

4731.2050 DETERMINATION OF INTERNAL EXPOSURE.

Subpart 1. **Required measurements.** For purposes of assessing dose used to determine compliance with occupational dose equivalent limits, a licensee must, when required under part 4731.2210, take suitable and timely measurements of:

- A. concentrations of radioactive materials in air in work areas;
- B. quantities of radionuclides in the body;
- C. quantities of radionuclides excreted from the body; or
- D. a combination of the measurements in items A to C.

Subp. 2. **Assumption.** Unless respiratory protective equipment is used according to part 4731.2260 or the assessment of intake is based on bioassays, a licensee must assume that an individual inhales radioactive material at the airborne concentration in which the individual is present.

Subp. 3. **Alternative assessment.** When specific information on the physical and biochemical properties of the radionuclides taken into the body or the behavior or the material in an individual is known, a licensee may:

- A. use that information to calculate the committed effective dose equivalent and, if used, the licensee must document that information in the individual's record;
- B. upon prior approval of the commissioner, 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 as listed in part 4731.2750 to the committed effective dose equivalent.

Subp. 4. **Delayed recording.** If a licensee chooses to assess intakes of Class Y material using the measurements given in subpart 1, item B or C, the licensee may delay the recording and reporting of the assessments for periods up to seven months, unless otherwise required under part 4731.2610 or 4731.2620, to permit the licensee to make additional measurements basic to the assessments.

Subp. 5. **Mixture; identity and concentration known.** 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 must be:

- A. the sum of the ratios of the concentration to the appropriate DAC value, for example, D, W, Y, from part 4731.2750, 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.

Subp. 6. **Mixture; identity known.** 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 must be the most restrictive DAC of any radionuclide in the mixture.

Subp. 7. **Mixture in air.** 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 part 4731.2020 and in complying with the monitoring requirements in part 4731.2210, subpart 2;

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 30 percent.

Subp. 8. **Committed effective dose equivalent considerations.** When determining the committed effective dose equivalent, the following information may be considered:

A. 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; and

B. when the ALI and the associated DAC are determined by the nonstochastic organ dose limit of 50 rems (0.5 Sv), the intake of radionuclides that would result in a committed effective dose equivalent of five rems (0.05 Sv), the stochastic ALI, is listed in parentheses in part 4731.2750, subpart 7, Table 1. 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 must also demonstrate that the limit in part 4731.2020, subpart 1, item A, subitem (2), is met.

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