

**WAC 246-221-040 Determination of internal exposure of individuals to concentrations of radioactive materials in restricted areas.**

(1) For purposes of assessing dose used to determine compliance with occupational dose equivalent limits, the licensee shall, when required under WAC 246-221-100, take suitable and timely measurements of:

(a) Concentrations of radioactive materials in air in work areas;

or

(b) Quantities of radionuclides in the body; or

(c) Quantities of radionuclides excreted from the body; or

(d) Combinations of these measurements.

(2) Unless respiratory protective equipment is used, as provided in WAC 246-221-117, 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.

(3) 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:

(a) 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

(b) Upon prior approval of the department, adjust the DAC or ALI values to reflect the actual physical and chemical characteristics of airborne radioactive material, for example, aerosol size distribution or density; and

(c) Separately assess the contribution of fractional intakes of Class D, W, or Y compounds of a given radionuclide to the committed effective dose equivalent. See WAC 246-221-290.

(4) If the licensee chooses to assess intakes of Class Y material using the measurements given in subsection (1)(b) or (c) of this section, the licensee may delay the recording and reporting of the assessments for periods up to seven months, unless otherwise required by WAC 246-221-250 or 246-221-260. This delay permits the licensee to make additional measurements basic to the assessments.

(5) 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:

(a) The sum of the ratios of the concentration to the appropriate DAC value, that is, D, W, or Y, from WAC 246-221-290 for each radionuclide in the mixture; or

(b) The ratio of the total concentration for all radionuclides in the mixture to the most restrictive DAC value for any radionuclide in the mixture.

(6) 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.

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

(a) The licensee uses the total activity of the mixture in demonstrating compliance with the dose limits in WAC 246-221-010 and in complying with the monitoring requirements in WAC 246-221-100; and

(b) The concentration of any radionuclide disregarded is less than ten percent of its DAC; and

(c) The sum of these percentages for all of the radionuclides disregarded in the mixture does not exceed thirty percent.

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

(a) 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.

(b) For an ALI and the associated DAC determined by the nonstochastic organ dose limit of 0.50 Sv (50 rem), the intake of radionuclides that would result in a committed effective dose equivalent of 0.05 Sv (5 rem), that is, the stochastic ALI, is listed in parentheses in Table I of WAC 246-221-290. 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 WAC 246-221-010 (1)(a)(ii) is met.

[Statutory Authority: RCW 70.98.050. WSR 14-01-077, § 246-221-040, filed 12/16/13, effective 1/16/14; WSR 94-01-073, § 246-221-040, filed 12/9/93, effective 1/9/94. Statutory Authority: RCW 70.98.050 and 70.98.080. WSR 91-15-112 (Order 184), § 246-221-040, filed 7/24/91, effective 8/24/91. Statutory Authority: RCW 43.70.040. WSR 91-02-049 (Order 121), recodified as § 246-221-040, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 70.98.050. WSR 81-01-011 (Order 1570), § 402-24-030, filed 12/8/80; Order 1095, § 402-24-030, filed 2/6/76; Order 1, § 402-24-030, filed 1/8/69; Rules (part), filed 10/26/66.]