AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO



# APPENDIX B TO PART 20—ANNUAL LIMITS ON INTAKE (ALIS) AND DERIVED AIR CONCENTRATIONS (DACS) OF RADIONUCLIDES FOR OCCUPATIONAL EXPOSURE; EFFLUENT CONCENTRATIONS; CONCENTRATIONS FOR RELEASE TO SEWERAGE

## INTRODUCTION

For each radionuclide table 1 indicates the chemical form which is to be used for selecting the appropriate ALI or DAC value. The ALIs and DACs for inhalation are given for an aerosol with an activity median aerodynamic diameter (AMAD) of 1 μm and for three classes (D,W,Y) of radioactive material, which refer to their retention (approximately days, weeks or years) in the pulmonary region of the lung. This classification applies to a range of clearance halftimes of less than 10 days for D, for W from 10 to 100 days, and for Y greater than 100 days. The class (D, W, or Y) given in the column headed ''Class'' applies only to the inhalation ALIs and DACs given in table 1, columns 2 and 3. Table 2 provides concentration limits for airborne and liquid effluents released to the general environment. Table 3 provides concentration limits for discharges to sanitary sewer systems.

## NOTATION

The values in tables 1, 2, and 3 are presented in the computer ''E'' notation. In this notation a value of 6E−02 represents a value of $6\times10^{-2}$ or 0.06, 6E+2 represents $6\times10^{2}$ or 600, and 6E+0 represents $6\times10^{0}$ or 6.

## TABLE 1 ''OCCUPATIONAL''

Note that the columns in table 1, of this appendix captioned ''Oral Ingestion ALI,'' ''Inhalation ALI,'' and ''DAC,'' are applicable to occupational exposure to radioactive material.

The ALIs in this appendix are the annual intakes of a given radionuclide by ''Reference Man'' which would result in either (1) a committed effective dose equivalent of 5 rems (stochastic ALI) or (2) a committed dose equivalent of 50 rems to an organ or tissue (non-stochastic ALI). The stochastic ALIs were derived to result in a risk, due to irradiation of organs and tissues, comparable to the risk associated with deep dose equivalent to the whole body of 5 rems. The derivation includes multiplying the committed dose equivalent to an organ or tissue by a weighting factor, $w_T$. This weighting factor is the proportion of the risk of stochastic effects resulting from irradiation of the organ or tissue, T, to the total risk of stochastic effects when the whole body is irradiated uniformly. The values of $w_T$ are listed under the definition of weighting factor in §20.1003. The non-stochastic ALIs were derived to avoid non-stochastic effects, such as prompt damage to tissue or reduction in organ function.

A value of $w_T$=0.06 is applicable to each of the five organs or tissues in the ''remainder'' category receiving the highest dose equivalents, and the dose equivalents of all other remaining tissues may be disregarded. The following parts of the GI tract—stomach, small intestine, upper large intestine, and lower large intestine—are to be treated as four separate organs.

Note that the dose equivalents for extremities (hands and forearms, feet and lower legs), skin, and lens of the eye are not considered in computing the committed effective dose equivalent, but are subject to limits that must be met separately.

When an ALI is defined by the stochastic dose limit, this value alone, is given. When an ALI is determined by the non-stochastic dose limit to an organ, the organ or tissue to which the limit applies is shown, and the ALI for the stochastic limit is shown in parentheses. (Abbreviated organ or tissue designations are used: LLI wall = lower large intestine wall; St. wall = stomach wall; Blad wall = bladder wall; and Bone surf = bone surface.)

The use of the ALIs listed first, the more limiting of the stochastic and non-stochastic ALIs, will ensure that non-stochastic effects are avoided and that the risk of stochastic effects is limited to an acceptably low value. If, in a particular situation involving a radionuclide for which the non-stochastic ALI is limiting, use of that non-stochastic ALI is considered unduly conservative, the licensee may use the stochastic ALI to determine the committed effective dose equivalent. However, the licensee shall also ensure that the 50-rem dose equivalent limit for any organ or tissue is not exceeded by the sum of the external deep dose equivalent plus the internal committed dose to that organ (not the effective dose). For the case where there is no external dose contribution, this would be demonstrated if the sum of the fractions of the nonstochastic ALIs ($ALI_{ns}$) that contribute to the committed dose equivalent to the organ receiving the highest dose does not exceed unity (*i.e.*, Σ (intake (in μCi) of each radionuclide/$ALI_{ns}$) <1.0). If there is an external deep dose equivalent contribution of $H_d$ then this sum must be less than $1-(H_d/50)$ instead of being <1.0.

The derived air concentration (DAC) values are derived limits intended to control chronic occupational exposures. The relationship between the DAC and the ALI is given by: DAC=ALI(in μCi)/(2000 hours per working year×60 minutes/hour×$2\times10^4$ ml per minute) = [ALI/$2.4\times10^9$] μCi/ml, where $2\times10^4$ ml is the volume of air breathed per minute at work by ''Reference Man'' under working conditions of ''light work.''

The DAC values relate to one of two modes of exposure: either external submersion or the internal committed dose equivalents resulting from inhalation of radioactive materials. Derived air concentrations based upon submersion are for immersion in a semi-infinite cloud of uniform concentration and apply to each radionuclide separately.

The ALI and DAC values relate to exposure to the single radionuclide named, but also include contributions from the in-growth of any daughter radionuclide produced in the body by the decay of the parent. However, intakes that include both the parent and daughter radionuclides should be treated by the general method appropriate for mixtures.

The value of ALI and DAC do not apply directly when the individual both ingests and inhales a radionuclide, when the individual is exposed to a mixture of radionuclides by either inhalation or ingestion or both, or when the individual is exposed to both internal and external radiation (see §20.1202). When an individual is exposed to radioactive materials which fall under several of the translocation classifications (*i.e.*, Class D, Class W, or Class Y) of the same radionuclide, the exposure may be evaluated as if it were a mixture of different radionuclides.

It should be noted that the classification of a compound as Class D, W, or Y is based on the chemical form of the compound and does not take into account the radiological half-life of different radioisotopes. For this reason, values are given for Class D, W, and Y compounds, even for very short-lived radionuclides.

TABLE 2

The columns in table 2 of this appendix captioned ''Effluents,'' ''Air,'' and ''Water,'' are applicable to the assessment and control of dose to the public, particularly in the implementation of the provisions of §20.1302. The concentration values given in columns 1 and 2 of table 2 are equivalent to the radionuclide concentrations which, if inhaled or ingested continuously over the course of a year, would produce a total effective dose equivalent of 0.05 rem (50 millirem or 0.5 millisieverts).

Consideration of non-stochastic limits has not been included in deriving the air and water effluent concentration limits because non-stochastic effects are presumed not to occur at the dose levels established for individual members of the public. For radionuclides, where the non-stochastic limit was governing in deriving the occupational DAC, the stochastic ALI was used in deriving the corresponding airborne effluent limit in table 2. For this reason, the DAC and airborne effluent limits are not always proportional as was the case in appendix B to §§20.1–20.601.

The air concentration values listed in table 2, column 1, were derived by one of two methods. For those radionuclides for which the stochastic limit is governing, the occupational stochastic inhalation ALI was divided by $2.4\times10^{9}$ ml, relating the inhalation ALI to the DAC, as explained above, and then divided by a factor of 300. The factor of 300 includes the following components: a factor of 50 to relate the 5-rem annual occupational dose limit to the 0.1-rem limit for members of the public, a factor of 3 to adjust for the difference in exposure time and the inhalation rate for a worker and that for members of the public; and a factor of 2 to adjust the occupational values (derived for adults) so that they are applicable to other age groups.

For those radionuclides for which submersion (external dose) is limiting, the occupational DAC in table 1, column 3, was divided by 219. The factor of 219 is composed of a factor of 50, as described above, and a factor of 4.38 relating occupational exposure for 2,000 hours per year to full-time exposure (8,760 hours per year). Note that an additional factor of 2 for age considerations is not warranted in the submersion case.

The water concentrations were derived by taking the most restrictive occupational stochastic oral ingestion ALI and dividing by $7.3\times10^{7}$. The factor of $7.3\times10^{7}$ (ml) includes the following components: the factors of 50 and 2 described above and a factor of $7.3\times10^{5}$ (ml) which is the annual water intake of ''Reference Man.''

Note 2 of this appendix provides groupings of radionuclides which are applicable to unknown mixtures of radionuclides. These groupings (including occupational inhalation ALIs and DACs, air and water effluent concentrations and sewerage) require demonstrating that the most limiting radionuclides in successive classes are absent. The limit for the unknown mixture is defined when the presence of one of the listed radionuclides cannot be definitely excluded either from knowledge of the radionuclide composition of the source or from actual measurements.

TABLE 3 ''SEWER DISPOSAL''

The monthly average concentrations for release to sanitary sewers are applicable to the provisions in §20.2003. The concentration values were derived by taking the most restrictive occupational stochastic oral ingestion ALI and dividing by $7.3\times10^{6}$ (ml). The factor of $7.3\times10^{6}$ (ml) is composed of a factor of $7.3\times10^{5}$ (ml), the annual water intake by ''Reference Man,'' and a factor of 10, such that the concentrations, if the sewage released by the licensee were the only source of water ingested by a reference man during a year, would result in a committed effective dose equivalent of 0.5 rem.

LIST OF ELEMENTS

| Name | Atomic | |
|---|---|---|
| | Symbol | No. |
| Actinium | Ac | 89 |
| Aluminum | Al | 13 |
| Americium | Am | 95 |
| Antimony | Sb | 51 |
| Argon | Ar | 18 |
| Arsenic | As | 33 |
| Astatine | At | 85 |
| Barium | Ba | 56 |
| Berkelium | Bk | 97 |
| Beryllium | Be | 4 |
| Bismuth | Bi | 83 |
| Bromine | Br | 35 |
| Cadmium | Cd | 48 |
| Calcium | Ca | 20 |
| Californium | Cf | 98 |
| Carbon | C | 6 |
| Cerium | Ce | 58 |
| Cesium | Cs | 55 |
| Chlorine | Cl | 17 |
| Chromium | Cr | 24 |
| Cobalt | Co | 27 |
| Copper | Cu | 29 |
| Curium | Cm | 96 |
| Dysprosium | Dy | 66 |
| Einsteinium | Es | 99 |
| Erbium | Er | 68 |
| Europium | Eu | 63 |
| Fermium | Fm | 100 |
| Fluorine | F | 9 |
| Francium | Fr | 87 |
| Gadolinium | Gd | 64 |
| Gallium | Ga | 31 |
| Germanium | Ge | 32 |
| Gold | Au | 79 |
| Hafnium | Hf | 72 |
| Holmium | Ho | 67 |
| Hydrogen | H | 1 |
| Indium | In | 49 |
| Iodine | I | 53 |
| Iridium | Ir | 77 |
| Iron | Fe | 26 |
| Krypton | Kr | 36 |
| Lanthanum | La | 57 |
| Lead | Pb | 82 |
| Lutetium | Lu | 71 |
| Magnesium | Mg | 12 |
| Manganese | Mn | 25 |
| Mendelevium | Md | 101 |
| Mercury | Hg | 80 |

LIST OF ELEMENTS—Continued

| Name | Atomic | |
|---|---|---|
| | Symbol | No. |
| Molybdenum | Mo | 42 |
| Neodymium | Nd | 60 |
| Neptunium | Np | 93 |
| Nickel | Ni | 28 |
| Niobium | Nb | 41 |
| Nitrogen | N | 7 |
| Osmium | Os | 76 |
| Oxygen | O | 8 |
| Palladium | Pd | 46 |
| Phosphorus | P | 15 |
| Platinum | Pt | 78 |
| Plutonium | Pu | 94 |
| Polonium | Po | 84 |
| Potassium | K | 19 |
| Praseodymium | Pr | 59 |
| Promethium | Pm | 61 |
| Protactinium | Pa | 91 |
| Radium | Ra | 88 |
| Radon | Rn | 86 |
| Rhenium | Re | 75 |
| Rhodium | Rh | 45 |
| Rubidium | Rb | 37 |
| Ruthenium | Ru | 44 |
| Samarium | Sm | 62 |
| Scandium | Sc | 21 |
| Selenium | Se | 34 |
| Silicon | Si | 14 |
| Silver | Ag | 47 |
| Sodium | Na | 11 |
| Strontium | Sr | 38 |
| Sulfur | S | 16 |
| Tantalum | Ta | 73 |
| Technetium | Tc | 43 |
| Tellurium | Te | 52 |
| Terbium | Tb | 65 |
| Thallium | Tl | 81 |
| Thorium | Th | 90 |
| Thulium | Tm | 69 |
| Tin | Sn | 50 |
| Titanium | Ti | 22 |
| Tungsten | W | 74 |
| Uranium | U | 92 |
| Vanadium | V | 23 |
| Xenon | Xe | 54 |
| Ytterbium | Yb | 70 |
| Yttrium | Y | 39 |
| Zinc | Zn | 30 |
| Zirconium | Zr | 40 |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentration | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col.2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average Concentration ($\mu$Ci/ml) |
| Atomic No. | Radionuclide | Class | ALI ($\mu$Ci) | ALI ($\mu$Ci) | DAC ($\mu$Ci/ml) | Air ($\mu$Ci/ml) | Water ($\mu$Ci/ml) | |
| 1 | Hydrogen-3 | Water, DAC includes skin absorption | 8E+4 | 8E+4 | 2E-5 | 1E-7 | 1E-3 | 1E-2 |
| | | Gas (HT or $T_2$) Submersion[1]: Use above values as HT and $T_2$ oxidize in air and in the body to HTO | | | | | | |
| 4 | Beryllium-7 | W, all compounds except those given for Y | 4E+4 | 2E+4 | 9E-6 | 3E-8 | 6E-4 | 6E-3 |
| | | Y, oxides, halides, and nitrates | - | 2E+4 | 8E-6 | 3E-8 | - | - |
| 4 | Beryllium-10 | W, see 7Be | 1E+3 | 2E+2 | 6E-8 | 2E-10 | - | - |
| | | | LLI wall | | | | | |
| | | | (1E+3) | - | - | - | 2E-5 | 2E-4 |
| | | Y, see 7Be | - | 1E+1 | 6E-9 | 2E-11 | - | - |
| 6 | Carbon-11[2] | Monoxide | - | 1E+6 | 5E-4 | 2E-6 | - | - |
| | | Dioxide | - | 6E+5 | 3E-4 | 9E-7 | - | - |
| | | Compounds | 4E+5 | 4E+5 | 2E-4 | 6E-7 | 6E-3 | 6E-2 |
| 6 | Carbon-14 | Monoxide | - | 2E+6 | 7E-4 | 2E-6 | - | - |
| | | Dioxide | - | 2E+5 | 9E-5 | 3E-7 | - | - |
| | | Compounds | 2E+3 | 2E+3 | 1E-6 | 3E-9 | 3E-5 | 3E-4 |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentration | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col.2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average Concentration ($\mu$Ci/ml) |
| Atomic No. | Radionuclide | Class | ALI ($\mu$Ci) | ALI ($\mu$Ci) | DAC ($\mu$Ci/ml) | Air ($\mu$Ci/ml) | Water ($\mu$Ci/ml) | |
| 7 | Nitrogen-13 [2] | Submersion[1] | - | 4E-6 | 2E-8 | - | - | - |
| 8 | Oxygen-15[2] | Submersion[1] | - | 4E-6 | 2E-8 | - | - | - |
| 9 | Fluorine-18[2] | D, fluorides of H, Li, Na, K, Rb, Cs, and Fr | 5e+4 | 7E+4 | 3E-5 | 1E-7 | - | - |
| | | | St wall (5E+4) | - | - | - | 7E-4 | 7E3 |
| | | W, fluorides of Be, Mg Ca, Sr, Ba, Ra, Al, Ga, In, Ti, As, Sb, Bi, Fe, Ru, Os, Co, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, V, Nb, Ta, Nm, Tc, and Re | - | 9e+4 | 4e-5 | 1e-7 | - | - |
| | | y, LANTHANUM FLUORIDE | - | 8e+4 | 3e-5 | 1e-7 | - | - |
| 11 | Sodium-22 | D, all compounds | 4E+2 | 6E+2 | 3E-7 | 9E-10 | 6E-6 | 6E-5 |
| 11 | Sodium-24 | D, all compounds | 4E+3 | 5E+3 | 2E-6 | 7E-9 | 5E-5 | 5E-4 |
| 12 | Magnesium-28 | D, all compounds except those given for W | 7E+2 | 2E+3 | 7E-7 | 2E-9 | 9E-6 | 9E-5 |
| | | W, oxides, hydroxides, carbides, halides, and nitrates | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| 13 | Aluminum-26 | D, all compounds except those given for W | 4E+2 | 6E+1 | 3E-8 | 9E-11 | 6E-6 | 6E-5 |
| | | W, oxides, hydroxides, carbides, halides, and nitrates | - | 9E+1 | 4E-8 | 1E-10 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 14 | Silicon-31 | D, all compounds except those given for W and Y | 9E+3 | 3E+4 | 1E-5 | 4E-8 | 1E-4 | 1E-3 |
| | | W, oxides, hydroxides, carbides, and nitrates | - | 3E+4 | 1E-5 | 5E-8 | - | - |
| | | Y, aluminosilicate glass | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| 14 | Silicon-32 | D, see $^{31}Si$ | 2E+3 | 2E+2 | 1E-7 | 3E-10 | - | - |
| | | | LLI wall (3E+3) | - | - | - | 4E-5 | 4E-4 |
| | | W, see $^{31}Si$ | - | 1E+2 | 5E-8 | 2E-10 | - | - |
| | | Y, see $^{31}Si$ | - | 5E+0 | 2E-9 | 7E-12 | - | - |
| 15 | Phosphorus-32 | D, all compounds except phosphates given for W | 6E+2 | 9E+2 | 4E-7 | 1E-9 | 9E-6 | 9E-5 |
| | | W, phosphates of $Zn^{2+}$, $S^{3+}$, $Mg^{2+}$, $Fe^{3+}$, $Bi^{3+}$, and lanthanides | - | 4E+2 | 2E-7 | 5E-10 | - | - |
| 15 | Phosphorus-33 | D, see $^{32}P$ | 6E+3 | 8E+3 | 4E-6 | 1E-8 | 8E-5 | 8E-4 |
| | | W, see $^{32}P$ | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| 16 | Sulfur-35 | Vapor | - | 1E+4 | 6E-6 | 2E-8 | - | - |
| | | D, sulfides and sulfates except those given for W | 1E+4 | 2E+4 | 7E-6 | 2E-8 | - | - |
| | | | LLI wall (8E+3) | - | - | - | 1E-4 | 1E-3 |
| | | W, elemental sulfur, sulfides of Sr, Ba, Ge, Sn, Pb, As, Sb, Bi, Cu, Ag, Au, Zn, Cd, Hg, W, and Mo. Sulfates of Ca, Sr, Ba, Ra, As, Sb, and Bi | 6E+3 - | 2E+3 | 9E-7 | 3E-9 | - | - |
| 17 | Chlorine-36 | D, chlorides of H, Li, Na, K, Rb, Cs, and Fr | 2E+3 | 2E+3 | 1E-6 | 3E-9 | 2E-5 | 2E-4 |
| | | W, chlorides of lanthanides, Be, Mg, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, Ge, Sn, Pb, As, Sb, Bi, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, Mn, Tc, and Re | - | 2E+2 | 1E-7 | 3E-10 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| 17 | Chlorine-38[2] | D, see $^{36}Cl$ | 2E+4 | 4E+4 | 2E-5 | 6E-8 | - | - |
| | | | St. wall (3E+4) | - | - | - | 3E-4 | 3E-3 |
| | | W, see $^{36}Cl$ | - | 5E+4 | 2E-5 | 6E-8 | - | - |
| 17 | Chlorine-39[2] | D, see $^{36}Cl$ | 2E+4 | 5E+4 | 2E-5 | 7E-8 | - | - |
| | | | St. wall (4E+4) | - | - | - | 5E-4 | 5E-3 |
| | | W, see $^{36}Cl$ | - | 6E+4 | 2E-5 | 8E-8 | - | - |
| 18 | Argon-37 | Submersion[1] | - | - | 1E+0 | 6E-3 | - | - |
| 18 | Argon-39 | Submersion[1] | - | - | 2E-4 | 8E-7 | - | - |
| 18 | Argon-41 | Submersion[1] | - | - | 3E-6 | 1E-8 | - | - |
| 19 | Potassium-40 | D, all compounds | 3E+2 | 4E+2 | 2E-7 | 6E-10 | 4E-6 | 4E-5 |
| 19 | Potassium-42 | D, all compounds | 5E+3 | 5E+3 | 2E-6 | 7E-9 | 6E-5 | 6E-4 |
| 19 | Potassium-43 | D, all compounds | 6E+3 | 9E+3 | 4E-6 | 1E-8 | 9E-5 | 9E-4 |
| 19 | Potassium-44[2] | D, all compounds | 2E+4 | 7E+4 | 3E-5 | 9E-8 | - | - |
| | | | St. wall (4E+4) | - | - | - | 5E-4 | 5E-3 |
| 19 | Potassium-45[2] | D, all compounds | 3E+4 | 1E+5 | 5E-5 | 2E-7 | - | - |
| | | | St. wall (5E+4) | - | - | - | 7E-4 | 7E-3 |
| 20 | Calcium-41 | W, all compounds | 3E+3 | 4E+3 | 2E-6 | - | - | - |
| | | | Bone surf (4E+3) | Bone surf (4E+3) | - | 5E-9 | 6E-5 | 6E-4 |
| 20 | Calcium-45 | W, all compounds | 2E+3 | 8E+2 | 4E-7 | 1E-9 | 2E-5 | 2E-4 |
| 20 | Calcium-47 | W, all compounds | 8E+2 | 9E+2 | 4E-7 | 1E-9 | 1E-5 | 1E-4 |
| 21 | Scandium-43 | Y, all compounds | 7E+3 | 2E+4 | 9E-6 | 3E-8 | 1E-4 | 1E-3 |
| 21 | Scandium-44m | Y, all compounds | 5E+2 | 7E+2 | 3E-7 | 1E-9 | 7E-6 | 7E-5 |
| 21 | Scandium-44 | Y, all compounds | 4E+3 | 1E+4 | 5E-6 | 2E-8 | 5E-5 | 5E-4 |
| 21 | Scandium-46 | Y, all compounds | 9E+2 | 2E+2 | 1E-7 | 3E-10 | 1E-5 | 1E-4 |
| 21 | Scandium-47 | Y, all compounds | 2E+3 | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | | LLI wall (3E+3) | - | - | - | 4E-5 | 4E-4 |
| 21 | Scandium-48 | Y, all compounds | 8E+2 | 1E+3 | 6E-7 | 2E-9 | 1E-5 | 1E-4 |
| 21 | Scandium-49[2] | Y, all compounds | 2E+4 | 5E+4 | 2E-5 | 8E-8 | 3E-4 | 3E-3 |
| 22 | Titanium-44 | D, all compounds except those given for W and Y | 3E+2 | 1E+1 | 5E-9 | 2E-11 | 4E-6 | 4E-5 |
| | | W, oxides, hydroxides, carbides, halides, and nitrates | - | 3E+1 | 1E-8 | 4E-11 | - | - |
| | | Y, $SrTiO_3$ | - | 6E+0 | 2E-9 | 8E-12 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 22 | Titanium-45 | D, see $^{44}$Ti | 9E+3 | 3E+4 | 1E-5 | 3E-8 | 1E-4 | 1E-3 |
| | | W, see $^{44}$Ti | - | 4E+4 | 1E-5 | 5E-8 | - | - |
| | | Y, see $^{44}$Ti | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| 23 | Vanadium-47[2] | D, all compounds except those given for W | 3E+4 | 8E+4 | 3E-5 | 1E-7 | - | - |
| | | | St. wall (3E+4) | - | - | - | 4E-4 | 4E-3 |
| | | W, oxides, hydroxides, carbides, and halides | - | 1E+5 | 4E-5 | 1E-7 | - | - |
| 23 | Vanadium-48 | D, see $^{47}$V | 6E+2 | 1E+3 | 5E-7 | 2E-9 | 9E-6 | 9E-5 |
| | | W, see $^{47}$V | - | 6E+2 | 3E-7 | 9E-10 | - | - |
| 23 | Vanadium-49 | D, see $^{47}$V | 7E+4 | 3E+4 | 1E-5 | - | - | - |
| | | | LLI wall (9E+4) | Bone surf (3E+4) | - | 5E-8 | 1E-3 | 1E-2 |
| | | W, see $^{47}$V | - | 2E+4 | 8E-6 | 2E-8 | - | - |
| 24 | Chromium-48 | D, all compounds except those given for W and Y | 6E+3 | 1E+4 | 5E-6 | 2E-8 | 8E-5 | 8E-4 |
| | | W, halides and nitrates | - | 7E+3 | 3E-6 | 1E-8 | - | - |
| | | Y, oxides and hydroxides | - | 7E+3 | 3E-6 | 1E-8 | - | - |
| 24 | Chromium-49[2] | D, see $^{48}$Cr | 3E+4 | 8E+4 | 4E-5 | 1E-7 | 4E-4 | 4E-3 |
| | | W, see $^{48}$Cr | - | 1E+5 | 4E-5 | 1E-7 | - | - |
| | | Y, see $^{48}$Cr | - | 9E+4 | 4E-5 | 1E-7 | - | - |
| 24 | Chromium-51 | D, see $^{48}$Cr | 4E+4 | 5E+4 | 2E-5 | 6E-8 | 5E-4 | 5E-3 |
| | | W, see $^{48}$Cr | - | 2E+4 | 1E-5 | 3E-8 | - | - |
| | | Y, see $^{48}$Cr | - | 2E+4 | 8E-6 | 3E-8 | - | - |
| 25 | Manganese-51[2] | D, all compounds except those given for W | 2E+4 | 5E+4 | 2E-5 | 7E-8 | 3E-4 | 3E-3 |
| | | W, oxides, hydroxides, halides, and nitrates | - | 6E+4 | 3E-5 | 8E-8 | - | - |
| 25 | Manganese-52m[2] | D, see $^{51}$Mn | 3E+4 | 9E+4 | 4E-5 | 1E-7 | - | - |
| | | | St. wall (4E+4) | - | - | - | 5E-4 | 5E-3 |
| | | W, see $^{51}$Mn | - | 1E+5 | 4E-5 | 1E-7 | - | - |
| 25 | Manganese-52 | D, see $^{51}$Mn | 7E+2 | 1E+3 | 5E-7 | 2E-9 | 1E-5 | 1E-4 |
| | | W, see $^{51}$Mn | - | 9E+2 | 4E-7 | 1E-9 | - | - |
| 25 | Manganese-53 | D, see $^{51}$Mn | 5E+4 | 1E+4 | 5E-6 | - | 7E-4 | 7E-3 |
| | | | - | Bone surf (2E+4) | - | 3E-8 | - | - |
| | | W, see $^{51}$Mn | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| 25 | Manganese-54 | D, see $^{51}$Mn | 2E+3 | 9E+2 | 4E-7 | 1E-9 | 3E-5 | 3E-4 |
| | | W, see $^{51}$Mn | - | 8E+2 | 3E-7 | 1E-9 | - | - |
| 25 | Manganese-56 | D, see $^{51}$Mn | 5E+3 | 2E+4 | 6E-6 | 2E-8 | 7E-5 | 7E-4 |
| | | W, see $^{51}$Mn | - | 2E+4 | 9E-6 | 3E-8 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 26 | Iron-52 | D, all compounds except those given for W | 9E+2 | 3E+3 | 1E-6 | 4E-9 | 1E-5 | 1E-4 |
| | | W, oxides, hydroxides, and halides | - | 2E+3 | 1E-6 | 3E-9 | - | - |
| 26 | Iron-55 | D, see $^{52}$Fe | 9E+3 | 2E+3 | 8E-7 | 3E-9 | 1E-4 | 1E-3 |
| | | W, see $^{52}$Fe | - | 4E+3 | 2E-6 | 6E-9 | - | - |
| 26 | Iron-59 | D, see $^{52}$Fe | 8E+2 | 3E+2 | 1E-7 | 5E-10 | 1E-5 | 1E-4 |
| | | W, see $^{52}$Fe | - | 5E+2 | 2E-7 | 7E-10 | - | - |
| 26 | Iron-60 | D, see $^{52}$Fe | 3E+1 | 6E+0 | 3E-9 | 9E-12 | 4E-7 | 4E-6 |
| | | W, see $^{52}$Fe | - | 2E+1 | 8E-9 | 3E-11 | - | - |
| 27 | Cobalt-55 | W, all compounds except those given for Y | 1E+3 | 3E+3 | 1E-6 | 4E-9 | 2E-5 | 2E-4 |
| | | Y, oxides, hydroxides, halides, and nitrates | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| 27 | Cobalt-56 | W, see $^{55}$Co | 5E+2 | 3E+2 | 1E-7 | 4E-10 | 6E-6 | 6E-5 |
| | | Y, see $^{55}$Co | 4E+2 | 2E+2 | 8E-8 | 3E-10 | - | - |
| 27 | Cobalt-57 | W, see $^{55}$Co | 8E+3 | 3E+3 | 1E-6 | 4E-9 | 6E-5 | 6E-4 |
| | | Y, see $^{55}$Co | 4E+3 | 7E+2 | 3E-7 | 9E-10 | - | - |
| 27 | Cobalt-58m | W, see $^{55}$Co | 6E+4 | 9E+4 | 4E-5 | 1E-7 | 8E-4 | 8E-3 |
| | | Y, see $^{55}$Co | - | 6E+4 | 3E-5 | 9E-8 | - | - |
| 27 | Cobalt-58 | W, see $^{55}$Co | 2E+3 | 1E+3 | 5E-7 | 2E-9 | 2E-5 | 2E-4 |
| | | Y, see $^{55}$Co | 1E+3 | 7E+2 | 3E-7 | 1E-9 | - | - |
| 27 | Cobalt-60m[2] | W, see $^{55}$Co | 1E+6 | 4E+6 | 2E-3 | 6E-6 | - | - |
| | | | St. wall (1E+6) | - | - | - | 2E-2 | 2E-1 |
| | | Y, see $^{55}$Co | - | 3E+6 | 1E-3 | 4E-6 | - | - |
| 27 | Cobalt-60 | W, see $^{55}$Co | 5E+2 | 2E+2 | 7E-8 | 2E-10 | 3E-6 | 3E-5 |
| | | Y, see $^{55}$Co | 2E+2 | 3E+1 | 1E-8 | 5E-11 | - | - |
| 27 | Cobalt-61[2] | W, see $^{55}$Co | 2E+4 | 6E+4 | 3E-5 | 9E-8 | 3E-4 | 3E-3 |
| | | Y, see $^{55}$Co | 2E+4 | 6E+4 | 2E-5 | 8E-8 | - | - |
| 27 | Cobalt-62m[2] | W, see $^{55}$Co | 4E+4 | 2E+5 | 7E-5 | 2E-7 | - | - |
| | | | St. wall (5E+4) | - | - | - | 7E-4 | 7E-3 |
| | | Y, see $^{55}$Co | - | 2E+5 | 6E-5 | 2E-7 | - | - |
| 28 | Nickel-56 | D, all compounds except those given for W | 1E+3 | 2E+3 | 8E-7 | 3E-9 | 2E-5 | 2E-4 |
| | | W, oxides, hydroxides, and carbides | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| | | Vapor | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| 28 | Nickel-57 | D, see $^{56}$Ni | 2E+3 | 5E+3 | 2E-6 | 7E-9 | 2E-5 | 2E-4 |
| | | W, see $^{56}$Ni | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | Vapor | - | 6E+3 | 3E-6 | 9E-9 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 28 | Nickel-59 | D, see $^{56}$Ni | 2E+4 | 4E+3 | 2E-6 | 5E-9 | 3E-4 | 3E-3 |
| | | W, see $^{56}$Ni | - | 7E+3 | 3E-6 | 1E-8 | - | - |
| | | Vapor | - | 2E+3 | 8E-7 | 3E-9 | - | - |
| 28 | Nickel-63 | D, see $^{56}$Ni | 9E+3 | 2E+3 | 7E-7 | 2E-9 | 1E-4 | 1E-3 |
| | | W, see $^{56}$Ni | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | Vapor | - | 8E+2 | 3E-7 | 1E-9 | - | - |
| 28 | Nickel-65 | D, see $^{56}$Ni | 8E+3 | 2E+4 | 1E-5 | 3E-8 | 1E-4 | 1E-3 |
| | | W, see $^{56}$Ni | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| | | Vapor | - | 2E+4 | 7E-6 | 2E-8 | - | - |
| 28 | Nickel-66 | D, see $^{56}$Ni | 4E+2 | 2E+3 | 7E-7 | 2E-9 | - | - |
| | | | LLI wall (5E+2) | - | - | - | 6E-6 | 6E-5 |
| | | W, see $^{56}$Ni | - | 6E+2 | 3E-7 | 9E-10 | - | - |
| | | Vapor | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| 29 | Copper-60[2] | D, all compounds except those given for W and Y | 3E+4 | 9E+4 | 4E-5 | 1E-7 | - | - |
| | | | St. wall (3E+4) | - | - | - | 4E-4 | 4E-3 |
| | | W, sulfides, halides, and nitrates | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| | | Y, oxides and hydroxides | - | 1E+5 | 4E-5 | 1E-7 | - | - |
| 29 | Copper-61 | D, see $^{60}$Cu | 1E+4 | 3E+4 | 1E-5 | 4E-8 | 2E-4 | 2E-3 |
| | | W, see $^{60}$Cu | - | 4E+4 | 2E-5 | 6E-8 | - | - |
| | | Y, see $^{60}$Cu | - | 4E+4 | 1E-5 | 5E-8 | - | - |
| 29 | Copper-64 | D, see $^{60}$Cu | 1E+4 | 3E+4 | 1E-5 | 4E-8 | 2E-4 | 2E-3 |
| | | W, see $^{60}$Cu | - | 2E+4 | 1E-5 | 3E-8 | - | - |
| | | Y, see $^{60}$Cu | - | 2E+4 | 9E-6 | 3E-8 | - | - |
| 29 | Copper-67 | D, see $^{60}$Cu | 5E+3 | 8E+3 | 3E-6 | 1E-8 | 6E-5 | 6E-4 |
| | | W, see $^{60}$Cu | - | 5E+3 | 2E-6 | 7E-9 | - | - |
| | | Y, see $^{60}$Cu | - | 5E+3 | 2E-6 | 6E-9 | - | - |
| 30 | Zinc-62 | Y, all compounds | 1E+3 | 3E+3 | 1E-6 | 4E-9 | 2E-5 | 2E-4 |
| 30 | Zinc-63[2] | Y, all compounds | 2E+4 | 7E+4 | 3E-5 | 9E-8 | - | - |
| | | | St. wall (3E+4) | - | - | - | 3E-4 | 3E-3 |
| 30 | Zinc-65 | Y, all compounds | 4E+2 | 3E+2 | 1E-7 | 4E-10 | 5E-6 | 5E-5 |
| 30 | Zinc-69m | Y, all compounds | 4E+3 | 7E+3 | 3E-6 | 1E-8 | 6E-5 | 6E-4 |
| 30 | Zinc-69[2] | Y, all compounds | 6E+4 | 1E+5 | 6E-5 | 2E-7 | 8E-4 | 8E-3 |
| 30 | Zinc-71m | Y, all compounds | 6E+3 | 2E+4 | 7E-6 | 2E-8 | 8E-5 | 8E-4 |
| 30 | Zinc-72 | Y, all compounds | 1E+3 | 1E+3 | 5E-7 | 2E-9 | 1E-5 | 1E-4 |
| 31 | Gallium-65[2] | D, all compounds except those given for W | 5E+4 | 2E+5 | 7E-5 | 2E-7 | - | - |
| | | | St. wall (6E+4) | - | - | - | 9E-4 | 9E-3 |
| | | W, oxides, hydroxides, carbides, halides, and nitrates | - | 2E+5 | 8E-5 | 3E-7 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 31 | Gallium-66 | D, see $^{65}$Ga | 1E+3 | 4E+3 | 1E-6 | 5E-9 | 1E-5 | 1E-4 |
| | | W, see $^{65}$Ga | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| 31 | Gallium-67 | D, see $^{65}$Ga | 7E+3 | 1E+4 | 6E-6 | 2E-8 | 1E-4 | 1E-3 |
| | | W, see $^{65}$Ga | - | 1E+4 | 4E-6 | 1E-8 | - | - |
| 31 | Gallium-68[2] | D, see $^{65}$Ga | 2E+4 | 4E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| | | W, see $^{65}$Ga | - | 5E+4 | 2E-5 | 7E-8 | - | - |
| 31 | Gallium-70[2] | D, see $^{65}$Ga | 5E+4 | 2E+5 | 7E-5 | 2E-7 | - | - |
| | | | St. wall (7E+4) | - | - | - | 1E-3 | 1E-2 |
| | | W, see $^{65}$Ga | - | 2E+5 | 8E-5 | 3E-7 | - | - |
| 31 | Gallium-72 | D, see $^{65}$Ga | 1E+3 | 4E+3 | 1E-6 | 5E-9 | 2E-5 | 2E-4 |
| | | W, see $^{65}$Ga | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| 31 | Gallium-73 | D, see $^{65}$Ga | 5E+3 | 2E+4 | 6E-6 | 2E-8 | 7E-5 | 7E-4 |
| | | W, see $^{65}$Ga | - | 2E+4 | 6E-6 | 2E-8 | - | - |
| 32 | Germanium-66 | D, all compounds except those given for W | 2E+4 | 3E+4 | 1E-5 | 4E-8 | 3E-4 | 3E-3 |
| | | W, oxides, sulfides, and halides | - | 2E+4 | 8E-6 | 3E-8 | - | - |
| 32 | Germanium-67[2] | D, see $^{66}$Ge | 3E+4 | 9E+4 | 4E-5 | 1E-7 | - | - |
| | | | St. wall (4E+4) | - | - | - | 6E-4 | 6E-3 |
| | | W, see $^{66}$Ge | - | 1E+5 | 4E-5 | 1E-7 | - | - |
| 32 | Germanium-68 | D, see $^{66}$Ge | 5E+3 | 4E+3 | 2E-6 | 5E-9 | 6E-5 | 6E-4 |
| | | W, see $^{66}$Ge | - | 1E+2 | 4E-8 | 1E-10 | - | - |
| 32 | Germanium-69 | D, see $^{66}$Ge | 1E+4 | 2E+4 | 6E-6 | 2E-8 | 2E-4 | 2E-3 |
| | | W, see $^{66}$Ge | - | 8E+3 | 3E-6 | 1E-8 | - | - |
| 32 | Germanium-71 | D, see $^{66}$Ge | 5E+5 | 4E+5 | 2E-4 | 6E-7 | 7E-3 | 7E-2 |
| | | W, see $^{66}$Ge | - | 4E+4 | 2E-5 | 6E-8 | - | - |
| 32 | Germanium-75[2] | D, see $^{66}$Ge | 4E+4 | 8E+4 | 3E-5 | 1E-7 | - | - |
| | | | St. wall (7E+4) | - | - | - | 9E-4 | 9E-3 |
| | | W, see $^{66}$Ge | - | 8E+4 | 4E-5 | 1E-7 | - | - |
| 32 | Germanium-77 | D, see $^{66}$Ge | 9E+3 | 1E+4 | 4E-6 | 1E-8 | 1E-4 | 1E-3 |
| | | W, see $^{66}$Ge | - | 6E+3 | 2E-6 | 8E-9 | - | - |
| 32 | Germanium-78[2] | D, see $^{66}$Ge | 2E+4 | 2E+4 | 9E-6 | 3E-8 | - | - |
| | | | St. wall (2E+4) | - | - | - | 3E-4 | 3E-3 |
| | | W, see $^{66}$Ge | - | 2E+4 | 9E-6 | 3E-8 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 33 | Arsenic-69[2] | W, all compounds | 3E+4 | 1E+5 | 5E-5 | 2E-7 | - | - |
| | | | St. wall (4E+4) | - | - | - | 6E-4 | 6E-3 |
| 33 | Arsenic-70[2] | W, all compounds | 1E+4 | 5E+4 | 2E-5 | 7E-8 | 2E-4 | 2E-3 |
| 33 | Arsenic-71 | W, all compounds | 4E+3 | 5E+3 | 2E-6 | 6E-9 | 5E-5 | 5E-4 |
| 33 | Arsenic-72 | W, all compounds | 9E+2 | 1E+3 | 6E-7 | 2E-9 | 1E-5 | 1E-4 |
| 33 | Arsenic-73 | W, all compounds | 8E+3 | 2E+3 | 7E-7 | 2E-9 | 1E-4 | 1E-3 |
| 33 | Arsenic-74 | W, all compounds | 1E+3 | 8E+2 | 3E-7 | 1E-9 | 2E-5 | 2E-4 |
| 33 | Arsenic-76 | W, all compounds | 1E+3 | 1E+3 | 6E-7 | 2E-9 | 1E-5 | 1E-4 |
| 33 | Arsenic-77 | W, all compounds | 4E+3 | 5E+3 | 2E-6 | 7E-9 | - | - |
| | | | LLI wall (5E+3) | - | - | - | 6E-5 | 6E-4 |
| 33 | Arsenic-78[2] | W, all compounds | 8E+3 | 2E+4 | 9E-6 | 3E-8 | 1E-4 | 1E-3 |
| 34 | Selenium-70[2] | D, all compounds except those given for W | 2E+4 | 4E+4 | 2E-5 | 5E-8 | 1E-4 | 1E-3 |
| | | W, oxides, hydroxides, carbides, and elemental Se | 1E+4- | 4E+4 | 2E-5 | 6E-8 | - | - |
| 34 | Selenium-73m[2] | D, see $^{70}$Se | 6E+4 | 2E+5 | 6E-5 | 2E-7 | 4E-4 | 4E-3 |
| | | W, see $^{70}$Se | 3E+4 | 1E+5 | 6E-5 | 2E-7 | - | - |
| 34 | Selenium-73 | D, see $^{70}$Se | 3E+3 | 1E+4 | 5E-6 | 2E-8 | 4E-5 | 4E-4 |
| | | W, see $^{70}$Se | - | 2E+4 | 7E-6 | 2E-8 | - | - |
| 34 | Selenium-75 | D, see $^{70}$Se | 5E+2 | 7E+2 | 3E-7 | 1E-9 | 7E-6 | 7E-5 |
| | | W, see $^{70}$Se | - | 6E+2 | 3E-7 | 8E-10 | - | - |
| 34 | Selenium-79 | D, see $^{70}$Se | 6E+2 | 8E+2 | 3E-7 | 1E-9 | 8E-6 | 8E-5 |
| | | W, see $^{70}$Se | - | 6E+2 | 2E-7 | 8E-10 | - | - |
| 34 | Selenium-81m[2] | D, see $^{70}$Se | 4E+4 | 7E+4 | 3E-5 | 9E-8 | 3E-4 | 3E-3 |
| | | W, see $^{70}$Se | 2E+4 | 7E+4 | 3E-5 | 1E-7 | - | - |
| 34 | Selenium-81[2] | D, see $^{70}$Se | 6E+4 | 2E+5 | 9E-5 | 3E-7 | - | - |
| | | | St. wall (8E+4) | - | - | - | 1E-3 | 1E-2 |
| | | W, see $^{70}$Se | - | 2E+5 | 1E-4 | 3E-7 | - | - |
| 34 | Selenium-83[2] | D, see $^{70}$Se | 4E+4 | 1E+5 | 5E-5 | 2E-7 | 4E-4 | 4E-3 |
| | | W, see $^{70}$Se | 3E+4 | 1E+5 | 5E-5 | 2E-7 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 Oral Ingestion | Col. 2 Inhalation | Col. 3 Inhalation | Col. 1 | Col. 2 | |
| | | | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| 35 | Bromine-74m[2] | D, bromides of H, Li, Na, K, Rb, Cs, and Fr | 1E+4 | 4E+4 | 2E-5 | 5E-8 | - | - |
| | | | St. wall (2E+4) | - | - | - | 3E-4 | 3E-3 |
| | | W, bromides of lanthanides, Be, Mg, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, Ge, Sn, Pb, As, Sb, Bi, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, Hf, V, Nb, Ta, Mn, Tc, and Re | - | 4E+4 | 2E-5 | 6E-8 | - | - |
| 35 | Bromine-74[2] | D, see $^{74m}$Br | 2E+4 | 7E+4 | 3E-5 | 1E-7 | - | - |
| | | | St. wall (4E+4) | - | - | - | 5E-4 | 5E-3 |
| | | W, see $^{74m}$Br | - | 8E+4 | 4E-5 | 1E-7 | - | - |
| 35 | Bromine-75[2] | D, see $^{74m}$Br | 3E+4 | 5E+4 | 2E-5 | 7E-8 | - | - |
| | | | St. wall (4E+4) | - | - | - | 5E-4 | 5E-3 |
| | | W, see $^{74m}$Br | - | 5E+4 | 2E-5 | 7E-8 | - | - |
| 35 | Bromine-76 | D, see $^{74m}$Br | 4E+3 | 5E+3 | 2E-6 | 7E-9 | 5E-5 | 5E-4 |
| | | W, see $^{74m}$Br | - | 4E+3 | 2E-6 | 6E-9 | - | - |
| 35 | Bromine-77 | D, see $^{74m}$Br | 2E+4 | 2E+4 | 1E-5 | 3E-8 | 2E-4 | 2E-3 |
| | | W, see $^{74m}$Br | - | 2E+4 | 8E-6 | 3E-8 | - | - |
| 35 | Bromine-80m | D, see $^{74m}$Br | 2E+4 | 2E+4 | 7E-6 | 2E-8 | 3E-4 | 3E-3 |
| | | W, see $^{74m}$Br | - | 1E+4 | 6E-6 | 2E-8 | - | - |
| 35 | Bromine-80[2] | D, see $^{74m}$Br | 5E+4 | 2E+5 | 8E-5 | 3E-7 | - | - |
| | | | St. wall (9E+4) | - | - | - | 1E-3 | 1E-2 |
| | | W, see $^{74m}$Br | - | 2E+5 | 9E-5 | 3E-7 | - | - |
| 35 | Bromine-82 | D, see $^{74m}$Br | 3E+3 | 4E+3 | 2E-6 | 6E-9 | 4E-5 | 4E-4 |
| | | W, see $^{74m}$Br | - | 4E+3 | 2E-6 | 5E-9 | - | - |
| 35 | Bromine-83 | D, see $^{74m}$Br | 5E+4 | 6E+4 | 3E-5 | 9E-8 | - | - |
| | | | St. wall (7E+4) | - | - | - | 9E-4 | 9E-3 |
| | | W, see $^{74m}$Br | - | 6E+4 | 3E-5 | 9E-8 | - | - |
| 35 | Bromine-84[2] | D, see $^{74m}$Br | 2E+4 | 6E+4 | 2E-5 | 8E-8 | - | - |
| | | | St. wall (3E+4) | - | - | - | 4E-4 | 4E-3 |
| | | W, see $^{74m}$Br | - | 6E+4 | 3E-5 | 9E-8 | - | - |
| 36 | Krypton-74[2] | Submersion[1] | - | - | 3E-6 | 1E-8 | - | - |
| 36 | Krypton-76 | Submersion[1] | - | - | 9E-6 | 4E-8 | - | - |
| 36 | Krypton-77[2] | Submersion[1] | - | - | 4E-6 | 2E-8 | - | - |
| 36 | Krypton-79 | Submersion[1] | - | - | 2E-5 | 7E-8 | - | - |
| 36 | Krypton-81 | Submersion[1] | - | - | 7E-4 | 3E-6 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| 36 | Krypton-83m[2] | Submersion[1] | | | 1E-2 | 5E-5 | - | |
| 36 | Krypton-85m | Submersion[1] | - | - | 2E-5 | 1E-7 | - | - |
| 36 | Krypton-85 | Submersion[1] | - | - | 1E-4 | 7E-7 | - | - |
| 36 | Krypton-87[2] | Submersion[1] | - | - | 5E-6 | 2E-8 | - | - |
| 36 | Krypton-88 | Submersion[1] | - | - | 2E-6 | 9E-9 | - | - |
| 37 | Rubidium-79[2] | D, all compounds | 4E+4 | 1E+5 | 5E-5 | 2E-7 | - | - |
| | | | St. wall (6E+4) | - | - | - | 8E-4 | 8E-3 |
| 37 | Rubidium-81m[2] | D, all compounds | 2E+5 | 3E+5 | 1E-4 | 5E-7 | - | - |
| | | | St. wall (3E+5) | - | - | - | 4E-3 | 4E-2 |
| 37 | Rubidium-81 | D, all compounds | 4E+4 | 5E+4 | 2E-5 | 7E-8 | 5E-4 | 5E-3 |
| 37 | Rubidium-82m | D, all compounds | 1E+4 | 2E+4 | 7E-6 | 2E-8 | 2E-4 | 2E-3 |
| 37 | Rubidium-83 | D, all compounds | 6E+2 | 1E+3 | 4E-7 | 1E-9 | 9E-6 | 9E-5 |
| 37 | Rubidium-84 | D, all compounds | 5E+2 | 8E+2 | 3E-7 | 1E-9 | 7E-6 | 7E-5 |
| 37 | Rubidium-86 | D, all compounds | 5E+2 | 8E+2 | 3E-7 | 1E-9 | 7E-6 | 7E-5 |
| 37 | Rubidium-87 | D, all compounds | 1E+3 | 2E+3 | 6E-7 | 2E-9 | 1E-5 | 1E-4 |
| 37 | Rubidium-88[2] | D, all compounds | 2E+4 | 6E+4 | 3E-5 | 9E-8 | - | - |
| | | | St. wall (3E+4) | - | - | - | 4E-4 | 4E-3 |
| 37 | Rubidium-89[2] | D, all compounds | 4E+4 | 1E+5 | 6E-5 | 2E-7 | - | - |
| | | | St. wall (6E+4) | - | - | - | 9E-4 | 9E-3 |
| 38 | Strontium-80[2] | D, all soluble compounds except $SrTiO_3$ | 4E+3 | 1E+4 | 5E-6 | 2E-8 | 6E-5 | 6E-4 |
| | | Y, all insoluble compounds and $SrTiO_3$ | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| 38 | Strontium-81[2] | D, see $^{80}Sr$ | 3E+4 | 8E+4 | 3E-5 | 1E-7 | 3E-4 | 3E-3 |
| | | Y, see $^{80}Sr$ | 2E+4 | 8E+4 | 3E-5 | 1E-7 | - | - |
| 38 | Strontium-82 | D, see $^{80}Sr$ | 3E+2 | 4E+2 | 2E-7 | 6E-10 | - | - |
| | | | LLI wall (2E+2) | - | - | - | 3E-6 | 3E-5 |
| | | Y, see $^{80}Sr$ | 2E+2 | 9E+1 | 4E-8 | 1E-10 | - | - |
| 38 | Strontium-83 | D, see $^{80}Sr$ | 3E+3 | 7E+3 | 3E-6 | 1E-8 | 3E-5 | 3E-4 |
| | | Y, see $^{80}Sr$ | 2E+3 | 4E+3 | 1E-6 | 5E-9 | - | - |
| 38 | Strontium-85m[2] | D, see $^{80}Sr$ | 2E+5 | 6E+5 | 3E-4 | 9E-7 | 3E-3 | 3E-2 |
| | | Y, see $^{80}Sr$ | - | 8E+5 | 4E-4 | 1E-6 | - | - |
| 38 | Strontium-85 | D, see $^{80}Sr$ | 3E+3 | 3E+3 | 1E-6 | 4E-9 | 4E-5 | 4E-4 |
| | | Y, see $^{80}Sr$ | - | 2E+3 | 6E-7 | 2E-9 | - | - |
| 38 | Strontium-87m | D, see $^{80}Sr$ | 5E+4 | 1E+5 | 5E-5 | 2E-7 | 6E-4 | 6E-3 |
| | | Y, see $^{80}Sr$ | 4E+4 | 2E+5 | 6E-5 | 2E-7 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| 38 | Strontium-89 | D, see $^{80}Sr$ | 6E+2 | 8E+2 | 4E-7 | 1E-9 | - | - |
| | | | LLI wall (6E+2) | - | - | - | 8E-6 | 8E-5 |
| | | Y, see $^{80}Sr$ | 5E+2 | 1E+2 | 6E-8 | 2E-10 | - | - |
| 38 | Strontium-90 | D, see $^{80}Sr$ | 3E+1 | 2E+1 | 8E-9 | - | - | - |
| | | | Bone surf (4E+1) | Bone surf (2E+1) | - | 3E-11 | 5E-7 | 5E-6 |
| | | Y, see $^{80}Sr$ | - | 4E+0 | 2E-9 | 6E-12 | - | - |
| 38 | Strontium-91 | D, see $^{80}Sr$ | 2E+3 | 6E+3 | 2E-6 | 8E-9 | 2E-5 | 2E-4 |
| | | Y, see $^{80}Sr$ | - | 4E+3 | 1E-6 | 5E-9 | - | - |
| 38 | Strontium-92 | D, see $^{80}Sr$ | 3E+3 | 9E+3 | 4E-6 | 1E-8 | 4E-5 | 4E-4 |
| | | Y, see $^{80}Sr$ | - | 7E+3 | 3E-6 | 9E-9 | - | - |
| 39 | Yttrium-86m[2] | W, all compounds except those given for Y | 2E+4 | 6E+4 | 2E-5 | 8E-8 | 3E-4 | 3E-3 |
| | | Y, oxides and hydroxides | - | 5E+4 | 2E-5 | 8E-8 | - | - |
| 39 | Yttrium-86 | W, see $^{86m}Y$ | 1E+3 | 3E+3 | 1E-6 | 5E-9 | 2E-5 | 2E-4 |
| | | Y, see $^{86m}Y$ | - | 3E+3 | 1E-6 | 5E-9 | - | - |
| 39 | Yttrium-87 | W, see $^{86m}Y$ | 2E+3 | 3E+3 | 1E-6 | 5E-9 | 3E-5 | 3E-4 |
| | | Y, see $^{86m}Y$ | - | 3E+3 | 1E-6 | 5E-9 | - | - |
| 39 | Yttrium-88 | W, see $^{86m}Y$ | 1E+3 | 3E+2 | 1E-7 | 3E-10 | 1E-5 | 1E-4 |
| | | Y, see $^{86m}Y$ | - | 2E+2 | 1E-7 | 3E-10 | - | - |
| 39 | Yttrium-90m | W, see $^{86m}Y$ | 8E+3 | 1E+4 | 5E-6 | 2E-8 | 1E-4 | 1E-3 |
| | | Y, see $^{86m}Y$ | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| 39 | Yttrium-90 | W, see $^{86m}Y$ | 4E+2 | 7E+2 | 3E-7 | 9E-10 | - | - |
| | | | LLI wall (5E+2) | - | - | - | 7E-6 | 7E-5 |
| | | Y, see $^{86m}Y$ | - | 6E+2 | 3E-7 | 9E-10 | - | - |
| 39 | Yttrium-91m[2] | W, see $^{86m}Y$ | 1E+5 | 2E+5 | 1E-4 | 3E-7 | 2E-3 | 2E-2 |
| | | Y, see $^{86m}Y$ | - | 2E+5 | 7E-5 | 2E-7 | - | - |
| 39 | Yttrium-91 | W, see $^{86m}Y$ | 5E+2 | 2E+2 | 7E-8 | 2E-10 | - | - |
| | | | LLI wall (6E+2) | - | - | - | 8E-6 | 8E-5 |
| | | Y, see $^{86m}Y$ | - | 1E+2 | 5E-8 | 2E-10 | - | - |
| 39 | Yttrium-92 | W, see $^{86m}Y$ | 3E+3 | 9E+3 | 4E-6 | 1E-8 | 4E-5 | 4E-4 |
| | | Y, see $^{86m}Y$ | - | 8E+3 | 3E-6 | 1E-8 | - | - |
| 39 | Yttrium-93 | W, see $^{86m}Y$ | 1E+3 | 3E+3 | 1E-6 | 4E-9 | 2E-5 | 2E-4 |
| | | Y, see $^{86m}Y$ | - | 2E+3 | 1E-6 | 3E-9 | - | - |
| 39 | Yttrium-94[2] | W, see $^{86m}Y$ | 2E+4 | 8E+4 | 3E-5 | 1E-7 | - | - |
| | | | St. wall (3E+4) | - | - | - | 4E-4 | 4E-3 |
| | | Y, see $^{86m}Y$ | - | 8E+4 | 3E-5 | 1E-7 | - | - |
| 39 | Yttrium-95[2] | W, see $^{86m}Y$ | 4E+4 | 2E+5 | 6E-5 | 2E-7 | - | - |
| | | | St. wall (5E+4) | - | - | - | 7E-4 | 7E-3 |
| | | Y, see $^{86m}Y$ | - | 1E+5 | 6E-5 | 2E-7 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 40 | Zirconium-86 | D, all compounds except those given for W and Y | 1E+3 | 4E+3 | 2E-6 | 6E-9 | 2E-5 | 2E-4 |
| | | W, oxides, hydroxides, halides, and nitrates | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | Y, carbide | - | 2E+3 | 1E-6 | 3E-9 | - | - |
| 40 | Zirconium-88 | D, see $^{86}Zr$ | 4E+3 | 2E+2 | 9E-8 | 3E-10 | 5E-5 | 5E-4 |
| | | W, see $^{86}Zr$ | - | 5E+2 | 2E-7 | 7E-10 | - | - |
| | | Y, see $^{86}Zr$ | - | 3E+2 | 1E-7 | 4E-10 | - | - |
| 40 | Zirconium-89 | D, see $^{86}Zr$ | 2E+3 | 4E+3 | 1E-6 | 5E-9 | 2E-5 | 2E-4 |
| | | W, see $^{86}Zr$ | - | 2E+3 | 1E-6 | 3E-9 | - | - |
| | | Y, see $^{86}Zr$ | - | 2E+3 | 1E-6 | 3E-9 | - | - |
| 40 | Zirconium-93 | D, see $^{86}Zr$ | 1E+3 | 6E+0 | 3E-9 | - | - | - |
| | | | Bone surf (3E+3) | Bone surf (2E+1) | - | 2E-11 | 4E-5 | 4E-4 |
| | | W, see $^{86}Zr$ | - | 2E+1 | 1E-8 | - | - | - |
| | | | - | Bone surf (6E+1) | - | 9E-11 | - | - |
| | | Y, see $^{86}Zr$ | - | 6E+1 | 2E-8 | - | - | - |
| | | | - | Bone surf (7E+1) | - | 9E-11 | - | - |
| 40 | Zirconium-95 | D, see $^{86}Zr$ | 1E+3 | 1E+2 | 5E-8 | - | 2E-5 | 2E-4 |
| | | | - | Bone surf (3E+2) | - | 4E-10 | - | - |
| | | W, see $^{86}Zr$ | - | 4E+2 | 2E-7 | 5E-10 | - | - |
| | | Y, see $^{86}Zr$ | - | 3E+2 | 1E-7 | 4E-10 | - | - |
| 40 | Zirconium-97 | D, see $^{86}Zr$ | 6E+2 | 2E+3 | 8E-7 | 3E-9 | 9E-6 | 9E-5 |
| | | W, see $^{86}Zr$ | - | 1E+3 | 6E-7 | 2E-9 | - | - |
| | | Y, see $^{86}Zr$ | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| 41 | Niobium-88[2] | W, all compounds except those given for Y | 5E+4 | 2E+5 | 9E-5 | 3E-7 | - | - |
| | | | St. wall (7E+4) | - | - | - | 1E-3 | 1E-2 |
| | | Y, oxides and hydroxides | - | 2E+5 | 9E-5 | 3E-7 | - | - |
| 41 | Niobium-89m[2] (66 min) | W, see $^{88}Nb$ | 1E+4 | 4E+4 | 2E-5 | 6E-8 | 1E-4 | 1E-3 |
| | | Y, see $^{88}Nb$ | - | 4E+4 | 2E-5 | 5E-8 | - | - |
| 41 | Niobium-89 (122 min) | W, see $^{88}Nb$ | 5E+3 | 2E+4 | 8E-6 | 3E-8 | 7E-5 | 7E-4 |
| | | Y, see $^{88}Nb$ | - | 2E+4 | 6E-6 | 2E-8 | - | - |
| 41 | Niobium-90 | W, see $^{88}Nb$ | 1E+3 | 3E+3 | 1E-6 | 4E-9 | 1E-5 | 1E-4 |
| | | Y, see $^{88}Nb$ | - | 2E+3 | 1E-6 | 3E-9 | - | - |
| 41 | Niobium-93m | W, see $^{88}Nb$ | 9E+3 | 2E+3 | 8E-7 | 3E-9 | - | - |
| | | | LLI wall (1E+4) | - | - | - | 2E-4 | 2E-3 |
| | | Y, see $^{88}Nb$ | - | 2E+2 | 7E-8 | 2E-10 | - | - |
| 41 | Niobium-94 | W, see $^{88}Nb$ | 9E+2 | 2E+2 | 8E-8 | 3E-10 | 1E-5 | 1E-4 |
| | | Y, see $^{88}Nb$ | - | 2E+1 | 6E-9 | 2E-11 | - | - |
| 41 | Niobium-95m | W, see $^{88}Nb$ | 2E+3 | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 3E-5 | 3E-4 |
| | | Y, see $^{88}Nb$ | - | 2E+3 | 9E-7 | 3E-9 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values: Col. 1 Oral Ingestion ALI (μCi) | Table 1 Occupational Values: Col. 2 Inhalation ALI (μCi) | Table 1 Occupational Values: Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations: Col. 1 Air (μCi/ml) | Table 2 Effluent Concentrations: Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers: Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 41 | Niobium-95 | W, see $^{88}Nb$ | 2E+3 | 1E+3 | 5E-7 | 2E-9 | 3E-5 | 3E-4 |
| | | Y, see $^{88}Nb$ | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| 41 | Niobium-96 | W, see $^{88}Nb$ | 1E+3 | 3E+3 | 1E-6 | 4E-9 | 2E-5 | 2E-4 |
| | | Y, see $^{88}Nb$ | - | 2E+3 | 1E-6 | 3E-9 | - | - |
| 41 | Niobium-97[2] | W, see $^{88}Nb$ | 2E+4 | 8E+4 | 3E-5 | 1E-7 | 3E-4 | 3E-3 |
| | | Y, see $^{88}Nb$ | - | 7E+4 | 3E-5 | 1E-7 | - | - |
| 41 | Niobium-98[2] | W, see $^{88}Nb$ | 1E+4 | 5E+4 | 2E-5 | 8E-8 | 2E-4 | 2E-3 |
| | | Y, see $^{88}Nb$ | - | 5E+4 | 2E-5 | 7E-8 | - | - |
| 42 | Molybdenum-90 | D, all compounds except those given for Y | 4E+3 | 7E+3 | 3E-6 | 1E-8 | 3E-5 | 3E-4 |
| | | Y, oxides, hydroxides, and $MoS_2$ | 2E+3 | 5E+3 | 2E-6 | 6E-9 | - | - |
| 42 | Molybdenum-93m | D, see $^{90}Mo$ | 9E+3 | 2E+4 | 7E-6 | 2E-8 | 6E-5 | 6E-4 |
| | | Y, see $^{90}Mo$ | 4E+3 | 1E+4 | 6E-6 | 2E-8 | - | - |
| 42 | Molybdenum-93 | D, see $^{90}Mo$ | 4E+3 | 5E+3 | 2E-6 | 8E-9 | 5E-5 | 5E-4 |
| | | Y, see $^{90}Mo$ | 2E+4 | 2E+2 | 8E-8 | 2E-10 | - | - |
| 42 | Molybdenum-99 | D, see $^{90}Mo$ | 2E+3 | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | | LLI wall (1E+3) | - | - | - | 2E-5 | 2E-4 |
| | | Y, see $^{90}Mo$ | 1E+3 | 1E+3 | 6E-7 | 2E-9 | - | - |
| 42 | Molybdenum-101[2] | D, see $^{90}Mo$ | 4E+4 | 1E+5 | 6E-5 | 2E-7 | - | - |
| | | | St. wall (5E+4) | - | - | - | 7E-4 | 7E-3 |
| | | Y, see $^{90}Mo$ | - | 1E+5 | 6E-5 | 2E-7 | - | - |
| 43 | Technetium-93m[2] | D, all compounds except those given for W | 7E+4 | 2E+5 | 6E-5 | 2E-7 | 1E-3 | 1E-2 |
| | | W, oxides, hydroxides, halides, and nitrates | - | 3E+5 | 1E-4 | 4E-7 | - | - |
| 43 | Technetium-93 | D, see $^{93m}Tc$ | 3E+4 | 7E+4 | 3E-5 | 1E-7 | 4E-4 | 4E-3 |
| | | W, see $^{93m}Tc$ | - | 1E+5 | 4E-5 | 1E-7 | - | - |
| 43 | Technetium-94m[2] | D, see $^{93m}Tc$ | 2E+4 | 4E+4 | 2E-5 | 6E-8 | 3E-4 | 3E-3 |
| | | W, see $^{93m}Tc$ | - | 6E+4 | 2E-5 | 8E-8 | - | - |
| 43 | Technetium-94 | D, see $^{93m}Tc$ | 9E+3 | 2E+4 | 8E-6 | 3E-8 | 1E-4 | 1E-3 |
| | | W, see $^{93m}Tc$ | - | 2E+4 | 1E-5 | 3E-8 | - | - |
| 43 | Technetium-95m | D, see $^{93m}Tc$ | 4E+3 | 5E+3 | 2E-6 | 8E-9 | 5E-5 | 5E-4 |
| | | W, see $^{93m}Tc$ | - | 2E+3 | 8E-7 | 3E-9 | - | - |
| 43 | Technetium-95 | D, see $^{93m}Tc$ | 1E+4 | 2E+4 | 9E-6 | 3E-8 | 1E-4 | 1E-3 |
| | | W, see $^{93m}Tc$ | - | 2E+4 | 8E-6 | 3E-8 | - | - |
| 43 | Technetium-96m[2] | D, see $^{93m}Tc$ | 2E+5 | 3E+5 | 1E-4 | 4E-7 | 2E-3 | 2E-2 |
| | | W, see $^{93m}Tc$ | - | 2E+5 | 1E-4 | 3E-7 | - | - |
| 43 | Technetium-96 | D, see $^{93m}Tc$ | 2E+3 | 3E+3 | 1E-6 | 5E-9 | 3E-5 | 3E-4 |
| | | W, see $^{93m}Tc$ | - | 2E+3 | 9E-7 | 3E-9 | - | - |
| 43 | Technetium-97m | D, see $^{93m}Tc$ | 5E+3 | 7E+3 | 3E-6 | - | 6E-5 | 6E-4 |
| | | | - | St. wall (7E+3) | - | 1E-8 | - | - |
| | | W, see $^{93m}Tc$ | - | 1E+3 | 5E-7 | 2E-9 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 43 | Technetium-97 | D, see $^{93m}$Tc | 4E+4 | 5E+4 | 2E-5 | 7E-8 | 5E-4 | 5E-3 |
| | | W, see $^{93m}$Tc | - | 6E+3 | 2E-6 | 8E-9 | - | - |
| 43 | Technetium-98 | D, see $^{93m}$Tc | 1E+3 | 2E+3 | 7E-7 | 2E-9 | 1E-5 | 1E-4 |
| | | W, see $^{93m}$Tc | - | 3E+2 | 1E-7 | 4E-10 | - | - |
| 43 | Technetium-99m | D, see $^{93m}$Tc | 8E+4 | 2E+5 | 6E-5 | 2E-7 | 1E-3 | 1E-2 |
| | | W, see $^{93m}$Tc | - | 2E+5 | 1E-4 | 3E-7 | - | - |
| 43 | Technetium-99 | D, see $^{93m}$Tc | 4E+3 | 5E+3 | 2E-6 | - | 6E-5 | 6E-4 |
| | | | - | St. wall (6E+3) | - | 8E-9 | - | - |
| | | W, see $^{93m}$Tc | - | 7E+2 | 3E-7 | 9E-10 | - | - |
| 43 | Technetium-101[2] | D, see $^{93m}$Tc | 9E+4 | 3E+5 | 1E-4 | 5E-7 | - | - |
| | | | St. wall (1E+5) | - | - | - | 2E-3 | 2E-2 |
| | | W, see $^{93m}$Tc | - | 4E+5 | 2E-4 | 5E-7 | - | - |
| 43 | Technetium-104[2] | D, see $^{93m}$Tc | 2E+4 | 7E+4 | 3E-5 | 1E-7 | - | - |
| | | | St. wall (3E+4) | - | - | - | 4E-4 | 4E-3 |
| | | W, see $^{93m}$Tc | - | 9E+4 | 4E-5 | 1E-7 | - | - |
| 44 | Ruthenium-94[2] | D, all compounds except those given for W and Y | 2E+4 | 4E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| | | W, halides | - | 6E+4 | 3E-5 | 9E-8 | - | - |
| | | Y, oxides and hydroxides | - | 6E+4 | 2E-5 | 8E-8 | - | - |
| 44 | Ruthenium-97 | D, see $^{94}$Ru | 8E+3 | 2E+4 | 8E-6 | 3E-8 | 1E-4 | 1E-3 |
| | | W, see $^{94}$Ru | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| | | Y, see $^{94}$Ru | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| 44 | Ruthenium-103 | D, see $^{94}$Ru | 2E+3 | 2E+3 | 7E-7 | 2E-9 | 3E-5 | 3E-4 |
| | | W, see $^{94}$Ru | - | 1E+3 | 4E-7 | 1E-9 | - | - |
| | | Y, see $^{94}$Ru | - | 6E+2 | 3E-7 | 9E-10 | - | - |
| 44 | Ruthenium-105 | D, see $^{94}$Ru | 5E+3 | 1E+4 | 6E-6 | 2E-8 | 7E-5 | 7E-4 |
| | | W, see $^{94}$Ru | - | 1E+4 | 6E-6 | 2E-8 | - | - |
| | | Y, see $^{94}$Ru | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| 44 | Ruthenium-106 | D, see $^{94}$Ru | 2E+2 | 9E+1 | 4E-8 | 1E-10 | - | - |
| | | | LLI wall (2E+2) | - | - | - | 3E-6 | 3E-5 |
| | | W, see $^{94}$Ru | - | 5E+1 | 2E-8 | 8E-11 | - | - |
| | | Y, see $^{94}$Ru | - | 1E+1 | 5E-9 | 2E-11 | - | - |
| 45 | Rhodium-99 | D, all compounds except those given for W and Y | 2E+4 | 6E+4 | 2E-5 | 8E-8 | 2E-4 | 2E-3 |
| | | W, halides | - | 8E+4 | 3E-5 | 1E-7 | - | - |
| | | Y, oxides and hydroxides | - | 7E+4 | 3E-5 | 9E-8 | - | - |
| 45 | Rhodium-99 | D, see $^{99m}$Rh | 2E+3 | 3E+3 | 1E-6 | 4E-9 | 3E-5 | 3E-4 |
| | | W, see $^{99m}$Rh | - | 2E+3 | 9E-7 | 3E-9 | - | - |
| | | Y, see $^{99m}$Rh | - | 2E+3 | 8E-7 | 3E-9 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 45 | Rhodium-100 | D, see $^{99m}$Rh | 2E+3 | 5E+3 | 2E-6 | 7E-9 | 2E-5 | 2E-4 |
| | | W, see $^{99m}$Rh | - | 4E+3 | 2E-6 | 6E-9 | - | - |
| | | Y, see $^{99m}$Rh | - | 4E+3 | 2E-6 | 5E-9 | - | - |
| 45 | Rhodium-101m | D, see $^{99m}$Rh | 6E+3 | 1E+4 | 5E-6 | 2E-8 | 8E-5 | 8E-4 |
| | | W, see $^{99m}$Rh | - | 8E+3 | 4E-6 | 1E-8 | - | - |
| | | Y, see $^{99m}$Rh | - | 8E+3 | 3E-6 | 1E-8 | - | - |
| 45 | Rhodium-101 | D, see $^{99m}$Rh | 2E+3 | 5E+2 | 2E-7 | 7E-10 | 3E-5 | 3E-4 |
| | | W, see $^{99m}$Rh | - | 8E+2 | 3E-7 | 1E-9 | - | - |
| | | Y, see $^{99m}$Rh | - | 2E+2 | 6E-8 | 2E-10 | - | - |
| 45 | Rhodium-102m | D, see $^{99m}$Rh | 1E+3 | 5E+2 | 2E-7 | 7E-10 | - | - |
| | | | LLI wall (1E+3) | - | - | - | 2E-5 | 2E-4 |
| | | W, see $^{99m}$Rh | - | 4E+2 | 2E-7 | 5E-10 | - | - |
| | | Y, see $^{99m}$Rh | - | 1E+2 | 5E-8 | 2E-10 | - | - |
| 45 | Rhodium-102 | D, see $^{99m}$Rh | 6E+2 | 9E+1 | 4E-8 | 1E-10 | 8E-6 | 8E-5 |
| | | W, see $^{99m}$Rh | - | 2E+2 | 7E-8 | 2E-10 | - | - |
| | | Y, see $^{99m}$Rh | - | 6E+1 | 2E-8 | 8E-11 | - | - |
| 45 | Rhodium-103m[2] | D, see $^{99m}$Rh | 4E+5 | 1E+6 | 5E-4 | 2E-6 | 6E-3 | 6E-2 |
| | | W, see $^{99m}$Rh | - | 1E+6 | 5E-4 | 2E-6 | - | - |
| | | Y, see $^{99m}$Rh | - | 1E+6 | 5E-4 | 2E-6 | - | - |
| 45 | Rhodium-105 | D, see $^{99m}$Rh | 4E+3 | 1E+4 | 5E-6 | 2E-8 | - | - |
| | | | LLI wall (4E+3) | - | - | - | 5E-5 | 5E-4 |
| | | W, see $^{99m}$Rh | - | 6E+3 | 3E-6 | 9E-9 | - | - |
| | | Y, see $^{99m}$Rh | - | 6E+3 | 2E-6 | 8E-9 | - | - |
| 45 | Rhodium-106m | D, see $^{99m}$Rh | 8E+3 | 3E+4 | 1E-5 | 4E-8 | 1E-4 | 1E-3 |
| | | W, see $^{99m}$Rh | - | 4E+4 | 2E-5 | 5E-8 | - | - |
| | | Y, see $^{99m}$Rh | - | 4E+4 | 1E-5 | 5E-8 | - | - |
| 45 | Rhodium-107[2] | D, see $^{99m}$Rh | 7E+4 | 2E+5 | 1E-4 | 3E-7 | - | - |
| | | | St. wall (9E+4) | - | - | - | 1E-3 | 1E-2 |
| | | W, see $^{99m}$Rh | - | 3E+5 | 1E-4 | 4E-7 | - | - |
| | | Y, see $^{99m}$Rh | - | 3E+5 | 1E-4 | 3E-7 | - | - |
| 46 | Palladium-100 | D, all compounds except those given for W and Y | 1E+3 | 1E+3 | 6E-7 | 2E-9 | 2E-5 | 2E-4 |
| | | W, nitrates | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| | | Y, oxides and hydroxides | - | 1E+3 | 6E-7 | 2E-9 | - | - |
| 46 | Palladium-101 | D, see $^{100}$Pd | 1E+4 | 3E+4 | 1E-5 | 5E-8 | 2E-4 | 2E-3 |
| | | W, see $^{100}$Pd | - | 3E+4 | 1E-5 | 5E-8 | - | - |
| | | Y, see $^{100}$Pd | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| 46 | Palladium-103 | D, see $^{100}$Pd | 6E+3 | 6E+3 | 3E-6 | 9E-9 | - | - |
| | | | LLI wall (7E+3) | - | - | - | 1E-4 | 1E-3 |
| | | W, see $^{100}$Pd | - | 4E+3 | 2E-6 | 6E-9 | - | - |
| | | Y, see $^{100}$Pd | - | 4E+3 | 1E-6 | 5E-9 | - | - |
| 46 | Palladium-107 | D, see $^{100}$Pd | 3E+4 | 2E+4 | 9E-6 | - | - | - |
| | | | LLI wall (4E+4) | Kidneys (2E+4) | - | 3E-8 | 5E-4 | 5E-3 |
| | | W, see $^{100}$Pd | - | 7E+3 | 3E-6 | 1E-8 | - | - |
| | | Y, see $^{100}$Pd | - | 4E+2 | 2E-7 | 6E-10 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 46 | Palladium-109 | D, see $^{100}Pd$ | 2E+3 | 6E+3 | 3E-6 | 9E-9 | 3E-5 | 3E-4 |
| | | W, see $^{100}Pd$ | - | 5E+3 | 2E-6 | 8E-9 | - | - |
| | | Y, see $^{100}Pd$ | - | 5E+3 | 2E-6 | 6E-9 | - | - |
| 47 | Silver-102[2] | D, all compounds except those given for W and Y | 5E+4 | 2E+5 | 8E-5 | 2E-7 | - | - |
| | | | St. wall (6E+4) | - | - | - | 9E-4 | 9E-3 |
| | | W, nitrates and sulfides | - | 2E+5 | 9E-5 | 3E-7 | - | - |
| | | Y, oxides and hydroxides | - | 2E+5 | 8E-5 | 3E-7 | - | - |
| 47 | Silver-103[2] | D, see $^{102}Ag$ | 4E+4 | 1E+5 | 4E-5 | 1E-7 | 5E-4 | 5E-3 |
| | | W, see $^{102}Ag$ | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| | | Y, see $^{102}Ag$ | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| 47 | Silver-104m[2] | D, see $^{102}Ag$ | 3E+4 | 9E+4 | 4E-5 | 1E-7 | 4E-4 | 4E-3 |
| | | W, see $^{102}Ag$ | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| | | Y, see $^{102}Ag$ | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| 47 | Silver-104[2] | D, see $^{102}Ag$ | 2E+4 | 7E+4 | 3E-5 | 1E-7 | 3E-4 | 3E-3 |
| | | W, see $^{102}Ag$ | - | 1E+5 | 6E-5 | 2E-7 | - | - |
| | | Y, see $^{102}Ag$ | - | 1E+5 | 6E-5 | 2E-7 | - | - |
| 47 | Silver-105 | D, see $^{102}Ag$ | 3E+3 | 1E+3 | 4E-7 | 1E-9 | 4E-5 | 4E-4 |
| | | W, see $^{102}Ag$ | - | 2E+3 | 7E-7 | 2E-9 | - | - |
| | | Y, see $^{102}Ag$ | - | 2E+3 | 7E-7 | 2E-9 | - | - |
| 47 | Silver-106m | D, see $^{102}Ag$ | 8E+2 | 7E+2 | 3E-7 | 1E-9 | 1E-5 | 1E-4 |
| | | W, see $^{102}Ag$ | - | 9E+2 | 4E-7 | 1E-9 | - | - |
| | | Y, see $^{102}Ag$ | - | 9E+2 | 4E-7 | 1E-9 | - | - |
| 47 | Silver-106[2] | D, see $^{102}Ag$ | 6E+4 | 2E+5 | 8E-5 | 3E-7 | - | - |
| | | | St. wall (6E+4) | - | - | - | 9E-4 | 9E-3 |
| | | W, see $^{102}Ag$ | - | 2E+5 | 9E-5 | 3E-7 | - | - |
| | | Y, see $^{102}Ag$ | - | 2E+5 | 8E-5 | 3E-7 | - | - |
| 47 | Silver-108m | D, see $^{102}Ag$ | 6E+2 | 2E+2 | 8E-8 | 3E-10 | 9E-6 | 9E-5 |
| | | W, see $^{102}Ag$ | - | 3E+2 | 1E-7 | 4E-10 | - | - |
| | | Y, see $^{102}Ag$ | - | 2E+1 | 1E-8 | 3E-11 | - | - |
| 47 | Silver-110m | D, see $^{102}Ag$ | 5E+2 | 1E+2 | 5E-8 | 2E-10 | 6E-6 | 6E-5 |
| | | W, see $^{102}Ag$ | - | 2E+2 | 8E-8 | 3E-10 | - | - |
| | | Y, see $^{102}Ag$ | - | 9E+1 | 4E-8 | 1E-10 | - | - |
| 47 | Silver-111 | D, see $^{102}Ag$ | 9E+2 | 2E+3 | 6E-7 | - | - | - |
| | | | LLI wall (1E+3) | Liver (2E+3) | - | 2E-9 | 2E-5 | 2E-4 |
| | | W, see $^{102}Ag$ | - | 9E+2 | 4E-7 | 1E-9 | - | - |
| | | Y, see $^{102}Ag$ | - | 9E+2 | 4E-7 | 1E-9 | - | - |
| 47 | Silver-112 | D, see $^{102}Ag$ | 3E+3 | 8E+3 | 3E-6 | 1E-8 | 4E-5 | 4E-4 |
| | | W, see $^{102}Ag$ | - | 1E+4 | 4E-6 | 1E-8 | - | - |
| | | Y, see $^{102}Ag$ | - | 9E+3 | 4E-6 | 1E-8 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 47 | Silver-115[2] | D, see $^{102}$Ag | 3E+4 | 9E+4 | 4E-5 | 1E-7 | - | - |
| | | | St. wall (3E+4) | - | - | - | 4E-4 | 4E-3 |
| | | W, see $^{102}$Ag | - | 9E+4 | 4E-5 | 1E-7 | - | - |
| | | Y, see $^{102}$Ag | - | 8E+4 | 3E-5 | 1E-7 | - | - |
| 48 | Cadmium-104[2] | D, all compounds except those given for W and Y | 2E+4 | 7E+4 | 3E-5 | 9E-8 | 3E-4 | 3E-3 |
| | | W, sulfides, halides, and nitrates | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| | | Y, oxides and hydroxides | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| 48 | Cadmium-107 | D, see $^{104}$Cd | 2E+4 | 5E+4 | 2E-5 | 8E-8 | 3E-4 | 3E-3 |
| | | W, see $^{104}$Cd | - | 6E+4 | 2E-5 | 8E-8 | - | - |
| | | Y, see $^{104}$Cd | - | 5E+4 | 2E-5 | 7E-8 | - | - |
| 48 | Cadmium-109 | D, see $^{104}$Cd | 3E+2 | 4E+1 | 1E-8 | - | - | - |
| | | | Kidneys (4E+2) | Kidneys (5E+1) | - | 7E-11 | 6E-6 | 6E-5 |
| | | W, see $^{104}$Cd | - | 1E+2 | 5E-8 | - | - | - |
| | | | - | Kidneys (1E+2) | - | 2E-10 | - | - |
| | | Y, see $^{104}$Cd | - | 1E+2 | 5E-8 | 2E-10 | - | - |
| 48 | Cadmium-113m | D, see $^{104}$Cd | 2E+1 | 2E+0 | 1E-9 | - | - | - |
| | | | Kidneys (4E+1) | Kidneys (4E+0) | - | 5E-12 | 5E-7 | 5E-6 |
| | | W, see $^{104}$Cd | - | 8E+0 | 4E-9 | - | - | - |
| | | | - | Kidneys (1E+1) | - | 2E-11 | - | - |
| | | Y, see $^{104}$Cd | - | 1E+1 | 5E-9 | 2E-11 | - | - |
| 48 | Cadmium-113 | D, see $^{104}$Cd | 2E+1 | 2E+0 | 9E-10 | - | - | - |
| | | | Kidneys (3E+1) | Kidneys (3E+0) | - | 5E-12 | 4E-7 | 4E-6 |
| | | W, see $^{104}$Cd | - | 8E+0 | 3E-9 | - | - | - |
| | | | - | Kidneys (1E+1) | - | 2E-11 | - | - |
| | | Y, see $^{104}$Cd | - | 1E+1 | 6E-9 | 2E-11 | - | - |
| 48 | Cadmium-115m | D, see $^{104}$Cd | 3E+2 | 5E+1 | 2E-8 | - | 4E-6 | 4E-5 |
| | | | - | Kidneys (8E+1) | - | 1E-10 | - | - |
| | | W, see $^{104}$Cd | - | 1E+2 | 5E-8 | 2E-10 | - | - |
| | | Y, see $^{104}$Cd | - | 1E+2 | 6E-8 | 2E-10 | - | - |
| 48 | Cadmium-115 | D, see $^{104}$Cd | 9E+2 | 1E+3 | 6E-7 | 2E-9 | - | - |
| | | | LLI wall (1E+3) | - | - | - | 1E-5 | 1E-4 |
| | | W, see $^{104}$Cd | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| | | Y, see $^{104}$Cd | - | 1E+3 | 6E-7 | 2E-9 | - | - |
| 48 | Cadmium-117m | D, see $^{104}$Cd | 5E+3 | 1E+4 | 5E-6 | 2E-8 | 6E-5 | 6E-4 |
| | | W, see $^{104}$Cd | - | 2E+4 | 7E-6 | 2E-8 | - | - |
| | | Y, see $^{104}$Cd | - | 1E+4 | 6E-6 | 2E-8 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 48 | Cadmium-117 | D, see $^{104}$Cd | 5E+3 | 1E+4 | 5E-6 | 2E-8 | 6E-5 | 6E-4 |
| | | W, see $^{104}$Cd | - | 2E+4 | 7E-6 | 2E-8 | - | - |
| | | Y, see $^{104}$Cd | - | 1E+4 | 6E-6 | 2E-8 | - | - |
| 49 | Indium-109 | D, all compounds except those given for W | 2E+4 | 4E+4 | 2E-5 | 6E-8 | 3E-4 | 3E-3 |
| | | W, oxides, hydroxides, halides, and nitrates | - | 6E+4 | 3E-5 | 9E-8 | - | - |
| 49 | Indium-110[2] (69.1 min) | D, see $^{109}$In | 2E+4 | 4E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| | | W, see $^{109}$In | - | 6E+4 | 2E-5 | 8E-8 | - | - |
| 49 | Indium-110 (4.9 h) | D, see $^{109}$In | 5E+3 | 2E+4 | 7E-6 | 2E-8 | 7E-5 | 7E-4 |
| | | W, see $^{109}$In | - | 2E+4 | 8E-6 | 3E-8 | - | - |
| 49 | Indium-111 | D, see $^{109}$In | 4E+3 | 6E+3 | 3E-6 | 9E-9 | 6E-5 | 6E-4 |
| | | W, see $^{109}$In | - | 6E+3 | 3E-6 | 9E-9 | - | - |
| 49 | Indium-112[2] | D, see $^{109}$In | 2E+5 | 6E+5 | 3E-4 | 9E-7 | 2E-3 | 2E-2 |
| | | W, see $^{109}$In | - | 7E+5 | 3E-4 | 1E-6 | - | - |
| 49 | Indium-113m[2] | D, see $^{109}$In | 5E+4 | 1E+5 | 6E-5 | 2E-7 | 7E-4 | 7E-3 |
| | | W, see $^{109}$In | - | 2E+5 | 8E-5 | 3E-7 | - | - |
| 49 | Indium-114m | D, see $^{109}$In | 3E+2 | 6E+1 | 3E-8 | 9E-11 | - | - |
| | | | LLI wall (4E+2) | - | - | - | 5E-6 | 5E-5 |
| | | W, see $^{109}$In | - | 1E+2 | 4E-8 | 1E-10 | - | - |
| 49 | Indium-115m | D, see $^{109}$In | 1E+4 | 4E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| | | W, see $^{109}$In | - | 5E+4 | 2E-5 | 7E-8 | - | - |
| 49 | Indium-115 | D, see $^{109}$In | 4E+1 | 1E+0 | 6E-10 | 2E-12 | 5E-7 | 5E-6 |
| | | W, see $^{109}$In | - | 5E+0 | 2E-9 | 8E-12 | - | - |
| 49 | Indium-116m[2] | D, see $^{109}$In | 2E+4 | 8E+4 | 3E-5 | 1E-7 | 3E-4 | 3E-3 |
| | | W, see $^{109}$In | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| 49 | Indium-117m[2] | D, see $^{109}$In | 1E+4 | 3E+4 | 1E-5 | 5E-8 | 2E-4 | 2E-3 |
| | | W, see $^{109}$In | - | 4E+4 | 2E-5 | 6E-8 | - | - |
| 49 | Indium-117[2] | D, see $^{109}$In | 6E+4 | 2E+5 | 7E-5 | 2E-7 | 8E-4 | 8E-3 |
| | | W, see $^{109}$In | - | 2E+5 | 9E-5 | 3E-7 | - | - |
| 49 | Indium-119m[2] | D, see $^{109}$In | 4E+4 | 1E+5 | 5E-5 | 2E-7 | - | - |
| | | | St. wall (5E+4) | - | - | - | 7E-4 | 7E-3 |
| | | W, see $^{109}$In | - | 1E+5 | 6E-5 | 2E-7 | - | - |
| 50 | Tin-110 | D, all compounds except those given for W | 4E+3 | 1E+4 | 5E-6 | 2E-8 | 5E-5 | 5E-4 |
| | | W, sulfides, oxides, hydroxides, halides, nitrates, and stannic phosphate | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| 50 | Tin-111[2] | D, see $^{110}$Sn | 7E+4 | 2E+5 | 9E-5 | 3E-7 | 1E-3 | 1E-2 |
| | | W, see $^{110}$Sn | - | 3E+5 | 1E-4 | 4E-7 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 50 | Tin-113 | D, see $^{110}Sn$ | 2E+3 | 1E+3 | 5E-7 | 2E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 3E-5 | 3E-4 |
| | | W, see $^{110}Sn$ | - | 5E+2 | 2E-7 | 8E-10 | - | - |
| 50 | Tin-117m | D, see $^{110}Sn$ | 2E+3 | 1E+3 | 5E-7 | - | - | - |
| | | | LLI wall (2E+3) | Bone surf (2E+3) | - | 3E-9 | 3E-5 | 3E-4 |
| | | W, see $^{110}Sn$ | - | 1E+3 | 6E-7 | 2E-9 | - | - |
| 50 | Tin-119m | D, see $^{110}Sn$ | 3E+3 | 2E+3 | 1E-6 | 3E-9 | - | - |
| | | | LLI wall (4E+3) | - | - | - | 6E-5 | 6E-4 |
| | | W, see $^{110}Sn$ | - | 1E+3 | 4E-7 | 1E-9 | - | - |
| 50 | Tin-121m | D, see $^{110}Sn$ | 3E+3 | 9E+2 | 4E-7 | 1E-9 | - | - |
| | | | LLI wall (4E+3) | - | - | - | 5E-5 | 5E-4 |
| | | W, see $^{110}Sn$ | - | 5E+2 | 2E-7 | 8E-10 | - | - |
| 50 | Tin-121 | D, see $^{110}Sn$ | 6E+3 | 2E+4 | 6E-6 | 2E-8 | - | - |
| | | | LLI wall (6E+3) | - | - | - | 8E-5 | 8E-4 |
| | | W, see $^{110}Sn$ | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| 50 | Tin-123m[2] | D, see $^{110}Sn$ | 5E+4 | 1E+5 | 5E-5 | 2E-7 | 7E-4 | 7E-3 |
| | | W, see $^{110}Sn$ | - | 1E+5 | 6E-5 | 2E-7 | - | - |
| 50 | Tin-123 | D, see $^{110}Sn$ | 5E+2 | 6E+2 | 3E-7 | 9E-10 | - | - |
| | | | LLI wall (6E+2) | - | - | - | 9E-6 | 9E-5 |
| | | W, see $^{110}Sn$ | - | 2E+2 | 7E-8 | 2E-10 | - | - |
| 50 | Tin-125 | D, see $^{110}Sn$ | 4E+2 | 9E+2 | 4E-7 | 1E-9 | - | - |
| | | | LLI wall (5E+2) | - | - | - | 6E-6 | 6E-5 |
| | | W, see $^{110}Sn$ | - | 4E+2 | 1E-7 | 5E-10 | - | - |
| 50 | Tin-126 | D, see $^{110}Sn$ | 3E+2 | 6E+1 | 2E-8 | 8E-11 | 4E-6 | 4E-5 |
| | | W, see $^{110}Sn$ | - | 7E+1 | 3E-8 | 9E-11 | - | - |
| 50 | Tin-127 | D, see $^{110}Sn$ | 7E+3 | 2E+4 | 8E-6 | 3E-8 | 9E-5 | 9E-4 |
| | | W, see $^{110}Sn$ | - | 2E+4 | 8E-6 | 3E-8 | - | - |
| 50 | Tin-128[2] | D, see $^{110}Sn$ | 9E+3 | 3E+4 | 1E-5 | 4E-8 | 1E-4 | 1E-3 |
| | | W, see $^{110}Sn$ | - | 4E+4 | 1E-5 | 5E-8 | - | - |
| 51 | Antimony-115[2] | D, all compounds except those given for W | 8E+4 | 2E+5 | 1E-4 | 3E-7 | 1E-3 | 1E-2 |
| | | W, oxides, hydroxides, halides, sulfides, sulfates, and nitrates | - | 3E+5 | 1E-4 | 4E-7 | - | - |
| 51 | Antimony-116m[2] | D, see $^{115}Sb$ | 2E+4 | 7E+4 | 3E-5 | 1E-7 | 3E-4 | 3E-3 |
| | | W, see $^{115}Sb$ | - | 1E+5 | 6E-5 | 2E-7 | - | - |
| 51 | Antimony-116[2] | D, see $^{115}Sb$ | 7E+4 | 3E+5 | 1E-4 | 4E-7 | - | - |
| | | | St. wall (9E+4) | - | - | - | 1E-3 | 1E-2 |
| | | W, see $^{115}Sb$ | - | 3E+5 | 1E-4 | 5E-7 | - | - |
| 51 | Antimony-117 | D, see $^{115}Sb$ | 7E+4 | 2E+5 | 9E-5 | 3E-7 | 9E-4 | 9E-3 |
| | | W, see $^{115}Sb$ | - | 3E+5 | 1E-4 | 4E-7 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 51 | Antimony-118m | D, see $^{115}Sb$ | 6E+3 | 2E+4 | 8E-6 | 3E-8 | 7E-5 | 7E-4 |
| | | W, see $^{115}Sb$ | 5E+3 | 2E+4 | 9E-6 | 3E-8 | - | - |
| 51 | Antimony-119 | D, see $^{115}Sb$ | 2E+4 | 5E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| | | W, see $^{115}Sb$ | 2E+4 | 3E+4 | 1E-5 | 4E-8 | - | - |
| 51 | Antimony-120 (16 min) | D, see $^{115}Sb$ | 1E+5 | 4E+5 | 2E-4 | 6E-7 | - | - |
| | | | St. wall (2E+5) | - | - | - | 2E-3 | 2E-2 |
| | | W, see $^{115}Sb$ | - | 5E+5 | 2E-4 | 7E-7 | - | - |
| 51 | Antimony-120 (5.76 d) | D, see $^{115}Sb$ | 1E+3 | 2E+3 | 9E-7 | 3E-9 | 1E-5 | 1E-4 |
| | | W, see $^{115}Sb$ | 9E+2 | 1E+3 | 5E-7 | 2E-9 | - | - |
| 51 | Antimony-122 | D, see $^{115}Sb$ | 8E+2 | 2E+3 | 1E-6 | 3E-9 | - | - |
| | | | LLI wall (8E+2) | - | - | - | 1E-5 | 1E-4 |
| | | W, see $^{115}Sb$ | 7E+2 | 1E+3 | 4E-7 | 2E-9 | - | - |
| 51 | Antimony-124m[2] | D, see $^{115}Sb$ | 3E+5 | 8E+5 | 4E-4 | 1E-6 | 3E-3 | 3E-2 |
| | | W, see $^{115}Sb$ | 2E+5 | 6E+5 | 2E-4 | 8E-7 | - | - |
| 51 | Antimony-124 | D, see $^{115}Sb$ | 6E+2 | 9E+2 | 4E-7 | 1E-9 | 7E-6 | 7E-5 |
| | | W, see $^{115}Sb$ | 5E+2 | 2E+2 | 1E-7 | 3E-10 | - | - |
| 51 | Antimony-125 | D, see $^{115}Sb$ | 2E+3 | 2E+3 | 1E-6 | 3E-9 | 3E-5 | 3E-4 |
| | | W, see $^{115}Sb$ | - | 5E+2 | 2E-7 | 7E-10 | - | - |
| 51 | Antimony-126m[2] | D, see $^{115}Sb$ | 5E+4 | 2E+5 | 8E-5 | 3E-7 | - | - |
| | | | St. wall (7E+4) | - | - | - | 9E-4 | 9E-3 |
| | | W, see $^{115}Sb$ | - | 2E+5 | 8E-5 | 3E-7 | - | - |
| 51 | Antimony-126 | D, see $^{115}Sb$ | 6E+2 | 1E+3 | 5E-7 | 2E-9 | 7E-6 | 7E-5 |
| | | W, see $^{115}Sb$ | 5E+2 | 5E+2 | 2E-7 | 7E-10 | - | - |
| 51 | Antimony-127 | D, see $^{115}Sb$ | 8E+2 | 2E+3 | 9E-7 | 3E-9 | - | - |
| | | | LLI wall (8E+2) | - | - | - | 1E-5 | 1E-4 |
| | | W, see $^{115}Sb$ | 7E+2 | 9E+2 | 4E-7 | 1E-9 | - | - |
| 51 | Antimony-128[2] (10.4 min) | D, see $^{115}Sb$ | 8E+4 | 4E+5 | 2E-4 | 5E-7 | - | - |
| | | | St. wall (1E+5) | - | - | - | 1E-3 | 1E-2 |
| | | W, see $^{115}Sb$ | - | 4E+5 | 2E-4 | 6E-7 | - | - |
| 51 | Antimony-128 (9.01 h) | D, see $^{115}Sb$ | 1E+3 | 4E+3 | 2E-6 | 6E-9 | 2E-5 | 2E-4 |
| | | W, see $^{115}Sb$ | - | 3E+3 | 1E-6 | 5E-9 | - | - |
| 51 | Antimony-129 | D, see $^{115}Sb$ | 3E+3 | 9E+3 | 4E-6 | 1E-8 | 4E-5 | 4E-4 |
| | | W, see $^{115}Sb$ | - | 9E+3 | 4E-6 | 1E-8 | - | - |
| 51 | Antimony-130[2] | D, see $^{115}Sb$ | 2E+4 | 6E+4 | 3E-5 | 9E-8 | 3E-4 | 3E-3 |
| | | W, see $^{115}Sb$ | - | 8E+4 | 3E-5 | 1E-7 | - | - |
| 51 | Antimony-131[2] | D, see $^{115}Sb$ | 1E+4 | 2E+4 | 1E-5 | - | - | - |
| | | | Thyroid (2E+4) | Thyroid (4E+4) | - | 6E-8 | 2E-4 | 2E-3 |
| | | W, see $^{115}Sb$ | - | 2E+4 | 1E-5 | | - | - |
| | | | - | Thyroid (4E+4) | - | 6E-8 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 52 | Tellurium-116 | D, all compounds except those given for W | 8E+3 | 2E+4 | 9E-6 | 3E-8 | 1E-4 | 1E-3 |
| | | W, oxides, hydroxides, and nitrates | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| 52 | Tellurium-121m | D, see $^{116}$Te | 5E+2 | 2E+2 | 8E-8 | - | - | - |
| | | | Bone surf (7E+2) | Bone surf (4E+2) | - | 5E-10 | 1E-5 | 1E-4 |
| | | W, see $^{116}$Te | - | 4E+2 | 2E-7 | 6E-10 | - | - |
| 52 | Tellurium-121 | D, see $^{116}$Te | 3E+3 | 4E+3 | 2E-6 | 6E-9 | 4E-5 | 4E-4 |
| | | W, see $^{116}$Te | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| 52 | Tellurium-123m | D, see $^{116}$Te | 6E+2 | 2E+2 | 9E-8 | - | - | - |
| | | | Bone surf (1E+3) | Bone surf (5E+2) | - | 8E-10 | 1E-5 | 1E-4 |
| | | W, see $^{116}$Te | - | 5E+2 | 2E-7 | 8E-10 | - | - |
| 52 | Tellurium-123 | D, see $^{116}$Te | 5E+2 | 2E+2 | 8E-8 | - | - | - |
| | | | Bone surf (1E+3) | Bone surf (5E+2) | - | 7E-10 | 2E-5 | 2E-4 |
| | | W, see $^{116}$Te | - | 4E+2 | 2E-7 | - | - | - |
| | | | - | Bone surf (1E+3) | - | 2E-9 | - | - |
| 52 | Tellurium-125m | D, see $^{116}$Te | 1E+3 | 4E+2 | 2E-7 | - | - | - |
| | | | Bone surf (1E+3) | Bone surf (1E+3) | - | 1E-9 | 2E-5 | 2E-4 |
| | | W, see $^{116}$Te | - | 7E+2 | 3E-7 | 1E-9 | - | - |
| 52 | Tellurium-127m | D, see $^{116}$Te | 6E+2 | 3E+2 | 1E-7 | - | 9E-6 | 9E-5 |
| | | | - | Bone surf (4E+2) | - | 6E-10 | - | - |
| | | W, see $^{116}$Te | - | 3E+2 | 1E-7 | 4E-10 | - | - |
| 52 | Tellurium-127 | D, see $^{116}$Te | 7E+3 | 2E+4 | 9E-6 | 3E-8 | 1E-4 | 1E-3 |
| | | W, see $^{116}$Te | - | 2E+4 | 7E-6 | 2E-8 | - | - |
| 52 | Tellurium-129m | D, see $^{116}$Te | 5E+2 | 6E+2 | 3E-7 | 9E-10 | 7E-6 | 7E-5 |
| | | W, see $^{116}$Te | - | 2E+2 | 1E-7 | 3E-10 | - | - |
| 52 | Tellurium-129[2] | D, see $^{116}$Te | 3E+4 | 6E+4 | 3E-5 | 9E-8 | 4E-4 | 4E-3 |
| | | W, see $^{116}$Te | - | 7E+4 | 3E-5 | 1E-7 | - | - |
| 52 | Tellurium-131m | D, see $^{116}$Te | 3E+2 | 4E+2 | 2E-7 | - | - | - |
| | | | Thyroid (6E+2) | Thyroid (1E+3) | - | 2E-9 | 8E-6 | 8E-5 |
| | | W, see $^{116}$Te | - | 4E+2 | 2E-7 | - | - | - |
| | | | - | Thyroid (9E+2) | - | 1E-9 | - | - |
| 52 | Tellurium-131[2] | D, see $^{116}$Te | 3E+3 | 5E+3 | 2E-6 | - | - | - |
| | | | Thyroid (6E+3) | Thyroid (1E+4) | - | 2E-8 | 8E-5 | 8E-4 |
| | | W, see $^{116}$Te | - | 5E+3 | 2E-6 | - | - | - |
| | | | - | Thyroid (1E+4) | - | 2E-8 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 52 | Tellurium-132 | D, see $^{116}Te$ | 2E+2 | 2E+2 | 9E-8 | - | - | - |
| | | | Thyroid (7E+2) | Thyroid (8E+2) | - | 1E-9 | 9E-6 | 9E-5 |
| | | W, see $^{116}Te$ | - | 2E+2 | 9E-8 | - | - | - |
| | | | - | Thyroid (6E+2) | - | 9E-10 | - | - |
| 52 | Tellurium-133m[2] | D, see $^{116}Te$ | 3E+3 | 5E+3 | 2E-6 | - | - | - |
| | | | Thyroid (6E+3) | Thyroid (1E+4) | - | 2E-8 | 9E-5 | 9E-4 |
| | | W, see $^{116}Te$ | - | 5E+3 | 2E-6 | - | - | - |
| | | | - | Thyroid (1E+4) | - | 2E-8 | - | - |
| 52 | Tellurium-133[2] | D, see $^{116}Te$ | 1E+4 | 2E+4 | 9E-6 | - | - | - |
| | | | Thyroid (3E+4) | Thyroid (6E+4) | - | 8E-8 | 4E-4 | 4E-3 |
| | | W, see $^{116}Te$ | - | 2E+4 | 9E-6 | - | - | - |
| | | | - | Thyroid (6E+4) | - | 8E-8 | - | - |
| 52 | Tellurium-134[2] | D, see $^{116}Te$ | 2E+4 | 2E+4 | 1E-5 | - | - | - |
| | | | Thyroid (2E+4) | Thyroid (5E+4) | - | 7E-8 | 3E-4 | 3E-3 |
| | | W, see $^{116}Te$ | - | 2E+4 | 1E-5 | - | - | - |
| | | | - | Thyroid (5E+4) | - | 7E-8 | - | - |
| 53 | Iodine-120m[2] | D, all compounds | 1E+4 | 2E+4 | 9E-6 | 3E-8 | - | - |
| | | | Thyroid (1E+4) | - | - | - | 2E-4 | 2E-3 |
| 53 | Iodine-120[2] | D, all compounds | 4E+3 | 9E+3 | 4E-6 | - | - | - |
| | | | Thyroid (8E+3) | Thyroid (1E+4) | - | 2E-8 | 1E-4 | 1E-3 |
| 53 | Iodine-121 | D, all compounds | 1E+4 | 2E+4 | 8E-6 | - | - | - |
| | | | Thyroid (3E+4) | Thyroid (5E+4) | - | 7E-8 | 4E-4 | 4E-3 |
| 53 | Iodine-123 | D, all compounds | 3E+3 | 6E+3 | 3E-6 | - | - | - |
| | | | Thyroid (1E+4) | Thyroid (2E+4) | - | 2E-8 | 1E-4 | 1E-3 |
| 53 | Iodine-124 | D, all compounds | 5E+1 | 8E+1 | 3E-8 | - | - | - |
| | | | Thyroid (2E+2) | Thyroid (3E+2) | - | 4E-10 | 2E-6 | 2E-5 |
| 53 | Iodine-125 | D, all compounds | 4E+1 | 6E+1 | 3E-8 | - | - | - |
| | | | Thyroid (1E+2) | Thyroid (2E+2) | - | 3E-10 | 2E-6 | 2E-5 |
| 53 | Iodine-126 | D, all compounds | 2E+1 | 4E+1 | 1E-8 | - | - | - |
| | | | Thyroid (7E+1) | Thyroid (1E+2) | - | 2E-10 | 1E-6 | 1E-5 |
| 53 | Iodine-128[2] | D, all compounds | 4E+4 | 1E+5 | 5E-5 | 2E-7 | - | - |
| | | | St. wall (6E+4) | - | - | - | 8E-4 | 8E-3 |
| 53 | Iodine-129 | D, all compounds | 5E+0 | 9E+0 | 4E-9 | - | - | - |
| | | | Thyroid (2E+1) | Thyroid (3E+1) | - | 4E-11 | 2E-7 | 2E-6 |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 53 | Iodine-130 | D, all compounds | 4E+2 | 7E+2 | 3E-7 | - | - | - |
| | | | Thyroid (1E+3) | Thyroid (2E+3) | - | 3E-9 | 2E-5 | 2E-4 |
| 53 | Iodine-131 | D, all compounds | 3E+1 | 5E+1 | 2E-8 | - | - | - |
| | | | Thyroid (9E+1) | Thyroid (2E+2) | - | 2E-10 | 1E-6 | 1E-5 |
| 53 | Iodine-132m[2] | D, all compounds | 4E+3 | 8E+3 | 4E-6 | - | - | - |
| | | | Thyroid (1E+4) | Thyroid (2E+4) | - | 3E-8 | 1E-4 | 1E-3 |
| 53 | Iodine-132 | D, all compounds | 4E+3 | 8E+3 | 3E-6 | - | - | - |
| | | | Thyroid (9E+3) | Thyroid (1E+4) | - | 2E-8 | 1E-4 | 1E-3 |
| 53 | Iodine-133 | D, all compounds | 1E+2 | 3E+2 | 1E-7 | - | - | - |
| | | | Thyroid (5E+2) | Thyroid (9E+2) | - | 1E-9 | 7E-6 | 7E-5 |
| 53 | Iodine-134[2] | D, all compounds | 2E+4 | 5E+4 | 2E-5 | 6E-8 | - | - |
| | | | Thyroid (3E+4) | - | - | - | 4E-4 | 4E-3 |
| 53 | Iodine-135 | D, all compounds | 8E+2 | 2E+3 | 7E-7 | - | - | - |
| | | | Thyroid (3E+3) | Thyroid (4E+3) | - | 6E-9 | 3E-5 | 3E-4 |
| 54 | Xenon-120[2] | Submersion[1] | - | - | 1E-5 | 4E-8 | - | - |
| 54 | Xenon-121[2] | Submersion[1] | - | - | 2E-6 | 1E-8 | - | - |
| 54 | Xenon-122 | Submersion[1] | - | - | 7E-5 | 3E-7 | - | - |
| 54 | Xenon-123 | Submersion[1] | - | - | 6E-6 | 3E-8 | - | - |
| 54 | Xenon-125 | Submersion[1] | - | - | 2E-5 | 7E-8 | - | - |
| 54 | Xenon-127 | Submersion[1] | - | - | 1E-5 | 6E-8 | - | - |
| 54 | Xenon-129m | Submersion[1] | - | - | 2E-4 | 9E-7 | - | - |
| 54 | Xenon-131m | Submersion[1] | - | - | 4E-4 | 2E-6 | - | - |
| 54 | Xenon-133m | Submersion[1] | - | - | 1E-4 | 6E-7 | - | - |
| 54 | Xenon-133 | Submersion[1] | - | - | 1E-4 | 5E-7 | - | - |
| 54 | Xenon-135m[2] | Submersion[1] | - | - | 9E-6 | 4E-8 | - | - |
| 54 | Xenon-135 | Submersion[1] | - | - | 1E-5 | 7E-8 | - | - |
| 54 | Xenon-138[2] | Submersion[1] | - | - | 4E-6 | 2E-8 | - | - |
| 55 | Cesium-125[2] | D, all compounds | 5E+4 | 1E+5 | 6E-5 | 2E-7 | - | - |
| | | | St. wall (9E+4) | - | - | - | 1E-3 | 1E-2 |
| 55 | Cesium-127 | D, all compounds | 6E+4 | 9E+4 | 4E-5 | 1E-7 | 9E-4 | 9E-3 |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 55 | Cesium-129 | D, all compounds | 2E+4 | 3E+4 | 1E-5 | 5E-8 | 3E-4 | 3E-3 |
| 55 | Cesium-130[2] | D, all compounds | 6E+4 | 2E+5 | 8E-5 | 3E-7 | - | - |
| | | | St. wall (1E+5) | - | - | - | 1E-3 | 1E-2 |
| 55 | Cesium-131 | D, all compounds | 2E+4 | 3E+4 | 1E-5 | 4E-8 | 3E-4 | 3E-3 |
| 55 | Cesium-132 | D, all compounds | 3E+3 | 4E+3 | 2E-6 | 6E-9 | 4E-5 | 4E-4 |
| 55 | Cesium-134m | D, all compounds | 1E+5 | 1E+5 | 6E-5 | 2E-7 | - | - |
| | | | St. wall (1E+5) | - | - | - | 2E-3 | 2E-2 |
| 55 | Cesium-134 | D, all compounds | 7E+1 | 1E+2 | 4E-8 | 2E-10 | 9E-7 | 9E-6 |
| 55 | Cesium-135m[2] | D, all compounds | 1E+5 | 2E+5 | 8E-5 | 3E-7 | 1E-3 | 1E-2 |
| 55 | Cesium-135 | D, all compounds | 7E+2 | 1E+3 | 5E-7 | 2E-9 | 1E-5 | 1E-4 |
| 55 | Cesium-136 | D, all compounds | 4E+2 | 7E+2 | 3E-7 | 9E-10 | 6E-6 | 6E-5 |
| 55 | Cesium-137 | D, all compounds | 1E+2 | 2E+2 | 6E-8 | 2E-10 | 1E-6 | 1E-5 |
| 55 | Cesium-138[2] | D, all compounds | 2E+4 | 6E+4 | 2E-5 | 8E-8 | - | - |
| | | | St. wall (3E+4) | - | - | - | 4E-4 | 4E-3 |
| 56 | Barium-126[2] | D, all compounds | 6E+3 | 2E+4 | 6E-6 | 2E-8 | 8E-5 | 8E-4 |
| 56 | Barium-128 | D, all compounds | 5E+2 | 2E+3 | 7E-7 | 2E-9 | 7E-6 | 7E-5 |
| 56 | Barium-131m[2] | D, all compounds | 4E+5 | 1E+6 | 6E-4 | 2E-6 | - | - |
| | | | St. wall (5E+5) | - | - | - | 7E-3 | 7E-2 |
| 56 | Barium-131 | D, all compounds | 3E+3 | 8E+3 | 3E-6 | 1E-8 | 4E-5 | 4E-4 |
| 56 | Barium-133m | D, all compounds | 2E+3 | 9E+3 | 4E-6 | 1E-8 | - | - |
| | | | LLI wall (3E+3) | - | - | - | 4E-5 | 4E-4 |
| 56 | Barium-133 | D, all compounds | 2E+3 | 7E+2 | 3E-7 | 9E-10 | 2E-5 | 2E-4 |
| 56 | Barium-135m | D, all compounds | 3E+3 | 1E+4 | 5E-6 | 2E-8 | 4E-5 | 4E-4 |
| 56 | Barium-139[2] | D, all compounds | 1E+4 | 3E+4 | 1E-5 | 4E-8 | 2E-4 | 2E-3 |
| 56 | Barium-140 | D, all compounds | 5E+2 | 1E+3 | 6E-7 | 2E-9 | - | - |
| | | | LLI wall (6E+2) | - | - | - | 8E-6 | 8E-5 |
| 56 | Barium-141[2] | D, all compounds | 2E+4 | 7E+4 | 3E-5 | 1E-7 | 3E-4 | 3E-3 |
| 56 | Barium-142[2] | D, all compounds | 5E+4 | 1E+5 | 6E-5 | 2E-7 | 7E-4 | 7E-3 |
| 57 | Lanthanum-131[2] | D, all compounds except those given for W | 5E+4 [4] | 1E+5 | 5E-5 | 2E-7 | 6E-4 | 6E-3 |
| | | W, oxides and hydroxides | - | 2E+5 | 7E-5 | 2E-7 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values: Col. 1 Oral Ingestion ALI (μCi) | Table 1 Occupational Values: Col. 2 Inhalation ALI (μCi) | Table 1 Occupational Values: Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations: Col. 1 Air (μCi/ml) | Table 2 Effluent Concentrations: Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers: Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 57 | Lanthanum-132 | D, see $^{131}$La | 3E+3 | 1E+4 | 4E-6 | 1E-8 | 4E-5 | 4E-4 |
| | | W, see $^{131}$La | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| 57 | Lanthanum-135 | D, see $^{131}$La | 4E+4 | 1E+5 | 4E-5 | 1E-7 | 5E-4 | 5E-3 |
| | | W, see $^{131}$La | - | 9E+4 | 4E-5 | 1E-7 | - | - |
| 57 | Lanthanum-137 | D, see $^{131}$La | 1E+4 | 6E+1 | 3E-8 | - | 2E-4 | 2E-3 |
| | | | - | Liver (7E+1) | - | 1E-10 | - | - |
| | | W, see $^{131}$La | - | 3E+2 | 1E-7 | - | - | - |
| | | | - | Liver (3E+2) | - | 4E-10 | - | - |
| 57 | Lanthanum-138 | D, see $^{131}$La | 9E+2 | 4E+0 | 1E-9 | 5E-12 | 1E-5 | 1E-4 |
| | | W, see $^{131}$La | - | 1E+1 | 6E-9 | 2E-11 | - | - |
| 57 | Lanthanum-140 | D, see $^{131}$La | 6E+2 | 1E+3 | 6E-7 | 2E-9 | 9E-6 | 9E-5 |
| | | W, see $^{131}$La | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| 57 | Lanthanum-141 | D, see $^{131}$La | 4E+3 | 9E+3 | 4E-6 | 1E-8 | 5E-5 | 5E-4 |
| | | W, see $^{131}$La | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| 57 | Lanthanum-142[2] | D, see $^{131}$La | 8E+3 | 2E+4 | 9E-6 | 3E-8 | 1E-4 | 1E-3 |
| | | W, see $^{131}$La | - | 3E+4 | 1E-5 | 5E-8 | - | - |
| 57 | Lanthanum-143[2] | D, see $^{131}$La | 4E+4 | 1E+5 | 4E-5 | 1E-7 | - | - |
| | | | St. wall (4E+4) | - | - | - | 5E-4 | 5E-3 |
| | | W, see $^{131}$La | - | 9E+4 | 4E-5 | 1E-7 | - | - |
| 58 | Cerium-134 | W, all compounds except those given for Y | 5E+2 | 7E+2 | 3E-7 | 1E-9 | - | - |
| | | | LLI wall (6E+2) | - | - | - | 8E-6 | 8E-5 |
| | | Y, oxides, hydroxides, and fluorides | - | 7E+2 | 3E-7 | 9E-10 | - | - |
| 58 | Cerium-135 | W, see $^{134}$Ce | 2E+3 | 4E+3 | 2E-6 | 5E-9 | 2E-5 | 2E-4 |
| | | Y, see $^{134}$Ce | - | 4E+3 | 1E-6 | 5E-9 | - | - |
| 58 | Cerium-137m | W, see $^{134}$Ce | 2E+3 | 4E+3 | 2E-6 | 6E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 3E-5 | 3E-4 |
| | | Y, see $^{134}$Ce | - | 4E+3 | 2E-6 | 5E-9 | - | - |
| 58 | Cerium-137 | W, see $^{134}$Ce | 5E+4 | 1E+5 | 6E-5 | 2E-7 | 7E-4 | 7E-3 |
| | | Y, see $^{134}$Ce | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| 58 | Cerium-139 | W, see $^{134}$Ce | 5E+3 | 8E+2 | 3E-7 | 1E-9 | 7E-5 | 7E-4 |
| | | Y, see $^{134}$Ce | - | 7E+2 | 3E-7 | 9E-10 | - | - |
| 58 | Cerium-141 | W, see $^{134}$Ce | 2E+3 | 7E+2 | 3E-7 | 1E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 3E-5 | 3E-4 |
| | | Y, see $^{134}$Ce | - | 6E+2 | 2E-7 | 8E-10 | - | - |
| 58 | Cerium-143 | W, see $^{134}$Ce | 1E+3 | 2E+3 | 8E-7 | 3E-9 | - | - |
| | | | LLI wall (1E+3) | - | - | - | 2E-5 | 2E-4 |
| | | Y, see $^{134}$Ce | - | 2E+3 | 7E-7 | 2E-9 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values: Col. 1 Oral Ingestion ALI (μCi) | Table 1 Occupational Values: Col. 2 Inhalation ALI (μCi) | Table 1 Occupational Values: Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations: Col. 1 Air (μCi/ml) | Table 2 Effluent Concentrations: Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers: Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 58 | Cerium-144 | W, see $^{134}$Ce | 2E+2 | 3E+1 | 1E-8 | 4E-11 | - | - |
| | | | LLI wall (3E+2) | - | - | - | 3E-6 | 3E-5 |
| | | Y, see $^{134}$Ce | - | 1E+1 | 6E-9 | 2E-11 | - | - |
| 59 | Praseodymium-136[2] | W, all compounds except those given for Y | 5E+4 | 2E+5 | 1E-4 | 3E-7 | - | - |
| | | | St. wall (7E+4) | - | - | - | 1E-3 | 1E-2 |
| | | Y, oxides, hydroxides, carbides, and fluorides | - | 2E+5 | 9E-5 | 3E-7 | - | - |
| 59 | Praseodymium-137[2] | W, see $^{136}$Pr | 4E+4 | 2E+5 | 6E-5 | 2E-7 | 5E-4 | 5E-3 |
| | | Y, see $^{136}$Pr | - | 1E+5 | 6E-5 | 2E-7 | - | - |
| 59 | Praseodymium-138m | W, see $^{136}$Pr | 1E+4 | 5E+4 | 2E-5 | 8E-8 | 1E-4 | 1E-3 |
| | | Y, see $^{136}$Pr | - | 4E+4 | 2E-5 | 6E-8 | - | - |
| 59 | Praseodymium-139 | W, see $^{136}$Pr | 4E+4 | 1E+5 | 5E-5 | 2E-7 | 6E-4 | 6E-3 |
| | | Y, see $^{136}$Pr | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| 59 | Praseodymium-142m[2] | W, see $^{136}$Pr | 8E+4 | 2E+5 | 7E-5 | 2E-7 | 1E-3 | 1E-2 |
| | | Y, see $^{136}$Pr | - | 1E+5 | 6E-5 | 2E-7 | - | - |
| 59 | Praseodymium-142 | W, see $^{136}$Pr | 1E+3 | 2E+3 | 9E-7 | 3E-9 | 1E-5 | 1E-4 |
| | | Y, see $^{136}$Pr | - | 2E+3 | 8E-7 | 3E-9 | - | - |
| 59 | Praseodymium-143 | W, see $^{136}$Pr | 9E+2 | 8E+2 | 3E-7 | 1E-9 | - | - |
| | | | LLI wall (1E+3) | - | - | - | 2E-5 | 2E-4 |
| | | Y, see $^{136}$Pr | - | 7E+2 | 3E-7 | 9E-10 | - | - |
| 59 | Praseodymium-144[2] | W, see $^{136}$Pr | 3E+4 | 1E+5 | 5E-5 | 2E-7 | - | - |
| | | | St. wall (4E+4) | - | - | - | 6E-4 | 6E-3 |
| | | Y, see $^{136}$Pr | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| 59 | Praseodymium-145 | W, see $^{136}$Pr | 3E+3 | 9E+3 | 4E-6 | 1E-8 | 4E-5 | 4E-4 |
| | | Y, see $^{136}$Pr | - | 8E+3 | 3E-6 | 1E-8 | - | - |
| 59 | Praseodymium-147[2] | W, see $^{136}$Pr | 5E+4 | 2E+5 | 8E-5 | 3E-7 | - | - |
| | | | St. wall (8E+4) | - | - | - | 1E-3 | 1E-2 |
| | | Y, see $^{136}$Pr | - | 2E+5 | 8E-5 | 3E-7 | - | - |
| 60 | Neodymium-136[2] | W, all compounds except those given for Y | 1E+4 | 6E+4 | 2E-5 | 8E-8 | 2E-4 | 2E-3 |
| | | Y, oxides, hydroxides, carbides, and fluorides | - | 5E+4 | 2E-5 | 8E-8 | - | - |
| 60 | Neodymium-138 | W, see $^{136}$Nd | 2E+3 | 6E+3 | 3E-6 | 9E-9 | 3E-5 | 3E-4 |
| | | Y, see $^{136}$Nd | - | 5E+3 | 2E-6 | 7E-9 | - | - |
| 60 | Neodymium-139m | W, see $^{136}$Nd | 5E+3 | 2E+4 | 7E-6 | 2E-8 | 7E-5 | 7E-4 |
| | | Y, see $^{136}$Nd | - | 1E+4 | 6E-6 | 2E-8 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 60 | Neodymium-139[2] | W, see $^{136}$Nd | 9E+4 | 3E+5 | 1E-4 | 5E-7 | 1E-3 | 1E-2 |
| | | Y, see $^{136}$Nd | - | 3E+5 | 1E-4 | 4E-7 | - | - |
| 60 | Neodymium-141 | W, see $^{136}$Nd | 2E+5 | 7E+5 | 3E-4 | 1E-6 | 2E-3 | 2E-2 |
| | | Y, see $^{136}$Nd | - | 6E+5 | 3E-4 | 9E-7 | - | - |
| 60 | Neodymium-147 | W, see $^{136}$Nd | 1E+3 | 9E+2 | 4E-7 | 1E-9 | - | - |
| | | | LLI wall (1E+3) | - | - | - | 2E-5 | 2E-4 |
| | | Y, see $^{136}$Nd | - | 8E+2 | 4E-7 | 1E-9 | - | - |
| 60 | Neodymium-149[2] | W, see $^{136}$Nd | 1E+4 | 3E+4 | 1E-5 | 4E-8 | 1E-4 | 1E-3 |
| | | Y, see $^{136}$Nd | - | 2E+4 | 1E-5 | 3E-8 | - | - |
| 60 | Neodymium-151[2] | W, see $^{136}$Nd | 7E+4 | 2E+5 | 8E-5 | 3E-7 | 9E-4 | 9E-3 |
| | | Y, see $^{136}$Nd | - | 2E+5 | 8E-5 | 3E-7 | - | - |
| 61 | Promethium-141[2] | W, all compounds except those given for Y | 5E+4 | 2E+5 | 8E-5 | 3E-7 | - | - |
| | | | St. wall (6E+4) | - | - | - | 8E-4 | 8E-3 |
| | | Y, oxides, hydroxides, carbides, and fluorides | - | 2E+5 | 7E-5 | 2E-7 | - | - |
| 61 | Promethium-143 | W, see $^{141}$Pm | 5E+3 | 6E+2 | 2E-7 | 8E-10 | 7E-5 | 7E-4 |
| | | Y, see $^{141}$Pm | - | 7E+2 | 3E-7 | 1E-9 | - | - |
| 61 | Promethium-144 | W, see $^{141}$Pm | 1E+3 | 1E+2 | 5E-8 | 2E-10 | 2E-5 | 2E-4 |
| | | Y, see $^{141}$Pm | - | 1E+2 | 5E-8 | 2E-10 | - | - |
| 61 | Promethium-145 | W, see $^{141}$Pm | 1E+4 | 2E+2 | 7E-8 | - | 1E-4 | 1E-3 |
| | | | - | Bone surf (2E+2) | - | 3E-10 | - | - |
| | | Y, see $^{141}$Pm | - | 2E+2 | 8E-8 | 3E-10 | - | - |
| 61 | Promethium-146 | W, see $^{141}$Pm | 2E+3 | 5E+1 | 2E-8 | 7E-11 | 2E-5 | 2E-4 |
| | | Y, see $^{141}$Pm | - | 4E+1 | 2E-8 | 6E-11 | - | - |
| 61 | Promethium-147 | W, see $^{141}$Pm | 4E+3 | 1E+2 | 5E-8 | - | - | - |
| | | | LLI wall (5E+3) | Bone surf (2E+2) | - | 3E-10 | 7E-5 | 7E-4 |
| | | Y, see $^{141}$Pm | - | 1E+2 | 6E-8 | 2E-10 | - | - |
| 61 | Promethium-148m | W, see $^{141}$Pm | 7E+2 | 3E+2 | 1E-7 | 4E-10 | 1E-5 | 1E-4 |
| | | Y, see $^{141}$Pm | - | 3E+2 | 1E-7 | 5E-10 | - | - |
| 61 | Promethium-148 | W, see $^{141}$Pm | 4E+2 | 5E+2 | 2E-7 | 8E-10 | - | - |
| | | | LLI wall (5E+2) | - | - | - | 7E-6 | 7E-5 |
| | | Y, see $^{141}$Pm | - | 5E+2 | 2E-7 | 7E-10 | - | - |
| 61 | Promethium-149 | W, see $^{141}$Pm | 1E+3 | 2E+3 | 8E-7 | 3E-9 | - | - |
| | | | LLI wall (1E+3) | - | - | - | 2E-5 | 2E-4 |
| | | Y, see $^{141}$Pm | - | 2E+3 | 8E-7 | 2E-9 | - | - |
| 61 | Promethium-150 | W, see $^{141}$Pm | 5E+3 | 2E+4 | 8E-6 | 3E-8 | 7E-5 | 7E-4 |
| | | Y, see $^{141}$Pm | - | 2E+4 | 7E-6 | 2E-8 | - | - |
| 61 | Promethium-151 | W, see $^{141}$Pm | 2E+3 | 4E+3 | 1E-6 | 5E-9 | 2E-5 | 2E-4 |
| | | Y, see $^{141}$Pm | - | 3E+3 | 1E-6 | 4E-9 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| 62 | Samarium-141m[2] | W, all compounds | 3E+4 | 1E+5 | 4E-5 | 1E-7 | 4E-4 | 4E-3 |
| 62 | Samarium-141[2] | W, all compounds | 5E+4 | 2E+5 | 8E-5 | 2E-7 | - | - |
| | | | St. wall (6E+4) | - | | - | 8E-4 | 8E-3 |
| 62 | Samarium-142[2] | W, all compounds | 8E+3 | 3E+4 | 1E-5 | 4E-8 | 1E-4 | 1E-3 |
| 62 | Samarium-145 | W, all compounds | 6E+3 | 5E+2 | 2E-7 | 7E-10 | 8E-5 | 8E-4 |
| 62 | Samarium-146 | W, all compounds | 1E+1 | 4E-2 | 1E-11 | - | - | - |
| | | | Bone surf (3E+1) | Bone surf (6E-2) | - | 9E-14 | 3E-7 | 3E-6 |
| 62 | Samarium-147 | W, all compounds | 2E+1 | 4E-2 | 2E-11 | - | - | - |
| | | | Bone surf (3E+1) | Bone surf (7E-2) | - | 1E-13 | 4E-7 | 4E-6 |
| 62 | Samarium-151 | W, all compounds | 1E+4 | 1E+2 | 4E-8 | - | - | - |
| | | | LLI wall (1E+4) | Bone surf (2E+2) | - | 2E-10 | 2E-4 | 2E-3 |
| 62 | Samarium-153 | W, all compounds | 2E+3 | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 3E-5 | 3E-4 |
| 62 | Samarium-155[2] | W, all compounds | 6E+4 | 2E+5 | 9E-5 | 3E-7 | - | - |
| | | | St. wall (8E+4) | - | - | - | 1E-3 | 1E-2 |
| 62 | Samarium-156 | W, all compounds | 5E+3 | 9E+3 | 4E-6 | 1E-8 | 7E-5 | 7E-4 |
| 63 | Europium-145 | W, all compounds | 2E+3 | 2E+3 | 8E-7 | 3E-9 | 2E-5 | 2E-4 |
| 63 | Europium-146 | W, all compounds | 1E+3 | 1E+3 | 5E-7 | 2E-9 | 1E-5 | 1E-4 |
| 63 | Europium-147 | W, all compounds | 3E+3 | 2E+3 | 7E-7 | 2E-9 | 4E-5 | 4E-4 |
| 63 | Europium-148 | W, all compounds | 1E+3 | 4E+2 | 1E-7 | 5E-10 | 1E-5 | 1E-4 |
| 63 | Europium-149 | W, all compounds | 1E+4 | 3E+3 | 1E-6 | 4E-9 | 2E-4 | 2E-3 |
| 63 | Europium-150 (12.62 h) | W, all compounds | 3E+3 | 8E+3 | 4E-6 | 1E-8 | 4E-5 | 4E-4 |
| 63 | Europium-150 (34.2 y) | W, all compounds | 8E+2 | 2E+1 | 8E-9 | 3E-11 | 1E-5 | 1E-4 |
| 63 | Europium-152m | W, all compounds | 3E+3 | 6E+3 | 3E-6 | 9E-9 | 4E-5 | 4E-4 |
| 63 | Europium-152 | W, all compounds | 8E+2 | 2E+1 | 1E-8 | 3E-11 | 1E-5 | 1E-4 |
| 63 | Europium-154 | W, all compounds | 5E+2 | 2E+1 | 8E-9 | 3E-11 | 7E-6 | 7E-5 |
| 63 | Europium-155 | W, all compounds | 4E+3 | 9E+1 | 4E-8 | - | 5E-5 | 5E-4 |
| | | | - | Bone surf (1E+2) | - | 2E-10 | - | - |
| 63 | Europium-156 | W, all compounds | 6E+2 | 5E+2 | 2E-7 | 6E-10 | 8E-6 | 8E-5 |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 63 | Europium-157 | W, all compounds | 2E+3 | 5E+3 | 2E-6 | 7E-9 | 3E-5 | 3E-4 |
| 63 | Europium-158[2] | W, all compounds | 2E+4 | 6E+4 | 2E-5 | 8E-8 | 3E-4 | 3E-3 |
| 64 | Gadolinium-145[2] | D, all compounds except those given for W | 5E+4 | 2E+5 | 6E-5 | 2E-7 | - | - |
| | | | St. wall (5E+4) | - | - | - | 6E-4 | 6E-3 |
| | | W, oxides, hydroxides, and fluorides | - | 2E+5 | 7E-5 | 2E-7 | - | - |
| 64 | Gadolinium-146 | D, see $^{145}$Gd | 1E+3 | 1E+2 | 5E-8 | 2E-10 | 2E-5 | 2E-4 |
| | | W, see $^{145}$Gd | - | 3E+2 | 1E-7 | 4E-10 | - | - |
| 64 | Gadolinium-147 | D, see $^{145}$Gd | 2E+3 | 4E+3 | 2E-6 | 6E-9 | 3E-5 | 3E-4 |
| | | W, see $^{145}$Gd | - | 4E+3 | 1E-6 | 5E-9 | - | - |
| 64 | Gadolinium-148 | D, see $^{145}$Gd | 1E+1 | 8E-3 | 3E-12 | - | - | - |
| | | | Bone surf (2E+1) | Bone surf (2E-2) | - | 2E-14 | 3E-7 | 3E-6 |
| | | W, see $^{145}$Gd | - | 3E-2 | 1E-11 | - | - | - |
| | | | - | Bone surf (6E-2) | - | 8E-14 | - | - |
| 64 | Gadolinium-149 | D, see $^{145}$Gd | 3E+3 | 2E+3 | 9E-7 | 3E-9 | 4E-5 | 4E-4 |
| | | W, see $^{145}$Gd | - | 2E+3 | 1E-6 | 3E-9 | - | - |
| 64 | Gadolinium-151 | D, see $^{145}$Gd | 6E+3 | 4E+2 | 2E-7 | - | 9E-5 | 9E-4 |
| | | | - | Bone surf (6E+2) | - | 9E-10 | - | - |
| | | W, see $^{145}$Gd | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| 64 | Gadolinium-152 | D, see $^{145}$Gd | 2E+1 | 1E-2 | 4E-12 | - | - | - |
| | | | Bone surf (3E+1) | Bone surf (2E-2) | - | 3E-14 | 4E-7 | 4E-6 |
| | | W, see $^{145}$Gd | - | 4E-2 | 2E-11 | - | - | - |
| | | | - | Bone surf (8E-2) | - | 1E-13 | - | - |
| 64 | Gadolinium-153 | D, see $^{145}$Gd | 5E+3 | 1E+2 | 6E-8 | - | 6E-5 | 6E-4 |
| | | | - | Bone surf (2E+2) | - | 3E-10 | - | - |
| | | W, see $^{145}$Gd | - | 6E+2 | 2E-7 | 8E-10 | - | - |
| 64 | Gadolinium-159 | D, see $^{145}$Gd | 3E+3 | 8E+3 | 3E-6 | 1E-8 | 4E-5 | 4E-4 |
| | | W, see $^{145}$Gd | - | 6E+3 | 2E-6 | 8E-9 | - | - |
| 65 | Terbium-147[2] | W, all compounds | 9E+3 | 3E+4 | 1E-5 | 5E-8 | 1E-4 | 1E-3 |
| 65 | Terbium-149 | W, all compounds | 5E+3 | 7E+2 | 3E-7 | 1E-9 | 7E-5 | 7E-4 |
| 65 | Terbium-150 | W, all compounds | 5E+3 | 2E+4 | 9E-6 | 3E-8 | 7E-5 | 7E-4 |
| 65 | Terbium-151 | W, all compounds | 4E+3 | 9E+3 | 4E-6 | 1E-8 | 5E-5 | 5E-4 |
| 65 | Terbium-153 | W, all compounds | 5E+3 | 7E+3 | 3E-6 | 1E-8 | 7E-5 | 7E-4 |
| 65 | Terbium-154 | W, all compounds | 2E+3 | 4E+3 | 2E-6 | 6E-9 | 2E-5 | 2E-4 |
| 65 | Terbium-155 | W, all compounds | 6E+3 | 8E+3 | 3E-6 | 1E-8 | 8E-5 | 8E-4 |
| 65 | Terbium-156m (5.0 h) | W, all compounds | 2E+4 | 3E+4 | 1E-5 | 4E-8 | 2E-4 | 2E-3 |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 65 | Terbium-156m (24.4 h) | W, all compounds | 7E+3 | 8E+3 | 3E-6 | 1E-8 | 1E-4 | 1E-3 |
| 65 | Terbium-156 | W, all compounds | 1E+3 | 1E+3 | 6E-7 | 2E-9 | 1E-5 | 1E-4 |
| 65 | Terbium-157 | W, all compounds | 5E+4 | 3E+2 | 1E-7 | - | - | - |
| | | | LLI wall (5E+4) | Bone surf (6E+2) | - | 8E-10 | 7E-4 | 7E-3 |
| 65 | Terbium-158 | W, all compounds | 1E+3 | 2E+1 | 8E-9 | 3E-11 | 2E-5 | 2E-4 |
| 65 | Terbium-160 | W, all compounds | 8E+2 | 2E+2 | 9E-8 | 3E-10 | 1E-5 | 1E-4 |
| 65 | Terbium-161 | W, all compounds | 2E+3 | 2E+3 | 7E-7 | 2E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 3E-5 | 3E-4 |
| 66 | Dysprosium-155 | W, all compounds | 9E+3 | 3E+4 | 1E-5 | 4E-8 | 1E-4 | 1E-3 |
| 66 | Dysprosium-157 | W, all compounds | 2E+4 | 6E+4 | 3E-5 | 9E-8 | 3E-4 | 3E-3 |
| 66 | Dysprosium-159 | W, all compounds | 1E+4 | 2E+3 | 1E-6 | 3E-9 | 2E-4 | 2E-3 |
| 66 | Dysprosium-165 | W, all compounds | 1E+4 | 5E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| 66 | Dysprosium-166 | W, all compounds | 6E+2 | 7E+2 | 3E-7 | 1E-9 | - | - |
| | | | LLI wall (8E+2) | - | - | - | 1E-5 | 1E-4 |
| 67 | Holmium-155[2] | W, all compounds | 4E+4 | 2E+5 | 6E-5 | 2E-7 | 6E-4 | 6E-3 |
| 67 | Holmium-157[2] | W, all compounds | 3E+5 | 1E+6 | 6E-4 | 2E-6 | 4E-3 | 4E-2 |
| 67 | Holmium-159[2] | W, all compounds | 2E+5 | 1E+6 | 4E-4 | 1E-6 | 3E-3 | 3E-2 |
| 67 | Holmium-161 | W, all compounds | 1E+5 | 4E+5 | 2E-4 | 6E-7 | 1E-3 | 1E-2 |
| 67 | Holmium-162m[2] | W, all compounds | 5E+4 | 3E+5 | 1E-4 | 4E-7 | 7E-4 | 7E-3 |
| 67 | Holmium-162[2] | W, all compounds | 5E+5 | 2E+6 | 1E-3 | 3E-6 | - | - |
| | | | St. wall (8E+5) | - | - | - | 1E-2 | 1E-1 |
| 67 | Holmium-164m[2] | W, all compounds | 1E+5 | 3E+5 | 1E-4 | 4E-7 | 1E-3 | 1E-2 |
| 67 | Holmium-164[2] | W, all compounds | 2E+5 | 6E+5 | 3E-4 | 9E-7 | - | - |
| | | | St. wall (2E+5) | - | - | - | 3E-3 | 3E-2 |
| 67 | Holmium-166m | W, all compounds | 6E+2 | 7E+0 | 3E-9 | 9E-12 | 9E-6 | 9E-5 |
| 67 | Holmium-166 | W, all compounds | 9E+2 | 2E+3 | 7E-7 | 2E-9 | - | - |
| | | | LLI wall (9E+2) | - | - | - | 1E-5 | 1E-4 |
| 67 | Holmium-167 | W, all compounds | 2E+4 | 6E+4 | 2E-5 | 8E-8 | 2E-4 | 2E-3 |
| 68 | Erbium-161 | W, all compounds | 2E+4 | 6E+4 | 3E-5 | 9E-8 | 2E-4 | 2E-3 |
| 68 | Erbium-165 | W, all compounds | 6E+4 | 2E+5 | 8E-5 | 3E-7 | 9E-4 | 9E-3 |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values: Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations: Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers: Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 68 | Erbium-169 | W, all compounds | 3E+3 | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | | LLI wall (4E+3) | - | - | - | 5E-5 | 5E-4 |
| 68 | Erbium-171 | W, all compounds | 4E+3 | 1E+4 | 4E-6 | 1E-8 | 5E-5 | 5E-4 |
| 68 | Erbium-172 | W, all compounds | 1E+3 | 1E+3 | 6E-7 | 2E-9 | - | - |
| | | | LLI wall (1E+3) | - | - | - | 2E-5 | 2E-4 |
| 69 | Thulium-162[2] | W, all compounds | 7E+4 | 3E+5 | 1E-4 | 4E-7 | - | - |
| | | | St. wall (7E+4) | - | - | - | 1E-3 | 1E-2 |
| 69 | Thulium-166 | W, all compounds | 4E+3 | 1E+4 | 6E-6 | 2E-8 | 6E-5 | 6E-4 |
| 69 | Thulium-167 | W, all compounds | 2E+3 | 2E+3 | 8E-7 | 3E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 3E-5 | 3E-4 |
| 69 | Thulium-170 | W, all compounds | 8E+2 | 2E+2 | 9E-8 | 3E-10 | - | - |
| | | | LLI wall (1E+3) | - | - | - | 1E-5 | 1E-4 |
| 69 | Thulium-171 | W, all compounds | 1E+4 | 3E+2 | 1E-7 | - | - | - |
| | | | LLI wall (1E+4) | Bone surf (6E+2) | - | 8E-10 | 2E-4 | 2E-3 |
| 69 | Thulium-172 | W, all compounds | 7E+2 | 1E+3 | 5E-7 | 2E-9 | - | - |
| | | | LLI wall (8E+2) | - | - | - | 1E-5 | 1E-4 |
| 69 | Thulium-173 | W, all compounds | 4E+3 | 1E+4 | 5E-6 | 2E-8 | 6E-5 | 6E-4 |
| 69 | Thulium-175[2] | W, all compounds | 7E+4 | 3E+5 | 1E-4 | 4E-7 | - | - |
| | | | St. wall (9E+4) | - | - | - | 1E-3 | 1E-2 |
| 70 | Ytterbium-162[2] | W, all compounds except those given for Y | 7E+4 | 3E+5 | 1E-4 | 4E-7 | 1E-3 | 1E-2 |
| | | Y, oxides, hydroxides, and fluorides | - | 3E+5 | 1E-4 | 4E-7 | - | - |
| 70 | Ytterbium-166 | W, see $^{162}$Yb | 1E+3 | 2E+3 | 8E-7 | 3E-9 | 2E-5 | 2E-4 |
| | | Y, see $^{162}$Yb | - | 2E+3 | 8E-7 | 3E-9 | - | - |
| 70 | Ytterbium-167[2] | W, see $^{162}$Yb | 3E+5 | 8E+5 | 3E-4 | 1E-6 | 4E-3 | 4E-2 |
| | | Y, see $^{162}$Yb | - | 7E+5 | 3E-4 | 1E-6 | - | - |
| 70 | Ytterbium-169 | W, see $^{162}$Yb | 2E+3 | 8E+2 | 4E-7 | 1E-9 | 2E-5 | 2E-4 |
| | | Y, see $^{162}$Yb | - | 7E+2 | 3E-7 | 1E-9 | - | - |
| 70 | Ytterbium-175 | W, see $^{162}$Yb | 3E+3 | 4E+3 | 1E-6 | 5E-9 | - | - |
| | | | LLI wall (3E+3) | - | - | - | 4E-5 | 4E-4 |
| | | Y, see $^{162}$Yb | - | 3E+3 | 1E-6 | 5E-9 | - | - |
| 70 | Ytterbium-177[2] | W, see $^{162}$Yb | 2E+4 | 5E+4 | 2E-5 | 7E-8 | 2E-4 | 2E-3 |
| | | Y, see $^{162}$Yb | - | 5E+4 | 2E-5 | 6E-8 | - | - |
| 70 | Ytterbium-178[2] | W, see $^{162}$Yb | 1E+4 | 4E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| | | Y, see $^{162}$Yb | - | 4E+4 | 2E-5 | 5E-8 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values: Col. 1 Oral Ingestion ALI (μCi) | Table 1: Col. 2 Inhalation ALI (μCi) | Table 1: Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations: Col. 1 Air (μCi/ml) | Table 2: Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers: Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 71 | Lutetium-169 | W, all compounds except those given for Y | 3E+3 | 4E+3 | 2E-6 | 6E-9 | 3E-5 | 3E-4 |
| | | Y, oxides, hydroxides, and fluorides | - | 4E+3 | 2E-6 | 6E-9 | - | - |
| 71 | Lutetium-170 | W, see $^{169}$Lu | 1E+3 | 2E+3 | 9E-7 | 3E-9 | 2E-5 | 2E-4 |
| | | Y, see $^{169}$Lu | - | 2E+3 | 8E-7 | 3E-9 | - | - |
| 71 | Lutetium-171 | W, see $^{169}$Lu | 2E+3 | 2E+3 | 8E-7 | 3E-9 | 3E-5 | 3E-4 |
| | | Y, see $^{169}$Lu | - | 2E+3 | 8E-7 | 3E-9 | - | - |
| 71 | Lutetium-172 | W, see $^{169}$Lu | 1E+3 | 1E+3 | 5E-7 | 2E-9 | 1E-5 | 1E-4 |
| | | Y, see $^{169}$Lu | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| 71 | Lutetium-173 | W, see $^{169}$Lu | 5E+3 | 3E+2 | 1E-7 | - | 7E-5 | 7E-4 |
| | | | - | Bone surf (5E+2) | - | 6E-10 | - | - |
| | | Y, see $^{169}$Lu | - | 3E+2 | 1E-7 | 4E-10 | - | - |
| 71 | Lutetium-174m | W, see $^{169}$Lu | 2E+3 | 2E+2 | 1E-7 | - | - | - |
| | | | LLI wall (3E+3) | Bone surf (3E+2) | - | 5E-10 | 4E-5 | 4E-4 |
| | | Y, see $^{169}$Lu | - | 2E+2 | 9E-8 | 3E-10 | - | - |
| 71 | Lutetium-174 | W, see $^{169}$Lu | 5E+3 | 1E+2 | 5E-8 | - | 7E-5 | 7E-4 |
| | | | - | Bone surf (2E+2) | - | 3E-10 | - | - |
| | | Y, see $^{169}$Lu | - | 2E+2 | 6E-8 | 2E-10 | - | - |
| 71 | Lutetium-176m | W, see $^{169}$Lu | 8E+3 | 3E+4 | 1E-5 | 3E-8 | 1E-4 | 1E-3 |
| | | Y, see $^{169}$Lu | - | 2E+4 | 9E-6 | 3E-8 | - | - |
| 71 | Lutetium-176 | W, see $^{169}$Lu | 7E+2 | 5E+0 | 2E-9 | - | 1E-5 | 1E-4 |
| | | | - | Bone surf (1E+1) | - | 2E-11 | - | - |
| | | Y, see $^{169}$Lu | - | 8E+0 | 3E-9 | 1E-11 | - | - |
| 71 | Lutetium-177m | W, see $^{169}$Lu | 7E+2 | 1E+2 | 5E-8 | - | 1E-5 | 1E-4 |
| | | | - | Bone surf (1E+2) | - | 2E-10 | - | - |
| | | Y, see $^{169}$Lu | - | 8E+1 | 3E-8 | 1E-10 | - | - |
| 71 | Lutetium-177 | W, see $^{169}$Lu | 2E+3 | 2E+3 | 9E-7 | 3E-9 | - | - |
| | | | LLI wall (3E+3) | - | - | - | 4E-5 | 4E-4 |
| | | Y, see $^{169}$Lu | - | 2E+3 | 9E-7 | 3E-9 | - | - |
| 71 | Lutetium-178m[2] | W, see $^{169}$Lu | 5E+4 | 2E+5 | 8E-5 | 3E-7 | - | - |
| | | | St. wall (6E+4) | - | - | - | 8E-4 | 8E-3 |
| | | Y, see $^{169}$Lu | - | 2E+5 | 7E-5 | 2E-7 | - | - |
| 71 | Lutetium-178[2] | W, see $^{169}$Lu | 4E+4 | 1E+5 | 5E-5 | 2E-7 | - | - |
| | | | St. wall (4E+4) | - | - | - | 6E-4 | 6E-3 |
| | | Y, see $^{169}$Lu | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| 71 | Lutetium-179 | W, see $^{169}$Lu | 6E+3 | 2E+4 | 8E-6 | 3E-8 | 9E-5 | 9E-4 |
| | | Y, see $^{169}$Lu | - | 2E+4 | 6E-6 | 3E-8 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 72 | Hafnium-170 | D, all compounds except those given for W | 3E+3 | 6E+3 | 2E-6 | 8E-9 | 4E-5 | 4E-4 |
| | | W, oxides, hydroxides, carbides, and nitrates | - | 5E+3 | 2E-6 | 6E-9 | - | - |
| 72 | Hafnium-172 | D, see $^{170}$Hf | 1E+3 | 9E+0 | 4E-9 | - | 2E-5 | 2E-4 |
| | | | - | Bone surf (2E+1) | - | 3E-11 | - | - |
| | | W, see $^{170}$Hf | - | 4E+1 | 2E-8 | - | - | - |
| | | | - | Bone surf (6E+1) | - | 8E-11 | - | - |
| 72 | Hafnium-173 | D, see $^{170}$Hf | 5E+3 | 1E+4 | 5E-6 | 2E-8 | 7E-5 | 7E-4 |
| | | W, see $^{170}$Hf | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| 72 | Hafnium-175 | D, see $^{170}$Hf | 3E+3 | 9E+2 | 4E-7 | - | 4E-5 | 4E-4 |
| | | | - | Bone surf (1E+3) | - | 1E-9 | - | - |
| | | W, see $^{170}$Hf | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| 72 | Hafnium-177m[2] | D, see $^{170}$Hf | 2E+4 | 6E+4 | 2E-5 | 8E-8 | 3E-4 | 3E-3 |
| | | W, see $^{170}$Hf | - | 9E+4 | 4E-5 | 1E-7 | - | - |
| 72 | Hafnium-178m | D, see $^{170}$Hf | 3E+2 | 1E+0 | 5E-10 | - | 3E-6 | 3E-5 |
| | | | - | Bone surf (2E+0) | - | 3E-12 | - | - |
| | | W, see $^{170}$Hf | - | 5E+0 | 2E-9 | - | - | - |
| | | | - | Bone surf (9E+0) | - | 1E-11 | - | - |
| 72 | Hafnium-179m | D, see $^{170}$Hf | 1E+3 | 3E+2 | 1E-7 | - | 1E-5 | 1E-4 |
| | | | - | Bone surf (6E+2) | - | 8E-10 | - | - |
| | | W, see $^{170}$Hf | - | 6E+2 | 3E-7 | 8E-10 | - | - |
| 72 | Hafnium-180m | D, see $^{170}$Hf | 7E+3 | 2E+4 | 9E-6 | 3E-8 | 1E-4 | 1E-3 |
| | | W, see $^{170}$Hf | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| 72 | Hafnium-181 | D, see $^{170}$Hf | 1E+3 | 2E+2 | 7E-8 | - | 2E-5 | 2E-4 |
| | | | - | Bone surf (4E+2) | - | 6E-10 | - | - |
| | | W, see $^{170}$Hf | - | 4E+2 | 2E-7 | 6E-10 | - | - |
| 72 | Hafnium-182m[2] | D, see $^{170}$Hf | 4E+4 | 9E+4 | 4E-5 | 1E-7 | 5E-4 | 5E-3 |
| | | W, see $^{170}$Hf | - | 1E+5 | 6E-5 | 2E-7 | - | - |
| 72 | Hafnium-182 | D, see $^{170}$Hf | 2E+2 | 8E-1 | 3E-10 | - | - | - |
| | | | Bone surf (4E+2) | Bone surf (2E+0) | - | 2E-12 | 5E-6 | 5E-5 |
| | | W, see $^{170}$Hf | - | 3E+0 | 1E-9 | - | - | - |
| | | | - | Bone surf (7E+0) | - | 1E-11 | - | - |
| 72 | Hafnium-183[2] | D, see $^{170}$Hf | 2E+4 | 5E+4 | 2E-5 | 6E-8 | 3E-4 | 3E-3 |
| | | W, see $^{170}$Hf | - | 6E+4 | 2E-5 | 8E-8 | - | - |
| 72 | Hafnium-184 | D, see $^{170}$Hf | 2E+3 | 8E+3 | 3E-6 | 1E-8 | 3E-5 | 3E-4 |
| | | W, see $^{170}$Hf | - | 6E+3 | 3E-6 | 9E-9 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupatjonal Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 73 | Tantalum-172[2] | W, all compounds except those given for Y | 4E+4 | 1E+5 | 5E-5 | 2E-7 | 5E-4 | 5E-3 |
| | | Y, elemental Ta, oxides, hydroxides, halides, carbides, nitrates, and nitrides | - | 1E+5 | 4E-5 | 1E-7 | - | - |
| 73 | Tantalum-173 | W, see $^{172}$Ta | 7E+3 | 2E+4 | 8E-6 | 3E-8 | 9E-5 | 9E-4 |
| | | Y, see $^{172}$Ta | - | 2E+4 | 7E-6 | 2E-8 | - | - |
| 73 | Tantalum-174[2] | W, see $^{172}$Ta | 3E+4 | 1E+5 | 4E-5 | 1E-7 | 4E-4 | 4E-3 |
| | | Y, see $^{172}$Ta | - | 9E+4 | 4E-5 | 1E-7 | - | - |
| 73 | Tantalum-175 | W, see $^{172}$Ta | 6E+3 | 2E+4 | 7E-6 | 2E-8 | 8E-5 | 8E-4 |
| | | Y, see $^{172}$Ta | - | 1E+4 | 6E-6 | 2E-8 | - | - |
| 73 | Tantalum-176 | W, see $^{172}$Ta | 4E+3 | 1E+4 | 5E-6 | 2E-8 | 5E-5 | 5E-4 |
| | | Y, see $^{172}$Ta | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| 73 | Tantalum-177 | W, see $^{172}$Ta | 1E+4 | 2E+4 | 8E-6 | 3E-8 | 2E-4 | 2E-3 |
| | | Y, see $^{172}$Ta | - | 2E+4 | 7E-6 | 2E-8 | - | - |
| 73 | Tantalum-178 | W, see $^{172}$Ta | 2E+4 | 9E+4 | 4E-5 | 1E-7 | 2E-4 | 2E-3 |
| | | Y, see $^{172}$Ta | - | 7E+4 | 3E-5 | 1E-7 | - | - |
| 73 | Tantalum-179 | W, see $^{172}$Ta | 2E+4 | 5E+3 | 2E-6 | 8E-9 | 3E-4 | 3E-3 |
| | | Y, see $^{172}$Ta | - | 9E+2 | 4E-7 | 1E-9 | - | - |
| 73 | Tantalum-180m | W, see $^{172}$Ta | 2E+4 | 7E+4 | 3E-5 | 9E-8 | 3E-4 | 3E-3 |
| | | Y, see $^{172}$Ta | - | 6E+4 | 2E-5 | 8E-8 | - | - |
| 73 | Tantalum-180 | W, see $^{172}$Ta | 1E+3 | 4E+2 | 2E-7 | 6E-10 | 2E-5 | 2E-4 |
| | | Y, see $^{172}$Ta | - | 2E+1 | 1E-8 | 3E-11 | - | - |
| 73 | Tantalum-182m[2] | W, see $^{172}$Ta | 2E+5 | 5E+5 | 2E-4 | 8E-7 | - | - |
| | | | St. wall (2E+5) | - | - | - | 3E-3 | 3E-2 |
| | | Y, see $^{172}$Ta | - | 4E+5 | 2E-4 | 6E-7 | - | - |
| 73 | Tantalum-182 | W, see $^{172}$Ta | 8E+2 | 3E+2 | 1E-7 | 5E-10 | 1E-5 | 1E-4 |
| | | Y, see $^{172}$Ta | - | 1E+2 | 6E-8 | 2E-10 | - | - |
| 73 | Tantalum-183 | W, see $^{172}$Ta | 9E+2 | 1E+3 | 5E-7 | 2E-9 | - | - |
| | | | LLI wall (1E+3) | - | - | - | 2E-5 | 2E-4 |
| | | Y, see $^{172}$Ta | - | 1E+3 | 4E-7 | 1E-9 | - | - |
| 73 | Tantalum-184 | W, see $^{172}$Ta | 2E+3 | 5E+3 | 2E-6 | 8E-9 | 3E-5 | 3E-4 |
| | | Y, see $^{172}$Ta | - | 5E+3 | 2E-6 | 7E-9 | - | - |
| 73 | Tantalum-185[2] | W, see $^{172}$Ta | 3E+4 | 7E+4 | 3E-5 | 1E-7 | 4E-4 | 4E-3 |
| | | Y, see $^{172}$Ta | - | 6E+4 | 3E-5 | 9E-8 | - | - |
| 73 | Tantalum-186[2] | W, see $^{172}$Ta | 5E+4 | 2E+5 | 1E-4 | 3E-7 | - | |
| | | | St. wall (7E+4) | - | - | - | 1E-3 | 1E-2 |
| | | Y, see $^{172}$Ta | - | 2E+5 | 9E-5 | 3E-7 | - | - |
| 74 | Tungsten-176 | D, all compounds | 1E+4 | 5E+4 | 2E-5 | 7E-8 | 1E-4 | 1E-3 |
| 74 | Tungsten-177 | D, all compounds | 2E+4 | 9E+4 | 4E-5 | 1E-7 | 3E-4 | 3E-3 |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| 74 | Tungsten-178 | D, all compounds | 5E+3 | 2E+4 | 8E-6 | 3E-8 | 7E-5 | 7E-4 |
| 74 | Tungsten-179[2] | D, all compounds | 5E+6 | 2E+6 | 7E-4 | 2E-6 | 7E-3 | 7E-2 |
| 74 | Tungsten-181 | D, all compounds | 2E+4 | 3E+4 | 1E-5 | 5E-8 | 2E-4 | 2E-3 |
| 74 | Tungsten-185 | D, all compounds | 2E+3 | 7E+3 | 3E-6 | 9E-9 | - | - |
| | | | LLI wall (3E+3) | - | - | - | 4E-5 | 4E-4 |
| 74 | Tungsten-187 | D, all compounds | 2E+3 | 9E+3 | 4E-6 | 1E-8 | 3E-5 | 3E-4 |
| 74 | Tungsten-188 | D, all compounds | 4E+2 | 1E+3 | 5E-7 | 2E-9 | - | - |
| | | | LLI wall (5E+2) | - | - | - | 7E-6 | 7E-5 |
| 75 | Rhenium-177[2] | D, all compounds except those given for W | 9E+4 | 3E+5 | 1E-4 | 4E-7 | - | - |
| | | | St. wall (2E+5) | - | - | - | 2E-3 | 2E-2 |
| | | W, oxides, hydroxides, and nitrates | - | 4E+5 | 1E-4 | 5E-7 | - | - |
| 75 | Rhenium-178[2] | D, see $^{177}$Re | 7E+4 | 3E+5 | 1E-4 | 4E-7 | - | - |
| | | | St. wall (1E+5) | - | - | - | 1E-3 | 1E-2 |
| | | W, see $^{177}$Re | - | 3E+5 | 1E-4 | 4E-7 | - | - |
| 75 | Rhenium-181 | D, see $^{177}$Re | 5E+3 | 9E+3 | 4E-6 | 1E-8 | 7E-5 | 7E-4 |
| | | W, see $^{177}$Re | - | 8E+3 | 4E-6 | 1E-8 | - | - |
| 75 | Rhenium-182 (12.7 h) | D, see $^{177}$Re | 7E+3 | 1E+4 | 5E-6 | 2E-8 | 9E-5 | 9E-4 |
| | | W, see $^{177}$Re | - | 2E+4 | 6E-6 | 2E-8 | - | - |
| 75 | Rhenium-182 (64.0 h) | D, see $^{177}$Re | 1E+3 | 2E+3 | 1E-6 | 3E-9 | 2E-5 | 2E-4 |
| | | W, see $^{177}$Re | - | 2E+3 | 9E-7 | 3E-9 | - | - |
| 75 | Rhenium-184m | D, see $^{177}$Re | 2E+3 | 3E+3 | 1E-6 | 4E-9 | 3E-5 | 3E-4 |
| | | W, see $^{177}$Re | - | 4E+2 | 2E-7 | 6E-10 | - | - |
| 75 | Rhenium-184 | D, see $^{177}$Re | 2E+3 | 4E+3 | 1E-6 | 5E-9 | 3E-5 | 3E-4 |
| | | W, see $^{177}$Re | - | 1E+3 | 6E-7 | 2E-9 | - | - |
| 75 | Rhenium-186m | D, see $^{177}$Re | 1E+3 | 2E+3 | 7E-7 | - | - | - |
| | | | St. wall (2E+3) | St. wall (2E+3) | - | 3E-9 | 2E-5 | 2E-4 |
| | | W, see $^{177}$Re | - | 2E+2 | 6E-8 | 2E-10 | - | - |
| 75 | Rhenium-186 | D, see $^{177}$Re | 2E+3 | 3E+3 | 1E-6 | 4E-9 | 3E-5 | 3E-4 |
| | | W, see $^{177}$Re | - | 2E+3 | 7E-7 | 2E-9 | - | - |
| 75 | Rhenium-187 | D, see $^{177}$Re | 6E+5 | 8E+5 | 4E-4 | - | 8E-3 | 8E-2 |
| | | | - | St. wall (9E+5) | - | 1E-6 | - | - |
| | | W, see $^{177}$Re | - | 1E+5 | 4E-5 | 1E-7 | - | - |
| 75 | Rhenium-188m[2] | D, see $^{177}$Re | 8E+4 | 1E+5 | 6E-5 | 2E-7 | 1E-3 | 1E-2 |
| | | W, see $^{177}$Re | - | 1E+5 | 6E-5 | 2E-7 | - | - |
| 75 | Rhenium-188 | D, see $^{177}$Re | 2E+3 | 3E+3 | 1E-6 | 4E-9 | 2E-5 | 2E-4 |
| | | W, see $^{177}$Re | - | 3E+3 | 1E-6 | 4E-9 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values: Col. 1 Oral Ingestion ALI (μCi) | Table 1: Col. 2 Inhalation ALI (μCi) | Table 1: Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations: Col. 1 Air (μCi/ml) | Table 2: Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers: Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 75 | Rhenium-189 | D, see $^{177}$Re | 3E+3 | 5E+3 | 2E-6 | 7E-9 | 4E-5 | 4E-4 |
| | | W, see $^{177}$Re | - | 4E+3 | 2E-6 | 6E-9 | - | - |
| 76 | Osmium-180[2] | D, all compounds except those given for W and Y | 1E+5 | 4E+5 | 2E-4 | 5E-7 | 1E-3 | 1E-2 |
| | | W, halides and nitrates | - | 5E+5 | 2E-4 | 7E-7 | - | - |
| | | Y, oxides and hydroxides | - | 5E+5 | 2E-4 | 6E-7 | - | - |
| 76 | Osmium-181[2] | D, see $^{180}$Os | 1E+4 | 4E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| | | W, see $^{180}$Os | - | 5E+4 | 2E-5 | 6E-8 | - | - |
| | | Y, see $^{180}$Os | - | 4E+4 | 2E-5 | 6E-8 | - | - |
| 76 | Osmium-182 | D, see $^{180}$Os | 2E+3 | 6E+3 | 2E-6 | 8E-9 | 3E-5 | 3E-4 |
| | | W, see $^{180}$Os | - | 4E+3 | 2E-6 | 6E-9 | - | - |
| | | Y, see $^{180}$Os | - | 4E+3 | 2E-6 | 6E-9 | - | - |
| 76 | Osmium-185 | D, see $^{180}$Os | 2E+3 | 5E+2 | 2E-7 | 7E-10 | 3E-5 | 3E-4 |
| | | W, see $^{180}$Os | - | 8E+2 | 3E-7 | 1E-9 | - | - |
| | | Y, see $^{180}$Os | - | 8E+2 | 3E-7 | 1E-9 | - | - |
| 76 | Osmium-189m | D, see $^{180}$Os | 8E+4 | 2E+5 | 1E-4 | 3E-7 | 1E-3 | 1E-2 |
| | | W, see $^{180}$Os | - | 2E+5 | 9E-5 | 3E-7 | - | - |
| | | Y, see $^{180}$Os | - | 2E+5 | 7E-5 | 2E-7 | - | - |
| 76 | Osmium-191m | D, see $^{180}$Os | 1E+4 | 3E+4 | 1E-5 | 4E-8 | 2E-4 | 2E-3 |
| | | W, see $^{180}$Os | - | 2E+4 | 8E-6 | 3E-8 | - | - |
| | | Y, see $^{180}$Os | - | 2E+4 | 7E-6 | 2E-8 | - | - |
| 76 | Osmium-191 | D, see $^{180}$Os | 2E+3 | 2E+3 | 9E-7 | 3E-9 | - | - |
| | | | LLI wall (3E+3) | - | - | - | 3E-5 | 3E-4 |
| | | W, see $^{180}$Os | - | 2E+3 | 7E-7 | 2E-9 | - | - |
| | | Y, see $^{180}$Os | - | 1E+3 | 6E-7 | 2E-9 | - | - |
| 76 | Osmium-193 | D, see $^{180}$Os | 2E+3 | 5E+3 | 2E-6 | 6E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 2E-5 | 2E-4 |
| | | W, see $^{180}$Os | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | Y, see $^{180}$Os | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| 76 | Osmium-194 | D, see $^{180}$Os | 4E+2 | 4E+1 | 2E-8 | 6E-11 | - | - |
| | | | LLI wall (6E+2) | - | - | - | 8E-6 | 8E-5 |
| | | W, see $^{180}$Os | - | 6E+1 | 2E-8 | 8E-11 | - | - |
| | | Y, see $^{180}$Os | - | 8E+0 | 3E-9 | 1E-11 | - | - |
| 77 | Iridium-182[2] | D, all compounds except those given for W and Y | 4E+4 | 1E+5 | 6E-5 | 2E-7 | - | - |
| | | | St. wall (4E+4) | - | - | - | 6E-4 | 6E-3 |
| | | W, halides, nitrates, and metallic iridium | - | 2E+5 | 6E-5 | 2E-7 | - | - |
| | | Y, oxides and hydroxides | - | 1E+5 | 5E-5 | 2E-7 | - | - |
| 77 | Iridium-184 | D, see $^{182}$Ir | 8E+3 | 2E+4 | 1E-5 | 3E-8 | 1E-4 | 1E-3 |
| | | W, see $^{182}$Ir | - | 3E+4 | 1E-5 | 5E-8 | - | - |
| | | Y, see $^{182}$Ir | - | 3E+4 | 1E-5 | 4E-8 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 77 | Iridium-185 | D, see $^{182}$Ir | 5E+3 | 1E+4 | 5E-6 | 2E-8 | 7E-5 | 7E-4 |
| | | W, see $^{182}$Ir | - | 1E+4 | 5E-6 | 2E-8 | - | - |
| | | Y, see $^{182}$Ir | - | 1E+4 | 4E-6 | 1E-8 | - | - |
| 77 | Iridium-186 | D, see $^{182}$Ir | 2E+3 | 8E+3 | 3E-6 | 1E-8 | 3E-5 | 3E-4 |
| | | W, see $^{182}$Ir | - | 6E+3 | 3E-6 | 9E-9 | - | - |
| | | Y, see $^{182}$Ir | - | 6E+3 | 2E-6 | 8E-9 | - | - |
| 77 | Iridium-187 | D, see $^{182}$Ir | 1E+4 | 3E+4 | 1E-5 | 5E-8 | 1E-4 | 1E-3 |
| | | W, see $^{182}$Ir | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| | | Y, see $^{182}$Ir | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| 77 | Iridium-188 | D, see $^{182}$Ir | 2E+3 | 5E+3 | 2E-6 | 6E-8 | 3E-5 | 3E-4 |
| | | W, see $^{182}$Ir | - | 4E+3 | 1E-6 | 5E-9 | - | - |
| | | Y, see $^{182}$Ir | - | 3E+3 | 1E-6 | 5E-9 | - | - |
| 77 | Iridium-189 | D, see $^{182}$Ir | 9E+3 | 5E+3 | 2E-6 | 7E-9 | - | - |
| | | | LLI wall (5E+3) | - | - | - | 7E-5 | 7E-4 |
| | | W, see $^{182}$Ir | - | 4E+3 | 2E-6 | 9E-9 | - | - |
| | | Y, see $^{182}$Ir | - | 4E+3 | 1E-6 | 5E-9 | - | - |
| 77 | Iridium-190m[2] | D, see $^{182}$Ir | 2E+5 | 2E+5 | 8E-5 | 3E-7 | 2E-3 | 2E-2 |
| | | W, see $^{182}$Ir | - | 2E+5 | 9E-5 | 3E-7 | - | - |
| | | Y, see $^{182}$Ir | - | 2E+5 | 8E-5 | 3E-7 | - | - |
| 77 | Iridium-190 | D, see $^{182}$Ir | 1E+3 | 9E+2 | 4E-7 | 1E-9 | 1E-5 | 1E-4 |
| | | W, see $^{182}$Ir | - | 1E+3 | 4E-7 | 1E-9 | - | - |
| | | Y, see $^{182}$Ir | - | 9E+2 | 4E-7 | 1E-9 | - | - |
| 77 | Iridium-192m | D, see $^{182}$Ir | 3E+3 | 9E+1 | 4E-8 | 1E-10 | 4E-5 | 4E-4 |
| | | W, see $^{182}$Ir | - | 2E+2 | 9E-8 | 3E-10 | - | - |
| | | Y, see $^{182}$Ir | - | 2E+1 | 6E-9 | 2E-11 | - | - |
| 77 | Iridium-192 | D, see $^{182}$Ir | 9E+2 | 3E+2 | 1E-7 | 4E-10 | 1E-5 | 1E-4 |
| | | W, see $^{182}$Ir | - | 4E+2 | 2E-7 | 6E-10 | - | - |
| | | Y, see $^{182}$Ir | - | 2E+2 | 8E-8 | 3E-10 | - | - |
| 77 | Iridium-194m | D, see $^{182}$Ir | 6E+2 | 9E+1 | 4E-8 | 1E-10 | 9E-6 | 9E-5 |
| | | W, see $^{182}$Ir | - | 2E+2 | 7E-8 | 2E-10 | - | - |
| | | Y, see $^{182}$Ir | - | 1E+2 | 4E-8 | 1E-10 | - | - |
| 77 | Iridium-194 | D, see $^{182}$Ir | 1E+3 | 3E+3 | 1E-6 | 4E-9 | 1E-5 | 1E-4 |
| | | W, see $^{182}$Ir | - | 2E+3 | 9E-7 | 3E-9 | - | - |
| | | Y, see $^{182}$Ir | - | 2E+3 | 8E-7 | 3E-9 | - | - |
| 77 | Iridium-195m | D, see $^{182}$Ir | 8E+3 | 2E+4 | 1E-5 | 3E-8 | 1E-4 | 1E-3 |
| | | W, see $^{182}$Ir | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| | | Y, see $^{182}$Ir | - | 2E+4 | 9E-6 | 3E-8 | - | - |
| 77 | Iridium-195 | D, see $^{182}$Ir | 1E+4 | 4E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| | | W, see $^{182}$Ir | - | 5E+4 | 2E-5 | 7E-8 | - | - |
| | | Y, see $^{182}$Ir | - | 4E+4 | 2E-5 | 6E-8 | - | - |
| 78 | Platinum-186 | D, all compounds | 1E+4 | 4E+4 | 2E-5 | 5E-8 | 2E-4 | 2E-3 |
| 78 | Platinum-188 | D, all compounds | 2E+3 | 2E+3 | 7E-7 | 2E-9 | 2E-5 | 2E-4 |
| 78 | Platinum-189 | D, all compounds | 1E+4 | 3E+4 | 1E-5 | 4E-8 | 1E-4 | 1E-3 |
| 78 | Platinum-191 | D, all compounds | 4E+3 | 8E+3 | 4E-6 | 1E-8 | 5E-5 | 5E-4 |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Concentration (μCi/ml) |
| 78 | Platinum-193m | D, all compounds | 3E+3 | 6E+3 | 3E-6 | 8E-9 | - | - |
| | | | LLI wall (3E+4) | - | - | - | 4E-5 | 4E-4 |
| 78 | Platinum-193 | D, all compounds | 4E+4 | 2E+4 | 1E-5 | 3E-8 | - | - |
| | | | LLI wall (5E+4) | - | - | - | 6E-4 | 6E-3 |
| 78 | Platinum-195m | D, all compounds | 2E+3 | 4E+3 | 2E-6 | 6E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 3E-5 | 3E-4 |
| 78 | Platinum-197m[2] | D, all compounds | 2E+4 | 4E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| 78 | Platinum-197 | D, all compounds | 3E+3 | 1E+4 | 4E-6 | 1E-8 | 4E-5 | 4E-4 |
| 78 | Platinum-199[2] | D, all compounds | 5E+4 | 1E+5 | 6E-5 | 2E-7 | 7E-4 | 7E-3 |
| 78 | Platinum-200 | D, all compounds | 1E+3 | 3E+3 | 1E-6 | 5E-9 | 2E-5 | 2E-4 |
| 79 | Gold-193 | D, all compounds except those given for W and Y | 9E+3 | 3E+4 | 1E-5 | 4E-8 | 1E-4 | 1E-3 |
| | | W, halides and nitrates | - | 2E+4 | 9E-6 | 3E-8 | - | - |
| | | Y, oxides and hydroxides | - | 2E+4 | 8E-6 | 3E-8 | - | - |
| 79 | Gold-194 | D, see $^{193}$Au | 3E+3 | 8E+3 | 3E-6 | 1E-8 | 4E-5 | 4E-4 |
| | | W, see $^{193}$Au | - | 5E+3 | 2E-6 | 8E-9 | - | - |
| | | Y, see $^{193}$Au | - | 5E+3 | 2E-6 | 7E-9 | - | - |
| 79 | Gold-195 | D, see $^{193}$Au | 5E+3 | 1E+4 | 5E-6 | 2E-8 | 7E-5 | 7E-4 |
| | | W, see $^{193}$Au | - | 1E+3 | 6E-7 | 2E-9 | - | - |
| | | Y, see $^{193}$Au | - | 4E+2 | 2E-7 | 6E-10 | - | - |
| 79 | Gold-198m | D, see $^{193}$Au | 1E+3 | 3E+3 | 1E-6 | 4E-9 | 1E-5 | 1E-4 |
| | | W, see $^{193}$Au | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| | | Y, see $^{193}$Au | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| 79 | Gold-198 | D, see $^{193}$Au | 1E+3 | 4E+3 | 2E-6 | 5E-9 | 2E-5 | 2E-4 |
| | | W, see $^{193}$Au | - | 2E+3 | 8E-7 | 3E-9 | - | - |
| | | Y, see $^{193}$Au | - | 2E+3 | 7E-7 | 2E-9 | - | - |
| 79 | Gold-199 | D, see $^{193}$Au | 3E+3 | 9E+3 | 4E-6 | 1E-8 | - | - |
| | | | LLI wall (3E+3) | - | - | - | 4E-5 | 4E-4 |
| | | W, see $^{193}$Au | - | 4E+3 | 2E-6 | 6E-9 | - | - |
| | | Y, see $^{193}$Au | - | 4E+3 | 2E-6 | 5E-9 | - | - |
| 79 | Gold-200m | D, see $^{193}$Au | 1E+3 | 4E+3 | 1E-6 | 5E-9 | 2E-5 | 2E-4 |
| | | W, see $^{193}$Au | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | Y, see $^{193}$Au | - | 2E+4 | 1E-6 | 3E-9 | - | - |
| 79 | Gold-200[2] | D, see $^{193}$Au | 3E+4 | 6E+4 | 3E-5 | 9E-8 | 4E-4 | 4E-3 |
| | | W, see $^{193}$Au | - | 8E+4 | 3E-5 | 1E-7 | - | - |
| | | Y, see $^{193}$Au | - | 7E+4 | 3E-5 | 1E-7 | - | - |
| 79 | Gold-201[2] | D, see $^{193}$Au | 7E+4 | 2E+5 | 9E-5 | 3E-7 | - | - |
| | | | St. wall (9E+4) | - | - | - | 1E-3 | 1E-2 |
| | | W, see $^{193}$Au | - | 2E+5 | 1E-4 | 3E-7 | - | - |
| | | Y, see $^{193}$Au | - | 2E+5 | 9E-5 | 3E-7 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values: Col. 1 Oral Ingestion ALI (μCi) | Table 1: Col. 2 Inhalation ALI (μCi) | Table 1: Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations: Col. 1 Air (μCi/ml) | Table 2: Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers: Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 80 | Mercury-193m | Vapor | - | 8E+3 | 4E-6 | 1E-8 | - | - |
| | | Organic D | 4E+3 | 1E+4 | 5E-6 | 2E-8 | 6E-5 | 6E-4 |
| | | D, sulfates | 3E+3 | 9E+3 | 4E-6 | 1E-8 | 4E-5 | 4E-4 |
| | | W, oxides, hydroxides, halides, nitrates, and sulfides | - | 8E+3 | 3E-6 | 1E-8 | - | - |
| 80 | Mercury-193 | Vapor | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| | | Organic D | 2E+4 | 6E+4 | 3E-5 | 9E-8 | 3E-4 | 3E-3 |
| | | D, see $^{193m}$Hg | 2E+4 | 4E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| | | W, see $^{193m}$Hg | - | 4E+4 | 2E-5 | 6E-8 | - | - |
| 80 | Mercury-194 | Vapor | - | 3E+1 | 1E-8 | 4E-11 | - | - |
| | | Organic D | 2E+1 | 3E+1 | 1E-8 | 4E-11 | 2E-7 | 2E-6 |
| | | D, see $^{193m}$Hg | 8E+2 | 4E+1 | 2E-8 | 6E-11 | 1E-5 | 1E-4 |
| | | W, see $^{193m}$Hg | - | 1E+2 | 5E-8 | 2E-10 | - | - |
| 80 | Mercury-195m | Vapor | - | 4E+3 | 2E-6 | 6E-9 | - | - |
| | | Organic D | 3E+3 | 6E+3 | 3E-6 | 8E-9 | 4E-5 | 4E-4 |
| | | D, see $^{193m}$Hg | 2E+3 | 5E+3 | 2E-6 | 7E-9 | 3E-5 | 3E-4 |
| | | W, see $^{193m}$Hg | - | 4E+3 | 2E-6 | 5E-9 | - | - |
| 80 | Mercury-195 | Vapor | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| | | Organic D | 2E+4 | 5E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| | | D, see $^{193m}$Hg | 1E+4 | 4E+4 | 1E-5 | 5E-8 | 2E-4 | 2E-3 |
| | | W, see $^{193m}$Hg | - | 3E+4 | 1E-5 | 5E-8 | - | - |
| 80 | Mercury-197m | Vapor | - | 5E+3 | 2E-6 | 7E-9 | - | - |
| | | Organic D | 4E+3 | 9E+3 | 4E-6 | 1E-8 | 5E-5 | 5E-4 |
| | | D, see $^{193m}$Hg | 3E+3 | 7E+3 | 3E-6 | 1E-8 | 4E-5 | 4E-4 |
| | | W, see $^{193m}$Hg | - | 5E+3 | 2E-6 | 7E-9 | - | - |
| 80 | Mercury-197 | Vapor | - | 8E+3 | 4E-6 | 1E-8 | - | - |
| | | Organic D | 7E+3 | 1E+4 | 6E-6 | 2E-8 | 9E-5 | 9E-4 |
| | | D, see $^{193m}$Hg | 6E+3 | 1E+4 | 5E-6 | 2E-8 | 8E-5 | 8E-4 |
| | | W, see $^{193m}$Hg | - | 9E+3 | 4E-6 | 1E-8 | - | - |
| 80 | Mercury-199m[2] | Vapor | - | 8E+4 | 3E-5 | 1E-7 | - | - |
| | | Organic D | 6E+4 | 2E+5 | 7E-5 | 2E-7 | - | - |
| | | | St. wall (1E+5) | - | - | - | 1E-3 | 1E-2 |
| | | D, see $^{193m}$Hg | 6E+4 | 1E+5 | 6E-5 | 2E-7 | 8E-4 | 8E-3 |
| | | W, see $^{193m}$Hg | - | 2E+5 | 7E-5 | 2E-7 | - | - |
| 80 | Mercury-203 | Vapor | - | 8E+2 | 4E-7 | 1E-9 | - | - |
| | | Organic D | 5E+2 | 8E+2 | 3E-7 | 1E-9 | 7E-6 | 7E-5 |
| | | D, see $^{193m}$Hg | 2E+3 | 1E+3 | 5E-7 | 2E-9 | 3E-5 | 3E-4 |
| | | W, see $^{193m}$Hg | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| 81 | Thallium-194m[2] | D, all compounds | 5E+4 | 2E+5 | 6E-5 | 2E-7 | - | - |
| | | | St. wall (7E+4) | - | - | - | 1E-3 | 1E-2 |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 81 | Thallium-194[2] | D, all compounds | 3E+5 | 6E+5 | 2E-4 | 8E-7 | - | - |
| | | | St. wall (3E+5) | - | - | - | 4E-3 | 4E-2 |
| 81 | Thallium-195[2] | D, all compounds | 6E+4 | 1E+5 | 5E-5 | 2E-7 | 9E-4 | 9E-3 |
| 81 | Thallium-197 | D, all compounds | 7E+4 | 1E+5 | 5E-5 | 2E-7 | 1E-3 | 1E-2 |
| 81 | Thallium-198m[2] | D, all compounds | 3E+4 | 5E+4 | 2E-5 | 8E-8 | 4E-4 | 4E-3 |
| 81 | Thallium-198 | D, all compounds | 2E+4 | 3E+4 | 1E-5 | 5E-8 | 3E-4 | 3E-3 |
| 81 | Thallium-199 | D, all compounds | 6E+4 | 8E+4 | 4E-5 | 1E-7 | 9E-4 | 9E-3 |
| 81 | Thallium-200 | D, all compounds | 8E+3 | 1E+4 | 5E-6 | 2E-8 | 1E-4 | 1E-3 |
| 81 | Thallium-201 | D, all compounds | 2E+4 | 2E+4 | 9E-6 | 3E-8 | 2E-4 | 2E-3 |
| 81 | Thallium-202 | D, all compounds | 4E+3 | 5E+3 | 2E-6 | 7E-9 | 5E-5 | 5E-4 |
| 81 | Thallium-204 | D, all compounds | 2E+3 | 2E+3 | 9E-7 | 3E-9 | 2E-5 | 2E-4 |
| 82 | Lead-195m[2] | D, all compounds | 6E+4 | 2E+5 | 8E-5 | 3E-7 | 8E-4 | 8E-3 |
| 82 | Lead-198 | D, all compounds | 3E+4 | 6E+4 | 3E-5 | 9E-8 | 4E-4 | 4E-3 |
| 82 | Lead-199[2] | D, all compounds | 2E+4 | 7E+4 | 3E-5 | 1E-7 | 3E-4 | 3E-3 |
| 82 | Lead-200 | D, all compounds | 3E+3 | 6E+3 | 3E-6 | 9E-9 | 4E-5 | 4E-4 |
| 82 | Lead-201 | D, all compounds | 7E+3 | 2E+4 | 8E-6 | 3E-8 | 1E-4 | 1E-3 |
| 82 | Lead-202m | D, all compounds | 9E+3 | 3E+4 | 1E-5 | 4E-8 | 1E-4 | 1E-3 |
| 82 | Lead-202 | D, all compounds | 1E+2 | 5E+1 | 2E-8 | 7E-11 | 2E-6 | 2E-5 |
| 82 | Lead-203 | D, all compounds | 5E+3 | 9E+3 | 4E-6 | 1E-8 | 7E-5 | 7E-4 |
| 82 | Lead-205 | D, all compounds | 4E+3 | 1E+3 | 6E-7 | 2E-9 | 5E-5 | 5E-4 |
| 82 | Lead-209 | D, all compounds | 2E+4 | 6E+4 | 2E-5 | 8E-8 | 3E-4 | 3E-3 |
| 82 | Lead-210 | D, all compounds | 6E-1 | 2E-1 | 1E-10 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (4E-1) | - | 6E-13 | 1E-8 | 1E-7 |
| 82 | Lead-211[2] | D, all compounds | 1E+4 | 6E+2 | 3E-7 | 9E-10 | 2E-4 | 2E-3 |
| 82 | Lead-212 | D, all compounds | 8E+1 | 3E+1 | 1E-8 | 5E-11 | - | - |
| | | | Bone surf (1E+2) | - | - | - | 2E-6 | 2E-5 |
| 82 | Lead-214[2] | D, all compounds | 9E+3 | 8E+2 | 3E-7 | 1E-9 | 1E-4 | 1E-3 |
| 83 | Bismuth-200[2] | D, nitrates | 3E+4 | 8E+4 | 4E-5 | 1E-7 | 4E-4 | 4E-3 |
| | | W, all other compounds | - | 1E+5 | 4E-5 | 1E-7 | - | - |
| 83 | Bismuth-201[2] | D, see $^{200}$Bi | 1E+4 | 3E+4 | 1E-5 | 4E-8 | 2E-4 | 2E-3 |
| | | W, see $^{200}$Bi | - | 4E+4 | 2E-5 | 5E-8 | - | - |
| 83 | Bismuth-202[2] | D, see $^{200}$Bi | 1E+4 | 4E+4 | 2E-5 | 6E-8 | 2E-4 | 2E-3 |
| | | W, see $^{200}$Bi | - | 8E+4 | 3E-5 | 1E-7 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values: Col. 1 Oral Ingestion ALI (μCi) | Table 1: Col. 2 Inhalation ALI (μCi) | Table 1: Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations: Col. 1 Air (μCi/ml) | Table 2: Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers: Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 83 | Bismuth-203 | D, see $^{200}$Bi | 2E+3 | 7E+3 | 3E-6 | 9E-9 | 3E-5 | 3E-4 |
| | | W, see $^{200}$Bi | - | 6E+3 | 3E-6 | 9E-9 | - | - |
| 83 | Bismuth-205 | D, see $^{200}$Bi | 1E+3 | 3E+3 | 1E-6 | 3E-9 | 2E-5 | 2E-4 |
| | | W, see $^{200}$Bi | - | 1E+3 | 5E-7 | 2E-9 | - | - |
| 83 | Bismuth-206 | D, see $^{200}$Bi | 6E+2 | 1E+3 | 6E-7 | 2E-9 | 9E-6 | 9E-5 |
| | | W, see $^{200}$Bi | - | 9E+2 | 4E-7 | 1E-9 | - | - |
| 83 | Bismuth-207 | D, see $^{200}$Bi | 1E+3 | 2E+3 | 7E-7 | 2E-9 | 1E-5 | 1E-4 |
| | | W, see $^{200}$Bi | - | 4E+2 | 1E-7 | 5E-10 | - | - |
| 83 | Bismuth-210m | D, see $^{200}$Bi | 4E+1 | 5E+0 | 2E-9 | - | - | - |
| | | | Kidneys (6E+1) | Kidneys (6E+0) | - | 9E-12 | 8E-7 | 8E-6 |
| | | W, see $^{200}$Bi | - | 7E-1 | 3E-10 | 9E-13 | - | - |
| 83 | Bismuth-210 | D, see $^{200}$Bi | 8E+2 | 2E+2 | 1E-7 | - | 1E-5 | 1E-4 |
| | | | - | Kidneys (4E+2) | - | 5E-10 | - | - |
| | | W, see $^{200}$Bi | - | 3E+1 | 1E-8 | 4E-11 | - | - |
| 83 | Bismuth-212[2] | D, see $^{200}$Bi | 5E+3 | 2E+2 | 1E-7 | 3E-10 | 7E-5 | 7E-4 |
| | | W, see $^{200}$Bi | - | 3E+2 | 1E-7 | 4E-10 | - | - |
| 83 | Bismuth-213[2] | D, see $^{200}$Bi | 7E+3 | 3E+2 | 1E-7 | 4E-10 | 1E-4 | 1E-3 |
| | | W, see $^{200}$Bi | - | 4E+2 | 1E-7 | 5E-10 | - | - |
| 83 | Bismuth-214[2] | D, see $^{200}$Bi | 2E+4 | 8E+2 | 3E-7 | 1E-9 | - | - |
| | | | St. wall (2E+4) | - | - | - | 3E-4 | 3E-3 |
| | | W, see $^{200}$Bi | - | 9E-2 | 4E-7 | 1E-9 | - | - |
| 84 | Polonium-203[2] | D, all compounds except those given for W | 3E+4 | 6E+4 | 3E-5 | 9E-8 | 3E-4 | 3E-3 |
| | | W, oxides, hydroxides, and nitrates | - | 9E+4 | 4E-5 | 1E-7 | - | - |
| 84 | Polonium-205[2] | D, see $^{203}$Po | 2E+4 | 4E+4 | 2E-5 | 5E-8 | 3E-4 | 3E-3 |
| | | W, see $^{203}$Po | - | 7E+4 | 3E-5 | 1E-7 | - | - |
| 84 | Polonium-207 | D, see $^{203}$Po | 8E+3 | 3E+4 | 1E-5 | 3E-8 | 1E-4 | 1E-3 |
| | | W, see $^{203}$Po | - | 3E+4 | 1E-5 | 4E-8 | - | - |
| 84 | Polonium-210 | D, see $^{203}$Po | 3E+0 | 6E-1 | 3E-10 | 9E-13 | 4E-8 | 4E-7 |
| | | W, see $^{203}$Po | - | 6E-1 | 3E-10 | 9E-13 | - | - |
| 85 | Astatine-207[2] | D, halides | 6E+3 | 3E+3 | 1E-6 | 4E-9 | 8E-5 | 8E-4 |
| | | W | - | 2E+3 | 9E-7 | 3E-9 | - | - |
| 85 | Astatine-211 | D, halides | 1E+2 | 8E+1 | 3E-8 | 1E-10 | 2E-6 | 2E-5 |
| | | W | - | 5E+1 | 2E-8 | 8E-11 | - | - |
| 86 | Radon-220 | With daughters removed | - | 2E+4 | 7E-6 | 2E-8 | - | - |
| | | With daughters present | - | 2E+1 (or 12 working level months) | 9E-9 (or 1.0 working level) | 3E-11 | - | - |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| 86 | Radon-222 | With daughters removed | - | 1E+4 | 4E-6 | 1E-8 | - | - |
| | | With daughters present | - | 1E+2 (or 4 working level months) | 3E-8 (or 0.33 working level) | 1E-10 | - | - |
| 87 | Francium-222[2] | D, all compounds | 2E+3 | 5E+2 | 2E-7 | 6E-10 | 3E-5 | 3E-4 |
| 87 | Francium-223[2] | D, all compounds | 6E+2 | 8E+2 | 3E-7 | 1E-9 | 8E-6 | 8E-5 |
| 88 | Radium-223 | W, all compounds | 5E+0 | 7E-1 | 3E-10 | 9E-13 | - | - |
| | | | Bone surf (9E+0) | - | - | - | 1E-7 | 1E-6 |
| 88 | Radium-224 | W, all compounds | 8E+0 | 2E+0 | 7E-10 | 2E-12 | - | - |
| | | | Bone surf (2E+1) | - | - | - | 2E-7 | 2E-6 |
| 88 | Radium-225 | W, all compounds | 8E+0 | 7E-1 | 3E-10 | 9E-13 | - | - |
| | | | Bone surf (2E+1) | - | - | - | 2E-7 | 2E-6 |
| 88 | Radium-226 | W, all compounds | 2E+0 | 6E-1 | 3E-10 | 9E-13 | - | - |
| | | | Bone surf (5E+0) | - | - | - | 6E-8 | 6E-7 |
| 88 | Radium-227[2] | W, all compounds | 2E+4 | 1E+4 | 6E-6 | - | - | - |
| | | | Bone surf (2E+4) | Bone surf (2E+4) | - | 3E-8 | 3E-4 | 3E-3 |
| 88 | Radium-228 | W, all compounds | 2E+0 | 1E+0 | 5E-10 | 2E-12 | - | - |
| | | | Bone surf (4E+0) | - | - | - | 6E-8 | 6E-7 |
| 89 | Actinium-224 | D, all compounds except those given for W and Y | 2E+3 | 3E+1 | 1E-8 | - | - | - |
| | | | LLI wall (2E+3) | Bone surf (4E+1) | - | 5E-11 | 3E-5 | 3E-4 |
| | | W, halides and nitrates | - | 5E+1 | 2E-8 | 7E-11 | - | - |
| | | Y, oxides and hydroxides | - | 5E+1 | 2E-8 | 6E-11 | - | - |
| 89 | Actinium-225 | D, see $^{224}$Ac | 5E+1 | 3E-1 | 1E-10 | - | - | - |
| | | | LLI wall (5E+1) | Bone surf (5E-1) | - | 7E-13 | 7E-7 | 7E-6 |
| | | W, see $^{224}$Ac | - | 6E-1 | 3E-10 | 9E-13 | - | - |
| | | Y, see $^{224}$Ac | - | 6E-1 | 3E-10 | 9E-13 | - | - |
| 89 | Actinium-226 | D, see $^{224}$Ac | 1E+2 | 3E+0 | 1E-9 | - | - | - |
| | | | LLI wall (1E+2) | Bone surf (4E+0) | - | 5E-12 | 2E-6 | 2E-5 |
| | | W, see $^{224}$Ac | - | 5E+0 | 2E-9 | 7E-12 | - | - |
| | | Y, see $^{224}$Ac | - | 5E+0 | 2E-9 | 6E-12 | - | - |
| 89 | Actinium-227 | D, see $^{224}$Ac | 2E-1 | 4E-4 | 2E-13 | - | - | - |
| | | | Bone surf (4E-1) | Bone surf (8E-4) | - | 1E-15 | 5E-9 | 5E-8 |
| | | W, see $^{224}$Ac | - | 2E-3 | 7E-13 | - | - | - |
| | | | - | Bone surf (3E-3) | - | 4E-15 | - | - |
| | | Y, see $^{224}$Ac | - | 4E-3 | 2E-12 | 6E-15 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 89 | Actinium-228 | D, see $^{224}$Ac | 2E+3 | 9E+0 | 4E-9 | - | 3E-5 | 3E-4 |
| | | | - | Bone surf (2E+1) | - | 2E-11 | - | - |
| | | W, see $^{224}$Ac | - | 4E+1 | 2E-8 | - | - | - |
| | | | - | Bone surf (6E+1) | - | 8E-11 | - | - |
| | | Y, see $^{224}$Ac | - | 4E+1 | 2E-8 | 6E-11 | - | - |
| 90 | Thorium-226[2] | W, all compounds except those given for Y | 5E+3 | 2E+2 | 6E-8 | 2E-10 | - | - |
| | | | St. wall (5E+3) | - | - | - | 7E-5 | 7E-4 |
| | | Y, oxides and hydroxides | - | 1E+2 | 6E-8 | 2E-10 | - | - |
| 90 | Thorium-227 | W, see $^{226}$Th | 1E+2 | 3E-1 | 1E-10 | 5E-13 | 2E-6 | 2E-5 |
| | | Y, see $^{226}$Th | - | 3E-1 | 1E-10 | 5E-13 | - | - |
| 90 | Thorium-228 | W, see $^{226}$Th | 6E+0 | 1E-2 | 4E-12 | - | - | - |
| | | | Bone surf (1E+1) | Bone surf (2E-2) | - | 3E-14 | 2E-7 | 2E-6 |
| | | Y, see $^{226}$Th | - | 2E-2 | 7E-12 | 2E-14 | - | - |
| 90 | Thorium-229 | W, see $^{226}$Th | 6E-1 | 9E-4 | 4E-13 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (2E-3) | - | 3E-15 | 2E-8 | 2E-7 |
| | | Y, see $^{226}$Th | - | 2E-3 | 1E-12 | - | - | - |
| | | | - | Bone surf (3E-3) | - | 4E-15 | - | - |
| 90 | Thorium-230 | W, see $^{226}$Th | 4E+0 | 6E-3 | 3E-12 | - | - | - |
| | | | Bone surf (9E+0) | Bone surf (2E-2) | - | 2E-14 | 1E-7 | 1E-6 |
| | | Y, see $^{226}$Th | - | 2E-2 | 6E-12 | - | - | - |
| | | | - | Bone surf (2E-2) | - | 3E-14 | - | - |
| 90 | Thorium-231 | W, see $^{226}$Th | 4E+3 | 6E+3 | 3E-6 | 9E-9 | 5E-5 | 5E-4 |
| | | Y, see $^{226}$Th | - | 6E+3 | 3E-6 | 9E-9 | - | - |
| 90 | Thorium-232 | W, see $^{226}$Th | 7E-1 | 1E-3 | 5E-13 | - | - | - |
| | | | Bone surf (2E+0) | Bone surf (3E-3) | - | 4E-15 | 3E-8 | 3E-7 |
| | | Y, see $^{226}$Th | - | 3E-3 | 1E-12 | - | - | - |
| | | | - | Bone surf (4E-3) | - | 6E-15 | - | - |
| 90 | Thorium-234 | W, see $^{226}$Th | 3E+2 | 2E+2 | 8E-8 | 3E-10 | - | - |
| | | | LLI wall (4E+2) | - | - | - | 5E-6 | 5E-5 |
| | | Y, see $^{226}$Th | - | 2E+2 | 6E-8 | 2E-10 | - | - |
| 91 | Protactinium-227[2] | W, all compounds except those given for Y | 4E+3 | 1E+2 | 5E-8 | 2E-10 | 5E-5 | 5E-4 |
| | | Y, oxides and hydroxides | - | 1E+2 | 4E-8 | 1E-10 | - | - |
| 91 | Protactinium-228 | W, see $^{227}$Pa | 1E+3 | 1E+1 | 5E-9 | - | 2E-5 | 2E-4 |
| | | | - | Bone surf (2E+1) | - | 3E-11 | - | - |
| | | Y, see $^{226}$Pa | - | 1E+1 | 5E-9 | 2E-11 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 91 | Protactinium-230 | W, see $^{227}Pa$ | 6E+2 | 5E+0 | 2E-9 | 7E-12 | - | - |
| | | | Bone surf (9E+2) | - | - | - | 1E-5 | 1E-4 |
| | | Y, see $^{227}Pa$ | - | 4E+0 | 1E-9 | 5E-12 | - | - |
| 91 | Protactinium-231 | W, see $^{227}Pa$ | 2E-1 | 2E-3 | 6E-13 | - | - | - |
| | | | Bone surf (5E-1) | Bone surf (4E-3) | - | 6E-15 | 6E-9 | 6E-8 |
| | | Y, see $^{226}Pa$ | - | 4E-3 | 2E-12 | - | - | - |
| | | | - | Bone surf (6E-3) | - | 8E-15 | - | - |
| 91 | Protactinium-232 | W, see $^{227}Pa$ | 1E+3 | 2E+1 | 9E-9 | - | 2E-5 | 2E-4 |
| | | | - | Bone surf (6E+1) | - | 8E-11 | - | - |
| | | Y, see $^{227}Pa$ | - | 6E+1 | 2E-8 | - | - | - |
| | | | - | Bone surf (7E+1) | - | 1E-10 | - | - |
| 91 | Protactinium-233 | W, see $^{227}Pa$ | 1E+3 | 7E+2 | 3E-7 | 1E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 2E-5 | 2E-4 |
| | | Y, see $^{227}Pa$ | - | 6E+2 | 2E-7 | 8E-10 | - | - |
| 91 | Protactinium-234 | W, see $^{227}Pa$ | 2E+3 | 8E+3 | 3E-6 | 1E-8 | 3E-5 | 3E-4 |
| | | Y, see $^{227}Pa$ | - | 7E+3 | 3E-6 | 9E-9 | - | - |
| 92 | Uranium-230 | D, $UF_6$, $UO_2F_2$, $UO_2(NO_3)_2$ | 4E+0 | 4E-1 | 2E-10 | - | - | - |
| | | | Bone surf (6E+0) | Bone surf (6E-1) | - | 8E-13 | 8E-8 | 8E-7 |
| | | W, $UO_3$, $UF_4$, $UCl_4$ | - | 4E-1 | 1E-10 | 5E-13 | - | - |
| | | Y, $UO_2$, $U_3O_8$ | - | 3E-1 | 1E-10 | 4E-13 | - | - |
| 92 | Uranium-231 | D, see $^{230}U$ | 5E+3 | 8E+3 | 3E-6 | 1E-8 | - | - |
| | | | LLI wall (4E+3) | - | - | - | 6E-5 | 6E-4 |
| | | W, see $^{230}U$ | - | 6E+3 | 2E-6 | 8E-9 | - | - |
| | | Y, see $^{230}U$ | - | 5E+3 | 2E-6 | 6E-9 | - | - |
| 92 | Uranium-232 | D, see $^{230}U$ | 2E+0 | 2E-1 | 9E-11 | - | - | - |
| | | | Bone surf (4E+0) | Bone surf (4E-1) | - | 6E-13 | 6E-8 | 6E-7 |
| | | W, see $^{230}U$ | - | 4E-1 | 2E-10 | 5E-13 | - | - |
| | | Y, see $^{230}U$ | - | 8E-3 | 3E-12 | 1E-14 | - | - |
| 92 | Uranium-233 | D, see $^{230}U$ | 1E+1 | 1E+0 | 5E-10 | - | - | - |
| | | | Bone surf (2E+1) | Bone surf (2E+0) | - | 3E-12 | 3E-7 | 3E-6 |
| | | W, see $^{230}U$ | - | 7E-1 | 3E-10 | 1E-12 | - | - |
| | | Y, see $^{230}U$ | - | 4E-2 | 2E-11 | 5E-14 | - | - |
| 92 | Uranium-234[3] | D, see $^{230}U$ | 1E+1 | 1E+0 | 5E-10 | - | - | - |
| | | | Bone surf (2E+1) | Bone surf (2E+0) | - | 3E-12 | 3E-7 | 3E-6 |
| | | W, see $^{230}U$ | - | 7E-1 | 3E-10 | 1E-12 | - | - |
| | | Y, see $^{230}U$ | - | 4E-2 | 2E-11 | 5E-14 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values: Col. 1 Oral Ingestion ALI (μCi) | Table 1 Occupational Values: Col. 2 Inhalation ALI (μCi) | Table 1 Occupational Values: Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations: Col. 1 Air (μCi/ml) | Table 2 Effluent Concentrations: Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers: Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|---|---|
| 92 | Uranium-235[3] | D, see $^{230}U$ | 1E+1 | 1E+0 | 6E-10 | - | - | - |
| | | | Bone surf (2E+1) | Bone surf (2E+0) | - | 3E-12 | 3E-7 | 3E-6 |
| | | W, see $^{230}U$ | - | 8E-1 | 3E-10 | 1E-12 | - | - |
| | | Y, see $^{230}U$ | - | 4E-2 | 2E-11 | 6E-14 | - | - |
| 92 | Uranium-236 | D, see $^{230}U$ | 1E+1 | 1E+0 | 5E-10 | - | - | - |
| | | | Bone surf (2E+1) | Bone surf (2E+0) | - | 3E-12 | 3E-7 | 3E-6 |
| | | W, see $^{230}U$ | - | 8E-1 | 3E-10 | 1E-12 | - | - |
| | | Y, see $^{230}U$ | - | 4E-2 | 2E-11 | 6E-14 | - | - |
| 92 | Uranium-237 | D, see $^{230}U$ | 2E+3 | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 3E-5 | 3E-4 |
| | | W, see $^{230}U$ | - | 2E+3 | 7E-7 | 2E-9 | - | - |
| | | Y, see $^{230}U$ | - | 2E+3 | 6E-7 | 2E-9 | - | - |
| 92 | Uranium-238[3] | D, see $^{230}U$ | 1E+1 | 1E+0 | 6E-10 | - | - | - |
| | | | Bone surf (2E+1) | Bone surf (2E+0) | - | 3E-12 | 3E-7 | 3E-6 |
| | | W, see $^{230}U$ | - | 8E-1 | 3E-10 | 1E-12 | - | - |
| | | Y, see $^{230}U$ | - | 4E-2 | 2E-11 | 6E-14 | - | - |
| 92 | Uranium-239[2] | D, see $^{230}U$ | 7E+4 | 2E+5 | 8E-5 | 3E-7 | 9E-4 | 9E-3 |
| | | W, see $^{230}U$ | - | 2E+5 | 7E-5 | 2E-7 | - | - |
| | | Y, see $^{230}U$ | - | 2E+5 | 6E-5 | 2E-7 | - | - |
| 92 | Uranium-240 | D, see $^{230}U$ | 1E+3 | 4E+3 | 2E-6 | 5E-9 | 2E-5 | 2E-4 |
| | | W, see $^{230}U$ | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| | | Y, see $^{230}U$ | - | 2E+3 | 1E-6 | 3E-9 | - | - |
| 92 | Uranium-natural[3] | D, see $^{230}U$ | 1E+1 | 1E+0 | 5E-10 | - | - | - |
| | | | Bone surf (2E+1) | Bone surf (2E+0) | - | 3E-12 | 3E-7 | 3E-6 |
| | | W, see $^{230}U$ | - | 8E-1 | 3E-10 | 9E-13 | - | - |
| | | Y, see $^{230}U$ | - | 5E-2 | 2E-11 | 9E-14 | - | - |
| 93 | Neptunium-232[2] | W, all compounds | 1E+5 | 2E+3 | 7E-7 | - | 2E-3 | 2E-2 |
| | | | - | Bone surf (5E+2) | - | 6E-9 | - | - |
| 93 | Neptunium-233[2] | W, all compounds | 8E+5 | 3E+6 | 1E-3 | 4E-6 | 1E-2 | 1E-1 |
| 93 | Neptunium-234 | W, all compounds | 2E+3 | 3E+3 | 1E-6 | 4E-9 | 3E-5 | 3E-4 |
| 93 | Neptunium-235 | W, all compounds | 2E+4 | 8E+2 | 3E-7 | - | - | - |
| | | | LLI wall (2E+4) | Bone surf (1E+3) | - | 2E-9 | 3E-4 | 3E-3 |
| 93 | Neptunium-236 (1.15E+5 y) | W, all compounds | 3E+0 | 2E-2 | 9E-12 | - | - | - |
| | | | Bone surf (6E+0) | Bone surf (5E-2) | - | 8E-14 | 9E-8 | 9E-7 |
| 93 | Neptunium-236m (22.5 h) | W, all compounds | 3E+3 | 3E+1 | 1E-8 | - | - | - |
| | | | Bone surf (4E+3) | Bone surf (7E+1) | - | 1E-10 | 5E-5 | 5E-4 |
| 93 | Neptunium-237 | W, all compounds | 5E-1 | 4E-3 | 2E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (1E-2) | - | 1E-14 | 2E-8 | 2E-7 |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| 93 | Neptunium-238 | W, all compounds | 1E+3 | 5E+1 | 3E-8 | - | 2E-5 | 2E-4 |
| | | | - | Bone surf (2E+2) | - | 2E-10 | - | - |
| 93 | Neptunium-239 | W, all compounds | 2E+3 | 2E+3 | 9E-7 | 3E-9 | - | - |
| | | | LLI wall (2E+3) | - | - | - | 2E-5 | 2E-4 |
| 93 | Neptunium-240[2] | W, all compounds | 2E+4 | 8E+4 | 3E-5 | 1E-7 | 3E-4 | 3E-3 |
| 94 | Plutonium-234 | W, all compounds except $PuO_2$ | 8E+3 | 2E+2 | 9E-8 | 3E-10 | 1E-4 | 1E-3 |
| | | Y, $PuO_2$ | - | 2E+2 | 8E-8 | 3E-10 | - | - |
| 94 | Plutonium-235[2] | W, see $^{234}Pu$ | 9E+5 | 3E+6 | 1E-3 | 4E-6 | 1E-2 | 1E-1 |
| | | Y, see $^{234}Pu$ | - | 3E+6 | 1E-3 | 3E-6 | - | - |
| 94 | Plutonium-236 | W, see $^{234}Pu$ | 2E+0 | 2E-2 | 8E-12 | - | - | - |
| | | | Bone surf (4E+0) | Bone surf (4E-2) | - | 5E-14 | 6E-8 | 6E-7 |
| | | Y, see $^{234}Pu$ | - | 4E-2 | 2E-11 | 6E-14 | - | - |
| 94 | Plutonium-237 | W, see $^{234}Pu$ | 1E+4 | 3E+3 | 1E-6 | 5E-9 | 2E-4 | 2E-3 |
| | | Y, see $^{234}Pu$ | - | 3E+3 | 1E-6 | 4E-9 | - | - |
| 94 | Plutonium-238 | W, see $^{234}Pu$ | 9E-1 | 7E-3 | 3E-12 | - | - | - |
| | | | Bone surf (2E+0) | Bone surf (1E-2) | - | 2E-14 | 2E-8 | 2E-7 |
| | | Y, see $^{234}Pu$ | - | 2E-2 | 8E-12 | 2E-14 | - | - |
| 94 | Plutonium-239 | W, see $^{234}Pu$ | 8E-1 | 6E-3 | 3E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (1E-2) | - | 2E-14 | 2E-8 | 2E-7 |
| | | Y, see $^{234}Pu$ | - | 2E-2 | 7E-12 | - | - | - |
| | | | - | Bone surf (2E-2) | - | 2E-14 | - | - |
| 94 | Plutonium-240 | W, see $^{234}Pu$ | 8E-1 | 6E-3 | 3E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (1E-2) | - | 2E-14 | 2E-8 | 2E-7 |
| | | Y, see $^{234}Pu$ | - | 2E-2 | 7E-12 | - | - | - |
| | | | - | Bone surf (2E-2) | - | 2E-14 | - | - |
| 94 | Plutonium-241 | W, see $^{234}Pu$ | 4E+1 | 3E-1 | 1E-10 | - | - | - |
| | | | Bone surf (7E+1) | Bone surf (6E-1) | - | 8E-13 | 1E-6 | 1E-5 |
| | | Y, see $^{234}Pu$ | - | 8E-1 | 3E-10 | - | - | - |
| | | | - | Bone surf (1E+0) | - | 1E-12 | - | - |

| Atomic No. | Radionuclide | Class | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 Oral Ingestion | Col. 2 Inhalation | Col. 3 Inhalation | Col. 1 | Col. 2 | |
| | | | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| 94 | Plutonium-242 | W, see $^{234}$Pu | 8E-1 | 7E-3 | 3E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (1E-2) | - | 2E-14 | 2E-8 | 2E-7 |
| | | Y, see $^{234}$Pu | - | 2E-2 | 7E-12 | - | - | - |
| | | | - | Bone surf (2E-2) | - | 2E-14 | - | - |
| 94 | Plutonium-243 | W, see $^{234}$Pu | 2E+4 | 4E+4 | 2E-5 | 5E-8 | 2E-4 | 2E-3 |
| | | Y, see $^{234}$Pu | - | 4E+4 | 2E-5 | 5E-8 | - | - |
| 94 | Plutonium-244 | W, see $^{234}$Pu | 8E-1 | 7E-3 | 3E-12 | - | - | - |
| | | | Bone surf (2E+0) | Bone surf (1E-2) | - | 2E-14 | 2E-8 | 2E-7 |
| | | Y, see $^{234}$Pu | - | 2E-2 | 7E-12 | - | - | - |
| | | | - | Bone surf (2E-2) | - | 2E-14 | - | - |
| 94 | Plutonium-245 | W, see $^{234}$Pu | 2E+3 | 5E+3 | 2E-6 | 6E-9 | 3E-5 | 3E-4 |
| | | Y, see $^{234}$Pu | - | 4E+3 | 2E-6 | 6E-9 | - | - |
| 94 | Plutonium-246 | W, see $^{234}$Pu | 4E+2 | 3E+2 | 1E-7 | 4E-10 | - | - |
| | | | LLI wall (4E+2) | - | - | - | 6E-6 | 6E-5 |
| | | Y, see $^{234}$Pu | - | 3E+2 | 1E-7 | 4E-10 | - | - |
| 95 | Americium-237[2] | W, all compounds | 8E+4 | 3E+5 | 1E-4 | 4E-7 | 1E-3 | 1E-2 |
| 95 | Americium-238[2] | W, all compounds | 4E+4 | 3E+3 | 1E-6 | - | 5E-4 | 5E-3 |
| | | | - | Bone surf (6E+3) | - | 9E-9 | - | - |
| 95 | Americium-239 | W, all compounds | 5E+3 | 1E+4 | 5E-6 | 2E-8 | 7E-5 | 7E-4 |
| 95 | Americium-240 | W, all compounds | 2E+3 | 3E+3 | 1E-6 | 4E-9 | 3E-5 | 3E-4 |
| 95 | Americium-241 | W, all compounds | 8E-1 | 6E-3 | 3E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (1E-2) | - | 2E-14 | 2E-8 | 2E-7 |
| 95 | Americium-242m | W, all compounds | 8E-1 | 6E-3 | 3E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (1E-2) | - | 2E-14 | 2E-8 | 2E-7 |
| 95 | Americium-242 | W, all compounds | 4E+3 | 8E+1 | 4E-8 | - | 5E-5 | 5E-4 |
| | | | - | Bone surf (9E+1) | - | 1E-10 | - | - |
| 95 | Americium-243 | W, all compounds | 8E-1 | 6E-3 | 3E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (1E-2) | - | 2E-14 | 2E-8 | 2E-7 |
| 95 | Americium-244m[2] | W, all compounds | 6E+4 | 4E+3 | 2E-6 | - | - | - |
| | | | St. wall (8E+4) | Bone surf (7E+3) | - | 1E-8 | 1E-3 | 1E-2 |
| 95 | Americium-244 | W, all compounds | 3E+3 | 2E+2 | 8E-8 | - | 4E-5 | 4E-4 |
| | | | - | Bone surf (3E+2) | - | 4E-10 | - | - |
| 95 | Americium-245 | W, all compounds | 3E+4 | 8E+4 | 3E-5 | 1E-7 | 4E-4 | 4E-3 |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | Monthly Average Concentration |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | (μCi/ml) |
| 95 | Americium-246m[2] | W, all compounds | 5E+4 | 2E+5 | 8E-5 | 3E-7 | - | - |
| | | | St. wall (6E+4) | - | - | - | 8E-4 | 8E-3 |
| 95 | Americium-246[2] | W, all compounds | 3E+4 | 1E+5 | 4E-5 | 1E-7 | 4E-4 | 4E-3 |
| 96 | Curium-238 | W, all compounds | 2E+4 | 1E+3 | 5E-7 | 2E-9 | 2E-4 | 2E-3 |
| 96 | Curium-240 | W, all compounds | 6E+1 | 6E-1 | 2E-10 | - | - | - |
| | | | Bone surf (8E+1) | Bone surf (6E-1) | - | 9E-13 | 1E-6 | 1E-5 |
| 96 | Curium-241 | W, all compounds | 1E+3 | 3E+1 | 1E-8 | - | 2E-5 | 2E-4 |
| | | | - | Bone surf (4E+1) | - | 5E-11 | - | - |
| 96 | Curium-242 | W, all compounds | 3E+1 | 3E-1 | 1E-10 | - | - | - |
| | | | Bone surf (5E+1) | Bone surf (3E-1) | - | 4E-13 | 7E-7 | 7E-6 |
| 96 | Curium-243 | W, all compounds | 1E+0 | 9E-3 | 4E-12 | - | - | - |
| | | | Bone surf (2E+0) | Bone surf (2E-2) | - | 2E-14 | 3E-8 | 3E-7 |
| 96 | Curium-244 | W, all compounds | 1E+0 | 1E-2 | 5E-12 | - | - | - |
| | | | Bone surf (3E+0) | Bone surf (2E-2) | - | 3E-14 | 3E-8 | 3E-7 |
| 96 | Curium-245 | W, all compounds | 7E-1 | 6E-3 | 3E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (1E-2) | - | 2E-14 | 2E-8 | 2E-7 |
| 96 | Curium-246 | W, all compounds | 7E-1 | 6E-3 | 3E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (1E-2) | - | 2E-14 | 2E-8 | 2E-7 |
| 96 | Curium-247 | W, all compounds | 8E-1 | 6E-3 | 3E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (1E-2) | - | 2E-14 | 2E-8 | 2E-7 |
| 96 | Curium-248 | W, all compounds | 2E-1 | 2E-3 | 7E-13 | - | - | - |
| | | | Bone surf (4E-1) | Bone surf (3E-3) | - | 4E-15 | 5E-9 | 5E-8 |
| 96 | Curium-249[2] | W, all compounds | 5E+4 | 2E+4 | 7E-6 | - | 7E-4 | 7E-3 |
| | | | - | Bone surf (3E+4) | - | 4E-8 | - | - |
| 96 | Curium-250 | W, all compounds | 4E-2 | 3E-4 | 1E-13 | - | - | - |
| | | | Bone surf (6E-2) | Bone surf (5E-4) | - | 8E-16 | 9E-10 | 9E-9 |
| 97 | Berkelium-245 | W, all compounds | 2E+3 | 1E+3 | 5E-7 | 2E-9 | 3E-5 | 3E-4 |
| 97 | Berkelium-246 | W, all compounds | 3E+3 | 3E+3 | 1E-6 | 4E-9 | 4E-5 | 4E-4 |
| 97 | Berkelium-247 | W, all compounds | 5E-1 | 4E-3 | 2E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (9E-3) | - | 1E-14 | 2E-8 | 2E-7 |
| 97 | Berkelium-249 | W, all compounds | 2E+2 | 2E+0 | 7E-10 | - | - | - |
| | | | Bone surf (5E+2) | Bone surf (4E+0) | - | 5E-12 | 6E-6 | 6E-5 |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| 97 | Berkelium-250 | W, all compounds | 9E+3 | 3E+2 | 1E-7 | - | 1E-4 | 1E-3 |
| | | | - | Bone surf (7E+2) | - | 1E-9 | - | - |
| 98 | Californium-244[2] | W, all compounds except those given for Y | 3E+4 | 6E+2 | 2E-7 | 8E-10 | - | - |
| | | | St. wall (3E+4) | - | - | - | 4E-4 | 4E-3 |
| | | Y, oxides and hydroxides | - | 6E+2 | 2E-7 | 8E-10 | - | - |
| 98 | Californium-246 | W, see $^{244}$Cf | 4E+2 | 9E+0 | 4E-9 | 1E-11 | 5E-6 | 5E-5 |
| | | Y, see $^{244}$Cf | - | 9E+0 | 4E-9 | 1E-11 | - | - |
| 98 | Californium-248 | W, see $^{244}$Cf | 8E+0 | 6E-2 | 3E-11 | - | - | - |
| | | | Bone surf (2E+1) | Bone surf (1E-1) | - | 2E-13 | 2E-7 | 2E-6 |
| | | Y, see $^{244}$Cf | - | 1E-1 | 4E-11 | 1E-13 | - | - |
| 98 | Californium-249 | W, see $^{244}$Cf | 5E-1 | 4E-3 | 2E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (9E-3) | - | 1E-14 | 2E-8 | 2E-7 |
| | | Y, see $^{244}$Cf | - | 1E-2 | 4E-12 | - | - | - |
| | | | - | Bone surf (1E-2) | - | 2E-14 | - | - |
| 98 | Californium-250 | W, see $^{244}$Cf | 1E+0 | 9E-3 | 4E-12 | - | - | - |
| | | | Bone surf (2E+0) | Bone surf (2E-2) | - | 3E-14 | 3E-8 | 3E-7 |
| | | Y, see $^{244}$Cf | - | 3E-2 | 1E-11 | 4E-14 | - | - |
| 98 | Californium-251 | W, see $^{244}$Cf | 5E-1 | 4E-3 | 2E-12 | - | - | - |
| | | | Bone surf (1E+0) | Bone surf (9E-3) | - | 1E-14 | 2E-8 | 2E-7 |
| | | Y, see $^{244}$Cf | - | 1E-2 | 4E-12 | - | - | - |
| | | | - | Bone surf (1E-2) | - | 2E-14 | - | - |
| 98 | Californium-252 | W, see $^{244}$Cf | 2E+0 | 2E-2 | 8E-12 | - | - | - |
| | | | Bone surf (5E+0) | Bone surf (4E-2) | - | 5E-14 | 7E-8 | 7E-7 |
| | | Y, see $^{244}$Cf | - | 3E-2 | 1E-11 | 5E-14 | - | - |
| 98 | Californium-253 | W, see $^{244}$Cf | 2E+2 | 2E+0 | 8E-10 | 3E-12 | - | - |
| | | | Bone surf (4E+2) | - | - | - | 5E-6 | 5E-5 |
| | | Y, see $^{244}$Cf | - | 2E+0 | 7E-10 | 2E-12 | - | - |
| 98 | Californium-254 | W, see $^{244}$Cf | 2E+0 | 2E-2 | 9E-12 | 3E-14 | 3E-8 | 3E-7 |
| | | Y, see $^{244}$Cf | - | 2E-2 | 7E-12 | 2E-14 | - | - |
| 99 | Einsteinium-250 | W, all compounds | 4E+4 | 5E+2 | 2E-7 | - | 6E-4 | 6E-3 |
| | | | - | Bone surf (1E+3) | - | 2E-9 | - | - |
| 99 | Einsteinium-251 | W, all compounds | 7E+3 | 9E+2 | 4E-7 | - | 1E-4 | 1E-3 |
| | | | - | Bone surf (1E+3) | - | 2E-9 | - | - |
| 99 | Einsteinium-253 | W, all compounds | 2E+2 | 1E+0 | 6E-10 | 2E-12 | 2E-6 | 2E-5 |

| | | | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|---|---|
| | | | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | | | Oral Ingestion | Inhalation | | | | |
| Atomic No. | Radionuclide | Class | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| 99 | Einsteinium-254m | W, all compounds | 3E+2 | 1E+1 | 4E-9 | 1E-11 | - | - |
| | | | LLI wall (3E+2) | - | - | - | 4E-6 | 4E-5 |
| 99 | Einsteinium-254 | W, all compounds | 8E+0 | 7E-2 | 3E-11 | - | - | - |
| | | | Bone surf (2E+1) | Bone surf (1E-1) | - | 2E-13 | 2E-7 | 2E-6 |
| 100 | Fermium-252 | W, all compounds | 5E+2 | 1E+1 | 5E-9 | 2E-11 | 6E-6 | 6E-5 |
| 100 | Fermium-253 | W, all compounds | 1E+3 | 1E+1 | 4E-9 | 1E-11 | 1E-5 | 1E-4 |
| 100 | Fermium-254 | W, all compounds | 3E+3 | 9E+1 | 4E-8 | 1E-10 | 4E-5 | 4E-4 |
| 100 | Fermium-255 | W, all compounds | 5E+2 | 2E+1 | 9E-9 | 3E-11 | 7E-6 | 7E-5 |
| 100 | Fermium-257 | W, all compounds | 2E+1 | 2E-1 | 7E-11 | - | - | - |
| | | | Bone surf (4E+1) | Bone surf (2E-1) | - | 3E-13 | 5E-7 | 5E-6 |
| 101 | Mendelevium-257 | W, all compounds | 7E+3 | 8E+1 | 4E-8 | - | 1E-4 | 1E-3 |
| | | | - | Bone surf (9E+1) | - | 1E-10 | - | - |
| 101 | Mendelevium-258 | W, all compounds | 3E+1 | 2E-1 | 1E-10 | - | - | - |
| | | | Bone surf (5E+1) | Bone surf (3E-1) | - | 5E-13 | 6E-7 | 6E-6 |
| - | Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than 2 hours | Submersion[1] | - | 2E+2 | 1E-7 | 1E-9 | - | - |
| - | Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life greater than 2 hours | | - | 2E-1 | 1E-10 | 1E-12 | 1E-8 | 1E-7 |
| - | Any single radionuclide not listed above that decays by alpha emission or spontaneous fission, or any mixture for which either the identity or the concentration of any radionuclide in the mixture is not known | | - | 4E-4 | 2E-13 | 1E-15 | 2E-9 | 2E-8 |

FOOTNOTES:

[1]"Submersion" means that values given are for submersion in a hemispherical semi-infinite cloud of airborne material.

[2]These radionuclides have radiological half-lives of less than 2 hours. The total effective dose equivalent received during operations with these radionuclides might include a significant contribution from external exposure. The DAC values for all radionuclides, other than those designated Class "Submersion," are based upon the committed effective dose equivalent due to the intake of the radionuclide into the body and do NOT include potentially significant contributions to dose equivalent from external exposures. The licensee may substitute 1E-7 μCi/ml for the listed DAC to account for the submersion dose prospectively, but should use individual monitoring devices or other radiation measuring instruments that measure external exposure to demonstrate compliance with the limits. (See § 20.1203.)

[3]For soluble mixtures of U-238, U-234, and U-235 in air, chemical toxicity may be the limiting factor (see § 20.1201(e)). If the percent by weight (enrichment) of U-235 is not greater than 5, the concentration value for a 40-hour workweek is 0.2 milligrams uranium per cubic meter of air average. For any enrichment, the product of the average concentration and time of exposure during a 40-hour workweek shall not exceed 8E-3 (SA) μCi-hr/ml, where SA is the specific activity of the uranium inhaled. The specific activity for natural uranium is 6.77E-7 curies per gram U. The specific activity for other mixtures of U-238, U-235, and U-234, if not known, shall be:

$$SA = 3.6E\text{-}7 \text{ curies/gram U} \qquad \text{U-depleted}$$

$$SA = [0.4 + 0.38\,(\text{enrichment}) + 0.0034\,(\text{enrichment})^2]\ E\text{-}6\ , \quad \text{enrichment} \geq 0.72$$

where enrichment is the percentage by weight of U-235, expressed as percent.

NOTE:

1. 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.

2. If the identity of each radionuclide in the mixture is not known, but it is known that certain radionuclides specified in this appendix are not present in the mixture, the inhalation ALI, DAC, and effluent and sewage concentrations for the mixture are the lowest values specified in this appendix for any radionuclide that is not known to be absent from the mixture; or

| | Table 1 Occupational Values | | | Table 2 Effluent Concentrations | | Table 3 Releases to Sewers |
|---|---|---|---|---|---|---|
| | Col. 1 | Col. 2 | Col. 3 | Col. 1 | Col. 2 | |
| | Oral Ingestion | Inhalation | | | | |
| Radionuclide | ALI (μCi) | ALI (μCi) | DAC (μCi/ml) | Air (μCi/ml) | Water (μCi/ml) | Monthly Average Concentration (μCi/ml) |
| If it is known that Ac-227-D and Cm-250-W are not present | - | 7E-4 | 3E-13 | - | - | - |
| If, in addition, it is known that Ac-227-W,Y, Th-229-W,Y, Th-230-W, Th-232-W,Y, Pa-231-W,Y, Np-237-W, Pu-239-W, Pu-240-W, Pu-242-W, Am-241-W, Am-242m-W, Am-243-W, Cm-245-W, Cm-246-W, Cm-247-W, Cm-248-W, Bk-247-W, Cf-249-W, and Cf-251-W are not present | - | 7E-3 | 3E-12 | - | - | - |
| If, in addition, it is known that Sm-146-W, Sm-147-W, Gd-148-D,W, Gd-152-D,W, Th-228-W,Y, Th-230-Y, U-232-Y, U-233-Y, U-234-Y, U-235-Y, U-236-Y, U-238-Y, Np-236-W, Pu-236-W,Y, Pu-238-W,Y, Pu-239-Y, Pu-240-Y, Pu-242-Y, Pu-244-W,Y, Cm-243-W, Cm-244-W, Cf-248-W, Cf-249-Y, Cf-250-W,Y, Cf-251-Y, Cf-252-W,Y, and Cf-254-W,Y are not present | - | 7E-2 | 3E-11 | - | - | - |
| If, in addition, it is known that Pb-210-D, Bi-210m-W, Po-210-D,W, Ra-223-W, Ra-225-W, Ra-226-W, Ac-225-D,W,Y, Th-227-W,Y, U-230-D,W,Y, U-232-D,W, Pu-241-W, Cm-240-W, Cm-242-W, Cf-248-Y, Es-254-W, Fm-257-W, and Md-258-W are not present | - | 7E-1 | 3E-10 | - | - | - |

| Radionuclide | Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi) | Col. 2 Inhalation ALI (μCi) | Col. 3 Inhalation DAC (μCi/ml) | Table 2 Effluent Concentrations Col. 1 Air (μCi/ml) | Col. 2 Water (μCi/ml) | Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml) |
|---|---|---|---|---|---|---|
| If, in addition, it is known that Si-32-Y, Ti-44-Y, Fe-60-D, Sr-90-Y, Zr-93-D, Cd-113m-D, Cd-113-D, In-115-D,W, La-138-D, Lu-176-W, Hf-178m-D,W, Hf-182-D,W, Bi-210m-D, Ra-224-W, Ra-228-W, Ac-226-D,W,Y, Pa-230-W,Y, U-233-D,W, U-234-D,W, U-235-D,W, U-236-D,W, U-238-D,W, Pu-241-Y, Bk-249-W, Cf-253-W,Y, and Es-253-W are not present | - | 7E+0 | 3E-9 | - | - | - |
| If it is known that Ac-227-D,W,Y, Th-229-W,Y, Th-232-W,Y, Pa-231-W,Y, Cm-248-W, and Cm-250-W are not present - | - | - | | 1E-14 | - | - |
| If, in addition, it is known that Sm-146-W, Gd-148-D,W, Gd-152-D, Th-228-W,Y, Th-230-W,Y, U-232-Y, U-233-Y, U-234-Y, U-235-Y, U-236-Y, U-238-Y, U-Nat-Y, Np-236-W, Np-237-W, Pu-236-W,Y, Pu-238-W,Y, Pu-239-W,Y, Pu-240-W,Y, Pu-242-W,Y, Pu-244-W,Y, Am-241-W, Am-242m-W, Am-243-W, Cm-243-W, Cm-244-W, Cm-245-W, Cm-246-W, Cm-247-W, Bk-247-W, Cf-249-W,Y, Cf-250-W,Y, Cf-251-W,Y, Cf-252-W,Y, and Cf-254-W,Y are not present | | | - | 1E-13 | - | - |
| If, in addition, it is known that Sm-147-W, Gd-152-W, Pb-210-D, Bi-210m-W, Po-210-D,W, Ra-223-W, Ra-225-W, Ra-226-W, Ac-225-D,W,Y, Th-227-W,Y, U-230-D,W,Y, U-232-D,W, U-Nat-W, Pu-241-W, Cm-240-W, Cm-242-W, Cf-248-W,Y, Es-254-W, Fm-257-W, and Md-258-W are not present | | | - | 1E-12 | - | - |
| If, in addition it is known that Fe-60, Sr-90, Cd-113m, Cd-113, In-115, I-129, Cs-134, Sm-145, Sm-147, Gd-148, Gd-152, Hg-194 (organic), Bi-210m, Ra-223, Ra-224, Ra-225, Ac-225, Th-228, Th-230, U-233, U-234, U-235, U-236, U-238, U-Nat, Cm-242, Cf-248, Es-254, Fm-257, and Md-258 are not present | - | - | - | - | 1E-6 | 1E-5 |

3 If a mixture of radionuclides consists of uranium and its daughters in ore dust (10 μm AMAD particle distribution assumed) prior to chemical separation of the uranium from the ore, the following values may be used for the DAC of the mixture: 6E-11 μCi of gross alpha activity from uranium-238, uranium-234, thorium-230, and radium-226 per milliliter of air; 3E-11 μCi of natural uranium per milliliter of air; or 45 micrograms of natural uranium per cubic meter of air.

4 If the identity and concentration of each radionuclide in a mixture are known, the limiting values should be derived as follows: determine, for each radionuclide in the mixture, the ratio between the concentration present in the mixture and the concentration otherwise established in Appendix B for the specific radionuclide when not in a mixture. The sum of such ratios for all of the radionuclides in the mixture may not exceed "1" (i.e., "unity").

Example: If radionuclides "A," "B," and "C" are present in concentrations $C_A$, $C_B$, and $C_C$, and if the applicable DACs are $DAC_A$, $DAC_B$, and $DAC_C$, respectively, then the concentrations shall be limited so that the following relationship exists:

$$\frac{C_A}{DAC_A} + \frac{C_B}{DAC_B} + \frac{C_C}{DAC_C} < 1$$

[56 FR 23409, May 21, 1991; 56 FR 61352, Dec. 3, 1991, as amended at 57 FR 57879, Dec. 8, 1992. Redesignated at 58 FR 67659, Dec. 22, 1993, as amended at 71 FR 15007, Mar. 27, 2006; 72 FR 55922, Oct. 1, 2007; 75 FR 73938, Nov. 30, 2010]