

April 14, 1980

Mr. Karl Kniel, Chief
Core Performance Branch
Division of Systems Safety
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Reference: Letter: Karl Kniel to J. H. Taylor, dated February 29, 1980,
concerning Proposed Standard Review Plan Section 4.2, "Fuel
System Design," Revision 2, Draft 1.

Dear Mr. Kniel:

We have reviewed the Draft 1, of Proposed Revision 2 to Standard Review
Plan 4.2, transmitted by your letter. We have the following comments to offer.

Appendix A

B.3 Uncertainty Allowances

'a, "..., impact loads from the PWR LOCA analysis should be increased
(by about 30%) to account for a pressure pulse, which is associated with
steam flashing that affects only the PWR Fuel Assembly analysis."

Comment: The choice of a safety factor of 1.3 on fuel assembly lateral
impact load appears conservative for loads created by crossflow,
particularly when applied to peripheral fuel assemblies. The
1.3 appears to come from an EGG analysis (Reference 2) that came
up with a safety factor on one fuel assembly of 1.15. Two
assemblies colliding would give the 1.3 value. B&W believes that
determination of the final load factor should include assurance
of the technical rigor of the EG&G analysis and should include
verification that effects on other systems are negligible. It
would also seem prudent to determine the differences in behavior
at the core baffle interface and interior assemblies.

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- B.3 "Variations in resultant loads should be determined for $\pm 10\%$ variations in input amplitude and frequency....., the sensitivity analysis should be performed on a plant-to-plant basis until the reviewer is confident that further sensitivity analysis are unnecessary."

Comment: B&W has performed sensitivity studies to evaluate variations grid impact force for $\pm 10\%$ variations in grid plates input motion magnitude and frequency (Reference 1). It has been established that the spacer grid impact loads do not change much (less than 5%) with variations in the core plate frequency and magnitude.

In this study, the effects of the reactor system modeling uncertainties have been established.

It seems repetitive to perform the sensitivity studies for various reactor plant design. It is suggested that once the effects of the reactor internals modeling uncertainties are established, it should not be necessary to perform sensitivity studies on a plant-to-plant basis.

B.5 Combination of Loads

Loads on fuel assembly components should be calculated for each input ..., and the resulting loads should be added by the square-root-of-sum-of-squares (SRSS) method".

Comment: B&W does not believe loads can be combined by the square-root-of-sum-of squares (SRSS) method in the inelastic range as appears to be proposed. B&W thinks that a mechanistic approach to time phasing of the applied forces should be incorporated as an alternative to combining seismic and LOCA loadings in Standard Review Plan Section 4.2. Suggested additional wording would be as follows: Alternative methods of analysis such as time phasing or loadings to account for nonlinear material behavior may be used if justified and evaluated.

C.1 Determination of Strength

C.1 "..., the extra margin in P_{crit} for irradiated grids is thus assumed to offset the unknown deformation behavior of irradiated beyond P_{crit} "

Comment: This paragraph restricts allowable crushing loads to unirradiated yield strengths. This is too restrictive particularly for grids made of zircaloy which have low yield strengths at operating temperatures. The NRC should be requested to provide latitude for post-yield material behavior.

D.1 Acceptance Criteria

D.1 "Loads from the most severe LOCA that requires control rod insertion must be combined with the SSE loads and control rod insertability must be demonstrated for the combined load"

Comment: The second paragraph of Section D.1 of Appendix A implies that there should be two LOCA conditions that must be analyzed. (1) The worst case LOCA and (2) the most severe LOCA that requires control rod insertion. If free passage for control rod insertion is assured for the worst case LOCA and combined with SSE loads then it should not be required to perform a separate analysis for the most severe LOCA.

Value Impact Statement

III Value Assessment

"This appendix will (a) provide fixed criteria and suitable methods for full designs and vendors..."

Comment: B&W disagrees with this statement. The proposed revision is aimed at over simplifying the NRC review task by proposing in essence linear elastic methods (SRSS) and preyield acceptance criteria. This approach is noncompatible with the methods proposed in our submitted topical using nonlinear analysis technique and post yield acceptance criteria. The proposed SRP does not adequately take into account the necessity of using these methods on zircaloy grids.

Babcock & Wilcox
Mr. Karl Kniel

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IV B. Industry

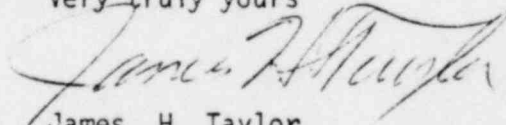
"There will be a small number of additional code runs required...
From preliminary information it appears that all current fuel designs
will meet the new criteria"

Comment: B&W disagrees with this statement. Our present practice is
to not to perform specific plant analysis as mentioned in
Section B.3. Instead loads are used which are large enough
to encompass all plants of a particular design. Therefore the
results if this SRP is accepted would be larger number of
additional computer runs, which we believe to be unnecessary.

If SRSS methods are used with preyield acceptance criteria,
B&W would not be able to show the present (and future) designs
without extensive reanalysis and testing.

If there are questions concerning these comments, please contact me.

Very truly yours



James H. Taylor
Manager, Licensing

JHT/fw

CC: R. B. Borsum B&W - Bethesda Office