA-MSC-0983, to address the new requirements.

These responses support demonstration of Waterford 3 compliance with the new requirements, specifically Applicant/Licensee Action Items (A/LAIs) 1, 2, and 7, per PA-MSC-0983, Revision 1, Tasks 3, 4, and 5. Note that information supporting the responses to A/LAIs 1 and 2 by addressing WF3 fluence history and cold-worked stainless steel components per MRP-2013-025 [10] is provided in documents PWROG-15039 [11] and PWROG-15041 [12].

2 SUPPORT FOR ADDRESSING MRP-227-A SAFETY EVALUATION A/LAIS 1, 2, AND 7 FOR WATERFORD 3

2.1 A/LAI 1: APPLICABILITY OF FAILURE MODES, EFFECTS, AND CRITICALITY ANALYSIS (FMECA) AND FUNCTIONALITY ANALYSIS ASSUMPTIONS

SE A/LAI 1: Applicability of FMECA and Functionality Analysis Assumptions from MRP-227-A:

"As addressed in Section 3.2.5.1 of this SE, each applicant/licensee is responsible for assessing its plant's design and operating history and demonstrating that the approved version of MRP-227 is applicable to the facility. Each applicant/licensee shall refer, in particular, to the assumptions regarding plant design and operating history made in the FMECA and functionality analyses for reactors of their design (i.e., Westinghouse, CE, or B&W) which support MRP-227 and describe the process used for determining plant-specific differences in the design of their RVI components or plant operating conditions, which result in different component inspection categories. The applicant/licensee shall submit this evaluation for NRC review and approval as part of its application to implement the approved version of MRP-227. This is Applicant/Licensee Action Item 1" [3]

Waterford 3 Compliance with A/LAI 1

The process used to provide reasonable assurance that the RVI components at Waterford 3 are reasonably represented by the generic industry program assumptions (with regard to neutron fluence, temperature, stress values, and materials used in the development of MRP-227-A [3]) is:

1. Identification of typical Combustion Engineering (CE) designed pressurized water reactor (PWR) RVI components [1, Table 4-5].

2. Identification of Waterford 3 RVI components.

3. Comparison of the typical CE-designed PWR RVI components to the Waterford 3 RVI components:

    a. Confirmation that no additional items were identified by this comparison (primarily supports A/LAI 2).

    b. Confirmation that the materials from MRP-191 [1, Table 4-5] are consistent with Waterford 3 RVI component materials.

    c. Confirmation that the design and fabrication of Waterford 3 RVI components are the same as, or equivalent to, the typical CE-designed PWR RVI components.

4. Confirmation that the Waterford 3 operating history is consistent with the assumptions in MRP-227-A [3] regarding core loading patterns and base load operation.

5. Confirmation that the Waterford 3 RVI materials operated at temperatures within the original design basis parameters.

6. Determination of stress values based on design basis documents.

7. Confirmation that any changes to the Waterford 3 RVI components do not impact the application of the MRP-227-A [3] generic aging management strategy.

The Waterford 3 RVI components are reasonably represented by the design and operating history assumptions regarding neutron fluence, temperature, materials, and stress values in the MRP-191 generic FMECA [1] and in the MRP-232 [4] functionality analysis based on the following:

1. Waterford 3 operating history is consistent with the assumptions in MRP-227-A [3] with regard to neutron fluence and fuel management.

    a. The FMECA and functionality analysis for MRP-227-A [3] were based on the assumption of 30 years of operation with high-leakage core loading patterns, followed by 30 years of low-leakage core fuel management strategy. As stated in [10, Section 1.1.1], Waterford 3 operated only the first 2 effective full power years with a high-leakage core loading pattern before switching to a low-leakage fuel management strategy; therefore, the assumption of 30 years operation with a high-leakage core is bounding for Waterford 3. Waterford 3 meets the fluence and fuel management assumptions in MRP-191 and requirements for MRP-227-A application

    b. As stated in [8, Section 7.1], Waterford 3 has always operated as a base load unit. Therefore, Waterford 3 satisfies the assumptions in materials reliability program MRP documents regarding operational parameters affecting fluence.

2. The Waterford 3 reactor coolant system operates between T_{cold} and T_{hot} [9]. T_{cold} is no lower than 543°F and T_{hot} is no higher than 602°F [9, Table 5.1-2]. The design temperature for the vessel is 650°F [9, Table 5.1-2]. Therefore, Waterford 3 operating history is within original design basis parameters and is consistent with the assumptions used to develop the MRP-227-A [3] aging management strategy with regard to temperature operational parameters.

3. As discussed below, the Waterford 3 RVI components and materials are comparable to the typical CE-designed PWR RVI components [1, Table 4-5]. Six components were not covered in MRP-191 [1, Table 4-5], but are dispositioned in A/LAI 2

    a. There are six additional components for Waterford 3 that are not included in MRP-191 [1, Table 4-5]. There are specialized control element assembly (CEA) shroud assemblies fitted with flow bypass inserts. Additionally, flow restrictor plugs are inserted into the fuel alignment plate flow holes. Core stabilizing shims, dowel pins, and bolts

interface with each core support barrel snubber lug. Lastly, in-core instrumentation couplings join the upper and lower thimble tubes. Other than the aforementioned, the components required to be in the Waterford 3 program [8] are consistent with those contained in MRP-191 [1, Table 4-5].

b. Waterford 3 RVI component materials are consistent with, or equivalent to, those materials identified in MRP-191 [1, Table 4-5] for CE-designed plants. Where differences exist, there is no impact on the Waterford 3 RVI program or the component is already credited as being managed under an alternate Waterford 3 aging management program, such as the ASME Section XI in-service inspection program.

c. Design and fabrication of Waterford 3 RVI components are the same as, or equivalent to, the typical CE-designed PWR RVI components.

4. Modifications to the Waterford 3 RVI made over the lifetime of the plant are those identified in general industry guidance or specifically directed by the original equipment manufacturer (OEM) [8]. OEM is defined as CE and Westinghouse. The OEM has developed or evaluated design changes and satisfied assumptions for A/LAI 1. The design has been maintained over the lifetime of the plant, as specified by the OEM [8]. Operational parameters (with regard to fluence and temperature) and the components are consistent with those considered in MRP-191 [1]. The materials for the components are consistent with those considered in MRP-191 [1]. Therefore, the Waterford 3 RVI stress values are represented by the assumptions in MRP-191 [1], MRP-227-A [3] and MRP-232 [4], confirming the applicability of the generic FMECA.

Conclusion

Waterford 3 complies with A/LAI 1 of the NRC SE regarding MRP-227, Revision 0; therefore, Waterford 3 meets the requirement for application of MRP-227-A [3] as a strategy for managing age-related material degradation in the RVI components. This includes the six components that were not covered in MRP-191 [1, Table 4-5], based on the evaluation presented in response to A/LAI 2.

2.2 A/LAI 2: PWR VESSEL INTERNALS COMPONENTS WITHIN THE SCOPE OF LICENSE RENEWAL

SE A/LAI 1: PWR Vessel Internal Component within the Scope of License Renewal from MRP-227-A:

"As discussed in Section 3.2.5.2 of this SE, consistent with the requirements addressed in 10 CFR 54.4, each applicant/licensee is responsible for identifying which RVI components are within the scope of LR for its facility. Applicants/licensees shall review the information in Tables 4-1 and 4-2 in MRP-189, Revision 1, and Tables 4-4 and 4-5 in MRP-191 and identify whether these tables contain all of the RVI components that are within the scope of LR for their facilities

in accordance with 10 CFR 54.4. If the tables do not identify all the RVI components that are within the scope of LR for its facility, the applicant or licensee shall identify the missing component(s) and propose any necessary modifications to the program defined in MRP-227, as modified by this SE, when submitting its plant-specific AMP. The AMP shall provide assurance that the effects of aging on the missing component(s) will be managed for the period of extended operation. This issue is Applicant/Licensee Action Item 2." [3]

Waterford 3 Compliance with A/LAI 2

This action item requires comparison of the Waterford 3 RVI components that are within the scope of license renewal for Waterford 3 to those components contained in MRP-191 [1, Table 4-5], because Waterford 3 has a CE plant design. There are six additional components for Waterford 3 that are not included in MRP-191 [1, Table 4-5] that are tabulated and dispositioned in Table 2-1.

Table 2-1 Summary of Dispositioned Waterford 3 Components Not Include in MRP-191

Component	Disposition
Flow Bypass Inserts	Classified as No Additional Measures components
Flow Restrictor Plugs	Do not require additional aging management beyond that included in MRP-227-A [3]
Core Stabilizing Shims	
Core Stabilizing Dowel Pins	
ICI Couplings	
Core Stabilizing Bolts	Covered under the Waterford 3 ASME Section XI In-Service Inspection Program

It was determined that no further action is required for aging management of the flow bypass inserts, since they are part of the CEA shroud assemblies which were classified as No Additional Measures components. The remaining five components were evaluated by expert panel review comparable to the expert panel guidance provided and applied in MRP-191 (Section 6) [1]. This expert panel determined that the flow restrictor plugs, core stabilizing shims and dowels, and ICI coupling did not require additional aging management beyond that included in MRP-227-A [3]. Based on operating experience and other aspects, the expert panel determined that the core stabilizing bolts required an additional inspection be added to the aging management program at Waterford 3. The core stabilizing lug assembly is examined as part of the Waterford 3 ASME Section XI In-Service Inspection Program. Thus, the core stabilizing lug bolts will be added to the Waterford 3 RVI aging management program [8] as an Existing Inspection Component.

Several components have different materials than those specified in MRP-191 [1], but the differences have no effect on the recommended MRP aging strategy, or aging is already managed by an alternate Waterford 3 program, such as the ASME Section XI in-service inspection program; therefore, no modifications to the program details in MRP-227-A [3] need to be proposed. There components are tabulated in Table 2-2. This supports the requirement that

the AMP shall provide assurance that the effects of aging on the Waterford 3 RVI components within the scope of license renewal, but not included in the generic CE-designed PWR RVI components from MRP-191 [1, Table 4-5], will be managed for the period of extended operation.

Table 2-2 Summary of Waterford 3 and MRP-191 Component Material Differences

Assembly	Component	MRP-191 Material	Waterford 3 Material
CEA – Shroud Assemblies	CEA Shroud Extension Shaft Guide Cylinder	304 SS	304L SS
	Instrument Tube: Instrument Guide Block	304 SS	UNS S21800 (Nitronic 60)
	CEA Shroud Bolt Lock Bars	A286 SS	304 SS
Core Shroud Assembly	Guide Lug Insert Bolt Dowel Pin	A286 SS	304 SS
ICI	ICI Guide Tubes	316 SS	304 SS

The generic scoping and screening of the RVI, as summarized in MRP-191 [1] and MRP-232 [4], to support the inspection sampling approach for aging management of the RVI specified in MRP-227-A [3] are applicable to Waterford 3 with the addition of an Existing Inspection requirement for the core stabilizing bolts.

Conclusion

Six components not specifically addressed in MRP-191 [1] were evaluated for inclusion in the Waterford 3 aging management program. One of these, the core stabilizing bolts, will be added to the Waterford 3 aging management program as an Existing Inspection component. With the addition of this Existing Inspection component, Waterford 3 complies with A/LAI 2 of the NRC SE on MRP 227, Revision 0. Therefore, Waterford 3 meets the requirements for application of MRP-227-A [3] as a strategy for managing age-related material degradation in reactor internals components.

2.3 A/LAI 7: PLANT-SPECIFIC EVALUATION OF CASS MATERIALS

NRC Applicant/Licensee Action Item 7: Plant-specific Evaluation of Cast Austenitic Stainless Steel (CASS) Materials:

"As discussed in Section 3.3.7 of this SE, the applicants/licensees of B&W, CE, and Westinghouse reactors are required to develop plant-specific analyses to be applied for their facilities to demonstrate that B&W IMI guide tube assembly spiders and CRGT spacer castings,

CE lower support columns, and Westinghouse lower support column bodies will maintain their functionality during the period of extended operation or for additional RVI components that may be fabricated from CASS, martensitic stainless steel or precipitation hardened stainless steel materials. These analyses shall also consider the possible loss of fracture toughness in these components due to thermal and irradiation embrittlement, and may also need to consider limitations on accessibility for inspection and the resolution/sensitivity of the inspection techniques. The requirement may not apply to components that were previously evaluated as not requiring aging management during development of MRP-227. That is, the requirement would apply to components fabricated from susceptible materials for which an individual licensee has determined aging management is required, for example during their review performed in accordance with Applicant/Licensee Action Item 2. The plant-specific analysis shall be consistent with the plant's licensing basis and the need to maintain the functionality of the components being evaluated under all licensing basis conditions of operation. The applicant/licensee shall include the plant-specific analysis as part of their submittal to apply the approved version of MRP-227. This is Applicant/Licensee Action Item 7." [3]

Waterford 3 Compliance

A/LAI 7, from the NRC's final SE on MRP-227, Revision 0, notes that, for assessment of CASS materials, the applicant/licensee for license renewal may apply the criteria in [5] as the basis for determining whether the CASS materials are susceptible to the thermal aging mechanism. If the application of the applicable screening criteria for the components' material demonstrates that the components are not susceptible to either thermal embrittlement (TE) or irradiation embrittlement (IE), or to the synergistic effects of TE and IE combined, then no other evaluation would be necessary. The Waterford 3 CASS RVI components and the assessment of their susceptibility to TE are summarized in Table 2-3.

The Waterford 3 flow bypass inserts and modified CEA shroud extension shaft guides are ASTM SA-351, Grade CF8 material. The elemental percentages from the certified material test reports (CMTRs) for the CASS flow bypass inserts and modified CEA shroud extension shaft guides, are input into Hull's formula (per guidance of NUREG/CR-4513 [6]) to calculate the delta ferrite content of the CASS material. The CMTRs do not list the element percentage for nitrogen; thus, per the guidance of NUREG/CR-4513, nitrogen is assumed to be 0.04%. The CMTRs do not list an elemental percentage for molybdenum. SA-351, Grade CF8 did not have a requirement for percent molybdenum in 1965. The 2013 ASME Code has SA-351, Grade CF8 chemistry requirements that specify a maximum of 0.5 percent molybdenum [7]; thus, this maximum value is input into Hull's formula.

There are a total of four flow bypass inserts and eight modified CEA shroud extension shaft guides. As summarized in Table 2-3, the ferrite content is less than or equal to 20%; thus, based on the NRC criteria [5], the four Waterford 3 CASS flow bypass inserts and eight Waterford 3 CASS modified CEA shroud extension shaft guides are not susceptible to TE.

The Waterford 3 CEA shroud tubes and modified CEA shroud extension shaft guide cylinders are low molybdenum and centrifugal cast; thus, they are not susceptible to TE.

The potential for IE in these CASS components was addressed in MRP-191 [1]. The screening criteria provided in MRP-191 [1, Section 3.6] were used by an expert panel to determine if IE was applicable for the components, and the screening results are provided in MRP-191 [1, Table 5-2]. This consideration of the effects of IE was used in the expert panel and other evaluations conducted for the development of MRP-227-A [3]; thus, no changes to the aging management guidance of MRP-227-A [3] are required for the components addressed in MRP-191 [1]. Any additional components not covered in MRP-191 [1, Table 4-5] were covered by the expert panel conducted specifically for Waterford 3.

The Waterford 3 reactor internals hold-down spring was manufactured from 403 SS, a martensitic stainless steel.

No martensitic precipitation-hardened stainless steel components were identified for the Waterford 3 RVI.

The austenitic precipitation hardened stainless steel components in the Waterford 3 RVI are listed in Table 2-4. All of the components in that table were fabricated from A286 material.

Table 2-3 Summary of Waterford 3 CASS Components and Their Susceptibility to TE

CASS Component	Molybdenum Content	Casting Method	Calculated Ferrite Content	Susceptibility to TE (Based on NRC Letter [5])
CEA Shroud Tube	Low, 0.5 Maximum	Centrifugal	N/A	87 of 87 Not Susceptible to TE
CEA Shroud Tube(2)	Low, 0.5 Maximum	Centrifugal	N/A	4 of 4 Not Susceptible to TE
Flow Bypass Insert	Low, 0.5 Maximum	Static	≤ 20%(1)	4 of 4 Not Susceptible to TE
Modified CEA Shroud Extension Shaft Guide	Low, 0.5 Maximum	Static	≤ 20%(1)	8 of 8 Not Susceptible to TE
Modified CEA Shroud Extension Shaft Guide Cylinder	Low, 0.5 Maximum	Centrifugal	N/A	4 of 4 Not Susceptible to TE

Notes:

(1) Ferrite content is based on CMTR chemistry data. When nitrogen is not listed on the CMTR, a value of 0.04% is used. When molybdenum is not listed on the CMTR, a value of 0.5% is used.

(2) Modified CEA shroud tube.

Table 2-4 Summary of Waterford 3 A286 Components

Component	Material
CEA Shroud Bolts	A286
Core Support Barrel – Alignment Keys	A286
Guide Lug Insert Bolts	A286
Guide Lug Dowel Pins	A286

Conclusion

It is concluded that continued application of the MRP-227-A [3] strategy will meet the requirement for managing age-related degradation of the Waterford 3 CASS RVI components.

3 REFERENCES

1. *Materials Reliability Program: Screening, Categorization, and Ranking of Reactor Internals Components for Westinghouse and Combustion Engineering PWR Design (MRP-191).* EPRI, Palo Alto, CA: 2006. 1013234.

2. *Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227-Rev. 0)*. EPRI, Palo Alto, CA: 2008. 1016596.

3. *Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227-A).* EPRI, Palo Alto, CA: 2011. 1022863.

4. *Materials Reliability Program: Aging Management Strategies for Westinghouse and Combustion Engineering PWR Internals Components (MRP-232, Revision 1).* EPRI, Palo Alto, CA: 2012. 1021029.

5. U.S. Nuclear Regulatory Commission Letter, "License Renewal Issue No. 98-0030, "Thermal Aging Embrittlement of Cast Austenitic Stainless Steel Components"," May 19, 2000 (NRC ADAMS Accession No. ML003717179).

6. U.S. Nuclear Regulatory Commission Document, NUREG/CR-4513, Rev. 1, "Estimation of Fracture Toughness of Cast Stainless Steels During Thermal Aging in LWR Systems," May 1994.

7. ASME Boiler and Pressure Vessel Code, Section II, 2013 Edition with No Addenda.

8. Entergy Letter, W3F1-2013-0070, "Submittal of Reactor Vessel Internals Aging Management Program Consistent with MRP-227-A Waterford Steam Electric Station, Unit 3 Docket No. 50-382 License No. NPF-38," December 16, 2013.

9. Waterford 3 Updated Final Safety Analysis Report, Rev. 308.

10. EPRI Letter MRP 2013-025, "MRP-227-A Applicability Template Guideline," October 14, 2013 (NRC ADAMS Accession No. ML13322A454).

11. PWROG Letter, PWROG-15039-NP, Rev. 0, "Waterford Unit 3 Summary Report for the Fuel Design / Fuel Management Assessments to Demonstrate MRP-227-A Applicability," June 3, 2015.

12. PWROG Letter, PWROG-15041-P, Rev. 0, "Waterford Unit 3 Summary Report for the Cold Work Assessment," June 4, 2015. (Proprietary)