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2017 Materials Programs Technical Information Exchange Meeting Guide Card Wear Activities Update

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PRESSURIZED WATER REACTOR OWNERS GROUP

Guide Card Wear Activities – PWROG MSC (1/5)

Guide Card Wear Inspection Guidance Development History

- In 2008, PWROG MSC initiated a project under PA-MSC-0163 to perform guide card wear measurements at three domestic plants to determine the extent of guide card wear in domestic plants with different guide tube designs
- The results of these initial inspections indicated that the guide card wear magnitude at these plants was as expected. Using constant volumetric wear rate methodology, the timeline for subsequent inspections for these plants was determined and informed the inspection requirements put into MRP-227 Rev. 0
- In 2009, a guide card wear inspection was completed independently, outside the PWROG program, at a foreign plant that indicated aggressive guide card wear. This finding lead to issuance of NSAL-10-1.
- In NSAL-10-1, Westinghouse provided a high level wear criteria for various guide tube designs. NSAL-10-1 also recommended PWROG to pursue developing guidance for managing guide card wear
- Therefore, in 2011, PWROG MSC began pursuing development of guide card wear management guidance under PA-MSC-0688. Subsequently, in 2011, MRP-227-A was also published.

Guide Card Wear Activities – PWROG MSC (2/5)

Guide Card Wear Inspection Guidance Development History

- Per MRP-227-A, a VT-3 inspection of 20% of the guide tubes was required within 2 refueling outages of license renewal
- In 2013, WCAP-17451-P, Rev. 1, the guidance document developed through PA-MSC-0688, was published and included NEI 03-08 “Needed” implementation requirements.
- EPRI MRP Letter 2014-006 was issued 2/18/2014 to provide interim guidance to follow WCAP-17451-P, Rev. 1 for guide card wear inspections in lieu of those in MRP-227-A.
- WCAP-17451-P, Rev. 1 was incorporated by reference into MRP-227 Rev. 1 and PWROG report, WCAP-17096-NP-2A.

Guide Card Wear Activities – PWROG MSC (3/5)

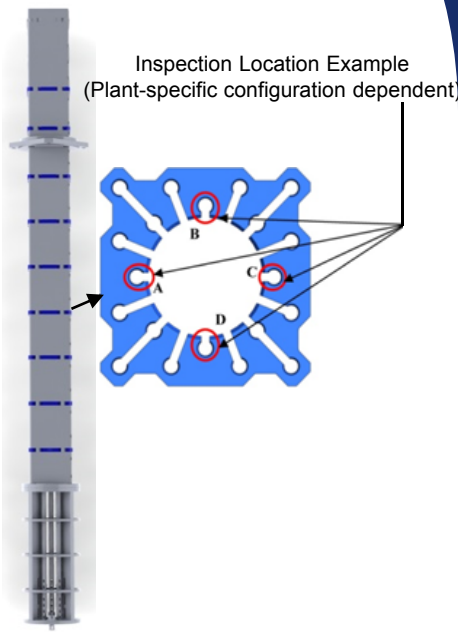
Guide Card Wear Inspection Guidance in WCAP-17451-P

- WCAP-17451-P, Rev. 1, specifies a guide card wear criteria, which was developed to ensure that rod insertability is not adversely impacted
- The criteria is defined by three wear zones: green, yellow and red, which are based on the amount of wear in the guide cards for a given guide tube
- In WCAP-17451-P, Rev. 1, foreign material exclusion (FME) videos from mostly support pin replacements were reviewed and the magnitude of guide card wear for several plants was conservatively determined
- Using the wear projection curves developed in WCAP-17451-P, Rev. 1 and the wear magnitude from FME videos, the baseline inspection timeline was established for various plants such that the guide card wear would be in the green zone at the time of the baseline inspection
- The inspection data gathered from the baseline inspection is used to determine the timeline for subsequent inspection or guide tube replacement, which is scheduled in the yellow zone
- A guide tube cannot be operated in the red zone

Guide Card Wear Activities – PWROG MSC (4/5)

Recent OE on Guide Card Wear and Impact on WCAP-17451-P

- Recent OE with ion nitrided rod cluster control assemblies (RCCAs) and 17x17 A/AS guide tube (GT) styles made available by EDF, Vandellós II and through FME tape reviews for the Duke Units of Catawba 1, Catawba 2 and McGuire 2 have indicated that guide card wear may be accelerated by use of ion nitride RCCAs as compared to chrome plated or stainless steel RCCAs
- Westinghouse issued a Part 21 Notification for those plants with the biggest concern for accelerated wear in November 2016 (17x17A/AS GT design plants)
- Westinghouse issued NSAL-17-1 “Guide Tube Guide Card Wear Attributed to Ion Nitride Rod Cluster Control Assembly” in late January 2017 to the affected plants
- The guidance in WCAP-17451-P, Rev 1 will need to be updated for the affected plants to account for wear acceleration from use of ion nitride RCCAs



Guide Card Wear Activities – PWROG MSC (5/5)

- MRP-2017-008 issued February 2017, “Survey Request of US PWR Inspection Plans for GT Guide Card Examination Timing, in response to Westinghouse NSAL-17-1”
- Evaluating the need for interim guidance based on the latest inspection results
- Additional work proposed to update PWROG report, WCAP-17451-P, Rev. 1
  - The revised report will accomplish the following for plants that have switched between ion nitride and chrome plated/304 SS RCCAs:
    - Updated methodology for using the operational time extension curves
    - Updated baseline inspection schedule for plants that have 17x17 A/AS/AXLR GTs and ion nitride RCCAs
  - The revised report will accomplish the following for all the plants:
    - Determination of minimum number of GTs required to be inspected during baseline inspection
    - Quantitative criteria for determining the appropriate alignment case for the operational time extension curves
    - Updated NEI-03-08 guidance contained in WCAP-17451-P, Rev. 1

Questions?

The Materials Committee is established to provide a forum for the identification and resolution of materials issues including their development, modification and implementation to enhance the safe, efficient operation of PWR plants.

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