

Baffle-Former Bolt Degradation NRC Update

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Background

- Unexpected numbers of degraded baffle-former bolts found during initial MRP-227-A inspections in 2016 in several plants.
- Industry developed enhanced inspection recommendations.
 - NSAL 16-1 (Westinghouse) (Ref. 1)
 - EPRI MRP Interim Guidance (Ref. 2, 3)
- NRC Staff Assessment of EPRI Interim Guidance (Ref. 4) found guidance acceptable.
- NRC completed a risk-informed assessment in 2016 determined it was acceptable for most susceptible plants to inspect BFBs at the next refueling outage (Ref. 5).
- NRC also performed focused inspections of BFB inspection and corrective actions at several plants in 2016.

NEIMA Report to Congress on Baffle-Former Bolts

- Section 104 of the Nuclear Energy Innovation and Modernization Act, required the NRC to submit to the appropriate congressional committees a report explaining revisions made to guidance on the baseline examination schedule and subsequent examination frequency for baffle-former bolts (BFBs) in pressurized-water reactors (PWRs) with down-flow configurations or a report explaining why current guidance is sufficient.
- Report was required 90 days after the bill was signed into law (January 14).

NEIMA Report to Congress on Baffle-Former Bolts

- The report and transmittal letter, dated April 9, 2019, can be found in Reference 6.
- The NRC's report explained why the current guidance is adequate.
 - NRC risk-informed evaluation.
 - NRC staff assessment of two EPRI-MRP interim guidance letters.
 - NRC inspection process monitors licensee corrective actions related to BFBs, including examination, replacement, and evaluation.
 - Operating experience.

NEIMA Report to Congress on Baffle-Former Bolts

- Good operating experience
 - Baseline UT completed at all 7 plants in the most susceptible group (Tier 1a).
 - Most of these plants replaced all degraded bolts plus some additional original bolts.
 - Follow-up UT exams completed at 2 of 7 Tier 1a plants showing relatively low degradation levels, thus bolt replacements appear to have been effective.
 - Baseline UT also completed at all but 1 two-loop and three-loop downflow plants, finding low to moderate numbers of degraded bolts.

NEIMA Report to Congress on Baffle-Former Bolts

- Report stated the NRC would formally document its position regarding EPRI's updated guidance in its final SE of MRP-227, Rev. 1.
- The SE has since been issued on April 25, 2019.

Recent Operating Experience

- During a spring 2019 refueling outage, one Tier 1a plant found visual indications of BFB degradation. The affected plant had previously replaced a significant number of BFBs in 2016.
- The plant therefore UT examined all original bolts and a sample of replacement bolts.
- The total number of potentially degraded original bolts is similar to the number found in 2016.
- Licensee had planned subsequent examination in 2020 based on its plant-specific evaluation.

Recent Operating Experience – NRC Response

- The NRC is monitoring the licensee's corrective actions through the inspection process.
- NRR is evaluating the generic implications of the recent OE.
- Corrective actions at other Tier 1a plants, including bolt replacements and subsequent examination timing, appear to have been effective in managing BFB degradation.
- EPRI guidance specifies that subsequent examination timing is determined by a plant-specific evaluation.
- NRC is assessing whether revisions to examination interval determination processes/guidance may be needed.

Future NRC Actions

- Final NRC SE of MRP-227, Rev. 1 constitutes formal guidance on BFB examinations.
- Future update to GALL-SLR will reference NRC-approved version of MRP-227, Rev. 1 in the PWR Internals Program.
- Continue to monitor OE related to BFB examinations.
- Continue to monitor BFB examinations and corrective actions through the inspection process.
- NRC will assess continued adequacy of BFB examination guidance based on OE.

References

1. Westinghouse Nuclear Safety Advisory Letter (NSAL) 16-01 Revision 1, "Baffle-Former Bolts," Westinghouse Electric Co. LLC, August 1, 2016 (ADAMS Accession No. ML16225A729).
2. Letter from Bernie Rudell and Anne Demma to the NRC, Subject: "Transmittal of NEI-03-08, "Needed" Interim Guidance Regarding Baffle Former Bolt Inspections for Tier 1 plants as Defined in Westinghouse NSAL 16-01 [sic]," EPRI Materials Reliability Program, MRP 2016-022, July 27, 2016 (ADAMS Accession No. ML16211A054).
3. Letter from Bernie Rudell and Brian Burgos dated March 23, 2017, Transmittal of NEI 03-08, "Needed" Interim Guidance Regarding Baffle Former Bolt Inspections for U.S. PWR Plants as Defined in Westinghouse NSAL 16-01" (MRP 2017-011) (ADAMS Accession No. ML17087A107).
4. Staff Assessment of EPRI MRP Interim Guidance on Baffle Former Bolts. November 20, 2017 (ADAMS Accession No. ML17310A861).
5. Degradation of Baffle-Former Bolts in Pressurized Water Reactors - Documentation of Integrated Risk-Informed Decision Making Process in Accordance with NRR Office Instruction LIC-504, October 20, 2016 (ADAMS Accession No. ML16225A341).
6. 04/09/19 - Letter to the Honorable John Barrasso and Frank Pallone, Jr. from Chairman Svinicki re: submits the report on the status of "Baffle-Former Bolt Guidance" (ADAMS Accession No. ML19078A017)