Response to Public Comments on Draft Regulatory Guide (DG)-1323
Comprehensive Vibration Assessment Program
For Reactor Internals During Preoperational
And Startup Testing
Proposed Revision 4 of Regulatory Guide (RG) 1.20

On July 2, 2015, the NRC published a notice in the *Federal Register* (80 FR 38239) that Draft Regulatory Guide, DG-1323 (Proposed Revision 4 of RG 1.20), was available for public comment. The Public Comment period ended on August 31, 2015. The NRC received comments from the organizations listed below. The NRC has combined the comments and NRC staff responses in the following table.

Comments were received from the following:

Robert Theuret
Westinghouse Electric Company (WEC)
ADAMS Accession No. ML15292A220

Jianfeng Yang
ADAMS Accession No. ML15292A305

Patricia Campbell
GE Hitachi Nuclear Energy (GEH)
ADAMS Accession No. ML15292A305

Commenter	Section of DG-1323	Specific Comments	NRC Resolution
Robert Theuret (WEC 1)	General	Organization of the document is confusing. For example, there are many instances where a paragraph with general applicability includes statements specific to BWR steam dryers. Recommend reorganizing into separate sections for (1) PWRs, (2) BWRs, and (3) Small Modular Reactors.	The NRC staff agrees in part with the comment and organized the guidance specific to the steam dryer in new Appendix A to the regulatory guide.The staff provided additional information for the application of the regulatory guide to other reactor types and components in Section B, Discussion.

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Robert Theuret (WEC 2)	General	Recommend organizing the document starting with the format from Rev. 2 of the Reg. Guide, and adding new information in appendices or sub-paragraphs. In particular, background and anecdotal information should be clearly identified as such, and separated from the actual regulatory guidance.	The NRC agrees with the comment in part. The document was revised to more clearly identify background information and examples from regulatory requirements, including preparing a new Appendix A for specific steam dryer guidance. However, the document has not been completely reorganized as the staff believes including the new information and lessons learned as examples within the regulatory guidance is helpful to future applicants.
Robert Theuret (WEC 3)	General	Overall readability of, and citations within, the document would be improved if subheadings were numbered.	The NRC staff agrees with the comment and provided subheading numbers.
Robert Theuret (WEC 4)	General	The document includes a significant amount of detailed information that is not strictly regulatory guidance. Consider publishing these details and lessons-learned in alternate documentation (i.e., IAEA FSI guidelines, ASME Section III Appendix N, etc.), or perhaps in a separate appendix to the Reg. Guide.	The NRC staff disagrees with the comment and determined that it was impractical to address the comment. The staff has provided the detailed information and lessons learned to serve as helpful examples to future applicants. Issuing this information separately would unnecessarily complicate use of this guide, and may be missed or overlooked by future applicants.
Robert Theuret (WEC 5)	General	The document includes many details, such as specific frequency ranges, damping values, fillet weld analysis methods, etc., which are not generically applicable. These details should be made more general to "consider" appropriate frequency ranges, damping values, stress analysis methods, etc. Also, the document should not conflict with ASME Section III requirements for stress evaluations.	The NRC staff agrees with the comment. The document was revised to clarify that much of the details serve as examples to help guide future applicants. The document is not intended to conflict with ASME BPV Code Section III requirements for stress evaluations. Certain added information is intended to provide guidance for conducting these stress evaluations.

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Robert Theuret (WEC 6)	General	It is often unclear what text is background information vs. expectations for a predictive analysis, measurement program, or inspection program. Please rework the document to clearly define the regulatory expectations for a CVAP separately from background or lessons- learned information.	The NRC staff agrees with the comment. The regulatory guide was revised to better distinguish background information from regulatory expectations. The following has also been clarified in the "Background" section: "The expanded guidance in Revision 4 is based in part on lessons learned from the review of recent new plant applications, EPU applications, and BWR steam dryer operating experience. Much of the revised guidance uses steam dryer lessons learned as examples (see Appendix A to this RG). Although the examples are specific to steam dryers, the generic guidance is applicable to all reactor internals."
Robert Theuret (WEC 7)	General	Much of the guidance in the text is not tied to an FIV excitation mechanism, i.e., the organization is not phenomenological. Recommend reorganizing the document to first identify the FIV mechanisms and then, for a given mechanism (for a given type of reactor), provide the appropriate regulatory guidance.	The NRC staff disagrees with the comment and determined that it was impractical to incorporate the comment. The regulatory guide is meant to provide general guidance, not be a specific guide for each potential reactor type, reactor internal, and excitation mechanism.
Robert Theuret (WEC 8)	General	There are several instances throughout the document where terms such as "power ascen[s]ion" and "power level" are used (e.g., Section C.2.1.2, pg 18; C.2.1.3, pg 24 & 26; C.2.2.3.b; C.2.2.3.c; C.2.5.c). These terms imply that the associated discussion is only applicable to BWRs, since CVAP testing with reactor power is unique to BWRs. If the discussion is intended to be specific to BWRs, this should be stated explicitly. If the discussion is intended to be generic, it should be reworded accordingly (e.g., FIV loads on PWR internals are a function of flow rate, which is not dependent on power level).	The NRC staff agrees with the comment and revised the regulatory guide to clarify that provisions are specific to steam dryers or provided as examples.

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Robert Theuret (WEC 9)	Background	Page 5: Define the term "secondary welds" in the BWR steam dryers.	The NRC staff agrees with the comment and deleted the sentence (The applicant may propose relaxed weld quality factors for secondary welds in BWR steam dryers where justified.), to avoid confusion. Applicants are always free to propose different approaches, if technically justified.
Robert Theuret (WEC 10)	C.1.4	Define a "high margin of safety."	The NRC staff agrees with the comment. An example of what the staff considers to be a high margin of safety was included.
Robert Theuret (WEC 11)	C.2.a	Provide guidance on the approach to be utilized to determine the hydrodynamic loading on the steam dryer due to "boiling water rumbling."	The NRC staff agrees with the comment. The sentence was modified to clarify the boiling water sources, and include other internal dynamic forces which are difficult to quantify. Additional guidance for difficult-to-quantify internal forces is provided in Section C.2.1.3, "Computing and Benchmarking Structural and Acoustic Operational Response," which advocates using end-to-end benchmarking of on-structure measurements so that bias errors can be used to account for any unaccounted sources.
Robert Theuret (WEC 12)	C.2.1.1	Specifying 2.5% frequency increments is unnecessarily specific. Consider removing 2.5% frequency increment guidance.	The NRC staff agrees with the comment regarding specificity of expectations. The 2.5% frequency increment comment is a helpful example of what was accepted in the past. The sentence was modified to explain this is only an example.
Robert Theuret (WEC 13)	C.2.1.1	Stress concentration factors (SCFs) should not be used to account for errors in a finite element model; rather SCFs are employed to account for geometric discontinuities or other peak stress effects that cannot be effectively modeled.	The NRC staff agrees, and deleted the following sentences: "In many cases, bias errors in numerical models (such as for stress) are associated with insufficient mesh refinement of stress concentration regions and improper modeling of structural joints. These errors may be accounted for with stress concentration factors (SCFs)."

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Robert Theuret (WEC 14)	C.2.1.1	The last paragraph of this section appears to be intended to cover all designs, but may not be generally true. This should be reworded to indicate that "ill-defined boundary conditions" should be evaluated where they have a significant impact on the response of the component. In some case, test data shows that installation/assembly does not affect the frequency response of the component.	The NRC staff agrees with the comment. The sentence was modified to address the comment. However, the modification calls for assessment of boundary condition variability when that variability leads to non-negligible response differences, not only "significant" response differences.
Robert Theuret (WEC 15)	C.2.1.2	Add flexibility to utilize only on-dryer strain gauges for the end-to-end benchmarking. Pressure transducers are supplemental and can be utilized to determine the load definition but are not required.	The NRC staff agrees with the comment and revised Section C.2.1.2 to clarify the option to use pressure instruments to measure and confirm pressure loading and strain gauges to confirm end-to-end benchmarking calculations.
Robert Theuret (WEC 16)	C.2.1.2	This section is very detailed regarding acoustics but doesn't cover other common topics like fluid-elastic instability (FEI) and vortex shedding lock-in (VSLI). Further, this level of detail would be more appropriately included in ASME Section III, Appendix N.	The NRC staff agrees with the comment in part, but no changes to the regulatory guide are warranted. The ASME BPV Code Section III, Appendix N discusses common excitation mechanisms (such as FEI & VSLI) in detail, but does not provide specific provisions for acoustic excitation which has been observed in recent extended power uprate (EPU) implementations in operating BWRs. For example, acoustic resonances in the standpipes of the safety relief valves in Quad Cities Unit 2 caused fatigue damage to the steam dryer. Revision 4 of RG 1.20 includes the lessons learned from previous EPU implementations and, in particular, the main issues that should be considered by applicants when assessing acoustic loading on steam dryers. The regulatory guide did not need to be revised to address this comment. In addition, the NRC staff continue to participate in consensus standards activities associated with potential revisions to Appendix N.

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Robert Theuret (WEC 17)	C.2.1.2	Paragraph "g": Reword to clarify that evaluation of narrowband response is important for certain situations, but not all. In some cases, broadband (total RMS) behavior with respect to flow is more relevant to the component response than individual frequency responses.	The NRC staff disagrees with the comment. Section C.2.1.2, Subheading "Scale Model Testing," item "g" starts with the statement "When evaluating the growth rates of resonance peaks as a function of power level". Therefore, the paragraph addresses the situation when the growth rate of a resonance peak is being evaluated, irrespective of the nature of the excitation source causing it (i.e., whether the excitation source is of a narrow or broadbanded nature). In either case, the growth rate of the resonance peak should be evaluated as described in paragraph "g."
Robert Theuret (WEC 18)	C.2.1.2	Paragraph "j": Reword to not require plant-specific data to demonstrate acceptability of a scale model test. Some scale model tests may be of unique configurations for which there is no comparable plant.	The NRC staff disagrees with the removal of provisions for plant-specific data, but Paragraph "j"(renumbered as Paragraph "k" in RG 1.20 Rev. 4) was expanded to further emphasize the need to demonstrate acceptability of scale model test data.
Robert Theuret (WEC 19)	C.2.1.2	Paragraph "b": Reword to replace "including proper definitions and representations of the smallest flow areas" with more general guidance to appropriately consider the effect of small flow passages. Rephrase the statement to provide general guidance to use sound judgment and provide validation where necessary in CFD [computational fluid dynamics] modeling.	The NRC staff agrees in part with the comment and therefore replaced "the smallest flow areas" with "small flow passages." No changes, however, were made regarding CFD validation because this issue is addressed in Paragraph "a."
Robert Theuret (WEC 20)	C.2.1.2	Paragraph "c": The term "local velocity" is ambiguous, and could be misinterpreted. Further, depending on circumstances, higher local velocities may not result in more limiting flow-induced loads. Recommend rewording the guidance to ensure effects such as high local velocities are appropriately considered.	The NRC staff agrees in part with the comment and replaced "the maximum possible flow velocity" with "high local velocities." No other changes however were made since Paragraph "c" does not state that more limiting flow-induced loads result from higher local velocities. Instead, it states that high local flow velocities need to be taken into account.

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Robert Theuret (WEC 21)	C.2.1.3	Fourth paragraph, last sentence: Replace with "For vibration analyses governed by a response at a specific frequency, frequency-dependent bias errors and uncertainties may need to be determined." Requiring frequency-dependent bias and uncertainty quantification in every situation is not appropriate.	The NRC staff agrees with the comment and revised the regulatory guide to allow options for RMS or peak value bias errors or uncertainties in cases where a single frequency dominates the response.
Robert Theuret (WEC 22)	C.2.1.3	Fifth paragraph: Please define what is meant by a cumulative stress spectrum plot. Is the last sentence in this paragraph asking for an RMS stress to be provided? Are static equivalents still acceptable for simple structures? Consider deleting this paragraph; as-written, the regulatory guidance provided by this paragraph is unnecessary and unclear.	The NRC staff agrees in part with the comment and provided a definition of cumulative stress spectrum plots and guidance regarding situations when cumulative stress spectrum plots should be used. The guidance on the cumulative stress spectrum plot was not deleted as it provides useful information for applicants.
Robert Theuret (WEC 23)	C.2.1.3	Eighth paragraph: This paragraph implies that 1% damping is generically endorsed by the NRC. However, damping ratios for certain structures/modes could be than 1%. Suggest rewording to specify the basis for the reference damping ratio (1% or otherwise).	The NRC staff agrees with the comment. The regulatory guide allows for higher damping where justified. This allowance is repeated in the last sentence in Section C.2.1.3.
Robert Theuret (WEC 24)	C.2.1.3	First paragraph: Modify the requirement to "validate the simulation of intermediate quantities, such as loads…." to reflect that the load measurement/prediction comparisons are supplemental and are not required.	The NRC staff agrees with the comments and modified the sentence to address the comment.
Robert Theuret (WEC 25)	C.2.1.3	Second paragraph: This paragraph states the standard practice is to provide 2 sigma uncertainties. Does this imply that 2 sigma stress results are required as well (this would mean using an RMS to Peak factor of less than 3-sigma)? This would impact pending revisions to ASME Section III Appendix N.	On October 13, 2015, the NRC staff and consultants held a clarification conference call with the commenter to understand the basis for 3 standard deviations and the relationship to ASME BPV Code Section III non-mandatory Appendix N. The commenter clarified that standard industry practice is to use 3 standard deviations or higher to convert root-mean-square (RMS) stress to peak stress to obtain a 99.7 percent confidence level. However, DG-1323 suggests

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			using 2 standard deviations, which is lower than the industry standard. The NRC staff clarified that the statement in DG-1323 is with regard to benchmarking the simulation results with measured data. The calculated responses should include bias errors and uncertainties to bound 95 percent of all measured data. This statement in DG-1323 regarding 2 standard deviations is not intended for converting RMS to peak stress. In response to a staff inquiry, the commenter retracted the following sentence from the comment: "This would impact pending revisions to ASME Section III Appendix N." Below is a list of attendees at the October 13, 2015 conference call: Yuken Wong (NRC) Richard Morante (NRC consultant) Steve Hambric (NRC consultant) Greg Banyay (Westinghouse) Brad Maurer (Westinghouse) Greg Meyer (Westinghouse) Rob Theuret (Westinghouse) Rick Vollmer (Westinghouse) Adam Walker (Westinghouse) The NRC staff agrees that the original wording could have been confusing. The two-sigma (95% confidence) guidance for benchmarking, however, does not conflict with ASME BPV Code Section III Appendix N-1722.2 guidance on combining uncorrelated dynamic responses.

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			The approach outlined in RG 1.20 provides confidence that predictive methods bound 95% of benchmarking locations, which is unrelated to combining uncorrelated dynamic responses at a particular location. Also, the guidance is unrelated to final stress estimates based on the square root of the sum of the squares of peak modal responses described in Section N-1223.1 To help clarify this topic, the NRC removed the clause 'Standard practice is to use…' and reworded the paragraph.
Robert Theuret (WEC 26)	C.2.1.3	First paragraph: This paragraph (and paragraph "c" 3rd sub-paragraph) implies a factor of safety is required in the fatigue analysis, which is then removed after adjustment of the analysis based on power ascension test data. This appears to be applicable to BWRs only, but the first sentence implies this is expected for PWRs also. Please clarify the guidance in this section.	The NRC staff agrees with the comment, and moved the discussion of design margin to the specific steam dyer guidance in Appendix A.
Robert Theuret (WEC 27)	C.2.1.3	Paragraph "a" (1st sub-paragraph) states that "widely-used" software must be used. This is highly subjective. Suggest replacing "widely- used, well-verified" with "sufficiently validated and verified."	The NRC staff agrees with the comment, and changed wording to "sufficiently validated and verified."
Robert Theuret (WEC 28)	C.2.1.3	Paragraph "a" (3rd sub-paragraph) states "...the intended use of the stress analysis output." Some finite element models do not supply a stress output; in some cases a displacement or force output from one model is used as a boundary condition in a (subsequent) more detailed model for calculating stress. Suggest removing "stress" from the first sentence.	The NRC staff agrees with the comment, and deleted the word "stress" from the first sentence.

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Robert Theuret (WEC 29)	C.2.1.3	Paragraph "a" (4th sub-paragraph) states the time increment should be no larger than 0.125 times the shortest period of interest, while paragraph "c" states the time increment should be no larger than 0.25 times the shortest period of interest. This is conflicting guidance. Consider generalizing this guidance to ensure a sufficiently converged solution, for example, confirming that time steps are sufficiently small in a time-history analysis.	The NRC staff agrees that the two values cited represent different time intervals, which could be confusing. Paragraph "a" (4th sub-paragraph) specifies 0.125 for the numerical solution time step. Paragraph "c" specifies 0.25 for inputting the time-varying forcing function. To avoid future misunderstandings, the NRC staff revised the document to use a single value for both time increments.
Robert Theuret (WEC 30)	C.2.1.3	Paragraph "a" (4th sub-paragraph) states that the lower bound "anchor" frequency for Rayleigh damping should be 0Hz. This is not appropriate for generic guidance, i.e., the lower anchor frequency could be appropriately greater than zero.	The NRC staff agrees with the comment and revised the text to address this comment.
Robert Theuret (WEC 31)	C.2.1.3	Paragraph "a" (5th sub-paragraph): Modify the damping value restriction for steam dryer to "Higher damping values greater than 1.0 for BWR steam dryers can be utilized providing sufficient justification/documentation is provided." This is consistent with RG 1.20 Rev. 3 guidance.	The NRC staff agrees with the comment. See the response to comment WEC 23.
Robert Theuret (WEC 32)	C.2.1.3	Paragraph "c": 1) Does this approach only apply to double fillet welds? 2) Does this override the ASME Code requirement of an FRSF of 4 for fillet welds (under Method 2)? This seems out of place; suggest removing this paragraph from the Reg. Guide and publishing in alternate documentation. Then state more generally that fatigue analysis methods must be sufficiently documented and justified, etc.	The NRC staff agrees with the comment and provided clarification in Paragraph "c" accordingly.
.Robert Theuret (WEC 33)	C.2.1.3	Paragraph "c": Method 1 – Is this saying the FRSF of 4 accounts for any local stresses in the weld that are not accounted for in the plate stresses?	The NRC staff agrees with the comment and provided clarification in Paragraph "c" accordingly.

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Robert Theuret (WEC 34)	C.2.1.3	Paragraph "c": Method 2 – Is there justification (e.g., publication or test data) that supports reducing the weld FRSF from 4 to 3? This is not consistent with ASME Code, Section III, subsection NG.	The NRC staff agrees with the comment and provided clarification in Paragraph "c" accordingly.
Robert Theuret (WEC 35)	C.2.1.3	Paragraph "c": There are other weld types that are not included in this discussion. Also, the additional safety factor of 2 for the design phase should be removed. ASME Code allowable/guidance should be allowed to be utilized for the design phase.	The NRC staff agrees with the comment and provided clarification in Paragraph "c" accordingly.
Robert Theuret (WEC 36)	C.2.2	First paragraph: Quantify the statement "less margin of safety against such effects."	The NRC staff disagrees with the comment; however, to prevent unnecessary confusion, the NRC staff removed the statement regarding instrumentation provisions on components with less margin of safety.
Robert Theuret (WEC 37)	C.2.2	First paragraph: Revise "Instrumentation will be needed for new components that have no operating experience" to add allowance for justification for no instrumentation for this new component.	The NRC staff agrees with the comment and revised the statement to enable flexibility for the instrumentation of new components that have no operating experience.
Robert Theuret (WEC 38)	C.2.2.2	Consider removing this list from the Reg. Guide and publishing as best-practice guidance in alternate documentation.	The NRC staff disagrees with the comment. A focus of the current regulatory guide revision is to disseminate lessons learned based on ten years of recent in-plant measurements, primarily on BWR steam dryers. The NRC staff considers this list to be valuable regulatory guidance on acceptable approaches to future in-plant measurement programs. This section is renumbered as C.2.2.1 in RG 1.20, Rev. 4.
Robert Theuret (WEC 39)	C.2.2.2	Paragraph "e": Reword to say "…result in erroneous measurements of vibration rather than surface pressure."	The NRC staff agrees with the comment and revised the sentence to address the comment.

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Robert Theuret (WEC 40)	C.2.2.3	Paragraph "b": The term "power ascension" is specific to BWRs. Some discussions within this paragraph may apply to PWRs (e.g., flow rate variation), but the paragraph mixes things that are specific to BWRs vs. general.	The NRC staff agrees with the comment and revised the language to include preoperational testing. This section is renumbered as C.2.2.2 in RG 1.20, Rev. 4.
Robert Theuret (WEC 41)	C.2.2.3	Paragraph "c": Define "permissible deviations" with respect to acceptance criteria (max allowable response). Also, the first mention of "acceptance criteria" occurs in the vibration measurement program (paragraph 2.2) and not the vibration analysis program (paragraph 2.1) – is that intentional?	The NRC staff agrees with the comment. Paragraph c of section C.2.2.2 was modified to address the comments, removing the term "permissible deviations." Also, the subheading ("Operational Vibration and Stress Limits") in Section 2.1.3 has been renamed and the section below slightly revised to use the term "acceptance criteria."
Robert Theuret (WEC 42)	C.2.2.3	Paragraph "e": This paragraph only discusses fuel assemblies, but should be generalized to address all significant differences between the CVAP test configuration and conditions and normal operating configuration and conditions.	The NRC staff agrees with the comment. This paragraph was expanded to address test configuration and conditions.
Robert Theuret (WEC 43)	C.4.2	First paragraph: Remove "other than steam dryers."	The NRC staff disagrees with the comment. This paragraph is specific to reactor internals other than the steam dryer. As stated in Paragraph C.4, the applicant/licensee for a BWR nuclear power plant should provide detailed justification if it proposes to classify a BWR steam dryer as a "non-prototype" reactor internal component.
Jianfeng Yang (J1)	Page 9 Section C.1.2	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?	On October 21, 2015, the NRC staff and consultants held a clarification conference call with the commenter to understand the situation discussed in the comment for the limited prototype classification. The commenter clarified that RG 1.20 should allow the reactor internals to be classified as a limited prototype if one or two components changed from the prototype reactor internals and if analysis shows that the overall

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			effect on the reactor internals is insignificant, even though the effect on the changed components is significant. The commenter also corrected the last sentence of the comments as follows: "Will the entire reactor internal assembly be classified as prototype because it cannot be demonstrated that there is no effect on all components?" Below is a list of attendees at the October 21, 2015 conference call: Yuken Wong (NRC) Richard Morante (NRC consultant) Steve Hambric (NRC consultant) Jianfeng Yang The NRC staff agrees with the comment. The section on prototypes was rewritten to address the reviewer comments. The introduction to Section C.1 was expanded to clarify the differences between the full reactor internals (the entire assembly) and individual components. Additional revisions are made throughout the section to address these differences. Finally, a new Subsection 1.5, "Special Considerations for Replacement/Modification of Individual Reactor Internal Components," was added to address individual component replacement/modification.
Jianfeng Yang (J2)	Page 11 Section C.2 2nd paragraph	I am using this paragraph as an example. At many places, 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.	The NRC staff agrees with the comment and revised the regulatory guide to clearly identify provisions that are specific to BWR steam dryers in new Appendix A.

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Jianfeng Yang (J3)	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.	The NRC staff agrees with the comment. Section C.2.1 (b) was revised to address the comments. The introductory paragraph to C.2.1 already explains that all test, transient, and steady state conditions need to be evaluated, so any redundant language in Section C.2.1 (b) was removed.
Jianfeng Yang (J4)	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.	The NRC staff agrees with the comment. Paragraph 5 of the Background section in Section B (Discussion) already provides a general summary of acceptable methods for determining bias errors and uncertainties, along with the benefits of end-to-end benchmarking which can eliminate the need for cumbersome component-level benchmarking.(This paragraph is moved to Paragraph 7 in Section C.2 in RG 1.20, Rev. 4.) To further clarify the discussion, this section was revised to mention the acceptable use of conservative assumptions (provided they are substantiated). Paragraph 4 in Section C.2.1.3 was similarly revised.
Jianfeng Yang (J5)	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.	The NRC staff agrees with the comment. The statement, along with neighboring sentences, was modified to clarify the impact of aligning loading and resonance frequencies.

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Jianfeng Yang (J6)	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.	The NRC staff agrees with the comment and revised stress terminologies in the document as necessary to be consistent with the ASME BPV Code, Subsection NG terminologies.

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Jianfeng Yang (J7)	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.	The NRC staff agrees with the comment and revised the statement to allow testing without real or dummy fuel assemblies if it is justified by analytical or experimental means such that the test condition will yield reasonable results.

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Patricia Campbell (GEH 1)	Section B Background Page 3 and Section C.2 (c) Page 12	The draft guidance states "...studies of past failures in nuclear power plants have determined that the steam dryer in a BWR plant experienced fatigue failure caused by vibration transmission from the reactor pumps at the [vane pass frequency] VPF." This is misleading because the studies cited did not state that the cause of the dryer fatigue failure was due to the reactor pump VPF vibrations. The structural resonance shown in the RAI response was measured on the repaired panel that operated successfully for more than 20 years. The reactor pump VPF vibrations most likely contributed to the fatigue failure; however, it was not conclusively determined that the VPF vibrations were the sole cause of the failure. Fatigue failures have occurred at the same dryer location in other BWRs with both variable speed reactor recirculation pumps and constant speed reactor recirculation pumps. <u>Recommendation</u> Revise the statement to read "...studies of past failures in nuclear power plants have determined that vibration transmission from the reactor pumps at the VPF may have contributed to the fatigue failure of the steam dryer in a BWR plant."	The NRC staff agrees with the comment. The second paragraph in Section B and Section C.2 (c) as shown in DG-1323 were modified to address the comments. The updated sentences state that reactor recirculation pump VPF tones may have contributed to fatigue failure.

Commenter	Section of DG-1323	Specific Comments	NRC Resolution
Patricia Campbell (GEH 2)	Section C2.2.2(f) Page 30	The draft guidance states "All instrumentation wiring needs to be properly shielded and, if possible, routed through reactor penetrations that do not include electrical supply lines." This is incorrect. "Reactor penetrations" should be changed to "containment penetrations." <u>Recommendation</u> Revise the statement to read "All instrumentation wiring needs to be properly shielded and, if possible, routed through containment penetrations that do not include electrical supply lines."	The NRC staff agrees with the comment and revised the sentence as recommend.
Patricia Campbell (GEH 3)	Background	The draft guidance contains the sentence: This regulatory guide discusses activities separate from inservice inspection and inservice testing programs established in compliance with 10 CFR 50.55a, "Codes and Standards." What the purpose is of this statement? <u>Recommendation</u> Please Clarify.	The NRC staff agrees with the comment and removed the statement to avoid confusion.