

**Revised Response to Request for Additional Information (RAI) 52 to Support Review of
Topical Report WCAP-17483-P/WCAP-17483-NP, Revision 0, "Westinghouse
Methodology for Spent Fuel Pool and New Fuel Rack Criticality Safety Analyses"
(Non-Proprietary)**

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Question:

There may be a couple of problems with the data provided in Table 5-2 of WCAP-17483-P/WCAP-17483-NP, Revision 0. [

] This may indicate typographical errors or the use of non-uniform axial zones. The second issue is that the [

] These unexpected results may be an artifact of the assemblies around the profiled assembly or of use of part-length absorbers. The data should be checked to ensure the data is in the correct columns. If the data is correct, provide an explanation as to why the relative burnups for the ends of the fuel for the low-burnup, non-blanket profiles is so low.

Westinghouse Response:

When axial profile data are collected from core design calculations, relative burnup of each axial node in an axial profile is determined by dividing the nodal burnup by the assembly average burnup:

$$\text{Relative Burnup}_j = \frac{BU_j}{\overline{BU}}$$

where BU_j is the absolute burnup of the axial node j and \overline{BU} is the assembly average burnup. In nodal calculations, the average assembly burnup is calculated by weighting the burnup in each axial node by the node height and the node loading. If annular pellets are present in the blanket regions of a fuel assembly, the loading in the blanket region nodes will be different than the rest of the fuel rods. This will lead to relative burnup distributions not normalizing to 1.0 even if uniform axial meshes are used. These relative burnups (i.e., axial profile) are used in 2D lattice depletion calculations to deplete each axial node such that final isotopics for that node are at the correct burnup. Consequently, axial profiles presented in Table 5-2 of WCAP-17483-P/WCAP-17483-NP, Revision 0 are correct and need not add up to 24.0 when annular pellets are present in the blanket regions.

In response to the second issue: The data in Table 5-2 of WCAP-17483-P/WCAP-17483-NP, Revision 0, is correct. In this particular example, a bounding shape was determined for each of the three different fuel types: non-blanket fuel, natural blanket, and enriched blanket fuel used at different cycles of operation. [

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