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Submitter Information

Name: Sasha Philips
Organization: Canberra Industries, Inc.

General Comment

See attached file(s)

Attachments

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Add = T. Powell (TAP)
M. Case (MJC)

Comments on DRAFT REGULATORY GUIDE DG-3030
S. Philips & S. Kane Smith, Canberra Industries Inc.
September 29, 2010.

Comments on Section C, Item 2b:

We recognize the importance of the detection of *both* neutron & gamma radiation in criticality accident alarm systems, since the detection of criticality events is dependent on both the characteristics of the event and the presence of moderating and shielding materials in the facility. It is also important for a criticality accident detection system to account for the relative contribution of neutrons and gamma rays as pointed out in Section B.2.2 of the ANSI/ANS-8.3-1997. We recommend that the standards reinforce the importance of criticality accident alarm systems being equipped with both neutron and gamma detectors.

With regard to the third exception, we recognize difficulties in the setting of the detection system alarm threshold based on absorbed-dose-in-tissue versus absorbed-dose-in-free-air. The absorbed-dose-in-tissue value can differ significantly from the absorbed-dose-in-free-air depending on the dose conversion factor that is used and the geometry between the dose point and the detector. Typical computational methods (MCNP) can be closely matched to the absorbed-dose-in-free-air.
[see WSRC-MS-2002-00472, "Rad-in-Tissue versus Rad-in-Air - A Look at the Difference and its Effect on 12-Rad Zone Analysis",
http://www.osti.gov/bridge/product.biblio.jsp?query_id=1&page=0&osti_id=799458 or
http://sti.srs.gov/fulltext/ms2002472/ms2002472.html]

In addition (and related), as described in Section B.2.2 of the ANSI/ANS-8.3-1997, an accurate estimation of the n/γ ratio is strongly influenced by the type of accident and on whether the absorbed-dose is determined in tissue or free-air. As mentioned previously the n/γ ratio is an important factor in criticality accident detection systems.

For these reasons, it appears that the absorbed-dose-in-free-air would be preferred as used in the ANSI/ANS-8.3-1997 standard.

With regard to the first exception, the conservative approach is certainly prudent whereby a criticality alarm system is required in each area (compared with only an *evaluation* per area).

With regard to the second exception, again a conservative approach is favored by using two or more detectors per system to ensure redundancy in the alarming system. There is the added benefit in the reduction of false alarms when requiring a 2-of-3 voting logic when using a three-detector system.

As a general comment, it would appear that some uncertainty exists in the full understanding of historical criticality events (ANSI/ANS-8.3-1997 standard). Uncertainty of the relative n/γ contributions and saturation of the detectors likely limits the evaluation of this data, and hinders the post-accident response. Going forward it may be advantageous to ensure that the criticality accident alarm systems are capable of providing more data for post-accident analysis.