ANS Issues a Response to an Inquiry on ANSI/ANS-5.1-2005/2014, "Decay Heat Power in Light Water Reactors."
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Inquiry Part 1:

Why are the results of the fission product decay heat power (*P'd*) between ANSI/ANS-5.1-2005 (withdrawn), "Decay Heat Power in Light Water Reactors," and ANSI/ANS-5.1-2014 (same title) different?

Response Part 1:

This question pertains to a standard that has been withdrawn. It refers to ANSI/ANS-5.1-2005 (withdrawn) not the current standard ANSI/ANS-5.1-2014. Implementation of the ANSI/ANS-5.1-2005 (withdrawn) could be impacted by round-off error. In the 2014 standard, although the basic data was not changed, the recommended implementation was revised to prevent this problem. The 2005 standard was found to be obsolete, and it was administratively withdrawn in 2014. The 2005 version of this standard is no longer maintained. The methods in ANSI/ANS-5.1-2005 (withdrawn) that are subject to potential round-off error are no longer the recommended approach. The round-off issue is discussed on p. 25 of ANSI/ANS-5.1-2014.

Inquiry Part 2:

Is the deviation of uncertainty equations of the standards different with the overall root-mean-square (RMS) equation? An earlier work[1)] had compared several uncertainty equations of the standard, ANSI/ANS-5.1-1994 (withdrawn), with similar RMS equation. Please confirm that equations (8) and (12) of ANSI/ANS-5.1-2014 don't use RMS equations.

Response Part 2:

This question appears to be limited to the RMS implementation of uncertainty. The RMS approach has never been adopted in the ANS decay heat standard (ANS-5.1) due to potential correlations between the decay heat terms. We can, therefore, confirm that equations (8) and (12) of ANSI/ANS-5.1-2014 do not use RMS equations. The RMS approach is similarly not used in International Organization of Standardization (ISO) standard ISO 10645:1992, "Nuclear Energy—Light Water Reactors—Calculation of the Decay Heat Power in Nuclear Fuels."

[1)] "Decay Heat Changes to 50.46 and Appendix K," Attachment 1, available at https://www.nrc.gov/docs/ML0217/ML021720702.pdf.