ANS Issues a Response to an Inquiry on ANSI/ANS- 19.6.1-2011, "Reload Startup Physics Tests for Pressurized Water Reactors," (revision of ANSI/ANS-19.6.1-2005)

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The ANS Standards Committee received an inquiry with multiple questions on ANSI/ANS-19.6.1-2011. The questions and responses are provided below (some editorial changes have been made for clarity):

Question #1:
Does the flux symmetry test mean power distribution comparison of each symmetric detector thimble location only, or does it include non-detector thimble located assembly? The latter is more reasonable for misloading.

Response to Question #1:
The flux symmetry test (FST) is meant to compare measured flux in symmetric thimble locations only. Please note that if a plant performs a normal full core power distribution test below 30 percent power, then it is not required to perform the FST. A fixed in-core detector system may have difficulty obtaining an accurate power distribution measurement below 30 percent power. The FST was included in the standard for plants with fixed in-cores to give an early indication of possible issues before a good flux map and power distribution can be performed, prior to reaching 30 percent power.

Question #2:
The Westinghouse-type nuclear design system is still on 7 percent flux symmetry mapping test. To apply new criteria, can the target power level be changed to around 30 percent? The xenon effect is very small and negligible.

Response to Question #2:
Yes, the standard allows the FST to be done up to 30 percent power but not higher. Usually, a Westinghouse-type plant performs a normal power distribution test before 30 percent power, which replaces the FST.

Question #3:
What is the specific reason for the criteria change for the flux symmetry test? It does not seem to be for safety. In my opinion, utilities prefer economy above all.

Response to Question #3:
In the original version of the standard, the suggested criteria included "or 0.1 RPD" to accommodate measurement uncertainties, which tended to be large on the periphery of the core at low power. In the years since the release of the original version, measurement systems have improved. It is the consensus of the working group that a difference of more than 10 percent in symmetric locations is unusual and suggests that something may be wrong, even if the locations are on the periphery.