

REQUEST FOR ADDITIONAL INFORMATION  
BY THE OFFICE OF NUCLEAR REACTOR REGULATION FOR  
WCAP-10216-P-A, REVISION 1A, ADDENDUM 1,  
“FQ SURVEILLANCE TECHNICAL SPECIFICATION: AXIAL OFFSET VALIDITY AND  
PART-POWER SURVEILLANCE GUIDANCE”  
WESTINGHOUSE ELECTRIC COMPANY  
PROJECT NO. 700

The staff request responses to the following questions in order to continue its review of WCAP-10216-P-A, Revision 1A, Addendum 1.

- 1) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 6, why is the  $1/P$  term limited to  $1/0.5$  for power levels below 50% of the rated thermal power?
- 2) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 8, how are the measured radial and axial components of the peaking factor that appear in equations 3.3 – 3.5 determined?
- 3) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 8 it states, “The ratio of measured to predicted steady state  $P(z)$  becomes a significant factor impacting the transient  $F_Q$  surveillance results when the measured target AO is different than the predicted target AO at the time of the surveillance. The parameter  $\Delta AO$  (or “Delta-AO”) is often used in describing such deviations, and is defined as follows for equilibrium surveillance conditions where the measured and predicted core power level and control rod insertion are consistent with one another:...” What is used to describe such deviations when the measured and predicted core power level and rod insertion are not consistent with one another? How does this other parameter fit into the  $F_Q$  surveillance?
- 4) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 9, what are the most significant approximations used in the nuclear models that would affect the  $W(z)$  functions, and how large could the discrepancies be?

ENCLOSURE 1

- 5) In WCAP-10216-P-A the variable P is defined as the fraction of rated thermal power at the time the surveillance measurement is taken. On WCAP-10216-P-A, Revision 1A, Addendum 1, page 10, it is indicated that the W(z) function is to be divided by the quantity 1/P. This is not currently part of WCAP-10216-P-A nor the Standard Technical Specifications in NUREG-1431, Revision 3.1, "Standard Technical Specifications Westinghouse Plants". Why is it being proposed here? To demonstrate the acceptability of higher peaking factors at reduced RTP WCAP-10216-P-A and the Standard Technical Specifications in NUREG-1431, currently stipulate that for part power surveillances the  $F_Q^{Limit}$  is to be divided by P. At 50% RTP this has the effect of doubling the the  $F_Q^{Limit}$ . Dividing W(z) by 1/P at 50% RTP would have the effect of cutting the W(z) function in half. Why is appropriate to cut the W(z) in half at the same time the  $F_Q^{Limit}$  is being doubled? Provide a detailed explanation.
- 6) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 10, what is the magnitude of the conservatism implied in the following statement "--- using unadjusted W(z) functions will result in conservative estimations of the minimum margin available to the  $F_Q(z)$  limit, when compared to performing the surveillance again with rigorously calculated W(z) functions"?
- 7) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 11 it states, "Required confirmation of the minimum transient  $F_Q^W(z)$  margin should be limited to surveillance powers greater than or equal to 50% RTP, since the AFD Technical Specification upon which the W(z) functions are based is not applicable below this power level." Since the  $F_Q$  surveillance is required at powers below 50% RTP, how is the surveillance to be conducted below 50% RTP? How is this requirement to be included in the technical specifications?
- 8) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 17, explain the "rebound effect" resulting from skewed axial burnup distributions from previous cycles, and how this leads to a positive  $\Delta AO$ ?
- 9) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 17, list the operating parameters that are varied, other than burnup, to produce the  $\Delta AO$  variations in the [ ] cases considered in the sensitivity study?
- 10) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 17, the sensitivity analysis discussed on page 17 refers to [ ] cases, in the explanation of the terms in Equation 3.1 (page 5) reference is made to "several thousand" cases in developing the numerator of W(z). Are these two numbers referring to the same problem? Is the statistical accuracy implied by using [ ] cases high enough to result in the required accuracy and confidence?
- 11) On WCAP-10216-P-A, Revision 1A Addendum 1 page 18, is the sensitivity analysis presented in section 4.2 limited to plants characterized by the description on page 18? Will it be necessary to repeat the study if new plants are operated?

- 12) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 19, there are only [ ] plant C, 10,000 MWD/T burnup points on table 4-1, and [ ] points plotted on Fig. 4-1b. What points (combination of plant type and burnup) are plotted on Fig. 4-1b?
- 13) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 19, how are the data points (top half of core, bottom half of core etc.) on Fig. 4-1b determined from the results shown in table 4-1?
- 14) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 19, discuss the proportionality between  $F_Q$  and initial disparity implied in the following statement. "It can be shown based on the data in this study that the maximum possible magnitude of the non-conservatism in the  $F_Q$  surveillance measurement due to  $\Delta AO$  in any particular case is proportional to [ ] due to this phenomenon".
- 15) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 21, are these criteria limited to those conditions and combinations covered by the [ ] combinations analyzed in section 4.2?
- 16) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 21 it states, "Therefore, as long as the bounds of the study are not exceeded, a [ ] allowance for FQ margin will bound any non-conservatism in the transient FQ surveillance measurements due to  $\Delta AO$  conditions in RAOC plants. With that in mind,..." Provide a list and description of the 'bounds of the study.'
- 17) On WCAP-10216-P-A, Revision 1A, Addendum 1, pages 22-23, are these guidelines dependent on the specifics of the [ ] conditions analyzed above in section 4.2?
- 18) On WCAP-10216-P-A, Revision 1A, Addendum 1, page 32, it is suggested that the "Steady State P(z) Ratio Method" not be applied to CIPS cores. Does this caution also apply to cores suffering from IFBA induced power shift, described in section 4.1?