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From: Joseph W. Moon, CHP

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RE: Submittal of Comments regarding Draft Reg. Guide 8.34 "Monitoring Criteria and Methods To Calculate Occupational Radiation Doses"

Ms. Bladey,
In accordance with directions in Federal Register Notice NRC – 2013-0234 of Friday October 25th, 2013,I hereby submit comments to the referenced Draft document. I have previously served on the (HPS) ANSI committee for "Bioassay of Mixed Activation and Fission Products" which was subsequently revised and renamed recently.

I have reviewed the document and have the following observations.

I applaud the flexibility for the use of calculation methods for determining dose equivalent in non-uniform fields based on survey measurements as described in section 3(b)3. That is a very useful tool under complex or changing radiological conditions. I have more on this topic if there is an interest.

The document provides useful guidance in deciphering the radionuclide tables and how to handle separate treatments of stochastic vs. non-stochastic radionuclide limits. The document also adequately shows how these components are assembled to demonstrate compliance with the limits for exposure as TEDE and TODE. Unfortunately the document provides little guidance on ***how*** the estimates of intake are derived from Whole Body Count or other bioassay data. The document does reference the seminal work NUREG CR-4884 in section 4(a)2 as a valid method for deriving intake from measurements of uptakes of radionuclides by bioassay. The examples given for dose calculation focus simplistically on single radionuclide results rather than a characterized suite of radionuclides to which the individuals are usually exposed and too conveniently present as a given the estimated *intake* without cautioning that the bioassay result is a measurement of *uptake*. Additional notes should make it clear that uptakes measured by bioassay such as whole body counting do not equate with intake but that the levels of intake can be derived from such measurements when documented assumptions for time and mode (inhalation or ingestion) of intake are presented along with the bioassay data assessment. There is no mention of the practice of folding in the contribution of non-gamma emitting or hard to

detect radionuclides into the dose calculation methodology. One gets the impression that if it is not seen on an air sample gamma scan or WBC, there is no need to account for exposure to it. Last time I checked no one has a filter that allows only gamma emitters to enter the internal deposition compartments.

The methods presented using air sampling results and DAC-hr equivalent dose is more direct (less complicated than estimating intake from bioassay data) and useful for demonstrating compliance with dose limitation constraints even if a characterized suite of radionuclides is utilized. For individual intakes measured by bioassay not consistent with air sampling results, bioassay is the ticket but time of intake must be known or closely estimated. Hard to detect components of the intake should be accounted for if presumably present.

In the practical use of supplied air hoods as respiratory protection devices which have a protection factor in the thousands, certainly there is a need to demonstrate compliance with the dose constraint limits in the application of the protection factor to externally measured concentrations of airborne radionuclides. There should be some flexibility when breathing zone samples are also obtained inside the supplied air hoods that these samples can be used to demonstrate compliance when the sample media obtained external to the hood are either too contaminated to be placed in sensitive measurement instrumentation or become non-representative of the ambient air concentrations due to mishandling or other difficult assessment conditions. In this case the protection factor would not be applied to the sample measurement.

For those individuals included in a bioassay program, the 10% of ALI monitoring criteria (500m Rem) provides an effective level for threshold dose evaluations. Exposures of greater than 100 mRem CEDE should be investigated and additional measurements conducted prior to assignment of CEDE. Where WBC data indicate (nuisance) low levels not reliably (statistically) discernible by recounting (for Co-60 and fission products this level seems to be around 5 mrem < 1% of monitoring requirement) might be justifiably not accounted for in individual dose records. If there is chronic exposure the levels will build to reproducibly detectable levels over time. The treatment of these nuisance and statistically unreliable measurements at the lower limits of detection of body scanning (and passingly insignificant levels of exposure) is not discussed in assignment of exposures (inclusion in calculations of TEDE or TODE) or requirements for records of bioassay measurement results.

Hopefully there is time to add some technical notes to the text providing guidance on these items.

Sincerely,

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