



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 7, 2023

Mr. Brad Adams, Chairman,
PMMP EC, Southern Nuclear

Mr. Robert O. McGill,
MRP Program Manager,
Electric Power Research Institute
Palo Alto Office
3420 Hillview Avenue
Palo Alto, CA 94304-1338

SUBJECT: REPORT REGARDING OCTOBER 31 THROUGH NOVEMBER 4, 2022,
REGULATORY AUDIT FOR ELECTRIC POWER RESEARCH INSTITUTE
TECHNICAL REPORT MATERIALS RELIABILITY PROGRAM-227,
REVISION 2, "MATERIALS RELIABILITY PROGRAM: PRESSURIZED WATER
REACTOR INTERNALS INSPECTION AND EVALUATION GUIDELINES"
(EPID L-2022-TOP-0029)

Dear Mr. Adams and Mr. McGill:

By letter dated May 9, 2022, the Electric Power Research Institute (EPRI) submitted technical report "Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227, Revision 2)" to the U.S. Nuclear Regulatory Commission (NRC) staff for review and approval (Agencywide Documents Access and Management System Package Accession No. ML21301A194). The staff reviewed and accepted the technical report on June 17, 2022 (ADAMS Accession No. ML22145A401).

On October 31 through November 4, 2022, the NRC staff conducted a virtual regulatory audit with EPRI technical staff to discuss supporting documentation and to ask questions about the review of MRP-227, Revision 2. The results of the audit provided additional information to support the NRC staff safety evaluation. The audit report is enclosed.

B. Adams, R. McGill

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Please contact me via e-mail at Lois.James@nrc.gov with any questions you may have regarding this letter or audit report.

Sincerely,

/RA/

Lois M. James, Project Manager
Licensing Projects Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 99902021

Enclosure:
Audit Report



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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REGULATORY AUDIT REPORT FOR ELECTRIC POWER RESEARCH INSTITUTE
NON-PROPRIETARY REPORT NO. 3002020105, "MATERIAL RELIABILITY PROGRAM:
PRESSURIZED WATER REACTOR INTERNALS INSPECTION AND EVALUATION
GUIDELINES (MRP-227, REVISION 2)"
DOCKET NO. 99902021; EPID: L-2022-TOP-0029

1.0 BACKGROUND

By audit plan dated October 10, 2022 (Ref. 10), the U.S. Nuclear Regulatory Commission (NRC) staff conducted an audit for understanding of Electric Power Research Institute's (EPRI's) Non-Proprietary Report No. 3002020105, "Material Reliability Program [(MRP)]: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227, Revision 2)" (Ref. 1). The virtual audit was held the week of October 31, 2022.

The NRC staff performed an audit for understanding to support timely completion of a safety evaluation (SE) and minimizing the potential need for a request for additional information (RAI) in accordance with Office of Nuclear Reactor Regulation (NRR) Office Instructions LIC-111, "Regulatory Audits" (Ref. 27) and LIC-500, "Topical Report Review Process" (Ref. 28).

2.0 REGULATORY AUDIT OBJECTIVES

To assist in its review, the NRC staff conducted a virtual regulatory audit the week of October 31, 2022. The objective of the audit was to increase review process efficiency through interaction with the EPRI's technical experts. During the audit, the NRC staff reviewed pertinent documentation made available by EPRI. A more detailed narrative on the topics covered is included below in Section 4.0, "Discussion," of this audit report. A list of all the documents and references that the NRC staff reviewed is included in Section 5.0, "Documents Reviewed and Referenced."

The NRC audit team was composed of the following members:

- Angie Buford, Branch Chief, NRR/Division of New and Renewed Licenses (DNRL)/Vessels and Internals Branch (NVIB)
- David Dijamco, Materials Engineer, NRR/DNRL/NVIB
- Emma Haywood, Materials Engineer, NRR/DNRL/NVIB
- Allen Hiser, Senior Materials Engineer, NRR/DNRL
- Lois James, Senior Project Manager, NRR/Division of Operation Reactor Licensing (DORL)/Licensing Projects Branch

Enclosure

- Annie Mayer, Project Manager, NRR/DORL/Plant Licensing Branch I
- James Medoff, Senior Mechanical Engineer, NRR/DNRL/NVIB
- Carol Moyer, Senior Materials Engineer, NRR/DNRL/NVIB
- Cory Parker, Materials Engineer, NRR/DNRL/NVIB
- John Tsao, Senior Materials Engineer, NRR/DNRL/NVIB
- John Wise, Senior Technical Advisor for License Renewal, NRR/DNRL
- On Yee, Materials Engineer, NRR/DNRL/NVIB

The following personnel represented or supported EPRI during the audit:

- Kyle Amberge, EPRI
- Jerri Byers, Southern Nuclear Company (SNC)
- Sarah Champion, SNC
- Jianwei Chen, Westinghouse Electric Company (WEC)
- Steve Chengelis, EPRI
- Scott Chesworth, Structural Integrity Associates
- Rob Choromokos, EPRI
- Nat Cofie, Structural Integrity Associates
- Corey Thomas, SNC
- Thomas Crippes, Luminant– Comanche Peak station
- Ernest Deemer, WEC
- Dilip Dehia, Structural Integrity Associates
- Hein Do, SNC
- Rachel Doss, Duke Energy
- Patrick Fabian, Public Service Enterprise Group (PSEG)
- Krishan Garg, PSEG
- Ryan Hosler, Framatome
- Adam Keyser, Tennessee Valley Authority
- Matthew King, South Texas Project
- Norman Eugene Kunkel, Duke Energy
- Steve Mays, Duke Energy
- Robert McGill, EPRI
- Joshua McKinley, WEC
- James Molkenthin, WEC
- Kaitlyn Musser, WEC
- Kathleen Nevins, Energy Harbor
- Tim O'Connor, WEC
- Nathan Palm, EPRI
- Deann Raleigh, Curtis Wright
- Chet Austin Sigmon, Duke Energy
- Donna Slivon, Florida Power and Light Company
- Stephen Smith, WEC
- Carroll Trull, WEC
- Dale E Turinetti, American Electric Power
- Mo Uddin, Luminant TXU Energy-Coppell TX
- Beverly Watson, Framatome
- Tyler Whaley, WEC
- Bryan Wilson, WEC

- Stacy Yoder, Framatome
- Kemper Young, Constellation Nuclear

3.0 REGULATORY AUDIT BASES

Part 54 of Title 10 of the *Code of Federal Regulations* (10 CFR) (Ref. 30) addresses the requirements for plant license renewal. The regulation at 10 CFR 54.21, “Contents of application—technical information,” requires that each application for license renewal contain an integrated plant assessment (IPA) and an evaluation of time-limited aging analyses. The IPA shall identify and list those structures and components subject to an aging management review and demonstrate that the effects of aging (i.e., cracking, loss of material, loss of fracture toughness, dimensional changes, loss of preload) will be adequately managed so that their intended functions will be maintained consistent with the current licensing basis for the period of extended operation as required by 10 CFR 54.29, “Standards of issuance of a renewed license.”

MRP-227 contains a discussion of the technical basis for the development of plant-specific aging management programs (AMPs) for reactor vessel internal (RVI) components in pressurized water reactor (PWR) vessels and provides Inspection and Evaluation (I&E) guidelines for PWR applicants to use in their plant-specific AMPs. MRP-227 provides the basis for renewed license holders to develop plant-specific inspection plans to manage aging effects on RVI components, as described by their final safety analysis report commitment.

4.0 DISCUSSION

The audit began with a detailed overview of each section of the methodology. Additional audit topics are described in the sections below.

4.1 Historical Background Information for the Audit¹

EPRI Report No. 3002020105 (MRP-227, Rev. 2, or alternatively for the objectives of this audit report, “the Subject TR [topical report]”) is the second revision of the MRP-227 report that has been transmitted by EPRI for staff approval. The original version of the report was submitted (Refer to EPRI Letter No. 2009-004; Ref. 6) as EPRI Proprietary Report No. 1016596 (MRP-227, Rev. 0; Ref. 7); however, the report was downgraded to non-proprietary status in EPRI Correspondence Letter No. MRP 2010-016 (Ref. 8). The staff-approved MRP-227, Rev. 0 in a SE dated December 16, 2011 (Ref. 9); On January 9, 2012 (Ref. 10), EPRI transmitted the staff-approved version of MRP-227, Rev. 0 as a non-proprietary report, MRP-227-A (Ref. 11). The scope of aging mechanisms evaluated by EPRI in MRP-227-A covered time-dependencies inclusive of PWR operations through a cumulative 60-year plant licensing term.²

On December 21, 2015 (Ref. 12), EPRI submitted its first revision of MRP-227 as Non-Proprietary Report No. 3002005349 (MRP-227, Rev. 1; Ref. 13), which was based on

¹ Cited records and associated ADAMS Accession Numbers are included in the reference list of Audit Report Table 1.

² Assessed aging mechanisms in the MRP-227 versions that are time-dependent are those that could be impacted by increasing component-specific neutron fluence exposures over time, increasing design transient cycle accumulation over time, or exposed cumulative time at elevated temperature, or metal-to-metal surface interactions over time. Those impacted by fluence exposure include irradiation-assisted stress corrosion cracking (IASCC), neutron irradiation embrittlement (IE), void swelling (VS), and for bolted, fastened, pinned, or keyed component types, irradiation-enhanced stress relaxation or creep (ISR/IC). Others include time-dependent wear or thermal embrittlement (TE).

EPRI's efforts to assess relevant PWR RVI industry operating experience that was compiled by the EPRI MRP since the issuance of MRP-227-A in January of 2012; however, the scope of EPRI's aging mechanisms and component-specific I&E criteria evaluated in MRP-227, Rev. 1 were still based on an evaluation of time-dependencies through a cumulative 60-year plant licensing term (which includes the 40 – 60 year initial license renewal (ILR) period). The staff-approved MRP-227, Rev. 1 in an SE dated April 25, 2019 (Ref. 14); EPRI transmitted the staff-approved version of MRP-227, Rev. 1 as a non-proprietary report, MRP-227, Rev. 1-A (Ref. 15).

Similar to the I&E methodology and results in the preceding versions of MRP-227-A and MRP-227, Rev. 1-A, the I&E methodology in MRP-227, Rev. 2 involves risk-informed, sampling-based aging assessments of RVI assemblies and components in the following types of PWRs: (1) PWRs designed by Babcock and Wilcox Company (B&W), (2) PWRs designed by Combustion Engineering Corporation (CE), and (3) PWRs designed by WEC. The scope of aging mechanism evaluations and component-specific screening and I&E assessments performed by EPRI in MRP-227, Rev. 2 are based on: (1) assessed time-dependencies inclusive of PWR plant operations through a cumulative 80-year plant licensing term, and (2) plant-specific or generic RVI operation experience not included or evaluated as part of the component-specific screening and I&E assessments performed in MRP-227, Rev. 1-A.

The staff accepted MRP-227, Rev. 2 for review in an email to the EPRI MRP dated June 17, 2022 (Ref. 4) and granted a fee waiver on the staff's pending review in an letter to the EPRI MRP dated July 25, 2022 (Ref. 5). Generic EPRI MRP background reports used for the development of MRP-227, Rev. 2 are given in Audit Report Table 1, Refs. 17 and 18. EPRI MRP background reports used for the development of the I&E criteria for B&W-design RVI components in MRP-227, Rev. 2 are given in Audit Report Table 1, Refs. 19 – 22. EPRI MRP background reports used for the development of the I&E criteria for CE-design and Westinghouse-design RVI components in MRP-227, Rev. 2 are given in Audit Report Table 1, References 23 – 26.

4.2 Scope of Staff Audit Review

By letter dated October 11, 2022 (Ref. 16), the NRC staff issued its audit plan to the EPRI MRP. In the audit plan, the staff divided the scope of its audit into the following discussion areas: (1) general audit discussion topics (including report Appendices), (2) B&W-design component-specific audit topics, (3) CE-design component-specific audit topics, (4) WEC-design component-specific audit topics, and (5) potential miscellaneous audit topics that might arise during the staff's audit review.

The audit is based on the following staff assumption and pre-audit confirmations that, for the updated guidelines in MRP-227, Rev. 2, the specified RVI components are still placed into one of the following four risk-informed, sampling-based component inspection categories defined by EPRI MRP: (1) Primary [P] category components, (2) Expansion [E] category components, (3) Existing Program [X] category components,³ and (4) No Additional Measures [NAM] Category of components.

³ Note that Framatome does not include or apply Existing Program (X) category of components to the age-related screening and I&E assessments of B&W-designed RVI components in MRP-227, Revision 2, or in the previous versions of the report. The X category of components only applies to specific types of RVI components in CE or WEC designed reactors.

The NRC staff performed its audit during the workweek of October 31, 2022, to November 4, 2022. The staff conducted an audit entrance meeting for the MRP-227, Rev. 2 review on Monday, October 31, 2022. During the meeting, the staff discussed the objective of the audit with the EPRI MRP and attending industry stakeholder members participating in the audit. Since the Subject TR is the second revision of MRP-227, the staff informed EPRI MRP that the upcoming SE for MRP-227, Rev. 2 would be limited only to those matters that the staff considered to be critical for inclusion in the SE (including matters that may warrant issuance of a RAI). Therefore, staff informed EPRI MRP that the audit was being held to discuss topical/technical matters or contents in MRP-227, Rev. 2 that needed: (1) additional clarifications or discussions with the staff, and (2) a decision by the staff on whether the technical or topical matter would warrant a request for additional (RAI) or inclusion in the upcoming SE for the subject TR. The staff focused its audit session discussions on (but not limited to) the following topics, factors, or considerations:

- Changes in component-specific screening assessment results
- Changes to component-specific inspection category designations
- Changes in Primary-to-Expansion component expansion-link relationships
- Changes to component-specific acceptance criteria
- Changes in component-specific accessibility criteria
- Changes in component-specific design (e.g., the design of the Salem replacement thermal shield flexures)
- Changes made in MRP-227, Rev. 2 that alter or may reopen NRC April 25, 2019, SE conclusions on component-specific methods and criteria previously approved in MRP-227, Rev. 1-A
- Components with significant operating experience over the last 10 years
- Impact of 60 – 80-year assessment periods on past applicant/licensee action items (A/LAIs) that were issued on a 40 – 60-year assessment period basis
- Changes to component-specific non-destructive examination criteria, including potential use of non-qualified visual inspection techniques
- Timing of scheduled inspections to be performed during a subsequent period or clarifications on inspection methods applied to component types
- For PWRs approved for subsequent license renewal (SLR) in accordance with a 10 CFR 54.29 Commission approval decision, relationship between the criteria in MRP-227, Rev. 2 versus PWR Vessel Internals Programs that were approved for the specific unit(s) using MRP-227, Rev. 1-A, as supplemented and adjusted by the results of an 80-year RVI component-specific gap analysis

5.0 DOCUMENTS REVIEWED AND REFERENCED

Table 1 provides a reference list of reports, documents, or records that have historical relevance or directly relate to development of the updated I&E guidelines in MRP-227, Rev. 2.

Table 1: List of Relevant Reports, Documents, or Records

Reference No.	Report/Record/ Document Type; Associated No.	Report Title or Record Subject	Revision, Date, and Agencywide Documents Access and Management System (ADAMS) Accession Numbers
Records Listed as MRP-227 Version References (Historical Record References)			
1	EPRI Non-Proprietary Report No. 3002020105	"Material Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227, Revision 2)"	September 2021 ML22129A141 (Publicly available ADAMS Record)
2	EPRI Transmittal Letter No. MRP 2022-013	"Report Transmittal: <i>Material Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227, Revision 2)</i> "	May 9, 2022 ML22129A140 (Publicly available ADAMS Record)
3	EPRI Transmittal Letter No. MRP 2022-014	"Request for Exemption of NRC Review Fees for MRP-227, Revision 2 (Ref. EPRI Docket No. 99902021)"	May 9, 2022 ML22129A139 (Publicly available ADAMS Record)
4	NRC Email Letter and Form 898 to EPRI MRP	"NRC Staff Acceptance for MRP-227, Revision 2, 'Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines' (EPID L-2022-TOP-0029)"	June 17, 2022 ML22145A444 (email); ML22145A445 (Form 898) (Publicly available ADAMS Records)
5	NRC Letter to Mr. Robert O. McGill, EPRI MRP Program Manager	"Letter to Robert O. McGill in Response to a Request for a Fee Waiver Exemption for Materials Reliability Program-227, Revision 2"	July 25, 2022 ML22161A482 (Publicly available ADAMS Record)
6	EPRI Transmittal Letter No. MRP 2009-004	"Report Transmittal: <i>Material Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227-Rev. 0)</i> "	January 12, 2009 ML090160204 (Publicly available ADAMS Record)
7	EPRI Non-Proprietary Report No. 1016596	"Material Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227-Rev. 0)"	December 2008 ML090160206 (Originally, a proprietary, non-publicly available record in ADAMS, but downgraded to non-proprietary, publicly available status in Reference 8 below)
8	EPRI Letter No. MRP 2010-016	" <i>Material Reliability Program: PWR Internals Inspection and Evaluation Guidelines (MRP-227, Rev. 0)</i> "	March 2, 2010 ML100640166 (Publicly available ADAMS Record)

Reference No.	Report/Record/ Document Type; Associated No.	Report Title or Record Subject	Revision, Date, and Agencywide Documents Access and Management System (ADAMS) Accession Numbers
9	NRC SE	"Revision 1 to Final Safety Evaluation of Electric Power Research Institute (EPRI) Report, Materials Reliability Program (MRP) Report 1016596 (MRP-227), Revision 0, 'Pressurized Water Reactor (PWR) Internals and Inspection Evaluation Guidelines'" (TAC No. ME0680"	December 16, 2011 ML11308A770 (Publicly available ADAMS Record)
10	EPRI Transmittal Letter No. MRP 2011-036	"Transmittal: PWR Reactor Internals Inspection and Evaluation Guidelines (MRP-227-A)"	January 9, 2012 ML12017A193 (Publicly available ADAMS Record)
11	EPRI Non-Proprietary Report No. 1022863	"Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227-A)"	December 2011 Collectively: ML12017A194, ML12017A196, ML12017A197, ML12017A191, ML12017A192, ML12017A195, and ML12017A199 (Publicly available ADAMS Record)
12	EPRI Transmittal Letter No. MRP 2015-040	"Report Transmittal: <i>Material Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluations Guideline (MRP-227, Revision 1)</i> "	December 21, 2015 ML15358A046 (Publicly available ADAMS Record)
13	EPRI Non-Proprietary Report No. 3002005349	"Material Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227, Revision 1)"	October 2015 ML15358A046 (Report was included as a Publicly Available Record in the ADAMS Record for the Transmittal Letter cited in Reference 12 above)
14	NRC SE	Final Safety Evaluation for Electric Power Research Institute Topical Report MRP-227, Revision 1, "Material Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluations Guideline"	April 25, 2019 ML19081A001 (Publicly available ADAMS Record)
15	EPRI Non-Proprietary Report No. 3002017168	"Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227, Revision 1-A)"	December 2019 ML20175A112 (Publicly available ADAMS Record)
16	NRC Letter to Mr. Brad ADAMS, Chairman PMMP EC (Southern Nuclear Operating Co., Inc.) and Mr. Robert O. McGill, EPRI MRP Program Manager	"Regulatory Audit Plan for Electric Power Research Institute Technical Report Materials Reliability Program-227, Revision 2, 'Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines' (EPID L-2022-TOP-0029)"	October 11, 2022 ML22264A107 (Publicly available ADAMS Record)

Reference No.	Report/Record/ Document Type; Associated No.	Report Title or Record Subject	Revision, Date, and Agencywide Documents Access and Management System (ADAMS) Accession Numbers
EPRI MRP Generic Background Report References (Applicable to All Nuclear Steam Supply System Designs)			
17	EPRI Proprietary Report No. 3002010268	"Materials Reliability Program: PWR Internals Material Aging Degradation Mechanism Screening and Threshold Values (MRP-175, Revision 1)"	Revision 1, October 2017 ML17361A188 (Publicly available, redacted ADAMS record)
18	EPRI Proprietary Report No. 3002018245	"Materials Reliability Program: Inspection Standard for Pressurized Water Reactor Internals (MRP-228, Rev. 4)"	Revision 4, December 2020 ML21019A003 (Publicly available, redacted ADAMS Record)
Design Specific EPRI MRP Background Report References for B&W-Design RVI Components			
19	EPRI Proprietary Report No. 3002013218	"Materials Reliability Program: Screening, Categorization and Ranking of Babcock & Wilcox Designed Pressurized Water Reactor Internals Component Items and Welds (MRP-189, Revision 3)"	Revision 3, December 2019 ML20091K282 (Publicly available, redacted ADAMS Record)
20	EPRI Non-Proprietary Report No. 1013233	"Materials Reliability Program: Failure Modes, Effects, and Criticality Analysis of B&W-Designed PWR Internals (MRP-190)"	Revision 0, November 2006 ML091910128 (Publicly available ADAMS Record)
21	EPRI Proprietary Report No. 3002018247 (EPRI Proprietary Report)	"Materials Reliability Program: Functionality Analysis for Babcock and Wilcox Representative PWR Internals (MRP-229, Revision 4)"	Revision 4, October 2020 ML20322A320 (Publicly available, redacted ADAMS Record)
22	EPRI Proprietary Report No. 3002020103	"Materials Reliability Program: Aging Management Strategies for B&W Pressurized Water Reactor Internals (MRP-231, Revision 4)"	Revision 4, May 2021 ML21225A071 (MRP-231-NP, Rev. 4; publicly available, redacted ADAMS Record)
Design Specific EPRI MRP Report References for CE and WEC-Design RVI Components			
23	EPRI Proprietary Report No. 3002013220	"Materials Reliability Program: Screening, Categorization, and Ranking of Reactor Internals Components for Westinghouse and Combustion Engineering PWR Design (MRP-191, Revision 2)"	Revision 2, November 2018 ; ML19081A060 (Publicly available, redacted ADAMS Record)
24	EPRI Proprietary Report No. 3002018248	"Materials Reliability Program: Functionality Analysis for Westinghouse and Combustion Engineering Representative PWR Internals (MRP-230, Revision 3)"	Revision 3, July 2020 ML20244A028 (Publicly available, redacted ADAMS Record)
25	EPRI Proprietary Report No. 3002020104	"Materials Reliability Program: Aging Management Strategies for Westinghouse and Combustion Engineering PWR Internals Components (MRP-232, Revision 2)"	Revision 2, May 2021 ML21180A031 (MRP-232-NP, Rev. 2; publicly available, redacted ADAMS Record)

Reference No.	Report/Record/ Document Type; Associated No.	Report Title or Record Subject	Revision, Date, and Agencywide Documents Access and Management System (ADAMS) Accession Numbers
26	EPRI Non-Proprietary Report No. MRP 2018-022	Transmittal of MRP-191-SLR Screening, Ranking and Categorization Results and Interim Guidance in Support of Sequent License Renewal and U.S PWR Plants	August 31, 2018 ML19081A061 (Publicly available ADAMS Record)
NRC Regulations and Guidance			
27	NRC Guidance No. LIC-111	"Regulatory Audits"	Revision 1, October 31, 2019 ML19226A274 (Publicly available ADAMS Record)
28	NRC Guidance No. LIC-500	"Topical Report Process"	Revision 9, January 27, 2022 ML20247G279 (Publicly available ADAMS Record)
29	NRC Regulations	10 CFR Part 50. <i>Code of Federal Regulations</i> , Title 10, Energy, Part 50, "Domestic licensing of production and utilization facilities"	(Publicly available on NRC website)
30	NRC Regulations	10 CFR Part 54. <i>Code of Federal Regulations</i> , Title 10, Energy, Part 54, "Requirements for renewal of operating licenses for nuclear power plants"	(Publicly available on NRC website)
31	NRC Regulatory Guide No. 1.147	"Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1"	Revision 20, December 17, 2021 ML21181A222 (Publicly available ADAMS Record)
Other			
35	Westinghouse Nuclear Safety Alert Letter No. NSAL-16-1	"Baffle-Former Bolts"	August 1, 2016 ML16222A513 (Publicly available ADAMS Record)
36	Westinghouse Technical Bulletin No. TB-14-5	"Reactor Internals Lower Radial Support Clevis Insert Cap Screw Degradation"	August 25, 2014 (Non-publicly available ADAMS Record)
37	NRC Request for Additional Information	FINAL Request for Additional Information - Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227, Revision 2) (EPID No. L-2022-TP-0029)	December 5, 2022 (Non-publicly available ADAMS Record)
38	NRC NUREG-2192	"Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants"	July 2017 ML17188A158 (Publicly Available ADAMS Record)

Reference No.	Report/Record/ Document Type; Associated No.	Report Title or Record Subject	Revision, Date, and Agencywide Documents Access and Management System (ADAMS) Accession Numbers
39	Pressurized Water Reactor Owners Group (PWROG) Guideline No. OG-21-160	"PWR Owners Group NEI 03-08 Needed Guidance: PWR Lower Radial Support Clevis Insert X-750 Bolt Inspection Requirements"	September 1, 2021 (Non-Publicly Available)
40	Westinghouse Technical Bulletin No. 19-5	"Westinghouse NSSS PWR Thermal Shield Degradation"	October 9, 2017 ML19302F228 (Publicly available ADAMS Record)
41	PWROG Guideline No. OG-20-113	"NEI 03-08 Needed Inspection Guidance for PWR CRDM Thermal Sleeve Wear"	August 31, 2018 (Non-Publicly Available)
42	Westinghouse Nuclear Safety Alert Letter No. NSAL-20-1	"Reactor Vessel Head Control Rod Drive Mechanism Penetration Thermal Sleeve Cross-Sectional Failure"	February 14, 2020 (Non-Publicly Available)
43	PWROG Report No. PWROG-15032-NP	"PA-MS-1288, Statistical Assessment of PWR RV Internals CASS Materials"	Revision 0, November 30, 2015 ML16068A245; ML16068A246 (Publicly Available ADAMS Record)

6.0 CONCLUSION

This section provides a summary of the results of the audit discussions the NRC staff conducted with EPRI MRP or associated industry organizations (e.g., Framatome, WEC, or PWR Owners Group (PWROG)) during the week of October 31, 2022. The audit summaries are arranged according to the following tables: (1) Table 2 for general discussion topic summaries, (2) Table 3 for WEC component-specific discussion topic summaries, (3) Table 4 for CE component-specific discussion topic summaries, and (4) Table 5 for B&W component-specific discussion topic summaries.

The NRC staff issued RAIs on December 1, 2022 (Ref. 37).

Table 2. Audit Summaries for General Audit Discussion Topics

General Audit Topic		Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
1. Underlying MRP-227 Assumptions (Validity Check for Potential 80-Year Impacts)	Use of post-weld heat treatment for screening objectives and inspection categorization results	<p>During the audit discussions, the staff acknowledged that it had previously accepted use of original weld design post-weld heat treatment (PWHT) as a basis for screening of stress corrosion cracking (SCC) in B&W-design core support shield (CSS) upper flanges welds, as previously accepted in Section 3.6.4 of the staff's April 25, 2019, SE for MRP-227, Revision 1 (Ref. 14). In MRP-227, Rev. 2 (the Subject TR), EPRI proposed to use PWHT as an SCC screening basis for additional PWR-design RVI components. However, the staff informed EPRI MRP that use of PWHT may not be considered by the staff to be an acceptable method for screening out of SCC for periods exceeding 60 years of service life due to increased level of neutron irradiation caused by a 60 – 80-year SLR period.</p> <p>The topic of using PWHT as an SCC screening basis will be evaluated in the upcoming SE for MRP-227, Rev. 2, but on a component-specific basis for those PWR component types that apply PWHT as part of an SCC screening basis.</p>	The staff may consider RAIs on PWHT on a component-specific basis for RVI components identified as relying on PWHT for SCC screening.
	General inspection method assumption (applies to all aging mechanisms regardless of mechanisms specified in line items)	<p>EPRI MRP clarified that this assumption still holds true for SLR periods, but clarified that updated bases in MRP-189, Rev. 3 and MRP-191, Rev. 2 for aging mechanism screening derived a refined set of component-specific screening results for assessed mechanisms, which were factored into the list of component-specific inspection recommendations in the Chapter 4 tables of the report.</p> <p>The staff does not see any need to evaluate this matter in the upcoming SE for MRP-227, Rev. 2.</p>	The staff does not anticipate the need for issuing an RAI on this matter. This matter does not need to be evaluated in the SE.

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>Base Load Operations with Low-leakage fuel assumption; impact of Flexible Operations on those Assumptions (including MRP-227, Rev. 2 Appendix D criteria for flexible, non-base load operations impacts.)</p>	<p>EPRI MRP confirmed that, for PWR units operating under base-load-following critical power operations, the guidance in MRP-227, Rev. 2 is still based on the assumption that the units implementing base-load-following operations have switched low-leakage fuel at 30 years of plants operations.</p> <p>For PWR units that have received license amendments for implementation of flexible, non-base load power operations, EPRI MRP confirmed that new criteria for assessing the impacts of the flexible operations on the Chapter 4 and Chapter 5 evaluation guidelines for component-specific locations are given in Appendix D of MRP-227, Rev. 2. The staff informed EPRI MRP that it may need to issue RAIs relative to the assessment and criteria provided in Appendix D of MRP-227, Rev. 2.</p> <p>The staff informed EPRI MPR that the criteria for evaluating impacts of flexible, non-base load operations on the screening results and I&E criteria for Primary and Expansion category components in the Subject TR are entirely new and will need to be evaluated in the upcoming SE for MRP-227, Rev. 2. The staff also informed EPRI MRP that there may be one or more RAIs relative to the technical assessment provided in Appendix D of the Subject TR.</p>	<p>The staff may need to issue one or more RAIs relative to the flexible, non-base load operations criteria and evaluation provided in Appendix D of MRP-227, Rev. 2.</p>
<p>NAM components that are defined as ASME B-N-2 or B-N-3 Examination Category Components</p>	<p>EPRI MRP confirmed that, for RVI components defined as NAM category components in MRP-227, Rev. 2 and ASME Code Class Examination Category B-N-2 or B-N-3 components in the current licensing basis (CLB), the methods in MRP-227, Rev. 2 do not supersede or reduce the need to inspect the components under the ASME Section XI inservice inspection (ISI) program (i.e., the program defined as NUREG-1801, "Generic Aging Lessons Learned (GALL) Report" (Ref. 32) or NUREG-2191, "Generic Aging Lessons-Learned for Subsequent License Renewal"(GALL-SLR) (Ref. 33) XI.M1 aging management program). EPRI MRP commented that this is formally identified in Section 3.3.1 of MRP-227, Rev. 2.</p> <p>Since this basis is being maintained in MRP-227, Rev. 2 (as defined in Section 3.3.1 of the report) and represents a conservative assumption in the methodology, the staff does not see any need to evaluate this topic in the upcoming SE for MRP-227, Rev. 2.</p>	<p>The staff does not anticipate the need for issuing an RAI on this matter from a generic perspective or to evaluate this generic topic in the upcoming SE for the Subject TR.</p>

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>2. Changes in MRP-227, Rev. 2 that may reopen staff conclusions in the April 25, 2019, SE for MRP-227, Rev. 1-A</p>	<p>The staff explained that some component-specific criteria changes being made in MRP-227, Rev. 2 are establishing changes for 40 – 60 year I&E criteria for some PWR RVI components that differ from the 40 – 60 year I&E criteria for the components in the staff's April 25, 2019, SE for MRP-227, Revision 1. The staff informed the EPRI MRP that these types of changes in the report will reopen the staff's assessment of the I&E criteria for the component types, as approved in the April 25, 2019, SE.</p> <p>EPRI MRP explained that its objective for MRP-227, Rev. 2 was to establish an updated I&E basis in MRP-227, Rev. 2 that would cover PWR component-specific criteria for all operating periods, including 40 – 60, 60 – 80, or 40 – 80 periods and operations beyond an 80-year cumulative service life.</p> <p>The staff acknowledged EPRI MRP's clarification on how MRP-227, Rev. 2 would be applied for plant operation timing periods and EPRI MRP's desire to use MRP-227, Rev. 2 as a methodology covering all plant service lives, including those that go beyond a cumulative 80-year SLR service term. However, the staff clarified that the scope of the upcoming SE for MRP-227, Rev. 2 would need to include any changes to component-specific I&E criteria for 40 – 60-year ILR periods that differ from those approved for the component types in the April 25, 2019, SE for MRP-227, Rev. 1/Rev. 1-A. For this SE objective, the staff may devote a specific SE subsection for component-specific I&E criteria changes in MRP-227, Rev. 2 that only apply to 40 – 60-year ILR periods.</p>	<p>Some component-specific RAIs may be needed for 40 – 60 year component-specific I&E criteria in MRP 227, Rev. 2 that differ from those approved for same component types in the staff's April 25, 2019, SE for MRP 227, Rev. 1/ Rev. 1-A</p>

<p>3. Past A/LAIs Topics</p> <p>(Validity Check for Potential 80-Year Impacts)</p>	<p>General A/LAI Topical Discussion and A/LAI #1 – MRP-227-A:</p> <p>Demonstration that underlying MRP-227 assumptions are valid inclusive of updated bases incorporated into MRP-227, Rev. 2</p>	<p>The staff explained the updated basis in MRP-227, Rev. 2 could potentially be changing EPRI MRP's bases for resolving past Applicant/Licensee Action Item (A/LAI) topics that were previously issued in the staff's December 16, 2011, SE for MRP-227, Rev. 0/Rev. -A and resolved in the staff's April 25, 2019, SE for MRP-227, Revision 1/Rev. 1-A. The staff informed EPRI MRP that the staff may not be necessarily reissuing these A/LAI topics in the upcoming SE for MRP-227, Rev. 2.</p> <p>However, for A/LAI topics and topical closure bases that were approved in the staff's April 25, 2019, SE for MRP-227, Rev. 1/Rev. 1-A, the SE for MRP-227, Rev. 2 would need to establish either: (1) why the past basis for resolving the A/LAI topic of interest in the April 25, 2019, SE was valid and could carry forward for the updated I&E basis in MRP-227, Rev. 2, or (2) if the past A/LAI topic resolution basis in MRP-227, Rev. 1-A was being amended or altered in MRP-227, Rev. 2 from that approved for the A/LAI topic in the April 25, 2019 SE, the updated basis in MRP-227, Rev. 2 was confirmed as being acceptable for the component-specific A/LAI topical matter.</p> <p>The past A/LAI #1 topic involved a former staff request for confirmation that the bounding assumptions of the MRP-227 methodology would hold true for the evaluation of RVI components over the ILR or SLR period of interest. EPRI informed the staff that, to address the bounding confirmation issue for Westinghouse and CE-design units, performance of the MRP-2013-025 power operation parameter checks are recommended as a Good Practice for the operating units, as included for Westinghouse and CE-design PWR units in Appendix B of Subject TR. This applies to Westinghouse or CE reactor units operating under the base-load-following power operation assumption. EPRI MRP stated that similar checks are being done for the five currently operating B&W-design units (i.e., the three units at Oconee Nuclear Station [ONS1, ONS2, and ONS3], the Davis Besse unit [DB], and the unit at Arkansas Nuclear One, Unit 1 [ANO1]).</p> <p>EPRI MRP confirmed that it addresses the potential impact of flexible, non-base load operations on the underlying assumptions of MRP-227 in Appendix D of the Subject TR. However, the staff informed EPRI MRP that the past basis for closing the A/LAI #1 topic in the staff's April 25, 2019, SE did not apply PWR units operating outside the base-load-following power operation assumption for the prior versions of MRP-227. Thus, the staff informed EPRI MRP that the staff will need to evaluate the impact of flexible, non-base load operations on the A/LAI topic and original operating assumption for MRP-227 in the upcoming SE for the Subject TR. The staff also informed the EPRI MRP that some RAIs may be necessary relative to the technical evaluation and basis provided in Appendix D of the Subject TR.</p>	<p>The staff does not anticipate the need for issuing an RAI on this matter if the PWR unit is operating under the normal base load operating assumption (including the assumption to move to low-leakage fuel at 30 years of reactor unit service).</p> <p>However, RAIs related to the bounding assumption topic may be needed if the licensee is implementing flexible, non-base load operations of its PWR unit or units. If RAIs are necessary, the staff will consider them relative to the information for flexible, non-base load operations in Appendix D of the Subject TR.</p> <p>Staff will need to decide whether a new A/LAI or Condition is needed for PWR units implementing flexible, non-base load operations.</p>
	<p>A/LAI #2 – MRP-227-A:</p>	<p>EPRI MRP clarified that the last bullet on page 2-6 and last paragraph of page 2-7 covers this A/LAI topic such that A/LAI #2 would not need to be reissued. EPRI MRP also clarified that MRP-191, Rev. 2 and MRP 2018-022 for CE and WEC</p>	<p>The staff does not anticipate the need for issuing an RAI on the</p>

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>Identification of missing components or components outside the scope of MRP-227, Rev. 2.</p>	<p>component types and MRP-189, Rev. 3 for B&W component types address missing components from prior versions of the report. The staff will include a brief statement in the upcoming SE regarding how the updated methodology in the Subject TR addresses the A/LAI #2 topic without the need for reissuing the stated A/LAI.</p>	<p>past A/LAI #2 topic. The upcoming SE to explain that the potential missing component issue addressed through updates of MRP-227 Rev. 2 and associated background reports.</p> <p>A/LAI #2 will not need to reopen or be reissued.</p>
<p>A/LAI #3 – MRP-227-A:</p> <p>Existing Programs for aging management of CE-design thermal shield positioning pins and incore instrumentation (ICI) thimble tubes and Westinghouse-design control rod guide tube (CRGT) guide tube support pins (split pins)</p>	<p>EPRI MRP informed the staff that the third paragraph on page 2-7 of MRP-227, Rev. 2 and the updated component evaluations in MRP-191, Rev. 2 discuss these types of component-specific and plant-specific <i>existing</i> programs. For aging management considerations of CE-design thermal shield positioning pins, EPRI MRP clarified that the thermal shield positioning pins only applied to Fort Calhoun (permanent defueled operations). EPRI MRP clarified that the CE-design ICI thimbles have new updated I&E criteria in MRP-227, Rev. 2. EPRI MRP explained that the Existing Program need for managing for Westinghouse-design CRGT splits pins continues to be dependent of the current material of fabrication for the split pins (i.e., evaluate and potential manage if the pins are made from X-750 nickel-based alloys; no aging management in the pins are made from Type 316 austenitic stainless steel).</p> <p>Staff to evaluate the potential for continued need of Existing Program bases for these component types in the upcoming SE for the Subject TR.</p>	<p>The staff does not anticipate the need for issuing an RAI on the past A/LAI #3 topic. The upcoming SE to explain how MRP-227, Rev. 2 addresses aging management of the past A/LAI #3 component types.</p> <p>A/LAI #3 will not need to reopen or be reissued.</p>

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>A/LAI #4 – MRP-227-A:</p> <p>Use of PWHT as an inspection categorization basis for the B&W-design CSS upper flange weld (UFW)</p>	<p>The staff informed EPRI MRP that in the MRP-227, Revision 0 report, the inspection categorization of the CSS UFW (i.e., placement in the Primary category versus placement in the No Additional Measure category) was subject to verification on whether the CSS UFW had been subjected to a PWHT during original weld fabrication. Thus, the CSS UFW was subject to the applicant action item in A/LAI #4, which requested applicant verification of the original weld design PWHT activity if the CSS UFW was to be placed in the NAM category of the PWR Vessel Internal aging management program for the B&W-design unit.</p> <p>EPRI MRP informed the staff that aging management of the B&W-design CSS UFW was updated in MRP-227, Rev. 2, and that the CSS UFW is now established as an Expansion category component based on screening results of the assessed fatigue aging mechanism (i.e., for the version of the PWR Vessel Internals Program that will be implemented during the 60 – 80-year SLR period). The staff will evaluate the updated aging management basis for B&W-design CSS UFW on a component-specific basis in the upcoming SE for the Subject TR.</p>	<p>The staff does not anticipate the need for issuing an RAI on the past A/LAI #4 topic. However, the upcoming SE will need to include an assessment of the updated aging management basis for the CSS UFW on a component-specific basis.</p> <p>A/LAI #4 will not need to reopen or be reissued.</p>

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>A/LAI #5 – MRP-227-A:</p> <p>Acceptance criteria for physical measurements applied to Westinghouse hold-down spring, and for CE plants with shroud designs in two vertical sections, the gap between the top and bottom shroud segments.</p>	<p>In the original A/LAI #5, the staff requested that licensees implementing the MRP-227-A methodology define the acceptance criteria for PWR RVI component types being subject to physical measurement techniques, as the acceptance criteria for the physical measurements were not defined in the original MRP-227, Revision 0 report.</p> <p>EPRI MRP confirmed that A/LAI #5 applied to physical measurements of Westinghouse-design hold-down springs, and the gap areas CE-design welded core shrouds that were fabricated with two vertical (upper and lower) core shroud cylinder sections. For the updated basis in MRP-227, Rev. 2 for the Westinghouse-design hold-down spring, EPRI informed the staff that the update physical measurement basis is given in line items W8 of Tables 4-3 and 5-3 of the Subject TR. Under the line item W8 bases, EPRI MRP explained that the owner of the Westinghouse unit can take the ILR period physical measurement results for the hold-down spring, evaluate them out to 80 years to determine whether they meet the acceptance criterion for justifying that the hold-down will maintain adequate preload through the end of the 80-year SLR period. EPRI MRP explained that if the acceptance criteria are not met for 80 years, additional measurements of the hold-down spring will be needed for the SLR period per Item W8 in Table 4-3 of MRP-227, Rev. 2. The staff will need to evaluate this basis on a component-specific basis in the upcoming SE for the Subject TR.</p> <p>For the updated basis in MRP-227, Rev. 2 for CE-design core shrouds with gap between the two vertical cylinder sections, EPRI informed the staff that physical measurement of the gap area is addressed in Item C4.a of Tables 4-2 and 5-2 of the MRP-227, Rev. 2 report. Under the line item C4.a bases, EPRI MRP explained that the visual VT-1 inspection basis of the gap area establishes the potential need for performance of physical measurements of the gap area if the visual inspections result in a significant change in gap area due to void/swelling distortion of the cylinder sections. The staff will need to evaluate this basis on a component-specific level in the upcoming SE for the Subject TR.</p>	<p>The staff does not anticipate the need for issuing an RAI on the past A/LAI #5 topic. However, upcoming SE will need to include an assessment of the potential physical measurements needs of these component types on a component-specific basis.</p> <p>A/LAI #5 will not need to reopen or be reissued.</p>

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>A/LAI #6 – MRP-227-A</p> <p>Management of B&W-design Core Barrel (CB) assembly component that are inaccessible to inspection or that do not currently have acceptable inspection techniques.</p>	<p>In summary of the original A/LAI #6, the staff requested that licensees implementing the MRP-227-A methodology address Expansion criteria for those B&W-design Expansion category components that EPRI MRP had designated as either inaccessible to inspection or had yet to have an established and qualified inspection technique for the component type. For the A/LAI topic, EPRI MRP had previously identified to the staff that the CB former plates, CB cylinder and cylinder vertical and circumferential seams welds, CB-to-former bolts and their locking devices, and external baffle-to-baffle bolts and their locking devices were inaccessible to inspection. The EPRI MRP identified that the internal baffle-to-baffle bolts were un-inspectable due to the lack of a currently available inspection technique. Under this A/LAI, the staff indicated that owners of B&W units will need to justify functionality of CB assembly with consideration of age-related degradation in these components by performing an evaluation of the assembly or alternatively through schedule replacement activities of the component types.</p> <p>The staff acknowledged that the staff closed A/LAI #6 in Section 3.6.6 of the staff's April 25, 2019, SE for MRP-227, Rev. 1/Rev. 1-A due to incorporation of these unaccessible/un-inspectable Expansion component criteria into Table 5-1 of MRP-227, Rev. 1-A and into WCAP-17096-NP-A, Revision 2. However, during the audit, the staff informed EPRI MRP that the updated I&E criteria in MRP-227, Rev. 2 were changing the accessibility considerations for some of these components (e.g., CB cylinder and cylinder weld components) from those approved in the April 25, 2019, SE and incorporated into the MRP-227, Rev. 1-A report. Therefore, the staff informed the EPRI MRP that the aging management bases for the B&W-design components that were within the scope of past A/LAI #6 topic will need to be evaluated on a component-to-component basis in the upcoming SE and that some RAIs or requests for confirmation may be necessary for the staff's evaluation of the updated I&E criteria for the specified inaccessible or un-inspectable B&W-design component types.</p>	<p>One or more RAIs will be necessary. But the staff will address this on a component-to-component basis in the SE for each of the B&W Expansion category components claimed as being inaccessible or un-inspectable in MRP-227, Rev. 1-A.</p>

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>A/LAI #7 – MRP-227-A:</p> <p>Management of loss of fracture toughness due to thermal aging embrittlement and neutron irradiation embrittlement (IE) in cast austenitic stainless steel (CASS), PH, and martensitic stainless steel components.</p>	<p>EPRI MRP informed the staff that the basis for closing the past-issued A/LAI #7 is discussed on pages 48 - 50 of MRP-277, Rev. 1-A, with the technical basis for closing the thermal embrittlement (TE) aging management topic being provided in PWROG Report No. PWROG-15032-NP, Revision 0 (Ref. 43).</p> <p>Post audit, the staff confirmed that A/LAI #7 was closed in Section 3.6.7 of the staff's April 25, 2019, SE for MRP-227 Rev. 1/Rev. 1-A. The staff also confirmed that the rationale for closing the A/LAI #7 TE aging management issue was based on the updated statistical analysis of delta-ferrite contents for CF8 and CF3M CASS materials, as evaluated in PWROG-15032-NP, Revision 0. The staff will summarize the past evaluation on TE of CASS materials in the upcoming SE for MRP-227, Rev. 2; however, no RAI will be necessary for the evaluation of this topic.</p>	<p>The staff does not anticipate the need for issuing an RAI on the past A/LAI #7 topic. However, the staff will need to assess the fracture toughness topic in the upcoming SE for MRP-227, Rev. 2.</p> <p>A/LAI #7 will not need to reopen or be reissued.</p>
<p>A/LAI #1 – MRP-227. Rev. 1-A</p> <p>Operating experience and updated aging management bases for Westinghouse-design baffle-to-former bolts.</p>	<p>The staff informed the EPRI MRP that this is an existing A/LAI topic since it was issued in the staff's April 25, 2019, SE for MRP-227, Rev. 1/Rev. 1-A. The A/LAI deals with the EPRI MRP's basis for managing cracking in Westinghouse-design baffle-to-former (BF) bolts, which are known to be potentially susceptible to irradiation-assisted stress corrosion cracking (IASCC) based on past plant-specific operating experience with crack-induced failures of Westinghouse BF bolts. The staff asked EPRI MRP to discuss the latest industry supplemental aging management bases for managing cracking in Westinghouse-design BF bolts.</p> <p>EPRI MRP explained that all relevant supplemental aging management methodologies for Westinghouse-design BF bolts were closed by incorporating the background methodologies as referenced methodologies in the update of Item W6 in Table 4-3 of MRP-227, Rev. 1-A. the EPRI MRP explained that these background report references have been incorporated and included in the update of Item W6 in Table 4-3 of the Subject TR.</p> <p>The staff will include an evaluation section in the upcoming SE for MRP-227, Rev. 2 that focuses on PWR RVI components with significant past operating experience. The SE section will address the PWR RVI components with past risk-significant operating experience, including Westinghouse-design BF bolt operating experience. The staff will consider whether A/LAI #1 of MRP-227, Rev. 1-A can be closed in the upcoming SE for the Subject TR. The staff does not see the need for issuing any RAIs on this BF bolt A/LAI matter.</p>	<p>The staff does not anticipate the need for issuing an RAI on the A/LAI #1 – MRP-227 Rev. 1-A topic. However, the staff will need to assess the updated I&E criteria for Westinghouse-design BF bolts in the upcoming SE for MRP-227, Rev. 2.</p>

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>4. Use of Non-Qualified Visual Inspection Methods (Sections 4.2.3 and 5.1.4, MRP-227, Rev. 2)</p>	<p>EPRI MRP commented that use of non-qualified visual inspection techniques only applies to the tie-rod assemblies in core shrouds of CE-design units with welded full height plate core shrouds (See Figure 4-24 in MRP-227, Rev. 2). Section 4, Table 4-2 discusses inspections required every outages for the tie rods. EPRI MRP stated that the non-qualified visual inspection method for tie rods is based on operating experience that detected tie-rod structural integrity issue. EPRI MRP also explained that these visual inspections are analogous to visual foreign material exclusion inspection and will monitor for evidence that tie-rod nuts holding tie rods in place are intact. Technique similar to VT-3 but less qualified. EPRI MRP clarified that a site-specific procedure will define how the non-qualified visual inspection will be done and that the inspection method is outside the scope of ASME defined visual methods (VT-1 or VT-3).</p> <p>The staff informed EPRI MRP that use of non-qualified visual inspection methods is not included or defined in the scope of the updated non-destructive examination (NDE) standard (i.e., MRP-228, Rev. 4) that was used for the MRP-227, Rev. 2 update. The EPRI MRP stated that it will take that non-qualified visual inspection acceptance criteria matter back to EPRI MRP NDE group.</p> <p>The staff will evaluate the non-qualified visual inspection matter in the upcoming SE for MRP-227, Revision 2; however, the staff does not see any need to issue an RAI on this topic, given that the inspection technique is only being applied to a single RVI component type and that the inspection method will only need to look for gross evidence of a loss of tie-rod integrity function.</p>	<p>The staff does not anticipate the need for issuing an RAI on the non-qualified visual inspection topic. However, the upcoming SE will need to include a component-specific assessment of the non-qualified visual inspection methods being applied to CE-design core shroud tie-rod assemblies.</p>
<p>5. Sections 5.1.1, 5.1.2, 5.1.3, 5.1.5, and 5.1.6 of the Subject TR on Potential NDE Inspection Methods for RVI Component Locations and Relevant Conditions for NDE Inspection Methods</p>	<p>The staff informed EPRI MRP that the 2019 Edition of ASME Boiler and Pressure Vessel Code, Section XI, includes a specific paragraph (Paragraph IWB-3520.2) for performance of foreign materials inspections. The staff commented that acceptance criteria in Section 5.1.1 on "Visual (VT-3) Examination" does not include foreign materials as one of the relevant conditions monitored by VT-3 visual inspection methods. The staff informed EPRI MRP that the staff may consider issuance of an RAI on this visual inspection method topic.</p> <p>Other than this VT-3 NDE topic and the non-qualified visual inspection topic in Item 4 above, the staff did not see any need to discuss the remaining NDE summaries in Chapter 5 of the Subject TR.</p>	<p>The staff may consider issuance of an RAI relative to the set of relevant conditions defined in Section 5.1.1 of the Subject TR.</p>

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>6. Chapter 6 basis for managing and analyzed loss of fracture toughness in PWR RVI components</p> <p>(Discussion to included EPRI MRP basis for resolving EPRI-identified Open Item topic for lower bound fracture toughness value being linked to the latest version of EPRI Proprietary Report BWRVIP-100 (with the latest version being BWRVIP-100, Rev. 1-A). Other fracture toughness references include MRP-210 and MRP-211).</p>	<p>The staff informed EPRI MRP that the Chapter 6 bases for performing component-specific flaw evaluations (i.e., when triggered by the results of component-specific inspection results) includes use of lower bound fracture toughness values, as referenced to MRP-210, MRP-211, and BWRVIP-100 report versions. However, the staff informed EPRI MRP that EPRI issued a supplemental letter on some potential Part 21 issues with the fracture toughness values reported in the BWRVIP-100, Rev. 1-A and MRP-211, Rev. 1 records. The staff informed EPRI that the Chapter 6 discussions on fracture toughness assessments did not acknowledge the EPRI Part 21 letter on fracture toughness values referenced in BWRVIP-100, Rev. 1-A and MRP-211, Rev. 1 records.</p> <p>EPRI MRP responded by stating that the applicable MRP Part 21 letter is given in EPRI Letter No. MRP 2021-030 (dated March 22, 2021; ADAMS Accession No. ML21084A164). EPRI MRP also commented that the EPRI MRP is working on a revision to EPRI report MRP-210 that will address current studies on lower bound fracture toughness values and that is expected to close Part 21 (potential open item on lower bound fracture toughness values).</p> <p>Given that the staff does not yet have a version of BWRVIP-100, MRP-210, or MRP-211 that is confirmed as being sufficient to close the referenced Part 21 fracture toughness value matter, the staff informed EPRI MRP that the staff may need to consider issuance of an RAI on this topic.</p>	<p>The staff may consider issuance of an RAI relative to lower bound fracture toughness value topic and will need to evaluate this topic in the upcoming SE for the Subject TR.</p>
<p>7. Chapter 6 flaw evaluation methods for establishing bounding flaw evaluation crack growth rates (CGRs) for stainless steel base metal and weld components</p> <p>(Staff-identified conditions for use of American Society of Mechanical Engineer (ASME) Code Case N-889 need to apply to EPRI model being referenced in the Subject TR)</p>	<p>The staff informed EPRI MRP that Chapter 6 identifies that the referenced CGR modeling and CGR value bases are referenced as being established in EPRI Report No. 3002003103, which has not been formally reviewed or approved by the staff. The staff informed EPRI MRP that the same CGR bases in Report No. 3002003103 were used to develop the CGR bases for AMSE Code Case N-889, which is subject to staff's conditions for applicable CGR value - fluence range relationships, as defined in Regulatory Guide (RG) 1.147, Revision 20 (ADAMS Accession No. ML21181A222). The staff informed EPRI MRP that the CGR basis referenced to Report No. 3002003103 does not acknowledge the conditions for the CGR bases as established in RG 1.147, Revision 20.</p> <p>The staff informed EPRI MRP that the staff may need to consider issuance of an RAI on this CGR matter. EPRI responded that it may address this matter by referring this over to the PWROG for the same issue on the current WCAP-17096 Rev. 3 review.</p>	<p>The staff may consider issuance of an RAI relative to the CGR value topic and will need to evaluate this topic in the upcoming SE for the Subject TR.</p>

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
8. Use of MRP-379 for performing weld repairs of irradiated PWR RVI materials.	<p>EPRI MRP clarified that MRP-379 is implementation guidance report on how to perform component-specific weld repairs and whether a licensee should consider weld repair as a viable corrective action option if the welded component types had been irradiated to a significant level. EPRI MRP explained that the MRP-379 is a supporting document to help decide on weld repair decisions and that it is an engineering tool but does not set acceptance standards for performing weld repairs. EPRI MRP stated that MRP-379 is not an Nuclear Energy Institute (NEI)-03-08 referenced document.</p> <p>Given that MRP-379 is only used as an engineering tool and is not an NEI-03-08 referenced report, the staff does not see the need to reference MRP-379 or evaluate the MRP-379 basis in the upcoming SE for MRP-227, Rev. 2.</p>	The staff does not see the need to evaluate the MRP-379 topic in the upcoming SE.
9. Logistics issue with the referencing of WCAP-17096-NP-A, Rev. 2 in Chapters 6 and 7 of the Subject TR	<p>The staff discussed the referencing of WCAP-17096-NP-A, Rev. 2 with the EPRI MRP. The staff informed EPRI MRP that the PWROG's acceptance criteria and data analysis criteria guidance in WCAP-17096-NP-A, Rev. 2, is referenced in Chapters 6 and 7 of the Subject TR as potential means of satisfying the Chapter 4 and 5 acceptance criteria for Primary and Expansion category component types in the Subject TR. The staff informed EPRI MRP that the acceptance criteria and data analysis criteria guidance in WCAP-17096-NP-A, Rev. 2, only correspond to the status of PWR RVI components defined as Primary or Expansion category component types in the prior staff-approved MRP-227-A report. The staff informed EPRI MRP that the current guidance containing the component-specific acceptance criteria and data analysis requirements for PWR Primary and Expansion category components is the current PWROG guidance in the WCAP-17096, Revision 3 report; EPRI MRP confirmed that this is the version of WCAP-17096 that corresponds to the status of Primary or Expansion category component types in staff-approved MRP-227, Revision 1-A report. PWROG also clarified that the PWROG has yet to develop a version of WCAP-17096 that corresponds to the updated set of RVI Primary and Expansion category component items in MRP-227, Rev. 2.</p> <p>The staff informed EPRI MRP that the staff may consider issuance of an RAI on the WCAP-17096 reference topic.</p>	The staff may consider issuance of an RAI relative to referencing of WCAP-17096-NP-A, Rev. 2 in the Subject TR and will need to evaluate this topic in the upcoming SE for the Subject TR.

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>10. Discussion of referenced reports in Section 7.1 of the Subject TR. Includes potential applicability of MRP 2013-025, MRP 2019-009 and MRP 2019-023 reports</p>	<p>The staff informed EPRI MRP that Section 7.1 of the Subject TR includes a list of EPRI background report reference and industry bulletin or alert letter records that were used to develop the updated guidance in MRP-227, Rev. 2. The staff informed EPRI that the staff did not see MRP 2013-025, MRP 2019-009 and MRP 2019-023 reports in the list of background reports provided in Section 7.1 of the Subject TR.</p> <p>EPRI MRP responded that MRP 2013-025 is not included in background document list because MRP 2013-025 power operating confirmation guidance for Westinghouse and CE-design internals was incorporated as interim guidance in Appendix A of the MRP-227, Rev. 1-A. EPRI MRP clarified that the MRP 2013-025 implementation guidance has carried over into Appendix A of the MRP-227, Rev. 2 report. EPRI MRP also explained that the supplemental guidance for Westinghouse and CE-design CB/core support barrel (CSB) middle axial welds and lower axial welds in MRP 2019-009 and MRP-2019-023 are addressed in Appendix A of MRP-227, Rev. 2, but only as Good Practice Operating Experience (OpE) guidelines.</p> <p>Based on the EPRI MRP explanations, the staff does not see any need to issue an RAI on the MRP 2013-025, MRP 2019-009 and MRP 2019-023 report references. The staff may opt to include a brief assessment of MRP-227, Rev. 2, Appendix A in the upcoming SE for the Subject TR.</p>	<p>The staff does not anticipate the need for issuing an RAI on the MRP 2013-025, MRP 2019-009 and MRP 2019-023 references. However, the upcoming SE may include a brief assessment on the contents of MRP-227, Rev. 2, Appendix A.</p>
<p>11. Section 7.1 statement: <i>"A failure to meet a Needed or Mandatory requirement is a deviation from the guidelines; a written justification for the deviation must be prepared and approved as described in Appendix B of NEI 03-08."</i> EPRI should be prepared to discuss which industry organization is responsible for receiving and processing these deviations for approval.</p>	<p>EPRI MRP clarified that deviations from I&E criteria or acceptance criteria for Primary or Expansion category components in MRP-227, Rev. 2 are prepared and issued directly to the EPRI MRP for disposition.</p> <p>Given that potential deviations will be dispositioned through coordination with EPRI MRP, the staff does not need to issue an RAI on this potential deviation-related matter. The staff's potential issue would only have applied if the deviations were needed and issued to NEI for disposition, but for the case where the licensee preparing the deviation was no longer an active or participating member of NEI. The staff may reference this matter in the "Referencing of the TR in the Current Licensing Basis" section or in an "Implementation of the TR" section of the upcoming SE for MRP-227, Rev. 2.</p>	<p>The staff does not anticipate the need for issuing an RAI on the potential I&E criteria deviation topic; but the staff may opt to include a brief assessment of this matter in the upcoming SE for MRP-227, Rev. 2.</p>

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>12. Adequacy of NEI 03-08 implementation criteria defined in Section 7.3 of the Subject TR.</p>	<p>EPRI MRP clarified that date for converting the PWR Vessel Internals Program (or equivalently named aging management program) over to the updated guidelines in MRP-227, Rev. 2 and for implementing the updated program are based relative to the date of the staff's future SE that is anticipated in approval of MRP-227, Rev. 2 report.</p> <p>The staff does not anticipate that an RAI will be needed on this implementation date matter. However, the staff may consider this topic for a Technical Report Update Action Item given that the date of the staff's final SE has yet to be determined or established. This would be analogous to past Technical Report update action items that were previously issued in the staff's December 16, 2011, SE for MRP-227, Rev. 0/Rev. -A.</p>	<p>The staff does not anticipate the need for issuing an RAI on the implementation data basis, but this matter may need to be considered for a TR update action item in the manner that such TR update action items were issued and addressed in the staff's December 16, 2011, SE for MRP-227, Rev. 0/Rev. -A.</p>
<p>13. Chapter 7 relevancy of MRP-227, Rev. 2 guidelines to PWR that have been approved for SLR using PWR Vessel Internals Program that are based on the guidelines of MRP-227, Rev. 1-A, as adjusted by the results of a site-specific 80-Year gap analysis for the RVI components (i.e., relevancy for licensees with 80-year PWR Vessel Internals Programs that precede the development of the updated methods in MRP-227, Rev. 2).</p>	<p>The staff discussed this CLB-related matter with the EPRI MRP. EPRI MRP clarified that for licensees that have had their 80-year versions of their PWR Vessel Internals Programs (or equivalent named program for the RVI components) approved in a SLR SE-type NUREG report for the processed subsequent license renewal applications (SLRAs), the NEI 03-08 implementation process and 10 CFR 50.59 design change process will address component-specific I&E criteria gaps for approved 80-year PWR Vessel Internals Programs that predate the I&E criteria in MRP-227, Rev. 2-A.</p> <p>The staff does not anticipate that an RAI will be needed on this topic. But the staff will need to address this topic in the "Referencing of the TR in the CLB" section of the upcoming SE for MRP-227, Rev. 2.</p>	<p>The staff does not anticipate the need for issuing an RAI on this topic. But the staff will need to address this topic in the "Referencing of the TR in the CLB" section of the upcoming SE for MRP-227, Rev. 2.</p>
<p>14. Timing of inspections for component-specific line items in Chapter tables that include the following type of inspection implementation statement:</p> <p><i>"no later than two refueling outages from the beginning of the license renewal period and subsequent examination at a 10-year interval."</i></p>	<p>EPRI MRP clarified that the referenced implementation statement refers to a basis for implementing the needed inspections or component evaluations either two outages before or two outages after entering into ILR or SLR period. EPRI MRP explains that this limited flexibility in the timing of the needed inspections or evaluations allows the licensee to match up with the ASME Section XI Code of Reference timing implementation. EPRI MRP stated that the EPRI MRP should not be dictating when to pull CB, which is dependent of the ASME Section XI timing criteria. The staff does not anticipate the need for an RAI on this implementation timing basis but may opt to include a brief statement on this matter in the upcoming SE for MRP-227, Rev. 2.</p>	<p>The staff does not anticipate the need for issuing an RAI on this implementation timing topic. The may address the implementation flexibility leeway in the upcoming SE for the Subject TR.</p>

General Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
15. Minimum coverage criteria for inspection credit of single and redundant component types	The staff informed EPRI MRP that the upcoming SE for MRP-227, Rev. 2 may include a brief section on minimum coverage criteria for inspection credit of component-specific Primary and Expansion category components in order to ensure that they are either consistent with the latest minimum coverage criteria approved for single or redundant component types in MRP-227, Rev. 1-A or else, as updated and further justified in MRP-227, Rev. 2.	The staff may include a SE section on this topic in the manner it was included in the April 25, 2019, SE for MRP-227, Rev. 1/Rev. 1-A.
16. MRP-227, Rev. 2, Appendix Methodologies or Criteria	The staff informed the EPRI MRP that the staff may need to issue one or more RAIs in regard to specific Appendix statements or bases provided in the MRP-227, Rev. 2 report. Examples are Appendix C on Alternate Aging Management Strategies or Appendix D on Flexible Operations.	The staff may need to consider some RAIs for Appendices C and D of the Subject TR. The contents and criteria in Appendices C and D will need to be evaluated in the upcoming SE for the Subject TR.

Table 3. Audit Summaries for Westinghouse Component-Specific Audit Discussion Topics

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>Control Rod Guide Tube (CRGT) Support Pins (Split Pins):</p> <p>Existing Program Basis for CRGT Split Pins in MRP-227, Rev. 1</p>	<p>The staff informed EPRI MRP that Section 4.5 states that upper internals guide tube support pins (split pins) are not a safety issue and does not require an aging management program, but Table 3-3 of the Subject TR leaves the CRGT split pins in as Existing Program components for the 40 – 80-year SLR version of the program. The staff informed EPRI MRP that Table 4-9 in MRP-227, Rev. 2 does not include a line item for the CRGT split pins. The staff asked EPRI to discuss what appear to be contradictory bases for the CRGT split pins.</p> <p>EPRI MRP informed the staff that the Existing Program basis for the CRGT split pins is given in Section 3.6.3 (pages 43 and 44) of the staff's April 25, 2019, SE for MRP-227, Rev. 1/Rev. 1-A. The staff does not anticipate the need for issuing an RAI on Existing Program basis for Westinghouse-design CRGT split pins. However, the upcoming SE will include as section for the CRGT split pins that the references the Existing Program evaluation of the CRGT split pins in Section 3.6.3 of the April 25, 2019, SE.</p>	<p>The staff does not anticipate the need for issuing an RAI on Existing Program basis for the CRGT split pins. The staff will include as cross reference to April 25, 2019, SE Section 3.6.3 in the upcoming SE for the Subject TR.</p>
<p>Upper Internals Assembly (UIA) Upper Core Plate (UCP) Components (Plate, Inserts and alignment Pins):</p> <p>Inspection Categories for the UCP Components in MRP-227, Rev. 2.</p>	<p>The staff acknowledged that Tables 4-3 and 4-6 in the Subject TR list the Item UCP as an Item W4.1 Expansion category component for the Primary Item W4 CB assembly lower girth weld (LGW); in contrast Items W15 and W19 in Table 4-9 include the UCP alignment pins and UCP inserts as ASME Section XI-based Existing Program components for the program. The staff may issue an RAI on the inspection category for the UCP itself (i.e., designated Expansion category component versus designated ASME Section XI-based Existing Program category component).</p>	<p>The staff may consider issuance of an RAI on the inspection category for Westinghouse-design UCPs.</p>
<p>UIA Conduit Seam Assembly Components (including tubes, bodies, tubesheets and tubesheet welds, brackets, clamps, terminal blocks, and strips):</p> <p>Inspection Categories for the Conduit Seal Assembly Components in MRP-227, Rev. 2</p>	<p>EPRI MRP clarified that the basis for placing the UIA conduit seal assembly components in the NAM category of the program is given in Section 4.2 of the Proprietary MRP-232, Rev. 2 report. Post audit, the staff confirmed the MRP-232, Rev. 2 Sections 4.2.7, 4.2.4.1, 4.2.7.3 and 4.2.7.4 provide the proprietary basis for placing the conduit seal assembly brackets, clamps, terminal blocks and strips in the NAM category of the program and that MRP-227, Rev. 2 Sections 4.2.8, 4.2.8.1 and 4.2.8.2 the proprietary basis for placing the conduit seal assembly tubes, bodies, tubesheets, and tubesheet welds in the NAM category of the program. Upon subsequent review of the proprietary information in MRP-232, Rev. 2 Sections 4.2.8.1 and 4.2.8.2, the staff notes that it may consider an RAI on the proprietary basis for placing the conduit seal assembly tubes, bodies, tubesheets, and tubesheet welds in the NAM category of the program.</p>	<p>The staff may consider issuance of an RAI on the inspection category for Westinghouse-design conduit seam assembly tubes, bodies, tubesheets, and tubesheet welds.</p>

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Core Barrel (CB) Outlet Nozzles and Safety Injection Nozzles – Updated Inspection Categories for the Nozzles in MRP-227, Rev. 2.	The staff discussed the inspection categorization for Westinghouse-design CB outlet nozzle and safety injection nozzle interfaces with the EPRI MRP. The staff informed the EPRI MRP that the CB outlet nozzles were specified as NAM category components in Table 3-3 of MRP-227, Rev. 2, but were designated as “Expansion” category components in Table 3-3 of MRP-227, Rev. 1-A. EPRI MRP clarified that the basis for designated the CB outlet nozzles as NAM category components in MRP-227, Rev. 2 is given in MRP-232, Rev. 2. Post audit, the staff noted that, although Sections 4.2.2.6 and 5.1.2.2 of the Proprietary MRP-232, Rev.2 cover the inspection categorization basis for the CB outlet nozzles, the information in MRP-233, Rev. 2 does not provide sufficient supporting information for placement of the CB outlet nozzles in the NAM category of the MRP-227, Rev. 2. Thus, the staff may issue an RAI in relation to the inspection category that is designated for Westinghouse-design CB outlet nozzles in MRP-227, Rev. 2.	The staff may consider issuance of an RAI on the inspection category for Westinghouse-design CB outlet nozzles and safety injection nozzle interfaces.
Core Barrel (CB) Upper Flange Weld (UFW), Lower Flange Weld (LFW), and Upper Axial Welds (UAWs); lower support forging or casting	<p>The staff did not opt to discuss the inspection categorizations for Westinghouse-design CB UFWs, UAWs and LFWs with the EPRI MRP during the audit. The staff confirmed prior to the audit that the Item W3.2 CB UAWs and Item W3.3 CB LFWs are maintained as first level or secondary level Expansion category component types for the EVT-1 visual, ultrasonic test (UT) volumetric, or eddy current test inspections that will be applied to the Primary Item W3 CB UFW. The staff confirmed that the Expansion Item W3.4 lower support casting/forging is also a second Expansion category component for the Primary Item W3 UFW and the main Expansion Item W3.3 CB LFW.</p> <p>The staff confirmed that the Proprietary information in Section 4.2.2.8 of MRP-232, Rev. 2 supports the inspection categorization bases and I&E criteria for the Westinghouse-design CB UFWs, LGWs, UAWs, and LFWs.</p>	SE to briefly clarify the applicable inspection categories for the Westinghouse CB UFW, UAW, and LFW component types.
Core Barrel (CB) Upper Girth Weld (UGW)	During the audit, the staff discussed the inspection categorization for Westinghouse-design CB UGWs with EPRI MRP. The staff informed EPRI MRP that the CB UGW is maintained in MRP-227, Rev. 2 as an Item W3.1 Expansion category weld for the Primary Item W3 CB UFW inspections and that the basis in the staff's April 25, 2019, SE for MRP-227, Rev. 1-A has supporting information for maintaining the CB UGW as an Item W3.1 Expansion category weld. However, following the staff's audit discussions on the inspection category for the CB UGW, the staff determined that there is newly reported operating experience with detected crack-like indications in Westinghouse-design CB UGWs. Thus, the staff may consider a supplemental RAI on the inspection categorizations for Westinghouse-design CB UGWs.	The staff may consider issuance of a supplemental RAI on the newly reported operating experience and the inspection category for Westinghouse-design CB UGWs.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Core Barrel (CB) Lower Girth Weld (LGW), Middle Axial Welds (MAWs) and Lower Axial Welds (LAWs); lower support column bodies (both cast and non-cast bodies)	<p>The staff informed EPRI MRP that the CB MAWs are maintained in MRP-227, Rev. 2 as an Item W3.2 and W4.2 Expansion category welds for the Primary Item W4 CB LGW and that the basis in the staff's April 25, 2019, SE for MRP-227, Rev. 1-A has supporting information for maintaining the CB MAWs and LAWs as Expansion category welds. The staff confirmed that the Expansion Item W4.1 UCP (discussed earlier in this table) and the Expansion Item W4.4 lower support column bodies (both cast and non-cast column body types) are also Expansion category components for the Primary Item W4 CB LGW.</p> <p>However, the staff also stated that there is existing supplemental guidance in MRP 2019-009 that recommends a one-time VT-3 visual inspection of the CB MAWs and LAWs. Thus, the staff asked EPRI MRP to clarify the relationship of the MRP 2019-009 guidelines (if any) to the Expansion category I&E criteria for the Westinghouse-design CB MAWs and LAWs. EPRI MRP clarified that the criteria in MRP 2019-009 for a one-time VT-3 visual inspection of the welds is issued only as an NEI 03-08 "Good Practice" and not as an NEI 03-08 "Mandatory" or "Needed" requirement. EPRI MRP stated that the licensees owning Westinghouse-design PWRs could implement the "Good Practice" guidelines in MRP 2019-009 at their discretion. The staff had no further questions on the MRP 2019-009 matter. The staff will address this matter briefly in the upcoming SE for the Subject TR but does not see any need for an RAI on this matter.</p>	The staff does not anticipate the need for issuing an RAI on the inspection category for the Westinghouse-design CB MAWs and LAWs. Staff will briefly summarize the inspection bases for the Category Item W4 and W4.1 – W4.4 components in the upcoming SE. The staff will also briefly discuss the MRP 2019-009 criteria for the MAWs and LAWs in the staff's upcoming SE for the Subject TR.
Flux Thimble Tubes and Flux Thimble Tube Plugs	<p>The staff did not discuss the Existing Program inspection categorization for Item Westinghouse-design flux thimble tubes with EPRI MRP during the audit, as the Existing Program criteria for the flux thimble tubes in Table 4-9 of the Subject TR are tied to the known Existing Program in GALL-SLR AMP XI.M37, "Flux Thimble Tube Inspection." However, the staff briefly touched base on the NAM categorization for the specified flux thimble tube plugs in Table 3-3 of the Subject TR. Specifically, the staff informed EPRI MRP that Westinghouse flux thimble tube plugs are listed in GALL-SLR AMP XI.M37 as a corrective action option for flux thimble tubes that are detected with an unacceptable level of wear in the tubes. EPRI MRP clarified that the flux thimble tube plugs referenced in Table 3-3 of MRP-227, Rev. 2 are not the type of plugs that might be installed as a corrective actions modification for flux thimble tubes exhibiting unacceptable levels of wear indications. EPRI MRP clarified that the plugs referenced in Table 3-3 of the Subject TR involve a welded part of thimble tube bullet nose (located at the end of the thimble tube) that is not associated with area of the tubes that is the subject of the aging by wear concern. The staff informed EPRI MRP that it did have any further inquiries on this matter, and concluded that this matter does not need to be addressed in the upcoming SE for the Subject TR.</p>	The flux thimble tube and flux thimble tube plug topic is closed for the audit. The staff does not need to address aging management of Westinghouse-design flux thimble tubes and tube plugs in the upcoming SE for the Subject TR.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Lower Core Plate (LCP, including XL types), Lower Fuel Alignment Pins, XL Lower Fuel Alignment Pins, LCP Bolts, and Manway Bolts	<p>The staff did not opt to discuss the Existing Program inspection categorization for Westinghouse-design Item W12 LCP, Item W17 lower fuel alignment pins, and Item W18 extra-long (XL) lower fuel alignment pins during the audit. EPRI MRP addressed the LCPs/XL LCPs and these fuel pin components as Existing Program components for Westinghouse-design PWRs with normal sized or extra-long (14-foot) core designs, as established and given in the MRP 2018-022 report. The upcoming SE will address the LCP/XL LCP, lower fuel alignment pins, and XL fuel alignment pins as established as Existing Program components for MRP-227, Rev. 2. However, the staff does not see any need to issue an RAI on the Existing Program bases for the LCP and these types of lower fuel alignment pins.</p> <p>The staff briefly discussed the NAM categorization for the lower core barrel (LCB) bolts and manway bolt with EPRI MRP. EPRI MRP clarified that the LCB bolts and internal manway bolts in Westinghouse-design reactors are dispositioned into the NAM category based on low fluence exposure and lack of intended function arguments. EPRI MRP also stated that the LCP bolts and manway bolts are inaccessible to inspection equipment.</p> <p>Post audit, the staff confirmed that the inspection categorization bases for the LCP, lower fuel alignment pins (including XL types), LCP bolts and manway bolts are supported by the proprietary assessment and basis for the components in Section 4.2.4 of MRP-232, Rev. 2 and its subsections. The staff will evaluate the Westinghouse-design LCP component types (including LCP, LCP bolts, manway bolts, and lower fuel/XL lower fuel alignment pins) in the upcoming SE for the Subject TR. However, the staff does not anticipate the need for issuing any RAIs on the inspection categorization for these components in MRP-227, Rev. 2.</p>	The Existing Program bases for the LCP and lower fuel alignments pins (including XL design types) will briefly be evaluated in the upcoming SE for the upcoming report.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Thermal Shield Bolts and Thermal Shield Flexures; Neutron Panel Components (Neutron Panel Bolts)	<p>The staff did not opt to discuss the Primary categorization basis Westinghouse-design thermal shield flexures (thermal shield assembly components) as the flexures are maintained as Item W9 Primary category components for Westinghouse-design RVI management programs. In addition, the EPRI MRP Primary Category VT-3 inspections of the thermal shield flexures have been sufficient to monitor and detect evidence of cracking in the flexures or occurrences of fractured or separated thermal shield flexures. Due to the relevant operating experience with cracking of thermal shield flexures, the staff will evaluate the Primary category basis for Westinghouse-design thermal shield flexures in the upcoming SE for the Subject TR.</p> <p>The staff briefly discussed the basis for placing the thermal shield bolts and neutron panel bolts in the NAM category of the program with the EPRI MRP. For thermal shield bolts in Westinghouse PWR units with thermal shield assemblies and neutron panel bolts in Westinghouse PWR units with neutron panels instead of thermal shield assemblies, EPRI MRP explained that the bolts are not nearly as irradiated as thermal shield flexures in Westinghouse-design units with thermal shield assemblies. However, the staff observed post audit that the PWROG's augment inspection criteria in Technical Bulletin (TB)-19-5 provide the "Good Practice" criteria for performing augmented, asset-management-based inspections of Westinghouse-design thermal shield bolts. Based on these explanations and observations, the staff does not anticipate the need for issuing any RAIs relative to the placement of neutron panel bolts or thermal shield bolts in the NAM category of the program. However, the staff will provide a brief evaluation of these components in the upcoming SE for the Subject TR.</p>	The staff will briefly evaluate in the inspection categorization bases for thermal shield flexure, thermal shield bolts and neutron panel bolts in the upcoming SE for the Subject TR. However, the staff does not anticipate the need for issuing any RAIs on the final inspection categorization bases for these component types.
Radial Support Keys	The staff did not include the new Existing Program criteria for the radial support keys within the scope of the audit. The staff was aware ahead of the audit and from its review of prior processed SLRAs for Westinghouse-design PWRs that the radial support keys were added as new ASME Section XI-related Existing Program components in MRP 2018-022 based on relevant operating experience with wear occurring in Westinghouse radial support keys. Thus, the new Existing Program criteria in Item W20 of MRP-227, Revision 2 Table 4-9 are the applicable aging management criteria for the radial support keys. The staff does not anticipate the need for any RAI on this topic; however, the upcoming SE for the Subject TR will explain the radial support keys are newly designated Item W20 Existing Program components for MRP-227, Revision 2.	Staff to briefly identify in the upcoming SE that Westinghouse radial support keys are new Item W20 Existing Program components for MRP-227, Rev. 2.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Clevis Insert Assemblies, Including Clevis Insert Bolts, Dowels, and Wear Surfaces	<p>The staff did not include the new Existing Program criteria for the specified clevis insert assembly components within the scope of the audit. The staff was aware ahead of the audit and from its review of prior processed SLRAs for Westinghouse-design PWRs that the generic operating experience with cracking clevis insert assembly bolts and wear of clevis insert wear surfaces was adequately addressed in MRP 2018-022 and covered as ASME Section XI-related Existing Program components in Table 4-9 of MRP-227, Rev. 2 (Item W14). Thus, the Existing Program criteria in Item W14 of MRP-227, Revision 2 Table 4-9 cover aging management of the clevis insert bolts and clevis wear surfaces. The staff does not anticipate the need for any RAI on this topic; however, the upcoming SE for the Subject TR will explain the operating experience for the clevis insert bolts and wear surfaces, and how Item W14 in Table 4-9 of the Subject TR accounts for this operating experience.</p>	Staff to briefly identify in the upcoming SE that Westinghouse clevis insert bolts and clevis wear surfaces are existing Item W14 Existing Program components for MRP-227, Rev. 2.
RVI hold-down spring	<p>The staff asked EPRI MRP to explain whether the Item W8 criteria for Westinghouse-design RVI hold-down springs in Table 4-3 of the Subject TR would call for a second round of physical measurements of the hold-down spring during management period associated with the SLR term (i.e., years 60 – 80 in the subsequent renewed operating license for the facility).</p> <p>EPRI MRP explained that the updated criteria in Item W8 of Tables 4-3 and 5-3 in MRP-227, Rev. 2 would call for additional measurements to be performed on the hold-down spring within three cycles from the beginning of the subsequent period of extended operation (i.e., 3 month prior to or 3 months after the subsequent period of extended operation) if the first set of measurements of the hold-down spring could not ensure adequate protection against wear-induced loss of preload during the subsequent period of extended operation.</p> <p>Based on the EPRI MRP's explanations, the staff does not anticipate any need to RAIs on the physical measurement criteria and basis used to manage loss of preload due to wear in the hold-down spring. However, the staff will evaluate the hold-down spring in the upcoming SE for the Subject TR, as the hold-down spring may be subject to a site-specific, time-dependent wear analysis that qualifies as a time-limited aging analysis (TLAA) for an incoming WEC-design PWR SLRA.</p>	Staff to evaluate the physical measurement basis for WEC-design hold-down springs in the upcoming SE for the Subject TR.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Control rod drive mechanism (CRDM) penetration thermal sleeves	<p>The staff discussed the new Existing Program criteria for Westinghouse-design CRDM penetration thermal sleeve funnels with the EPRI MRP. The staff acknowledged that Table 4-9 in MRP-227, Revision 2 includes new Existing Program Items W21.a and W21.b on management of loss or material due to wear and fatigue-induced cracking in the thermal sleeves. The staff stated that Item W21a credits the criteria in MRP 2018-027 and PWROG Proprietary Report No. PWROG-16003-P for management of wear in the CRDM thermal sleeve funnels and visual VT-1 criteria in PWROG Letter No. OG-20-113 and Westinghouse Alert Letter No. NSAL-20-1 as the basis for managing fatigue-induced cracking in the thermal sleeves. The staff acknowledged that none of the reference reports, letters, or methodologies identified in Item W21.a or W21.b are staff approved methodologies or records.</p> <p>EPRI MRP clarified that Item W21.a is included in Table 4-9 to manage the potential for loss of material due to wear to occur in the CRDM thermal sleeves. EPRI MRP explained that the MRP 2018-027 and PWROG-16003-P methods reference call for the monitoring of potential drops on the thermal sleeves that might be indicative of wear occurring in the thermal components. EPRI MRP clarified that the MRP 2018-027 letter and PWROG-16003-P report references which Westinghouse-design PWRs have had relevant operating experience with wear occurring in the thermal sleeves and when to do inspections for wear.</p> <p>EPRI MRP clarified that Item W21.b is included in Table 4-9 to manage the potential for fatigue-induced cracking to occur in the CRDM thermal sleeves. EPRI MRP clarified that the criteria in NSAL-20-1 establishes the Existing Program criteria in Item W21.b apply to those Westinghouse-design PWRs whose CRDM thermal sleeves are designed with a stepped-collar design that is susceptible to fatigue, and that the criteria in PWROG Letter OG-20-113 establish how to perform VT-1 visual inspection of the thermal sleeves that are included in these types of Westinghouse PWR designs.</p> <p>The guidance in Section 3.1.2.2.10.2 of NUREG-2192, "Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants" (Ref. 38), addresses aging management of Westinghouse-design CRDM thermal sleeves. Thus, while the staff does not anticipate the need for issuing any RAIs on the new Items W21.a and W21.b criteria for the thermal sleeves, the staff will need to address the relevant operating experience with Westinghouse-design CRDM thermal sleeves in the upcoming SE for the Subject TR.</p>	Staff to evaluate the I&E criteria for Westinghouse-design CRDM thermal sleeves in the upcoming SE for the Subject TR.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Control rod guide tube (CRGT) guide plates (guide cards)	<p>The staff discussed the change in the inspection category for Westinghouse-design CRGT guide cards. Specifically, the staff acknowledged the change in the inspection category of the guide cards from Item W1 Primary category components in Table 4-3 of MRP-227, Rev. 1-A to being Item W1 Existing Program components in Table 4-9 of the Subject TR. The staff informed EPRI MRP that it acknowledges that the change in the inspection category is strictly administrative, as Item W1 in both the MRP-227, Rev. 1-A and MRP-227, Rev. 2 reports credits the WCAP-17451-P methods as the basis for inspection and monitoring for potential indications of wear in the CRGT guide cards. However, the staff asked EPRI MRP to clear up which version of WCAP-17451-P is currently being used and applied for inspection of the CRGT guide cards during a 60 – 80-year SLR period.</p> <p>EPRI MPR explained that the applicable version of WCAP-17451-P being applied to the inspections is currently up to WCAP-17451-P, Revision 2, as referenced for use in MRP-232, Rev. 2.</p> <p>Although the staff does not anticipate the need for any RAI on this inspection category topic, the staff will evaluate the change in the inspection category of the CRGT guide cards in the upcoming SE for the Subject TR.</p>	Staff will evaluate the change in the inspection category of the CRGT guide cards in the upcoming SE for the Subject TR.
Baffle edge bolts and bolt locking devices	<p>The staff discussed the basis for using VT-3 visual inspection methods to manage cracking, IE, or ISR/IC in the baffle edge bolts. EPRI MRP clarified that the baffle edge bolts (i.e., components within the scope of Primary Item W5 in Table 4-3 of the Subject TR) are not relied on for structural integrity of the baffle-former assembly, and that the basis for using VT-3 visual methods to manage the baffle edge bolts is adequately discussed in Section 4.2.1 of MRP-232, Revision 2. EPRI MRP clarified that the current VT-3 visual inspections are based on asset management considerations and not safety considerations. EPRI MRP also clarified that the VT-3 visual inspections look for gross deformation or distortion in the baffle edge bolts that could potentially lead to baffle jetting in the baffle-former assembly of the PWR unit.</p> <p>The staff confirmed after the audit that Section 4.2.1 of MRP-232, Revision 2 provides sufficient support for maintaining VT-3 visual inspection techniques as the asset aging management bases for the baffle edge bolts and bolt locking devices during the SLR period. The staff confirmed that alternative options for asset aging management of the baffle edge bolts (and associated bolt locking devices) are given and discussed in Section 5.2.1.2 of MRP-232, Revision 2. Although the staff does not anticipate the need for any RAI on this inspection category topic, the staff will provide a brief assessment of the aging management bases for the baffle edge bolts and bolt locking devices in the upcoming SE for the Subject TR.</p>	Staff to briefly evaluate the inspection category for Westinghouse-design baffle edge bolts and bolt locking devices in the upcoming SE for the Subject TR.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>Baffle-to-former (BF) bolts; core barrel-to-former (CB-F) bolts; lower support structure (LSS) - lower support column bolts</p> <p>(NOTE: Staff acknowledges that BF assembly corner bolts are a subset of the BF bolts in the assembly)</p>	<p>The staff discussed the inspection categories, inspection and <i>expansion</i>-link criteria, and operating experience associated with Primary Item W6 BF bolts, Expansion Item W6.1 CB-F bolts, and Expansion Item W6.2 core support column bolts with the EPRI MRP.</p> <p>EPRI MRP stated that the updated criteria for Primary Category BF bolts in Item W6 of Tables 4-3 and 5-3 in the Subject TR incorporate the supplemental aging management guidelines for BF bolts in Risk Group (Tier) 1, 2, 3, and 4 ranked baffle assemblies, as defined in Westinghouse Nuclear Safety Alert Letter No. NSAL-16-1, "Baffle-Former Bolts," August 1, 2016 (Ref. 35); the staff noted that this provides the EPRI MRP's basis for breaking up Item W6 for the BF bolts (as previously defined in Table 4-3 of MRP-227, Rev. 1-A) into Item W6a for Tier 1 BF bolts, Item W6b for Tier 2 BF bolts and Item W6c for Tier 3 and 4 BF bolts in Table 4-3 of the Subject TR. EPRI MRP also clarified that, for Westinghouse-design units with Tier 2 or Tier 3 ranked baffle assemblies, the corrective actions process would address any significant degradation (e.g., recordable UT-detected flaw indications of cracking) detected in the BF bolts of the units, including the potential for adjusting the re-inspection frequency for the bolts; however, EPRI MRP pointed out that the operating experience review would not necessarily call for a change to the original Risk Group (Tier) ranking for the unit's baffle assembly.</p> <p>The staff acknowledged that Item W6.1 in Tables 4-6 of MRP-227, Revision 1-A calls for Expansion-linked UT inspections of the CB-F bolts if triggered by the results of UT inspection of the Primary Item W6 BF bolts; however, the staff informed EPRI MRP that Item W6.1 of Table 4-6 in the Subject TR has somewhat of a shift in the Expansion criteria for the CB-F bolts by changing the sample-<i>expansion</i> inspection technique of the CB-F bolts from a UT inspection to a VT-3 type visual inspection when the sample-<i>expansion</i> is based on: (1) an unacceptable number of clustered groups of BF bolts with detected degradation, and (2) secondary sample-<i>expansion</i> basis that results from the UT inspections performed on the Expansion Item W6.2 lower support column bolts. The staff informed EPRI MRP that it did not know which EPRI MRP record provided the source of the new VT-3 inspection basis for the CB-F bolts. EPRI MRP clarified that the MRP 2018-022 provides the basis for applying VT-3 methods as a secondary sample-<i>expansion</i> basis for the CB-F bolts. Under the adjusted I&E basis, EPRI MRP clarified that a given CB-F bolt would be declared as inoperable (i.e., the bolt would be declared as a failed) if the VT-3 visual of the bolt resulted in visible evidence of surface-breaking degradation occurring in the bolt. (NOTE: Post audit, the staff acknowledges that Item W6.1 in Table 4-6 of the Subject TR still initiates direct UT sample-<i>expansion</i> inspections of the CB-F bolts if large clusters of BF bolts are observed with unacceptable indications of aging; however, the sample-<i>expansion</i> bases for WEC-design CB-F bolts has changed somewhat in MRP-227, Rev. 2 from those given for the CB-F bolts in prior version of MRP-227, Rev. 1-A).</p>	<p>Staff will evaluate EPRI MRP's updated I&E criteria for WEC-design BF bolts, CB-F bolts, and lower support column bolts in the upcoming SE for the Subject TR.</p>

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
	<p>EPRI MRP confirmed that, in relation to the use of “acceptable bolting pattern analysis” methodologies for bolted assemblies, the staff-approved methods in PWROG Proprietary Report No. WCAP-15029-P-A, Rev. 1 have only been formally approved for evaluating the structural integrity of mechanical BF assemblies adjoined by BF bolts or mechanical CB-F assemblies adjoined by CB-F bolts.</p> <p>The staff acknowledged that the basis for evaluating large clusters of the BF bolts (i.e., multiple bolts with detected indications of cracking in localized close proximity to one another) is adequately defined in Item W6 of Table 5-3 in the Subject TR; however, the staff informed EPRI MRP that the staff did not note similar criteria defined for the Expansion category CB-F bolts. The staff also asked if the direct <i>sample-expansion</i> basis for initiating VT-3 visual inspection of the Expansion Item W6.2 lower support column bolts is based solely on the number of BF bolts with detected degradation or whether clustered groups of BF bolts with detected degradation would also trigger <i>sample-expansion</i> to the lower support column bolts. EPRI MRP clarified that the clustered-based criteria for the Expansion category CB-F bolts are defined in the following Notes in Table 4-6 of the Subject TR: (1) Note 8 that defines large clusters of CB-F bolts, and (2) Note 9 that defines the inspection coverage criteria for large clusters of CB-F bolts. The staff had no further inquiries on the clustered-based criteria for WEC-design BF and CB-F bolting types.</p> <p>For potential <i>sample-expansion</i> to the Item W6.2 Expansion category lower support column bolts, the staff asked the EPRI if the <i>sample-expansion</i> basis is based on an upper bound threshold on number of BF bolts with detected flaw indications or on a number of clustered regions of BF bolts with unacceptable flaw indication. EPRI MRP clarified that <i>sample-expansion</i> to the lower support column bolts is established only in relation to exceeding an EPRI MRP established upper bound number of BF bolts with detected flaw indications (i.e., set by having a number of BF bolts with detected, unacceptable flaw indications exceed more than 5 percent of the total population of BF bolts in the BF assembly). The EPRI MRP clarified that <i>sample-expansion</i> basis for the lower support column bolts does not include any additional <i>sample-expansion</i> criteria based on clustered bolt regions because the LSS is not directly attached to the BF assembly in the manner that the CB assembly is attached to the BF assembly.</p> <p>Based on the EPRI MRP's explanations, the staff does not anticipate any need to RAIs on I&E criteria for WEC-design BF bolts, CB-F bolts and lower support column bolts. However, the staff will evaluate the updated I&E criteria for these bolting types in the upcoming SE for the Subject TR, based on the relevant operating experience for WEC-design BF bolt degradation and the significant changes to the I&E criteria for these bolting types in the Subject TR.</p>	

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Baffle-to-former (BF) assembly (including baffle plates, baffle edge bolts, bracket and/or corner bolts [if applicable in the plant design], and former plates)	<p>The staff did not choose to audit the Primary I&E criteria for WEC-design BF assemblies in Item W7 of Table 4-3 of the Subject TR. The updated criteria in Item W7 of the Subject TR maintain the entire BF assembly as a Primary assembly structure for evaluated change in dimension effects induced by VS or distortion mechanisms or for gross evidence of cracking induced by an IASCC. The I&E criteria in Item W7 assign the Primary BF assembly to VT-3 visual inspections of the assembly and its components.</p> <p>SE to briefly mention that the BF assembly is subject Primary VT-3 visual inspections for distortion or gross evidence of cracking. A full evaluation of the Item W7 basis for the BF assembly is not warranted in the upcoming SE from a risk-informed perspective as the assembly is still maintained as a Primary category internal structure.</p>	The staff will only need to acknowledge in the upcoming SE that the BF assemblies are maintained as Item W7 Primary category structures; a full evaluation of Item W7 I&E criteria for the BF assembly structure is not warranted for the upcoming SE.
Control rod guide tube (CRGT) lower flange welds (for both peripheral and non-peripheral CRGT LFWs); Bottom mounted instrument (BMI) column bodies	<p>The staff did not choose to audit the I&E criteria for WEC-design CRGT LFWs as defined in Tables 4-3 and 4-6 of the Subject TR. The staff acknowledged that the peripheral CRGT LFWs are maintained in Table 4-3 of the Subject TR as Primary Item W2 category welds and that the remaining, non-peripheral CRGT LFWs are maintain in Table 4-6 of the Subject TR as the applicable Expansion category welds for the Primary, peripheral CRGT LFWs. The welds are maintained as being subject to EVT-1 visual inspection for detected of cracking that may be induced by SCC or fatigue cracking mechanisms, and for indirect management of thermal or IE mechanisms (where detection of surface-breaking crack-like flaw indications may be indicative of embrittlement occurring in the welds). The peripheral CRGT LFWs also expand to the Expansion category Item W2.2 BMI column bodies (which are made from CASS materials).</p> <p>SE to briefly mention that the peripheral CRGT LFWs are maintained as Item W2 Primary category welds and that the associated, non-peripheral CRGT LFWs and BMI column bodies are maintained as the linked Expansion Item W2.1 and W2.2 category components for the Primary CRGT LFWs; SE to briefly explain the inspection methods are maintained using VT-3 visual inspections and a 10-year re-inspection frequency basis.</p>	The staff will only need to acknowledge I&E criteria for these component types in the upcoming SE; a full evaluation of Item W2 criteria for peripheral CRGT LFWs, Item W2.1 criteria for non-peripheral CRGT LFWs, and Item W2.2 criteria for BMI column bodies is not warranted for the upcoming SE.
Baffle-Former (BF) Assembly	The staff did not choose to audit the I&E criteria for the Primary Item W7 WEC-design BF assemblies as part of the audit. The Item W7 BF assembly (including the baffle and former plates, and any accessible bracket bolts or corner bolts [if included in the plant design]) are subject to general VT-3 type visual inspections to look for gross evidence of aging occurring the components as defined in Item W7 of Table 5-3 in the Subject TR.	The staff will only need to acknowledge I&E criteria for the BF assembly component type in the upcoming SE; a full evaluation of the Item W7 BF assembly is not warranted for the upcoming SE.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Core barrel flange; UIA upper support ring or skirt; UIA fuel alignment pins	The staff did not opt to discuss the Existing Program criteria for the CB flange, the UIA support ring or skirt, or UIA fuel alignment pins with EPRI MRP. The staff confirmed that the CB flange in the CB assembly and the UIA support ring or skirt remain as an Existing Program components per Items W10 and W11 in Table 4-9 of the Subject TR. The staff also confirmed that the UIA fuel alignment pins have been elevated to being designated as new Existing Program components for the program per inclusion of new Existing Program Item W16 in Table 4-8 of the Subject TR. Since the W10, W11, and W16 items call for aging management of the components through implementation of the applicable ASME Code, Section XI VT-3 visual inspections of the component types, the staff will only need to acknowledge these components as appropriate Existing Program components for the upcoming SE for the Subject TR.	The staff will only need to acknowledge these components as Existing Program components in the SE for the Subject TR.

Table 4. Audit Summaries for Combustion Engineering (CE) Component-Specific Audit Discussion Topics

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Upper internals assembly (UIA): fuel alignment plate	<p>The staff discussed the updated I&E criteria for CE-design UIA fuel alignment plates with the EPRI MRP during the audit. The staff acknowledged that the fuel alignment plate remains as one of the three original CE-design RVI component types whose inspection category justification was established by a component-specific screening analysis (i.e., the other CE component types subject to this type of aging management basis being the CE-design CSB flexure weld (CSBFW) and LSS core support plate). The staff acknowledged that, in MRP-227, Rev. 1-A methodology, the limiting aging effect and mechanism of interest for the fuel alignment plate was cracking induced by fatigue and that the fuel alignment plate would be placed in the Primary category of the program if "screening for fatigue cannot be satisfied by plant-specific evaluation." Per Item C10 in Table 4-2 of MRP-227, Rev. 1-A EPRI called for an EVT-1 visual inspection of the fuel alignment plate for evidence of crack-induced indications if the component screened in for fatigue, with the ensuing augmented inspections to be performed on a 10-year inspection frequency. Otherwise, the staff acknowledged the MRP-227, Rev. 1-A permitted the fuel alignment plate to be placed in the NAM category of the program if the plate did not screen in for fatigue. In contrast, the staff informed EPRI MRP that the updated 40 – 80-year assessment and I&E criteria for CE-design fuel alignment plate in MRP-227, Rev. 2 continues to use this type of aging management basis for the fuel alignment plates with some adjustments of the aging management bases for the component type. Thus, the staff asked EPRI MRP to clarify how the updated criteria in MRP-227, Rev. 2 manage CE-design UIA fuel alignment plates apply because the Subject TR has two different line items for UIA fuel alignment plates: (1) one which lists the plate as a Primary component per Item C10 in Table 4-2 of the Subject TR, and (2) one which lists the plate as an Expansion component for the Primary Item CSB middle girth weld (MGW), per Item C6.4 in Table 4-5 of the Subject TR.</p> <p>EPRI MRP clarified the different I&E criteria for CE-design fuel alignment plates in MRP-227, Rev. 2 are dependent on whether the plate is referenced for a CE-design PWR unit that has a welded core shroud fabricated in two vertical shroud sections or that has a welded core shroud fabricated from full height shroud plates. EPRI MRP explained that, for fuel alignment plates in units with welded core shrouds utilizing two vertical shroud sections, fatigue screening is not needed as the plates screen in for SCC. Thus, for fuel alignment plates in CE designs with two vertical shroud sections, the plates are listed (per Item C6.4 in Table 4-5 of the Subject TR) as one of the Expansion category components for the Primary Item C6 CSB UGW in that type of CE-unit design. In contrast, EPRI MRP explained that the fuel alignment plates in CE-design units with shrouds utilizing full height shroud plates are covered by Primary Item C10 in Table 4-1 of MRP-227, Rev. 2 and are subject to the component-specific fatigue screening evaluation; under Item C10, the fuel alignment plate would be subject to the EVT-1 visual inspections on a 10-year augmented inspection frequency if the plate screens in for fatigue. The staff</p>	The staff will evaluate the updated I&E criteria or CE-design UIA fuel alignment plates in the upcoming SE for the Subject TR and may issue one or more RAIs on the updated I&E criteria for the component type.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
	<p>acknowledges that supporting information for the inspection categorization bases of the design specific UIA fuel alignment plate configurations are given in Chapters 3 and 4 of MRP-232, Rev. 2.</p> <p>The staff also discussed how component-specific fatigue screening evaluations of CE-design UIA fuel alignment plates relate to the staff criteria in 10 CFR 54.3 for defining plant analyses or evaluations as TLAA's. The staff informed EPRI MRP that 60-year plant-specific fatigue screening analyses of CE-design UIA fuel alignment plates (i.e., performed in support of ILR application [LRA] aging management bases for the plates) did not typically qualify as TLAA's because the analyses were not performed as part of the original licensing basis for the plants. However, for fuel alignment plates in CE PWR designs that call for a component-specific fatigue screening analysis (i.e., those in the CE-design PWRs with welded, full height plate fabricated shrouds), the staff explained that once the fatigue screening analysis is performed and established as an update of the CLB for the first renewed operating license, the fatigue screening analysis of the fuel alignment could qualify as a plant-specific TLAA for an ensuing (SLRA) per the criteria in Section 4.7 and Table 4.7-1 of NUREG-2192 (as updated in Appendix F of NRR Interim Staff Guidance No. SRP-SLR-2021-01-PWRVI, "Updated Aging Management Criteria for Reactor Vessel Internal Components of Pressurized Water Reactors of Subsequent License Renewal Guidance" (Ref. 34).</p> <p>The staff informed EPRI MRP that it will need to evaluate the updated I&E criteria for CE-design UIA fuel alignment plates in the upcoming SE for the Subject TR and that it may consider one or more RAIs on the updated I&E criteria for the UIA fuel alignment plates in the Subject TR.</p>	

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Upper Internals Assembly: Upper core barrel (CB) flange	<p>The staff did not need to discuss the updated inspection category and I&E criteria for CE-design upper core flanges with EPRI MRP during the audit. The staff acknowledges that, in MRP-227, Rev. 1-A, the upper core barrel (UCB) flange was identified and justified as being one of the NAM category components for CE-design PWR Vessel Internals Programs that would be implemented during 40 – 60 -year ILR periods. However, the staff also acknowledges that, in MRP-227, Rev. 2, the UCB flanges has been elevated as one of the Existing Program components for CE-design programs, as indicated in new Existing Program Item C16 in Table 4-8 of the MRP-227, Rev. 2 report. The new item calls for the licensee to manage wear-induced loss of material in the flange using the existing ASME Section XI VT-3 visual inspections of the component type which are implemented on a 10-year ISI inspection frequency. The staff acknowledges that this represents a conservative risk-informed change to the I&E criteria for inspecting CE-design UCP flanges.</p> <p>The staff will provide a brief analysis of the change in the inspection category and I&E criteria for CE-design UCB flanges in the upcoming SE for the Subject TR. However, the staff does not anticipate the need for issuing any RAIs on the updated I&E criteria that were included for the component type in the Subject TR.</p>	The staff will evaluate the new Existing Program I&E criteria for CE-design upper CB flanges in the upcoming SE for the Subject TR.
Control element assembly (CEA): CEA instrument guide tubes and supports	<p>The staff performed a brief audit discussion with EPRI MRP to confirm that the “Final Inspection Category” entry in MRP-227, Revision 2, Table 3-2 is listed “P/E” for the component type based on the fact that the peripheral CEA instrument guide tubes are designated Primary category components for CE-design PWR Vessel Internals Program and that the accessible, non-peripheral (i.e., remaining) CEA instrument guide tubes are the corresponding Expansion category components for the peripheral CEA guide tubes. EPRI MRP confirmed that this is the basis for the “Final Inspection Category” entry of “P/E” for the component type in Table 3-2.</p> <p>Based on this confirmation, the staff acknowledges that the inspection categorizations for peripheral and non-peripheral CEA instrument guide tubes and supports in MRP-227, Rev. 2 are the same as those designated and approved for the components in MRP-227, Rev. 1-A and continue to provide an adequate risk-informed basis for managing CEA instrument guide tubes and supports for both 40 – 60 IRL periods and 60 – 80 year SLR periods.</p>	The staff will only need to briefly acknowledge in the upcoming SE for the Subject TR that the inspection categories and I&E criteria for peripheral and non-peripheral CEA instrument guide tubes and supports remain the same as those approved for the components in MRP-227, Rev. 1-A.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Control element assembly (CEA) shroud bolts (applicable to CE-design PWRs with welded core shrouds fabricated from two vertical shroud sections)	<p>The staff discussed the new inspection category and I&E criteria bases in MRP-227, Rev. 2 for Primary category (Primary Item C19) CE-design CEA shroud bolts with EPRI MRP during the audit. The staff acknowledged that the 80-year screening assessment results provided for the CEA shroud bolts in Table 3-2 of the Subject TR and the new Primary category C19 line item for the CEA shrouds in Table 4-2 of the Subject TR were entirely new. The staff also informed EPRI MRP that the new Primary Item C19 line item for the CEA shroud bolts would allow the licensees owning the specified CE PWR design (i.e., those with welded core shrouds assembled with two vertical shroud sections) to avoid inspections of the bolts if a component-specific analysis of the CEA shroud bolts was performed by the licensee and the analysis did not screen the CEA shroud bolts in for the assessed IASCC, fatigue, or IE mechanisms. Given that Table 3-2 of MRP-227, Rev. 2 screens the CEA shroud bolts in for assessed IASCC, fatigue, IE, and ISR/IC mechanisms, the staff informed EPRI MRP that it will need to evaluate the new I&E criteria for Primary category CEA shroud bolts in the upcoming SE for the Subject TR, and may consider one or more RAIs on the technical I&E basis for the component type.</p>	<p>The staff will evaluate the new I&E criteria for Primary Item C19 CEA shroud bolts in the upcoming SE for the Subject TR and may consider issuance of one or more RAIs on the I&E criteria bases for the component type.</p>
Core support barrel (CSB) assembly: CSB upper cylinder girth welds, including upper flange weld (UFW) and upper girth weld (UGW)	<p>The staff discussed the updated inspection categories and I&E criteria bases in MRP-227, Rev. 2 for the CSB UFWs and UGWs with EPRI MRP during the audit. EPRI MRP informed the staff that in both the MRP-227, Rev. 1-A and MRP-227, Rev. 2 report, the CSB UGW are designated (per Expansion Item C5.2) and remain as one of the five Expansion category components for the Primary category (Item C5) CSB UFW inspections cited in MRP-227, Rev. 2 (with the other linked Expansion category components being the Item C5.1 CSB LFW/LGW, Item C5.3 CSB UAWs, Item C5.4 lower core support beams, and Item C5.5 CSBFW [for SCC]).</p> <p>At the time of the audit, the staff informed EPRI MRP that it did not have any further questions with the inspection categorization and I&E criteria bases for CE-design CSB UFWs and UGWs. However, following the staff's performance of the audit, the staff acknowledges that there has been some newly reported operating experience in one of the corresponding Westinghouse-design PWRs regarding cracking that was detected in the unit's CB UGW; the staff acknowledges that this operating experience may (potentially) have generic applicability to CE-design CSB UGWs and may impact EPRI MRP's designated Expansion category basis for CE-design CSB UGWs. Thus, the staff may need to consider issuance of a supplemental RAI on the Expansion-based inspection categorization basis for CE-design CSB UGWs in the Subject TR based on the recently reported operating experience event.</p>	<p>The staff will evaluate the inspection categories and I&E criteria bases for CE-design CSB UFWs and UGWs in the upcoming SE for the Subject TR and may consider issuance of a supplemental RAI on the adequacy of the Expansion category being assigned to the CSB UGW component type.</p>

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
CSB upper axial welds (UAWs)	<p>The staff briefly discussed the inspection category and I&E criteria bases for CE-design CSB UAWs with EPRI MRP during the audit. EPRI MRP informed the staff that in both the MRP-227, Rev. 1-A and MRP-227, Rev. 2 report, the CSB UAWs are designated (per Expansion Item C5.3) and remain as one of the five Expansion category components for the Primary category (Item C5) CSB UFW inspections cited in MRP-227, Rev. 2 (with the other linked Expansion category components being the Item C5.1 CSB LFW/LGW, Item C5.2 CSB UGWs, Item C5.4 lower core support beams, and Item C5.5 CSBFW [for SCC]).</p> <p>For a risk perspective, the staff will only need to acknowledge that the inspection and I&E criteria in MRP-227, Rev. 2 for the Expansion category CSB UAWs remain the same as those for the component type in MRP-227, Rev. 1-A.</p>	The staff will only need to briefly acknowledge in the upcoming SE for the Subject TR that, from a risk-perspective, the inspection categories and I&E criteria for CSB UAWs in Subject TR remain the same as those approved for the CSB UAWs in the MRP-227, Rev. 1-A report.
CSB middle girth weld (MGW) and lower girth weld/lower flange weld (LFW/LGW)	<p>The staff performed a brief audit discussion with EPRI MRP to confirm that the "Final Inspection Category" entry in MRP-227, Revision 2, Table 3-2 is listed "P/E" for the component type based on the fact that the peripheral CSB MGW is a designated Primary category component for CE-design PWR Vessel Internals Program and that the CSB LGW/LFW is designated as one of the five corresponding Expansion category components (per Expansion Item C5.1) for the Primary category (Primary Item C5) CSB MGW inspections (with the other linked Expansion category components being the Item C5.2 CSB UGWs, Item C5.3 CSB UAWs, Item C5.4 lower core support beams, and Item C5.5 CSBFW [for SCC]). EPRI MRP confirmed that this is the basis for the "Final Inspection Category" entry of "P/E" for the CSB MGW and LFW/LGW component types in Table 3-2.</p> <p>Based on this confirmation, the staff acknowledges that the inspection categorizations for the CSB MGW and LFW/LGW component types in MRP-227, Rev. 2 are the same as those designated and approved for the components in MRP-227, Rev. 1-A and continue to provide an adequate risk-informed basis for managing CE-design CSB MGWs and LFWs/LGWs for both 40 – 60 IRL periods and 60 – 80-year SLR periods.</p>	The staff will only need to briefly acknowledge in the upcoming SE for the Subject TR that the inspection categories and I&E criteria for CE-design CSB MGWs and LFWs/LGWs remain the same as those approved for the weld types in MRP-227, Rev. 1-A.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
CSB middle axial welds (MAWs) and lower axial welds (LAWs)	<p>The staff discussed the updated inspection categories and I&E criteria bases for CE-design CSB MAWs and LAWs with EPRI MRP during the audit. The staff acknowledged that the CSB MAWs and LAWs were approved in MRP-227, Rev. 1-A as two of the three Expansion category component types (per Expansion Items C6.1. and C6.2) for the Primary category (Primary Item C6) CSB MGW; the staff also acknowledged that the CSB MAWs and LAWs remain as designated Expansion Item C6.1 and C6.2 Expansion category welds for the Primary Item C6 CSB MGW inspections. However, informed EPRI MRP that there was some past operating experience history with reported cracking in CE-design CSB MAWs or LAWs, as reported in regard to the past St. Lucie Unit 1 cracking event. The staff stated that EPRI MRP developed additional supplemental guidelines for CE-design and Westinghouse-design CSB/CB MAW and LAW inspections, as incorporated into the MRP 2021-009 report and referenced in MRP-2021-023. The staff asked EPRI MRP to discuss the supplemental guidance for CE-design CSB MAWs and LAWs (as defined in MRP 2021-009) and the relationship of the supplemental guidance to the stated Expansion category I&E criteria established for CE-design CSB MAWs and LAWs in Table 4-5 of MRP-227, Rev. 2.</p> <p>EPRI MRP clarified that the supplement guidance in MRP 2021-009 calls for a one-time VT-3 visual inspection of the MAWs and LAWs.in CE-design CSBs and in Westinghouse-designs CBs to verify that cracking is not occurring in welds in the manner it had occurred in the impacted St. Lucie CE-design unit. However, EPRI MRP clarified that the guidance in MRP 2021-009 is set as a "good practice" under the Chapter 7 implementation criteria of the MRP-227 report versions, and that the guidelines in MRP 2021-009 are noted established as NEI 03-08 "Mandatory Requirements" or "Needed Requirements" for the program. Thus, EPRI MRP clarified that the "Good Practice" criteria and supplemental inspection guidelines in MRP 2021-009 do not have any impact on the Expansion category I&E criteria for CE-design CSB MAWs and LAWs in MRP-227, Rev. 2.</p> <p>The staff informed EPRI MRP that it did not have any additional inquiries regarding the Expansion category I&E criteria and bases for CE-design CSB MAWs and LAWs in the Subject TR, but informed the EPRI MRP that it would need to make these clarifications in the upcoming SE for the Subject TR. The staff does not anticipate the need for any RAIs related to the Expansion category I&E criteria and bases provided for CE-design CSB MAWs and LAWs in MRP-227, Rev. 2.</p>	The staff will evaluate the Expansion category I&E criteria and supplemental guidelines for CE-design CSB MAWs and LAWs in the upcoming SE of the Subject TR in order to distinguish the supplemental guidance criteria for the weld types from the MRP-227 based guidance for the welds. However, the staff does not anticipate the need for any RAIs on these technical matters.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>CSB flexure weld (CSBFW) (all CE-design units with welded core shrouds in two vertical sections or utilizing full height shroud plates)</p>	<p>The staff asked discussed the updated inspection categorization bases and I&E criteria for the CSBFW during the audit. The staff acknowledged that MRP-227, Rev. 1-A and MRP-227, Rev. 2 identify the CSBFW as the CE-design weld that is used to adjoin the lower CB flange to the top of the perforated support skirt that is located internally at (and is welded to) the reactor pressure vessel bottom head dome. The staff also acknowledged that the CSBFW is one of the CE-design components that is subject to a component-specific screening analysis (for fatigue and SCC mechanisms) to establish the final inspection category basis or bases for the component type. The staff informed EPRI MRP that MRP-227, Rev. 2 includes two different I&E-based line items for the CSBFW in the report: (1) a Primary category-based line item in Item C7 of Table 4-2 in the report, which would call for a Primary enhanced visual (EVT-1), eddy current surface (ET), volumetric UT inspection of the weld "if screening of fatigue of fatigue could not be satisfied by plant-specific evaluation," and (2) an Expansion category-based line item for the CSBFW in Item C5.5 of Table 4-5 in the report, which would call for sample-expansion-based inspection (EVT-1, UT, or ET type inspection) of the CSBFW if cracking were detected in the Primary category (Primary Item C5) CSB UFW. The staff stated that this is different from the way the CSBFW was established as an inspection category component in MRP-227, Rev. 1-A, which placed the CSBFW in the Primary category of the program if a plant-specific screening evaluation of the CSBFW resulted in screening of the weld in for either fatigue or SCC assessed cracking mechanisms (i.e., MRP-227, Rev. 1-A called for both plant-specific fatigue and SCC screening of the CSBFW).</p> <p>Based on these differences, the staff informed EPRI MRP that it would need to evaluate the updated inspection category bases and I&E criteria for the CSBFW in the upcoming SE for the Subject TR and that the staff may need to issue one or more RAIs on the updated inspection categories and I&E criteria for the CSBFW weld type.</p>	<p>The staff will evaluate the updated inspection category bases and I&E criteria for CE-design CSBFWs in the upcoming SE for the Subject TR and may issue one or more RAIs on updated I&E criteria for the weld type.</p>

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Core stabilizing lugs, shims and bolts (all operating CE-design units)	<p>The staff briefly discussed the updated Existing Program I&E criteria for CE-design core stabilizing lugs, shims and bolts with EPRI MRP during the audit. The staff acknowledged that MRP-227, Rev. 2 now places the core stabilizing lugs in the Existing Program per the inclusion of Item C17 in Table 4-8 of MRP-227, Rev. 2; the staff also acknowledged the new Existing Program C17 item for the core stabilizing lugs, shims and bolts credits the ASME Section XI inspections of the component type, as supplemented the guidelines in Westinghouse TB-14-5 (Ref. 36) and the PWR Owners Group guidelines in Report OG-21-160. The staff asked EPRI MRP to clarify how the supplement guidelines in TB 14-5 and OG-21-160 relate to aging management inspections of the core stabilizing lugs, shims, and bolts and whether the referenced supplemental guidelines are included as industry records in ADAMS.</p> <p>EPRI MRP clarified that the TB-14-5 has the additional guidelines on how to perform the VT-3 type visual inspection of the core stabilizing lugs, shims and bolts, and the bulletin in including in ADAMS Accession No. ML15334A252 (Ref. 36). EPRI also stated that OG-21-160 provides additional criteria for performing volumetric UT inspections of the components but confirmed that OG-21-160 has not been submitted to the NRC for inclusion in ADAMS. EPRI MRP clarified that, if UT inspections were applied to the component types, the UT inspections would appropriately be performed in accordance with the NDE standards for UT inspections in EPRI MRP Proprietary Report No. MRP-228, Rev. 4.</p> <p>The staff commented back that updated version of Item C17 in MRP-227, Rev. 2 Table 4-8 adds in the OG-21-160 guidelines as new guidelines for aging management that were not accounted for in the previous version of Item C17 in Table 4-8 of MRP-227, Rev. 1-A. Therefore, the staff informed EPRI MRP that it will need to provide a brief evaluation of the changes to Item C7 in Table4-8 in the upcoming SE for the Subject TR. However, the staff informed EPRI MRP that it does not anticipate the need to issue any RAIs on the Existing Program criteria for CE-design core stabilizing lugs, shims, and bolts.</p>	The staff will provide a brief evaluation of the updated Existing Program I&E criteria for CE-design core stabilizing lugs, shims and bolts in the upcoming SE for the Subject TR.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Core shroud plates and former plates, and associated core shroud plate-to-former plate welds (CE-design PWRs with welded core shrouds in two vertical sections or utilizing welded full height shroud plates only)	<p>The staff did not discuss the updated inspection categories and I&E criteria for the core shroud plates and former plates (and the associated core shroud plate-to-former plate welds) with EPRI MRP during the audit. The staff acknowledges that these components remain as Primary category components through the inclusion of Primary Items C2 and C3 in Table 4-2 of the Subject TR, where the EVT-1 examinations focus on the shroud plate-to-former plate weld seams located at the core shroud re-entrant corners of the core midplane. The remaining axial welds are designated (i.e., remain) as the designate Expansion category (i.e., <i>sample-expansion</i>) components for the Primary inspections being performed on the welds at the re-entrant corners.</p> <p>The staff will only need to acknowledge that the I&E criteria for these components in MRP-227, Rev. 2 remain the same as those approved for the component types in MRP-227, Rev. 1-A.</p>	The staff will only need to acknowledge in the upcoming SE for the Subject TR that the I&E criteria for these core shroud plates, former plates and associated welds in MRP-227, Rev. 2 remain the same as those approved for the component types in MRP-227, Rev. 1-A.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Core shroud assembly (CE-design PWR units with welded core shrouds that are fabricated from two vertical shroud sections only)	<p>The staff discussed the inspection category or I&E criteria for the core shroud assemblies in these type of CE-design unit (i.e., those with welded core shrouds in two vertical sections) with EPRI MRP during the audit. The staff acknowledged that the core shroud assemblies in this type of CE-design PWR remain as designated Primary category components through the inclusion of Item C4.a in Table 4-2 of MRP-227, Rev. 2, and that Item C4.a in Table 5--2 of the Subject TR calls for a VT-1 inspection between the top and bottom vertical core shroud sections to look for evidence of separation occurring between the shroud sections. However, the staff informed EPRI that the shrouds in this category were also subject to a one-time physical measurement that was to be performed within two refueling outages from entering into the ILR term for the unit. The staff asked EPRI MRP to clarify whether another physical measurement of the gap area between the top and bottom shroud sections would need to be performed during the 60 – 80-year SLR period.</p> <p>As previously summarized in the A/LAI #5-related line item regarding physical measurements in Table 2 of this audit report, EPRI informed the staff that the need for performance of an additional physical measurement of the gap area is addressed in Item C4.a entries of Tables 4-2 and 5-2 of the MRP-227, Rev. 2 report. Under the line item C4.a bases, EPRI MRP explained that the visual VT-1 inspection basis of the gap area establishes the potential need for additional performance of physical measurements or supplemental analysis of the gap area between the vertical sections if the visual inspection of the gap region resulted in a significant change in gap area due to void/swelling distortion of the shroud cylinder sections.</p> <p>The staff acknowledged EPRI MRP's explanations of these technical matters and informed EPRI MRP that it did not have any further questions on the basis for inspecting the core shroud gap area in CE-design units with this type of shroud configuration. The staff informed EPRI MRP that it would need to incorporate these explanations in the upcoming SE for the Subject TR. However, the staff does not anticipate the need to issue any RAIs on the updated criteria for inspection of the core shroud gap areas in CE-design units with welded core shrouds that utilized two vertical shroud sections.</p>	The staff will evaluate the inspection criteria for CE-design core shroud assemblies (applicable to units the units with welded shrouds utilizing two vertical shroud sections) in the upcoming SE for the Subject TR.
Core shroud tie rods and nuts (Operating CE-design units whose core shrouds include tie-rod assemblies)	The staff briefly discussed the updated inspection category of the core shroud tie rods and nuts with EPRI MRP during the audit. The staff acknowledged that the basis for including the core shroud tie rods and nuts as newly designated Primary category components (without any linked Expansion components) was established in the MRP 2018-022 report, and the MRP-227, Rev. 2 accounts for this in the new Item C18 in Table 4-2 of the Subject TR. However, the staff informed EPRI MRP that it may need to issue an RAI on the basis for using non-qualified visual inspection technique as the condition monitoring basis for the component type.	The staff will evaluate the new I&E criteria for SE-design core shroud tie rods and nuts in the upcoming SE for the Subject TR and may issue an RAI on the rationale for applying a non-qualified visual technique as the condition monitoring basis for the component type.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Core shroud guide lugs (including lug insert and bolts) (All operating CE-design units)	<p>The staff discussed the I&E criteria for CE-design core shroud guide lugs (including lug inserts and bolts) with EPRI MRP during the audit. The staff acknowledged that the core shroud guide lugs remain as Existing Program category components for the program per Item C13 and C14 in Table 4-8 of the Subject TR; however, the staff informed EPRI MRP that Table 4-8 has two different line items for the component type. EPRI MRP clarified that its intent was to cover the core shroud guide lug components through inclusion of different line items for the lugs and bolted lug inserts, with: (1) Item C13 applying to aging management of loss of material due to wear and ISR/IC in the guide lugs, and (2) Item C14 applying aging management of loss of material due to wear and ISR/IC in the guide lug inserts and bolts.</p> <p>The staff informed EPRI MRP that it did not have any further questions on the Existing Program criteria for core shroud guide lugs and guide lug insert and bolts, and that the upcoming SE for the Subject TR will only need to account for the fact that the aging management basis for these components remain the same as those specified for the component types in Table 4-8 of MRP-227, Rev. 1-A.</p>	The staff will only need to acknowledge in the upcoming SE for MRP-227, Rev. 2 that the Existing Program criteria for CE-design core shroud guide lug and guide lug insert and bolts remain the same as those approved for the component types in MRP-227, Rev. 1-A.
Lower support structure (LSS): core support plate	<p>The staff discussed the updated I&E criteria for CE-design LSS core support plates with the EPRI MRP during the audit. The staff acknowledged that the core support plate remains as one of the three original CE-design RVI component types whose inspection category justification was established by a component-specific screening analysis (i.e., the other CE component types subject to this type of aging management basis being the CE-design CSBFW and the UIA fuel alignment plate). The staff acknowledged that, in MRP-227, Rev. 1-A methodology, the limiting aging effect and mechanism of interest for the core support plate was cracking induced by fatigue and that the core support plate would be placed in the Primary category of the program if "screening for fatigue cannot be satisfied by plant-specific evaluation." Per Item C9 in Table 4-2 of MRP-227, Rev. 1-A, EPRI's guidance called for an EVT-1 visual inspection of the core support plate for evidence of crack-induced indications if the component screened in for fatigue, with the ensuing augmented inspections to be performed on a 10-year inspection frequency. Otherwise, the staff acknowledged the MRP-227, Rev. 1-A permitted the core support plate to be placed in the NAM category of the program if the plate did not screen in for fatigue. The staff also informed EPRI MRP that the updated 40 – 80-year assessment and I&E criteria for CE-design core support plates in MRP-227, Rev. 2 continues to use this type of aging management basis for the plates per Primary Item C9 in Table 4-2 of the Subject TR.</p> <p>The staff informed EPRI MRP that since the I&E criteria for the core support plate are still dependent on the results of a component-specific fatigue evaluation of the plate, the staff will need to evaluate the I&E criteria for CE-design core support plates in the upcoming SE for the Subject TR. The staff acknowledges that supporting information for the inspection categorization bases of the LSS core support plates is given in Section 4.1 of MRP-232, Rev. 2.</p>	The staff will evaluate the updated I&E criteria or CE-design LSS core support plates in the upcoming SE for the Subject TR.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
LSS fuel alignment pins	<p>The staff discussed the updated I&E criteria for CE-design LSS fuel alignment pins with EPRI MRP during the audit. The staff acknowledged aging management bases for the LSS fuel alignment pins in MRP-227, Rev. 2 remain the same as the those used for the pins in MRP-227, Rev. 1-A. However, the staff informed EPRI MRP that Table 4-8 has two different line items for the component type. EPRI MRP clarified that its intent was to cover aging management of the fuel alignment pins through inclusion of different line items for each of aging effects that screen in for the component type, with: (1) Item C15.a applying to aging management of cracking in the pins from potential fatigue, SCC, or IASCC mechanisms, and (2) Item C15.b applying to management of loss of materials in the pins, as induced by a wear mechanism. EPRI MRP explained that the reference Table 4-8 line items also cover IE and ISR/IC in the pins.</p> <p>The staff informed EPRI MRP that it did not have any further questions on the Existing Program criteria for LSS fuel alignment pins, and that the upcoming SE for the Subject TR will only need to account for the fact that the aging management basis for these components remain the same as those specified for the component types in Table 4-8 of MRP-227, Rev. 1-A.</p> <p>The staff acknowledges that supporting information for the inspection categorization bases of the LSS fuel alignment pins in the CE-design specific configurations are given in Section 4.1.1.4 and 4.1.4.3 of MRP-232, Rev. 2.</p>	<p>The staff will only need to identify in the upcoming SE for MRP-227, Rev. 2 that the Existing Program criteria for LSS fuel alignment pins in MRP-227, Rev. 2 remain the same as those for the pins in MRP-227, Rev. 1-A.</p>

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>LSS lower core support beams (CE-design units with welded core shrouds fabricated in two vertical shroud sections); LSS lower core support column deep beams (CE-design units with welded core shroud fabricated from full- height shroud plates)</p>	<p>The staff requested that EPRI MRP provide a brief explanation of the differences in the inspection categories and the I&E criteria for these types of support beam components during the audit. The staff acknowledged that the LSS core support beams in CE-design units with welded core shrouds fabricated in two vertical shroud sections are identified as one of the Expansion category components (per Expansion Item C5.4 in Table 4-5 of the Subject TR) for primary inspections that will be performed on the Primary Item C5 CSB UFW. In contrast, LSS core support deep beams in CE-design units with welded core shrouds fabricated from full height shroud plates are identified as Primary category component (per Item C12 in Table 4-2 of the Subject TR) that will be subject to augmented EVT-1 visual inspections during the 60 – 80-year SLR period (with the inspections to be performed on a 10-year augmented inspection frequency).</p> <p>EPRI MRP explained that the differences are based on the location of the beams relative to the fuel in the reactor core and the expected neutron dose considerations for the beam components. For the LSS core support beams in CE-design units with welded core shrouds utilizing full height shroud plates, the LSS assembly is configured in a manner where the reactor fuel sits directly on top of the LSS core support deep beams, which leads to a higher expected dose for the deep beams. Thus, for the LSS core support deep beams in this type of CE-unit configuration, the deep beams are established and maintained Primary category components for both 40 – 60-year ILR applications and 60 – 80-year SLR applications.</p> <p>For the core support beams in CE-design units with welded core shrouds in two vertical sections, EPRI MRP explained that the fuel does not sit directly on top of the beams and that the neutron dose expectancy for this type of support beams is expected to be less than the neutron dose expectancy of the LSS core support deep beams in the units with the other core shroud design. EPRI MRP explained that the LSS core support beams in this type of CE-unit configuration are established as one of four Expansion category components that are linked to the Primary Item C5 CSB UFW inspections.</p> <p>The staff informed EPRI MRP that it will need to evaluate the updating I&E criteria for LSS core support beams and LSS core support deep beams in the upcoming SE for the Subject TR; however, the staff does not anticipate the need to ask any RAIs on the updated I&E criteria for these core support beam types.</p>	<p>Staff to evaluate the updated I&E criteria for LSS core support beams and LSS core support deep beams in the upcoming SE for the Subject TR; however, the staff does not anticipate the need to issue any RAIs on the updated I&E criteria for these types of support beams.</p>

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
LSS core support columns (CE-design PWRs with welded core shrouds fabricated with two vertical shroud sections only)	The staff did not discuss the updated I&E criteria for CE-design LSS core support columns with EPRI MRP during the audit. The aging management bases for the LSS core support columns in MRP-227, Rev. 2 remain the same as the those used for the columns in MRP-227, Rev. 1-A. The staff acknowledged that the LSS core support columns are only applicable to CE-design PWRs with welded core shrouds fabricated from two vertical shroud sections. The staff also acknowledged that the LSS core support column are adequately managed as one of the four Expansion category components (per Expansion Item C6.3 in Table 4-5 of the Subject TR) that are linked to the primary EVT-1, UT, or ET inspections that will be performed on the Primary Item C6 CSB MGW. The staff acknowledges that supporting information for the inspection categorization basis of the LSS core support columns in given in Section 4.1.1.3 of MRP-232, Rev. 2.	The staff will only need to identify in the upcoming SE for MRP-227, Rev. 2 that the Expansion category criteria for LSS core support columns in MRP-227, Rev. 2 remain the same as those for the core support columns in MRP-227, Rev. 1-A.
Lower core barrel (CB) flange	<p>The staff discussed the inspection categorization basis and I&E criteria for the CE-design lower CB flanges with EPRI MRP during the audit. The staff acknowledged that, per Item C5.1 in Table 4-2 of the Subject TR, the lower CB flange remains as a designated Expansion category component through the Expansion category status assigned to inspection of the CSB LFW/LGW. However, the staff informed EPRI MRP that MRP-227, Rev. 2, assigns the corresponding upper CB flange as an Existing Program component that is assigned by Item C16 in Table 4-8 of the Subject TR. The staff asked EPRI MRP to explain whether the lower CB flange is a designed ASME Section XI Examination Category B-N-3 core support structure component and if so, why Table 4-8 in the Subject TR does not include an applicable Existing Program line item for the lower CB flange in the manner that Table 4-8 includes an applicable Existing Program line item for the upper CB flange.</p> <p>EPRI MRP clarified that the lower core flange is defined as one of the Examination Category B-N-3 core support structure components referenced in ASME Section XI, Table IWB-2500-1. However, EPRI MRP stated that the CSB LFW/LGW can remain designated as an assigned Expansion category (Expansion Item weld for the Primary category (Primary Item C5) CSB UFW), as the licensee owning the CE PWR unit would still be required to perform it 10 CFR 50.55a ISI of the core support structure (which includes the lower CB flange). The staff did not have any further questions in relation to the component-specific I&E criteria for the lower CB flange or the CSB LFW/LGW, but informed EPRI MRP that it would need to make these clarifications in the upcoming SE for the Subject TR. The staff does not anticipate the need to issue any RAIs on the inspection categories and I&E criteria for these components.</p>	The staff will provide a brief assessment of the inspection categories and I&E criteria for CE-design lower CB flanges and LFWs/LGWs in the upcoming SE for the Subject TR.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
LSS fuel alignment pins	<p>The staff discussed the I&E criteria for CE-design LSS fuel alignment pins with EPRI MRP during the audit. The staff acknowledged that LSS fuel alignment pins remain as Existing Program category components for the program per Table 4-8 of the Subject TR; however, the staff informed EPRI MRP that Table 4-8 has two different line items for the component type. EPRI MRP clarified that its intent was to cover aging management of the fuel alignment pins through inclusion of different line items for each of aging effects that screen in for the component type, with: (1) Item C15.a applying to aging management of cracking in the pins from potential fatigue, SCC, or IASCC mechanisms, and (2) Item C15.b applying to management of loss of materials in the pins, as induced by a wear mechanism. EPRI MRP explained that the reference Table 4-8 line items also cover IE and ISR/IC in the pins.</p> <p>The staff informed EPRI MRP that it did not have any further questions on the Existing Program criteria for LSS fuel alignment pins, and that the upcoming SE for the Subject TR will only need to account for the fact that the aging management basis for these components remain the same as those specified for the component types in Table 4-8 of MRP-227, Rev. 1-A.</p>	The staff will only need to acknowledge in the upcoming SE for MRP 227, Rev. 2 that the Existing Program criteria for CE-design LSS fuel alignment pins remain the same as those approved for the component type in MRP-227, Rev. 1-A.
Incore instrumentation (ICI) thimble tubes (lower) (Operating CE-design PWRs with top-mounted ICI only)	<p>The staff discussed the new Existing Program criteria for top-mounted ICI thimble tubes-lower with the EPRI MRP during the audit. EPRI MRP explained that an evaluation of the Existing Program criteria for these components using an existing site-specific program was included in Section 3.6.3 of the staff's April 25, 2019, SE for MRP-227, Rev. 1-A (even though Table 4-8 did not include a specific line item for the component type in Table 4-8 of MRP-227, Rev. 1-A). The staff explained that the concern is with irradiation-assisted growth/creep of grains of the Zircalloy alloys used in the tube design that could potentially induce changes in dimension/distortion in the tubes. EPRI MRP clarified that the technical bases for including the ICI thimble tubes – lower as new Existing Program components for the program is given in the proprietary assessment in Section 4.17 of MRP-232, Rev. 2.</p> <p>The staff informed EPRI MRP that it would evaluate the new Existing Program criteria for the top-mounted ICI thimble tubes – lower in the upcoming SE for the Subject TR, but informed EPRI MRP that it did not anticipate any need for issuing RAIs on these technical matters.</p>	The staff will evaluate the new Existing Program criteria for top-mounted ICI thimble tubes – lower in the upcoming SE for the Subject TR.
Incore instrumentation (ICI) nozzles (CE units with System 80 bottom mounted ICI nozzles)	The staff did not discuss the updated screening results and the NAM inspection category for bottom mounted ICI nozzles with EPRI MRP during the audit. The staff confirmed that the proprietary assessments in Section 5.1.6 of MRP-232, Rev. 2 provides an adequate basis for placing System 80 bottom mounting ICI nozzles in the NAM category of the program. The staff will only need to provide a brief accountability of basis for categorizing bottom mounted ICI nozzles as NAM-category components in the upcoming SE for the Subject TR.	The staff will need to provide a brief evaluation of the NAM basis for the bottom mounted ICI nozzles in the upcoming SE for the Subject TR.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p><i>Previous CE-design RVI components that were evaluated in MRP -227, Rev. 1-A that are no longer within the scope of MRP-227, Rev. 2 (specified component types are only applicable to CE-design PWRs that were designed with bolted core shroud assemblies):</i></p> <ul style="list-style-type: none"> a) LSS core support column bolts b) CSB thermal shield positioning pins c) core shroud plates and shroud bolts in bolted shroud assemblies d) former plates in units with bolted shroud assemblies e) CSB-to-shroud bolts 	<p>During the audit, the staff acknowledged the EPRI MRP's basis for removing aging mechanism screening, inspection categorization, and I&E criteria assessments of these components based on staff confirmation prior to the audit that: (1) the components only apply to CE-design PWRs whose core shroud is designed using a bolted shroud configuration, and (2) the fact that the only two U.S. CE-design PWRs with these core shroud configurations (i.e., the licensee's owning the single units at Fort Calhoun and Palisades nuclear power plants have both entered into permanently defueled operations of the units, as defined in Renewed Facility License No. DPR-40 for Fort Calhoun Station, and Renewed Facility License No. DPR-20 for Palisade Nuclear Plant).</p> <p>The staff will acknowledge the EPRI MPR's basis for removing these CE-design RVI components from the scope of MRP-227, Rev. 2 in the upcoming SE for the Subject TR.</p>	<p>Upcoming SE to provide a brief assessment of EPRI MRP's rationale for removing these components from the scope of MRP-227, Rev. 2.</p>

Table 5. Audit Summaries for Babcock and Wilcox (B&W) Component-Specific Audit Discussion Topics

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
B&W-design "No Additional Measures" (NAM) category components	<i>Upper grid assembly (UGA) rib-to-ring cap screws:</i> EPRI MRP clarified that the screws are low radiation-dose components and that the basis for the NAM categorization of the screws is given in Section 2.4 (including Table 2-3) of MRP-231, Rev. 4.	For these component types, the staff verified (post audit) that either the MRP-189, Rev. 3 or the MRP-231, Rev. 4 report has as sufficient proprietary basis for maintaining the specific component type in the NAM category of the program. Upcoming SE for the Subject TR to provide a tabular summary and evaluation of the NAM categorization basis for these B&W-design RVI components. The staff does not anticipate the need for issuing any RAIs on the NAM categorization bases for these components, or from a risk-perspective, the need for providing a full evaluation of EPRI MRP's NAM categorization basis for these components.
	<i>CRGT flange-to-grid cap screws:</i> EPRI MPR clarified that the basis for the NAM categorization of these cap screws is given in Section 2.4 (including Table 2-3) of MRP-231, Rev. 4.	
	<i>Reactor vessel level monitoring system brazement (RVLMS) assembly J-bolts and nuts (ANO-1 only):</i> EPRI MRP clarified that the J-bolts and nuts are low radiation-dose components and that the basis for the NAM categorization of the RVLMS J-bolts and nuts is given in Sections 2.4 (including Table 2-3) and 2.7 of MRP-231, Rev. 4.	
	<i>Remaining surveillance specimen holder tube (SSHT) assembly components (Oconee Nuclear Station [ONS] and Arkansas Nuclear One Unit 1 [ANO-1] units only):</i> EPRI MPR clarified that the basis for maintaining these SSHT assembly components as NAM category components is given in Section 2.2 of MRP-231, Rev. 4.	
	<i>Lower grid guide block bolts (all B&W-design units except DB):</i> EPRI MPR clarified that the basis for the NAM categorization of these guide block bolts is given in Section 2.4.4 of MRP-231, Rev. 4.	
	<i>Lower grid forgings (All B&W-design units except ONS-1)/lower grid weldment rib pads (ONS-1 only):</i> EPRI MRP clarified that the difference in the design configuration of the referenced lower grid assembly (LGA) components (i.e., weldment rib pads in ONS-1 versus lower grid rib forgings in the other B&W-design units) is explained in MRP-189, Rev. 3 and MRP-231, Rev. 4. EPRI MRP clarified that the basis for the NAM safety categorization of these components is given in Table 4-3 of MRP-189, Rev. 3.	
	<i>UGA dowel locking welds:</i> EPRI MRP clarified that basis for maintaining the UGA dowel locking welds as NAM category components of the program is given in Section 2.8 of MRP-231, Rev. 4.	
	<i>UGA dowel-to-rib section welds:</i> EPRI MRP clarified that basis for maintaining the UGA dowel-to-rib section welds as NAM category components of the program is given in Section 2.8 of MRP-231, Rev. 4.	
	<i>CRGT and CRGT sectors:</i> EPRI MRP clarified that the main aging concern with B&W-design CRGTs and CRGT sectors was with the aging mechanism of wear occurring in the components. EPRI MPR clarified that the basis for maintaining the CRGTs and CRGT sectors as NAM category components of the program is given in Section 2.3 of MRP-231, Rev. 4.	
	<i>Alloy X-750 dowel-to-CB cylinder welds:</i> EPRI MPR clarified that these welds do not serve an intended function and that the basis from maintaining the welds as NAM category components is given in Section 2.8 of MRP-231, Rev. 4.	
<i>CB top and bottom cylinder-to-former plate dowels (made from X-750 nickel-based alloy materials):</i> EPRI MPR clarified that the basis for placing these dowels in the NAM category of the program is given in Section 2.8 of MRP-231, Rev. 4.		

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
	<p><i>LGA rib-to-shell cap screws and lower grid support post pipe cap screws:</i> EPRI MRP clarified that the basis for placing these types of caps crews in the NAM category of the program is given in Section 2.4.4 of MRP-231, Rev 4.</p> <p><i>LGA shock pad bolts and associated locking devices (Three Mile Island (TMI) units only):</i> EPRI explained that it has removed these LGA component types as Primary components for the TMI Unit 1 (TMI-1) specific programs. The staff acknowledges that both TMI units have decommissioned.</p> <p><i>LGA guide block bolts (All B&W-design units except DB):</i> EPRI MRP clarified that the basis for placing the LGA guide block bolts in the NAM category of the program is given in Section 2.4.4 of MRP-231, Rev. 4.</p> <p><i>Alloy X-750 dowel-to-lower grid shell forging welds and Alloy X-750 dowel-to-lower grid rib section welds:</i> EPRI MPR clarified that the basis for placing these LGA dowel components in the NAM category of the program is given in Section 2.8 of MRP-231, Rev. 4.</p> <p><i>Alloy X-750 dowel-to-lower grid support pad welds:</i> EPRI MPR clarified that the basis for placing these LGA support pad welds in the NAM category of the program is given in Section 2.8 of MRP-231, Rev. 4.</p> <p><i>Alloy X-750 dowel-to-flow distributor (FD) flange welds:</i> EPRI MPR clarified that the basis for placing these FD flange welds in the NAM category of the program is given in Section 2.8 of MRP-231, Rev. 4.</p> <p><i>Incore monitoring instrument (IMI) guide tubes and tube nuts:</i> EPRI MPR clarified that the basis maintaining these IMI components as NAM category component of the program is given in Sections 2.4.4 and 2.5.1 of MRP-231, Rev. 4.</p>	
Plenum cover (PC) assembly: PC weldment rib pads, PC support flange, and PC support ring; core support shield (CSS) assembly: CSS top flange	The staff did not include the Primary B1.a, B1.b, B1.c, and B1.d Items for the PC weldment rib pads, PC support flange, PC support ring, and CSS top flange within the scope of the audit. The staff confirmed that, similar to the prior bases for these components in MRP-227, Rev. 1-A, the cited components are maintained as Primary category components for B&W-designed PWRs in Table 4-1 of the Subject TR without any linked Expansion category component types. The staff acknowledged that Table 4-1 identifies that components may be susceptible to loss of material effects caused by wear. The staff confirmed that the basis for approving these components as Primary category component types for B&W-designed PWRs is sufficiently discussed in Section 3.1.3.1 of the staff's April 25, 2019, SE for MRP-227, Rev. 1-A. The staff also confirmed that updated basis for maintaining these components at the Primary level is sufficiently evaluated in Section 3.2.1 of MRP-231, Rev. 4.	The staff will only need to acknowledge in the upcoming SE that the PC weldment rib pads, support flange, and support ring, and CSS support flange are maintained as Item B1.a, B1.b, B1.c, and B1.d Primary category components; a full evaluation of these components is not warranted for the upcoming SE.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Control rod guide tube (CRGT) spacer castings; Vent Valve (VV) bodies	<p>The staff discussed the inspection categories, inspection, and <i>expansion</i>-link criteria for Primary Item B2 CRGT spacer castings and the VV bodies (which are no longer inspection category items in the Subject TR) with the EPRI MRP. The staff acknowledged that in Table 4-1 of MRP-227, Rev. 2, the EPRI MRP maintains the Primary B2 CRGT spacer castings as Primary category components for cracking that might be influenced by a loss of fracture toughness/TE mechanism. The staff informed EPRI MRP that, in Table 4-1 of MRP-227, Rev. 1-A, the VV bodies were upgraded to Expansion Item B2.1 expansion-link items for the CRGT spacer castings, and that this basis was discussed, evaluated, and approved in Section 3.1.3.1 of the staff's April 25, 2019, SE for MRP-227, Rev. 1-A. However, the staff informed EPRI MRP that the updated basis in Tables 3-1, 4-1, and 5-1 of the Subject TR reverts the inspection categorizations of the CRGT spacer castings and the VV bodies back to the original basis in MRP-227-A, which is to maintain the CRGT spacer castings as Primary Item B2 components for the mechanism of TE without any linked <i>expansion</i>-link component types and to realign the VV bodies into the NAM category of the program, as applied during a 40 – 80-year service period.</p> <p>The staff acknowledged that the revised basis removing the VV bodies as linked Expansion category components for the CRGT spacer castings is supported by the revised, proprietary aging mechanism susceptibility assessment in Section 3.2, Subsection J of MRP-189, Rev. 3. The staff acknowledged that the revised basis in MRP-189, Rev. 3 are used to support the conclusion in the Subject TR that the VV bodies do not need to be age managed during a 40 – 80-year renewed/subsequent renewed service period and can be placed in the NAM category of the program. The staff acknowledged that it did not anticipate the need for issuing any RAIs on this matter. However, the staff informed EPRI MRP that the staff would need to evaluate the lack of expansion-link relationships between CRGT spacer castings and the VV bodies in the upcoming SE for the Subject TR, as this updated basis represents a switch from the staff's previous assessment of CRGT spacer casting/VV body <i>expansion</i>-link relationships in Section 3.1.3.1 of the April 25, 2019 SE for MRP-227, Rev. 1-A, and covers both 40 – 60-year and 60 – 80-year periods.</p>	Staff does not anticipate any need to issue an RAI on the updated I&E criteria for CRGT spacer castings and VV bodies in the Subject TR. However, the staff will need to evaluate the updated basis for these components in the upcoming SE for the Subject TR.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
Vent valve (VV) assembly top and bottom retaining rings; VV original locking devices (pressure plate, spring, spring retainer and U-cover, and key ring and pin); VV modified locking devices (bolt locking cup, jackscrew locking cap, and bolted block {ONS units and DB only})	The staff did not discuss the I&E criteria for VV assembly components rings with EPRI MRP during audit, other than to acknowledge that: (1) the VV top and bottom retaining rings are maintained as Primary Item B3.a and B3.b components in Tables 4-1 and 5-1 of MRP-227, Rev. 2 without associated (linked) Expansion category components, (2) the VV original locking devices (pressure plate, spring, spring retainer and U-cover) are maintained as Primary Item B4 components in Tables 4-1 and 5-1 of MRP-227, Rev. 2 without any associated Expansion category components, (3) the VV original locking devices (key ring and pin) are maintained as Primary Item B5 components in Tables 4-1 and 5-1 of MRP-227, Rev. 2 without any associated Expansion category components, and (4) the VV modified locking devices (bolt locking cup, jackscrew locking cap, and bolted block [ONS units and DB only]) are maintained as Primary Item B6 components in Tables 4-1 and 5-1 of MRP-227, Rev. 2 without any associated Expansion category components.	The staff will only need to acknowledge that these components remain as Primary components in the upcoming SE; a full evaluation of these components is not warranted for the upcoming SE.
Upper core barrel (UCB) bolts and bolt locking devices, lower core barrel (LCB) bolts and bolt locking devices, flow distributor (FD) bolts and bolt locking devices upper thermal shield (UTS) bolts and bolt locking devices, and lower thermal shield (LTS) bolts/screws and nuts and associated bolt/screw locking devices	<p>The staff informed EPRI MRP that there were a number of changes to the I&E criteria for these bolting types in MRP-227, Rev. 2 that would require the staff to evaluate the component-specific I&E criteria for the bolting types in the upcoming SE for the Subject TR. The staff stated the UCB, LCB, and FD bolts remaining as Primary Item B7, B8, and B12 bolting types in Table 4-1 and 5-1 of MRP-227, Rev. 2, but added that the associated locking devices for bolting types have been re-aligned from the Primary category of the program to the NAM category. Similarly, the staff acknowledged that the UTS bolts and LTS bolts/screws and nuts remain as the linked Expansion category components (per Items B7.1 and B8.1 in Table 4-4 of MRP-227, Rev. 2) for the specified Primary UCB, LCB, and FD bolt types, but added that the associated locking devices for bolting types have likewise been re-aligned from the Expansion category of the program to the NAM category. EPRI MRP informed the staff that the basis for placing the UCB, LCB, FD, UTS, and LTS bolt locking devices into the NAM category of the program is based on the high-strength materials that were used to fabricate the LCB, UCB, FD, UTS, and LTS bolting types; EPRI MRP clarified that the basis for the change is discussed in Sections 3.2.4 and 3.3.4.5 of MRP-231, Rev. 4.</p> <p>The staff also acknowledged that there were some changes to the EPRI MRP criteria on the types of detected flaw indications that would prompt <i>sample-expansion</i> of the UT inspections performed on UCB, LCB, and FD bolting types over to the Expansion category UTS bolts and LTS bolts or screws. The staff informed EPRI MRP that some RAIs may be warranted to the I&E criteria changes made in MRP-227, Rev. 2 for these types of bolts/screws and associated bolt locking devices.</p>	The staff will need to assess the changes to the I&E criteria for UCB, LCB, FD, UTS, and LTS bolting types and their associated bolt locking devices, in the upcoming SE for the Subject TR. The staff may consider issuance of one or more RAIs related to the updated I&E criteria for these bolting types in MRP-227, Rev. 2.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>Core barrel (CB) assembly components: CB upper flange, CB top flange-to-top cylinder circumferential seam weld, CB top cylinder plates and bottom cylinder plates, CB top-cylinder-to-bottom cylinder center circumferential seam weld, CB top cylinder and bottom cylinder axial seams welds, CB cylinder bottom flange, CB bottom cylinder-to-bottom flange circumferential seam weld.</p> <p>Plenum cover (PC) weldment rib-to-rib (rib to each other) welds</p>	<p>The staff informed the EPRI MPR that the updated I&E criteria for the specified B&W-design CB assembly components in the left-hand column entry (and the associated PC weldment rib-to-rib welds, which are Expansion Item B20.1 welds for the Primary Item 20 CB top flange circumferential weld) would need to be fully evaluated in the upcoming SE for the MRP-227, Rev. 2 review. and that the staff review may result in the issuance on one or more RAIs on the updated I&E criteria for the specified CB assembly base metal and weld component types in the Subject TR. Specifically, the staff informed EPRI MRP that, in MRP-227-A and in MRP-227, Rev. 1-A, the CB assembly base metal and weld components were placed into the Expansion category of the MRP-227-based program as result of EPRI MPR's past claims that the components are inaccessible to inspection and the staff's past issuance of A/LAI No. 6 in the past December 16, 2011, SE for the MRP-227, Rev. 0 report. However, the staff acknowledged that MRP-227, Rev. 2 switches this up somewhat (particularly in relation to establishing how the specified CB assembly welds would be age managed under the program) by claiming that some B&W-design CB assembly welds may be partially accessible to inspection.</p> <p>The staff also informed EPRI MRP that the updated criteria in MRP-227, Rev. 2 for the specified CB assembly welds would allow the welds to potentially be placed in the NAM category of the program if: (1) it was confirmed that the weld type was subject to a weld stress-mitigation practice during implementation of the original weld fabrication activities, and (2) it was confirmed that the specified weld type had not been subject to subsequent weld repair practice. However, the staff stated the use of these types of original weld stress-mitigation practices had never been credited or approved as a basis for potentially placed B&W-design CB assembly weld into the NAM category of the program. Thus, the staff informed EPRI MRP that the staff would need to evaluate the following technical considerations when considering the updated I&E criteria for these CB assembly component in the Subject TR: (1) validity of allowing an original weld design stress-mitigation practice as a basis for placing B&W-design CB weld types in the NAM category of the program, (2) degree of component accessibility to inspection, and if justified for placement in the Primary or Expansion category of the program, minimum inspection coverage that must be achieved to claim inspection credit for the weld type, and (3) if placed in the Expansion category of the program, use of alternate criteria to disposition the Expansion weld type by alternate (supplemental) analysis or alternate repair/replacement activities, and (4) applicable Expansion category components for specified CB assembly welds if identified as Primary category welds in Table 4-1 of MRP-227, Rev. 2.</p> <p>EPRI MRP acknowledged that the B&W-design CB assembly components (and the associated plenum rib weld type) would be the subject of a specific evaluation section in the upcoming SE for the Subject TR.</p>	<p>The B&W CB assembly components will be the subject of a specific evaluation section in the upcoming SE for the Subject TR. The staff may issue RAIs relative to the updated I&E bases for B&W-design CB assembly base metal and weld components in the Subject TR.</p>
<p>Core support shield (CSS) assembly components: CSS top</p>	<p>The staff discussed the inspection categories for these CSS components with the EPRI MRP. For Programs applied during the 60 – 80 Year licensed service period, the CSS top</p>	<p>The B&W CSS top and bottom flanges and their</p>

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
flange and top flange circumferential weld; and CSS bottom flange and bottom flange circumferential weld	<p>flange and top flange circumferential weld are listed as an Expansion category components for fatigue-induced degradation as linked to the Primary Item B20 CB cylinder top flange circumferential weld per Expansion Item B20.2 in Table 4-4 of MRP-227, Rev. 2. As stated in an earlier line item the CSS top flange is also a Primary components for the assessment of wear per Item B1.d in Table 4-1 of MRP-227, Rev. 2.</p> <p>The staff informed EPRI MRP that it will need to evaluate the inspection categories of the CSS top and bottom flanges and their associated flange welds in the upcoming SE for the Subject TR. Although staff notes that aging management of the CSS bottom flange is afforded by the Primary inspections applied to the UCB bolts (Primary Item B7 bolts), which are used to secure the CSS top flange to the CB assembly top flange. For the CSS top flange and flange weld, the staff informed EPRI MRP that use of original weld design stress relief practices as a basis for potentially screening out SCC induced cracking in the welds may need to be revisited as part of the staff's review and may be the topic of an RAI.</p>	associated circumferential flange welds will be the subject of a specific evaluation section in the upcoming SE for the Subject TR. The staff may issue an RAI relative to the use of original weld design stress relief practices for screening of the SCC mechanism.
Baffle plates and former plates	<p>The staff discussed the inspection categories and Primary-to-Expansion category relationships between Primary Item 10 baffle plates and Expansion Item B10.2 former plates with EPRI MRP. The staff informed EPRI MRP that, in MRP-227, Rev. 1-A for the 40 – 60-year service, the Expansion Item B10.2 former plates were one of the designated inaccessible, Expansion category components for the VT-3 performed on the Primary Item B10 baffle plates. The staff acknowledged that the former plates remain as Item B10.2 Expansion category components for the Item B10 former plates in MRP-227, Rev. 2, but only for the time period associated with a subsequent period of extended operation (i.e., only for the service period in licensed service terms between service years 60 – 80). The staff stated that MRP-227, Rev. 2 removes the former plates as Expansion category plates for the baffle plates during service years 40 – 60, which is different from the approval for the baffle plate-former plate relationships approved in the staff's April 25, 2019, SE for MRP-227, Rev. 1-A. The staff informed EPRI MRP that the staff may need to issue one or more RAIs on this technical topic.</p>	The staff will be evaluated the Primary-to-Expansion link relationships for B&W-design baffle and former plates in the upcoming SE for the Subject TR. The staff may issue one or more RAIs on this technical topic.
Baffle-to-former (BF) bolts; baffle-to-baffle (BB) bolts; and core barrel-to-former bolts (CB-F), (and associated bolt locking devices)	<p>The staff discussed the updated I&E criteria for Primary Item B9 BF bolts, and Expansion Item B9.1 BB bolts and Item B9.2 CF-F bolts with EPRI MRP during the audit. The staff acknowledged that from a risk perspective, the updated I&E criteria for these bolting types in MRP-227, Rev 2 were identical to those provided for the Primary Item B9 BF bolts and linked Expansion Item B9.1 BB bolts and Item B9.2 CB-F bolts in MRP-227, Rev. 1-A. The staff discussed the updated I&E criteria for Primary Item B11 BF and internal BB bolt locking devices and the Expansion Item B11.1 external BB and CB-F bolt locking devices with EPRI MRP during the audit.</p> <p>The staff acknowledged that the external BB bolts and CB-F bolts remain in MRP-227, Rev. 2 as Expansion category that are inaccessible to inspection, and that the internal BB bolts are still identified as bolting types for which a qualified inspection technical has yet</p>	The staff will provide an evaluation of the updated I&E criteria for B&W-design BF bolts, BB bolts, and CB-F bolts (and their associated bolt locking devices) in the upcoming SE. The staff may issue one or more RAIs on the component access and inspection method topics for the component types.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
	<p>to be developed. The staff stated that, per the MRP-227 criteria if <i>sample-expansion</i> to the BB bolts and CB-F bolts is triggered by the inspections performed on the BF bolts, <i>sample-expansion</i> of the component type is to be addressed by supplemental analysis or component-specific repair replacement activities. Similarly, the staff acknowledged that the locking devices of the CB-F bolts and BB bolts are inaccessible to inspection. If <i>sample-expansion</i> to the BB bolt locking devices or CB-F bolt locking devices is triggered by the inspections performed on the locking device type, <i>sample-expansion</i> of the locking device type is to be addressed by supplemental analysis or component-specific repair replacement activities.</p> <p>The staff informed EPRI MRP that it will need to provide an evaluation of the updated I&E criteria for B&W-design BF, BB, and CB-F bolts and associated locking devices in the upcoming SE for the Subject TR and that the staff may consider issuing one or more RAIs on the updated technical I&E criteria on accessibility or available, qualified inspection methods for these bolts and bolt locking device types.</p>	
Surveillance specimen holder tube (SSHT) bolts (Davis Besse [DB] only)	<p>The staff did not discuss the I&E criteria for the DB SSHT bolts with EPRI MRP during audit. For the 40 – 60-year period, the SSHT bolt and bolt locking devices remain as Expansion category item B7.2 bolting types for the Primary UCB, LCB, or FD bolts (Primary Item B7, B8, and B12 bolt types) in the units. For the 60 – 80-year service period, the staff acknowledges that the SSHT bolts (and their bolt locking devices) are elevated to Primary category (Primary Item B19) bolts for the program that applies to the DB unit.</p> <p>The staff will need to evaluate the 60 – 80-year I&E criteria changes SSHT bolts in the upcoming SE for MRP-227, Rev. 2; however, the staff does not anticipate the need for issuing any RAIs on the updated I&E criteria for SSHT bolts, as defined and evaluated in the Subject TR.</p>	Staff to evaluate the updated criteria for B&W-design SSHT bolts in the upcoming SE. However, the staff does not anticipate the need to issues any RAIs on this technical topic.
Alloy X-750 dowel-to-lower guide block welds; Alloy X-750 dowel-to-upper grid support pad welds; Alloy X-750 dowel-to-lower grid support pad welds (All operating B&W-design PWRs except Davis Besse [DB])	The staff did not discuss the I&E criteria for the Alloy X-750 dowel-to-lower guide block welds, Alloy X-750 dowel-to-upper grid support pad welds, and Alloy X-750 dowel-to-lower grid support pad welds with EPRI MRP during audit. For the 40 – 80-year period, the Alloy X-750 dowel-to-lower guide block welds in the LGA remain as the Primary Item B13 welds for B&W-design unit-specific programs at ONS Units 1, 2, and 3 and Arkansas Nuclear One, Unit 1 and the Alloy X-750 dowel-to-upper grid assembly support pad welds and Alloy X-750 dowel-to-lower grid fuel assembly support pad welds remain as the Expansion Item B13.1 and B13.2 welds for the dowel-to-lower grid guide block.	The staff's upcoming SE for MRP-227, Rev. 2 will include a specific section for the updated I&E criteria on B&W-design UGA and LGA dowel weld components; however, the staff does not anticipate any need for issuing an RAI on the technical criteria for these types of B&W-design LGA and UGA dowel weld components.

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>Alloy X-750 dowel-to-lower grid support pad welds; Alloy-750 dowel-to-upper grid support pad welds</p> <p>(Davis Besse [DB] unit only)</p>	<p>The staff discussed the new criteria for the Primary Item B21 Alloy-750-to-lower grid support pad welds (DB unit only) with EPRI MRP. EPRI MRP explain the Primary Item B21 was developed for Table 4-3 in MRP-227, Rev. 2 to account for the different design configuration of the LGA at DB from the design of the corresponding LGAs at ONS Units 1, 2, and 3 and at Arkansas Nuclear One, Unit 1 (ANO-1). EPRI MRP explained that the LGA at DB does not include Alloy X-750 dowel-to-lower guide block welds, so the Primary Item B21 Alloy-750-to-lower grid support pad welds at DB are designated as the substitute Primary category component in lieu of guide block welds. EPRI MRP confirmed that like the Primary Alloy X-750 dowel-to-lower grid guide block welds at the ONS and ANO-1 units, the Alloy X-750 dowel-to-lower grid supports pad welds at DB will expand the Expansion Item B13.1 Alloy X-750 dowel-to-upper grid support pad weld in the DB unit.</p> <p>The staff will include an evaluation of the DB unit-specific Alloy X-750 dowel-to-lower grid support pad welds and Alloy-750 dowel-to-upper grid support pad welds in the upcoming SE for MRP-227, Rev. 2. However, the staff does not anticipate any need for issuing any RAIs on inspection categorization bases defined for B&W-design UGA and LGA dowel weld types in the Subject TR.</p>	<p>The staff's upcoming SE for MRP-227, Rev. 2 will include a specific section for the upped criteria B&W-design UGA and LGA dowel weld components; however, the staff does not anticipate any need for issuing an RAI on the technical criteria for these types of B&W--design LGA and UGA dowel weld components.</p>
<p>Lower grid rib sections</p>	<p>The staff did not discuss the updated I&E criteria for B&W-design lower grid rib sections in MRP-227, Rev. 2, with EPRI MRP. The staff acknowledge that, in MRP-227, Rev. 2 the lower grid rib sections remain as linked Expansion Item B10.3 components for Primary Item B10 baffle plate inspections that will be performed during the 40 – 60 service period. However, the staff acknowledges that for the 60 – 80-year service period, the lower grid rib sections have been elevated to Primary Item B18 base metal components of the augmented PWR Vessel Internals Program that will implemented during the subsequent period of extended operation (i.e., during years 60 – 80 of the subsequent renewed licensing term).</p> <p>While the staff will need to evaluate these changes in the upcoming SE for the Subject TR, the staff does not anticipate the need for issuing any RAIs on the updated technical I&E criteria for B&W design lower grid rib sections.</p>	<p>The staff's upcoming SE for MRP-227, Rev. 2 will include a specific section for the upped criteria B&W-design LGA components, including the lower grid rib sections; however, the staff does not anticipate any need for issuing an RAI on the updated inspection categorizations and I&E criteria for the lower grid rib sections.</p>

Applicable Component(s) And Component-Specific Audit Topic	Summary of Audit Discussions and Results	Will Topic be Considered for An RAI or Inclusion in the Staff's SE?
<p>Incore monitoring instrument (IMI) guide tube spiders and spider-to-lower grid rib section welds; upper grid assembly support pad items (including pad, Alloy X-750 dowels, cap screws and associate weld locking devices); lower grid assembly (LGA) support pad items (including pad, pad-to-rib section welds, Alloy X-750 dowels, cap screws, and associated locking welds)</p>	<p>The staff discussed the updated inspection categorization bases and I&E criteria for B&W-design IMI spiders and spider-to-lower grid rib section welds with EPRI MRP. Specifically, the staff acknowledged that the IMI spider-to-lower grid rib sections welds remain as Primary Item B15.b welds in MRP-227, Rev. 2. However, the staff informed EPRI MRP of its perception that, while Table 4-1 in MRP-227, Rev. 2 designates the IMI spiders as Primary Item B15.a base metal components, Table 3-1 in MRP-227, Rev. 2 could give the impression that the IMI spiders can be placed in the NAM category of the program for B&W-design RVI components. EPRI MRP clarified that the IMI spiders remain as Primary Item B15.a components in MRP-227, Rev. 2 and that the NAM categorization basis for the spiders in Table 3-1 of MRP-227, Rev. 2 is only for the screening basis of the TE aging mechanism. EPRI MRP explained that both the IMI spiders and IMI spider-to-lower grid rib section welds are designated as Primary interfacing components based on the screening of the IE aging mechanism. EPRI MRP confirmed that the Expansion Item B15.1 lower grid fuel assembly support pad items (i.e., the LGA pad, pad-to-rib section welds, Alloy X-750 dowels, cap screws and associated locking welds) remain as the Expansion category components for the IMI spiders and spider-to-lower grid rib sections welds for years 40 – 60; but added that, for years 60 – 80, the program adds in the upper grid fuel assembly support pad items (i.e. pad, Alloy X-750 dowels, cap screws and associated locking welds) as secondary Expansion components for the IMI spider and spider welds through secondary expansion of the LGA support pad item inspections (if triggered by the IMI spider component inspections).</p> <p>While the staff will need to evaluate these changes in the upcoming SE for the Subject TR, the staff does not anticipate the need for issuing any RAIs on the updated technical I&E criteria for B&W-design IMI spiders and spider-to-lower grid rib sections in the Subject TR.</p>	<p>The staff's upcoming SE for MRP-227, Rev. 2 will include a specific section for the updated criteria B&W-design IMI spiders and spider-to-rib section welds; however, the staff does not anticipate any need for issuing an RAI on the updated screening results, inspection categorizations, and I&E criteria for these IMI spider components.</p>

APPENDIX A – ACRONYM LIST

A/LAIs	applicant/licensee action items
ABPA	Acceptable bolting pattern analysis
ADAMS	Agencywide Documents Access and Management System
AMP	aging management program
ASME	American Society of Mechanical Engineers
B&W	Babcock and Wilcox Company
BB	baffle-to-baffle
BF	baffle-to-former
BMI	bottom mounted instrument
CASS	cast austenitic stainless steel
CB	core barrel
CB-F	core barrel-to-former
CE	Combustion Engineering Corporation
CEA	control element assembly
CFR	Code of Federal Regulations
CGR	crack growth rates
CLB	current licensing basis
CRDM	Control rod drive mechanism
CRGT	control rod guide tube
CSB	core support barrel
CSBFW	core support barrel flexure weld
CSS	core support shield
DB	Davis Besse
DNRL	Division of New and Renewed Licenses
DORL	Division of Operation Reactor Licensing
E	Expansion
ECT	Eddy current test
EPRI	Electric Power Research Institute
ET	eddy current surface
EVT-1	enhanced visual
FD	flow distributor
GALL	NUREG-1801, Generic Aging Lessons Learned (GALL) Report, July 2001
I&E	inspection and evaluation
IASCC	irradiation-assisted stress corrosion cracking
ICI	incore instrumentation
IE	irradiation embrittlement
ILR	initial license renewal
IMI	incore monitoring instrument
IPA	integrated plant assessment
IRL	initial license renewal
ISI	inservice inspection
ISR/IC	irradiation-enhanced stress relaxation or creep

LAW	lower axial weld
LCB	lower core barrel
LFW	lower flange weld
LGA	lower grid assembly
LGW	lower girth weld
LRA	license renewal application
LSS	lower support structure
LTS	lower thermal shield
MAW	middle axial weld
MGW	middle girth weld
MPR	? I think this should be MRP but I need to ask Jim
MRP	materials reliability program
NAM	no additional measures
NDE	non-destructive examination
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
NVIB	Vessels and Internals Branch
ONS	Oconee Nuclear Station
OpE	operating experience
P	Primary
PC	plenum cover
PSEG	Public Service Enterprise Group
PWHT	post-weld heat treatment
PWR	pressurized water reactor
PWROG	Pressurized Water Reactor Owners Group
RAI	request for additional information
RVI	reactor vessel internal
RVLMS	Reactor vessel level monitoring system
SCC	stress corrosion cracking
SE	safety evaluation
SLR	subsequent license renewal
SLRA	subsequent license renewal application
SNC	Southern Nuclear Company
SSHT	surveillance specimen holder tube
Subject TR	EPRI Non-Proprietary Report No. 3002020105, "Material Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227, Revision 2)," September 2021
TB	Technical Bulletin
TE	thermal embrittlement
TLAA	time-limited aging analysis
TMI	Three Mile Island

TR	topical report
UAW	upper axial weld
UCB	upper core barrel
UCP	upper core plate
UFW	upper flange weld
UGA	upper grid assembly
UGW	upper girth weld
UIA	upper internals assembly
UT	ultrasonic test
UTS	upper thermal shield
VS	void swelling
VV	vent valve
WEC	Westinghouse Electric Company
X	Existing Program
XL	extra large

SUBJECT: REPORT REGARDING OCTOBER 31 THROUGH NOVEMBER 4, 2022,
 REGULATORY AUDIT FOR ELECTRIC POWER RESEARCH INSTITUTE
 TECHNICAL REPORT MATERIALS RELIABILITY PROGRAM-227, REVISION 2,
 "MATERIALS RELIABILITY PROGRAM: PRESSURIZED WATER REACTOR
 INTERNALS INSPECTION AND EVALUATION GUIDELINES"
 (EPID L-2022-TOP-0029) DATED FEBRUARY 7, 2023

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