

## **10A NCAC 15 .1607 DETERMINATION OF INTERNAL EXPOSURE**

(a) For purposes of assessing dose used to determine compliance with occupational dose equivalent limits, the licensee shall, when required by Rule .1614 of this Section, take suitable and timely measurements of:

- (1) concentrations of radioactive materials in air in work areas; or
- (2) quantities of radionuclides in the body; or
- (3) quantities of radionuclides excreted from the body; or
- (4) combinations of these measurements.

(b) Unless respiratory protective equipment is used, as provided in Rule .1620 of this Section, or the assessment of intake is based on bioassays, the licensee shall assume that an individual inhales radioactive material at the airborne concentration in which the individual is present.

(c) When specific information on the physical and biochemical properties of the radionuclides taken into the body or the behavior of the material in an individual is known, the licensee may:

- (1) use that information to calculate the committed effective dose equivalent, provided the licensee documents that information in the individual's record; and
- (2) upon prior approval of the agency, adjust the DAC or ALI values to reflect the actual physical and chemical characteristics of airborne radioactive material (e.g., aerosol size distribution or density); and
- (3) separately assess the contribution of fractional intakes of Class D, W, or Y compounds of given radionuclide to the committed effective dose equivalent. Requirements for annual limits on intake are provided in Appendix B to 10 CFR §§ 20.1001 - 20.2401.

(d) If the licensee chooses to assess intakes of Class Y material using the measurements given in Subparagraph (a)(2) or (3) of this Rule, the licensee may delay the recording and reporting of the assessments for periods up to seven months, unless otherwise required by Rules .1646 or .1647 of this Section, in order to permit the licensee to make additional measurements basic to the assessments.

(e) If the identity and concentration of each radionuclide in a mixture are known, the fraction of the DAC applicable to the mixture for use in calculating DAC-hours shall be either:

- (1) the sum of the ratios of the concentration to the appropriate DAC value (e.g., D, W, Y) from Appendix B to 10 CFR §§ 20.1001 - 20.2401 for each radionuclide in the mixture; or
- (2) the ratio of the total concentration for all radionuclides in the mixture to the most restrictive DAC value for any radionuclide in the mixture.

(f) If the identity of each radionuclide in a mixture is known, but the concentration of one or more of the radionuclides in the mixture is not known, the DAC for the mixture shall be the most restrictive DAC of any radionuclide in the mixture.

(g) When a mixture of radionuclides in air exists, licensees may disregard certain radionuclides in the mixture if:

- (1) the licensee uses the total activity of the mixture in demonstrating compliance with the dose limits in Rule .1604 of this Section and in complying with the monitoring requirements in Rule .1614 of this Section;
- (2) the concentration of any radionuclide disregarded is less than 10 percent of its DAC; and
- (3) the sum of these percentages for all of the radionuclides disregarded in the mixture does not exceed 30 percent.

(h) In order to calculate the committed effective dose equivalent, the licensee may assume that the inhalation of one ALI, or an exposure of 2,000 DAC-hours, results in a committed effective dose equivalent of five rems (0.05 Sv) for radionuclides that have their ALIs or DACs based on the committed effective dose equivalent.

(i) When the ALI and the associated DAC are determined by the nonstochastic organ dose limit of 50 rems (0.5 Sv), the stochastic ALI, which is the intake of radionuclides that would result in a committed effective dose equivalent of five rems (0.05 Sv), is listed in parentheses in Table 1 of Appendix B to 10 CFR §§ 20.1001 - 20.2401. In this case, the licensee may, as a simplifying assumption, use the stochastic ALIs to determine committed effective dose equivalent. However, if the licensee uses the stochastic ALIs, the licensee shall also demonstrate that the limit in Part (a)(1)(B) of Rule .1604 of this Section is met.

*History Note: Authority G.S. 104E-7(a)(2);  
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