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Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Startup Testing

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Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Startup Testing

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General Comment

Comment 1: Page 9, Section C.1.2, Limited Prototype
This paragraph did not address the situation if only one or two components change and the rest of the components remain the same as the prototype. Normally, the overall flow condition may not change. However, for the one or two components that have the design change, detailed analyses will need to be performed. The changes may have significant effect on these one or two components but not on the others. Will the entire reactor internal assembly be classified as non-prototype because it cannot be demonstrated that there is no effect on all components?

Comment 2: Page 11, Section C.2, 2nd Paragraph
I am using this paragraph as an example. At many palaces, specific requirements for EPU condition are prescribed. I'd suggest taking these specific requirements out of the general requirements and putting them together as a dedicated section for EPU. It will make the RG much easier to follow.

Comment 3: Page 12, Section C.2.1 (b)
The meaning of the statement "...under flow conditions up to and including the full operating power level..." is not clear and may not be correct. It may imply only forcing functions at less or equal to 100% flow need to be evaluated. As stated at other sections, all test, transient and steady state conditions need to be evaluated.

E-RIDS = ADM-03
Add = T. Scarbrough (tgs)

Susan Bellier Complete
Memphis = ADM-013

Comment 4: Page 22, Section C.2.1.3, 4th Paragraph
I am using this paragraph as an example. At many palaces, addressing bias and uncertainty is required. Even though determining the uncertainty of the experimentally collected data can be done, performing rigorous statistical analysis for the theoretically derived forcing function and the finite element analysis uncertainties and the propagation of the variable uncertainties can be very difficult and does not add value to the program. Most of the uncertainties during the analysis are addressed by using conservative assumptions. The RG shall be clearer on what specific uncertainties shall be addressed and how they should be addressed. Add a summary section to the RG for bias and uncertainty will be beneficial. As a minimum, specify how NRC wants the bias and uncertainty to be presented in the report.

Comment 5: Page 22, Section C.2.1.3, 6th Paragraph
The statement "all uncertainty and bias associate with natural frequencies is eliminated with this approach" is not correct. The uncertainty and bias associate with natural frequencies is not eliminated with this approach. Actually, it creates a positive bias by taking this conservative assumption.

Comment 6: Page 26, 2nd and 3rd Paragraphs
I am using these paragraphs as an example. Throughout the RG, the term "peak stress" has been misused to refer to "total stress". For example, "...is multiplied by a factor of 4, to obtain the peak stress..." shall be "to obtain the total stress". "...producing a peak stress range equal to 2 times the calculated peak stress..." shall be "producing a total stress range equal to 2 times the calculated total stress". Please refer to NG-3213.10 and NG-3213.13 for the definitions of peak stress and total stress.

Comment 7: Page 33, Section C.2.2.3 (e)
This requirement is very difficult to implement and not practical. First, regarding "dummy assemblies that provide equivalent dynamic mass and flow characteristics", while producing equivalent flow characteristics is completely necessary and can be achieved by installing flow restrictors, creating equivalent dynamic mass would require massive structures and increase the construction risk. I do not think it was ever been implemented during CVAP. Second, this paragraph does allow conducting the test without the dummy fuel if it justified that such condition will yield conservative results. However, the conservative results may not always be achieved without the fuel due to that many factors affect the final response such as the flow rate, the structural frequency and the temperature. Higher flow rate or lower temperature may not lead to conservative stresses due to the structural frequency aspect of the analysis. As the paragraph currently written, one would have to install dummy fuels which cycles back to the first problem. In addition, some modification to the internals may be needed in order to route the wires out. I think as long as (1) the internals without the fuel is analyzed, tested and inspected during the CVAP test; (2) reconciliation and validation of the analysis approach (both forcing function and stress) is performed based on the test result; (3) the same validated approach is used to analyze the internals with fuel; the stress results for the internals with fuel shall be valid.