PDR

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August 8, 1996

Ms. Carolyn Fairbanks
US Nuclear Regulatory Commission
M/S T-10E10
Washington, D.C. 20555

Dear Ms. Fairbanks:

I understand that you have taken over responsibility for Draft Regulatory Guide DG-1053 "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence" from Al Taboada. I had numerous comments on the previous version (DG-1025) which were submitted as part of the comments from the Nuclear Energy Institute (NEI). Since I am no longer associated with the NEI, I am submitting my comments to you directly.

I was pleased to see that some of my earlier comments have been reflected in changes to the draft guide. However, I still have some problems with the new version. In particular, I think the guide needs to more specifically address the benchmarking requirements by connecting the benchmark to be used with the specific applications. In addition, I find that I do not understand the reasoning behind some of the specific guide sections. The attached comments and questions detail the specific items I think should be addressed. Some of these questions could perhaps be answered at the upcoming meeting on September 18.

In the version of DG-1053 that I received, the figures were missing. In addition, there was talk at previous meetings that a sample analysis would be done to illustrate the requirements for meeting the draft guide. If this is made available, it would possibly answer some of my questions.

I would appreciate it if you would forward my comments to the appropriate parties for review. Also I would like to be informed on the schedule and agenda for the meeting to discuss the guide and would like to have any future revisions sent to me directly.

Sincerely,

E. P. Lippincott

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Questions/Comments on DG-1053 (June 1996 Version)

E. P. Lippincott

August 1996

1. *Page 3, lines 22-24.*
Calculation-to-Measurement comparisons do identify biases but can only confirm that uncertainty estimates are reasonable. The statement here that "comparisons ... provide reliable estimates of the fluence uncertainties" seems to contradict Section 1.4.3.

2. *Page 4, lines 2-5.*
Could this statement be clarified? An "'absolute' fluence calculation ... rather than a simple spatial extrapolation" seems to contradict the statement in 1.4.3 "the bias should be applied as a multiplicative correction to the calculated fluence to determine the best-estimate value". In cases where the measurements are regarded as much more accurate than the calculation, this results in a simple spatial extrapolation.

3. *Pages 15-17, Section 1.4.1.*
The analytic uncertainty analysis can be fairly simple or require many man-months of effort. It seems from the description here, and from the calculation cost estimates, that a limited study of the analytic uncertainty is sufficient. However, it would be advantageous if previous documented work (such as References 3 and 4) would be deemed adequate for estimates of uncertainty in similar applications when these estimates are significantly less than 20%. Moreover, use of methods that meet the guide requirements for mesh density, angular expansion, etc., could be stated to contribute less than xx% uncertainty to the fluence calculation in the vessel in the beltline region. This would save the calculator considerable time investigating the effects of changing all these parameters. Note that if the geometry is very well known, the uncertainties from this source may not dominate, and to get an accurate uncertainty estimate may involve consideration of many small contributors. Use of an upper limit analytic uncertainty in these cases would greatly simplify the analysis needed while still resulting in an error considerably below 20%.

4. *Pages 17-18, Section 1.4.2*
The specification of the requirements for benchmarking is confusing. Line 10 says "must", while line 11 says "should". Section 1.4.2.1 says "should" while sections 1.4.2.2 and 1.4.2.3 use "may". It would be helpful to specifically identify the minimum requirements. In addition, while the calculation of the calculational benchmarks may be useful for methods qualification, they will only accomplish this purpose if a sufficient assortment are calculated. Usually, this calculation may not be necessary for methods meeting the standards of this guide and using cross section sets that are already accepted. If left in the guide, it is suggested that the calculational benchmark part be voluntary.

5. *Page 18, lines 14-18.*
What is the basis for the statement about large uncertainties in typical measurements? In fact, typical capsule and cavity measurements consist of a number of dosimeters to provide reduncancy and excellent consistency is achieved. For example, in WCAP-14044*, analyses of

131 capsules from Westinghouse plants indicate consistencies for similar capsules as low as 5% (1σ). For comparisons of capsules within the same plant, only a few capsules show deviations from the mean of more than 10%, and none more than 15%. These results indicate that single capsule measurements are very unlikely to be as much as 20% from the value that would be obtained from a large number of measurements. Similar consistent results have been obtained for cavity dosimetry measurements and for plants from other vendors.

6. *Page 19, lines 22-24.*
What is meant by this statement?

* E.P. Lippincott, "Westinghouse Surveillance Capsule Neutron Fluence Reevaluation", WCAP-14044, Westinghouse Electric Corp., April 1994.