**Section 340.240 Determination of Internal Exposure**

a) For purposes of assessing dose used to determine compliance with occupational dose equivalent limits, the licensee shall, when required pursuant to Section 340.520, take measurements of:

1) Concentrations of radioactive materials in air in work areas during conditions of operations; or

2) Quantities of radionuclides in the body after exposure to materials that could result in an intake; or

3) Quantities of radionuclides excreted from the body after exposure to materials that could result in an intake; or

4) Combinations of these measurements.

b) Unless respiratory protective equipment is used, as provided in Section 340.730, 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, and if used, the licensee shall document 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 a given radionuclide (see appendix B to 10 CFR 20, published at 72 Fed. Reg. 55922, October 1, 2007, exclusive of subsequent amendments or editions) to the committed effective dose equivalent.

d) If the licensee chooses to assess intakes of Class Y material using the measurements specified in subsections (a)(2) or (3), the licensee may delay the recording and reporting of the assessments for periods up to 7 months, unless otherwise required by Sections 340.1220 or 340.1230.

AGENCY NOTE: This delay permits 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 or Y) from appendix B to 10 CFR 20, published at 72 Fed. Reg. 55922, October 1, 2007, exclusive of subsequent amendments or editions, 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, a licensee 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 Section 340.210 and in complying with the monitoring requirements in Section 340.520(b);

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) When determining the committed effective dose equivalent, the following information may be considered:

1) 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 0.05 Sv (5 rem) for radionuclides that have their ALIs or DACs based on the committed effective dose equivalent.

2) For an ALI (and the associated DAC) determined by the nonstochastic organ dose limit of 0.5 Sv (50 rem), the intake of radionuclides that would result in a committed effective dose equivalent of 0.05 Sv (5 rem) (the stochastic ALI) is listed in parentheses in table 1 of appendix B to 10 CFR 20, published at 72 Fed. Reg. 55922, October 1, 2007, exclusive of subsequent amendments or editions. The licensee may, as a simplifying assumption, use the stochastic ALI to determine committed effective dose equivalent. However, if the licensee uses the stochastic ALI, the licensee shall also demonstrate that the limit in Section 340.210(a)(1)(B) is met.

(Source: Amended at 35 Ill. Reg. 934, effective December 30, 2010)