

ANS Issues Clarification on ANSI/ANS-19.6.1-2005, "Reload Startup Physics Tests for Pressurized Water Reactors."

Inquiry:

I would like to get a clarification on the test method described in ANSI/ANS-19.6.1-2005 for the critical boron concentration (CBC) test measurement described in A.3.1. The initial conditions listed in A.3.1.1 allow the lead control rod group to be inserted 200 pcm¹ or 20% of the total worth. The test method directs you to measure or predict the worth of the inserted rods. I have two questions concerning this test that are not clear in the description:

1. For the 200 pcm or 20% of the total worth, should the rods be at the minimum of these two values or are they allowed to be at the maximum of the two values?

2. a) For calculation of the CBC value, can the lead group remain stationary at the position established in the initial conditions, and the predicted worth of the bank used in the CBC calculation? b) If not, and the bank is unable to be fully withdrawn do to start up rate limitations, how much of its predicted reactivity worth can remain inserted and be used in the CBC calculation?

Response to Question #1:

First, be aware that the Appendix is not part of the standard. The Appendix is provided only as a guideline on how to implement the requirements of the standard. The "200 pcm or 20% of the total worth" is a limit on how much the lead control group can be inserted to obtain a valid result. The purpose of this test is to obtain the critical boron concentration at "all rods out" condition. To provide some flexibility, however, we have allowed the lead control group to be inserted "a little." So the lead control group is allowed to be somewhere between completely withdrawn or inserted "a little" but not more than 200 pcm or 20% of the total worth, whichever is smaller. Having the lead control group inserted more than this introduces unnecessary uncertainties in the measurement of the "all rods out" boron concentration.

Response to Question #2 a):

Yes, that is allowed as long as the lead group is not inserted more than 200 pcm or 20% of the total group worth. See response to question #1 above.

Response to Question #2 b):

The bank does not need to be "fully withdrawn." It only needs to be withdrawn such that not more than 200 pcm or 20% of the total group worth is inserted.

Be aware that a utility can always request an exception to the standard as long as they provide sufficient justification for such exception to the regulator.

¹ pcm: percent milli-rho