COLORADO
Department of Public Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

To: Members of the State Board of Health

From: James Jarvis, Health Physicist, Hazardous Materials and Waste Management Division

Through: Gary Baughman, Division Director GB

Date: March 30, 2015

Subject: **Request for Rulemaking Hearing**
Proposed amendments to 6 CCR 1007-1, Part 4, Standards for Radiation, with a request for the rulemaking hearing to occur in June of 2015

The Division is proposing minor amendments to regulatory part 4, titled *Standards for Protection Against Radiation*.

The regulatory part is being amended to remove information that is no longer valid, to correct typographical errors, to add language specific to the handling and recordkeeping for decay-in-storage consistent with other regulatory parts, and to reformat a table containing a typographic spelling error.

The specific proposed Part 4 changes include:
(1) Removing an invalid web address (also known as a Uniform Resource Locator or "URL") due to revisions to the Departments website in 2014. The web address references Tables 4B1, 4B2, and 4B3;
(2) Inserting Tables 4B1, 4B2, 4B3 into the body of the rule without change. These tables have been maintained separate from the rule (due to their complex formatting) but were linked via website address/URL to the rule. The URLs are no longer valid;
(3) Replacing and reformatting Table 4C in its entirety to correct a spelling error (with no other changes to table values proposed);
(4) Adding language pertaining to requirements and recordkeeping for short-lived radioactive materials held for decay-in-storage consistent with Part 7 rule language; and
(5) Correction of typographical errors.

Approximately 500 stakeholders were notified of the proposed rule amendment and were provided the opportunity to comment. Due to the minor nature of the rule changes, no stakeholder meetings were scheduled. The stakeholder comment period remains open through April 8. To date, the Division received no written comments from stakeholders.

Further details are listed in a Statement of Basis and Purpose and Specific Statutory Authority for the proposed rule, which, along with a Regulatory Analysis and supporting information, is available at: http://www.colorado.gov/pacific/cdphe/radregs

At the April 15, 2015 request for rulemaking, the Radiation Program requests that the Board of Health set a rulemaking hearing for June of 2015.

cc: Deborah Nelson, Administrator, State Board of Health

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STATEMENT OF BASIS AND PURPOSE
AND SPECIFIC STATUTORY AUTHORITY
for Amendments to
6 CCR 1007-1, Radiation Control, Part 4, Standards for Protection Against Radiation

Basis and Purpose.

The Colorado Radiation Control Act, Title 25, Article 11, Colorado Revised Statutes (the Act), requires the State Board of Health to formulate, adopt and promulgate rules and regulations pertaining to radiation control.

Section 25-11-103 of the Act requires the Colorado Department of Public Health and Environment (Department) to develop and conduct programs for evaluation and control of hazards associated with the use of sources of ionizing radiation. Under this authority the Department requires registration of sources of ionizing radiation such as radiation machines and licenses governing the use of radioactive materials.

Section 25-11-104 of the Act requires Colorado's radiation regulations to be consistent with the Suggested State Regulations for Control of Radiation (SSRCR) of the Conference of Radiation Control Program Directors, Inc., except when the Board of Health concludes, on the basis of detailed findings, that a substantial deviation from the SSRCR is warranted. The Department's regulations, where applicable, must also be compatible with the regulations adopted by the U.S. Nuclear Regulatory Commission (NRC) in order to maintain status as an Agreement State. The Act establishes the SSRCR as the model for Colorado to use in adopting NRC regulatory provisions. In some instances, maintaining consistency with the SSRCR may not be possible due to the model regulation being out of date with NRC changes, where no model regulation exists, or where there are specific programmatic needs that differ greatly from the SSRCR. Colorado's Part 4 - is based upon SSRCR Part "D" (2003).

The Department is proposing minor changes to Part 4 to correct minor errors and due to internal and programmatic needs. The proposed rule changes are not specifically driven by NRC compatibility or requirements. Maintaining proper tables of limits is however a matter of compatibility, and thus the correction of table link errors will help to maintain compatibility.

Note that editorial comments, notes, and information shown in the right side margin of the draft proposed rule changes are for information only to aid the reader, and are not considered part of the regulation. These will be removed from the final regulation prior to submission to the Colorado Secretary of State's office for publishing in the Colorado register.

Specific Statutory Authority.
These rules are promulgated pursuant to the following statutory provisions: 25-1.5-101(1)(k), 25-1.5(1)(l), 25-11-103, 25-11-104, and 25-1-108, C.R.S.

SUPPLEMENTAL QUESTIONS

Is this rulemaking due to a change in state statute?

_____ Yes, the bill number is _____; rules are ___ authorized ___ required.
___X__ No

Is this rulemaking due to a federal statutory or regulatory change?

_____ Yes
__X__ No

Does this rule incorporate materials by reference?

__X__ Yes**
_____ No

****The rule in its entirety does incorporate materials by reference. The proposed rule changes which are excerpts of the complete rule do not contain materials by reference.**

Does this rule create or modify fines or fees?

_____ Yes
__X__ No

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REGULATORY ANALYSIS

for Amendments to

6 CCR 1007-1, Radiation Control, Part 4, Standards for Protection Against Radiation

1. **A description of the classes of persons who will be affected by the proposed rule, including classes that will bear the costs of the proposed rule and classes that will benefit from the proposed rule.**

   The proposed rule change is expected to have little to no impact on licensees and there is no cost associated with the rule amendment. The proposed changes are primarily corrections and/or editorial in nature without substantive changes. One added provision pertaining to decay in storage is consistent with language contained in another part (Part 7) of the current rules. The Part 7 rule applies only to medical use licensees, adding this language to Part 4 will apply equivalent requirements to all other licensees thereby eliminating the need to have the requirements in individual license condition.

   There are no specific classes of persons that are expected to benefit from the proposed rule.

   Registrants or users of radiation producing (x-ray) machines are not impacted by the proposed rule changes. This rule change applies only to specific radioactive materials licensees and typically only those licensees using unsealed radioactive materials.

2. **To the extent practicable, a description of the probable quantitative and qualitative impact of the proposed rule, economic or otherwise, upon affected classes of persons.**

   Due to the minor nature of the proposed changes, there are no expected quantitative or qualitative impacts of the proposed rule.

3. **The probable costs to the agency and to any other agency for the implementation and enforcement of the proposed rule and any anticipated effect on state revenues.**

   There are no anticipated costs to the Department as a result of the proposed rule change. The majority of changes are administrative in nature.

   A minor cost savings may be realized due to the added provision pertaining to decay in storage in the proposed rule. The additional language pertaining to decay in storage is expected to benefit the Department by eliminating the need to have special provisions or language pertaining to this topic in the licenses. With the language added to the rule, language specific to decay in storage will be consistent for all types of licensees and not limited to medical licensees.

4. A comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction.

There are no anticipated costs as a result of the proposed rule. The benefits of amending the rule will be to correct invalid website links in the rule and to correct other typographical type errors. The addition of the decay-in-storage provision will eliminate the need to add this language to licensees by deferring to regulation.

Inaction on the proposed rule will retain website links which are no longer appropriate or valid and will not correct the typographical errors in the rule. This may result in confusion on the part of the regulated community due to the unavailability of tables of limits that licensees are required to adhere to.

5. A determination of whether there are less costly methods or less intrusive methods for achieving the purpose of the proposed rule.

The Radiation Program believes there are no less costly or less intrusive methods for implementing these minor changes. The changes are necessary to correct functional and typographical errors in the rule which will benefit both the regulated community and the regulatory program responsible for enforcing the rule. The added provision is expected to ensure licensees have clear and concise requirements in regulation.

6. Alternative Rules or Alternatives to Rulemaking Considered and Why Rejected.

There are no alternative rules or rulemaking considered.

7. To the extent practicable, a quantification of the data used in the analysis; the analysis must take into account both short-term and long-term consequences.

Both the short-term and long-term consequences of failing to implement the proposed regulatory changes would result in the rule continuing to have or contain invalid information and typographical errors. Failing to implement the proposed change pertaining to waste disposal would also result in the program continuing to add requirements to license condition rather than deferring to rule, which in the long term is likely to be less efficient.

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STAKEHOLDER COMMENTS
for Amendments to
6 CCR 1007-1, Radiation Control, Part 4, Standards for Protection Against Radiation

The following individuals and/or entities were included in the development of these proposed rules: All radioactive materials licensees with valid email addresses, and other interested stakeholders.

On March 9-11, 2015, specific radioactive materials licensees and other entities were notified of the opportunity to comment on the proposed draft rule. The entities notified represented:
- All ~300+ radioactive materials licensees;
- Approximately 190 "other stakeholders" representing individuals who have specifically signed up to receive notification of proposed radiation regulation changes and who represent a wide variety of interests, most of whom would not be impacted by the proposed rule changes. These stakeholder entities include: x-ray registrants, radioactive materials licensees; private citizens; private companies; professional organizations; and special interest groups.

This rulemaking does not include a local government mandate. The burden of regulatory conformity to this rule applies to the regulated entities (licensees) only. EO5 does not apply.

Summarize Major Factual and Policy Issues Encountered and the Stakeholder Feedback Received. If there is a lack of consensus regarding the proposed rule, please also identify the Department's efforts to address stakeholder feedback or why the Department was unable to accommodate the request.

To date, no stakeholders have provided written comments opposing or supporting the rule, nor have changes to the rule been suggested.

No specific policy issues have been identified with development of the proposed rule changes. The minor rule changes address programmatic needs and typographical error corrections to ensure that both the regulated community and program staff have true and correct information in the rule.

Please identify health equity and environmental justice (HEEJ) impacts. Does this proposal impact Coloradoans equally or equitably? Does this proposal provide an opportunity to advance HEEJ? Are there other factors that influenced these rules?

The Department has proposed minor, mostly editorial rule changes that treat entities that possess and use radioactive materials equitably. The proposed changes are neutral with respect to HEEJ.

DRAFT 1 03/30/15

DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Hazardous Materials and Waste Management Division

RADIATION CONTROL - STANDARDS FOR PROTECTION AGAINST RADIATION

6 CCR 1007-1 Part 04

Adopted by the Board of Health June 17, 2015

[Editor's Notes follow the text of the rules at the end of this CCR Document.]

PART 4: STANDARDS FOR PROTECTION AGAINST RADIATION

STANDARDS FOR PROTECTION AGAINST RADIATION

[* * * = Indicates omission of unaffected rule sections]

*** * ***

Comment [JJ1]: The draft date is for information only and is not part of the final rule or rule language.

Comment [JJ2]:
EDITORIAL NOTE 1: ALL COMMENTS (SUCH AS THIS ONE) SHOWN IN THE RIGHT SIDE MARGIN OF THIS DOCUMENT ARE FOR INFORMATION PURPOSES ONLY TO PROVIDE ADDITIONAL INFORMATION AND TO AID THE READER IN UNDERSTANDING THE PROPOSED RULE DURING THE DRAFT REVIEW PROCESS. SINCE THIS IS A NEW RULE, MOST COMMENTS REFLECT CROSS-REFERENCE INFORMATION TO THE SUGGESTED STATE REGULATION AND NRC REGULATION.

THESE COMMENTS ARE **NOT** PART OF THE RULE AND ALL COMMENTS WILL BE DELETED PRIOR TO FINAL SUBMISSION.

EDITORIAL NOTE 2: THE ENTIRE RULE IS NOT PROVIDED/PRESENTED AS THE PROPOSED CHANGES IMPACT ONLY A LIMITED NUMBER OF SECTIONS. UNAFFECTED SECTIONS ARE OMITTED FROM THE DRAFT.

Comment [JJ3]: This reflects the date of anticipated approval by the Colorado Board of Health. The effective date is approximately 60 days beyond this date, pending additional review and approvals.

This date is subject to change as determined by the Board of Health. Changes to this date will be properly reflected in the rule, as applicable.

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Comment [JJ4]: The language in brackets and subsequent "***" marks are not part of the final rule and will be deleted prior to final submission.

WASTE DISPOSAL

4.33 General Requirements.

4.33.1 A licensee or registrant shall dispose of licensed or registered material only:

4.33.1.1 By transfer to an authorized recipient as provided in 4.38 or in Parts 3, 14, or 18 of these regulations, or to the U.S. Department of Energy; or

4.33.1.2 By decay in storage **in accordance with the following**~~:; or~~

(1) A licensee may hold radioactive material with a physical half-life of less than or equal to 120 days for decay-in-storage before disposal without regard for its radioactivity if the licensee:

(a) Monitors radioactive material at the container surface before disposal and determines that its radioactivity cannot be distinguished from the background radiation level with a radiation detection survey instrument set on its most sensitive scale and with no interposed shielding; and

(b) Removes or obliterates all radiation labels, except for material that will be handled as biomedical waste after release;

or

4.33.1.3 By release in effluents within the limits in 4.14; or

4.33.1.4 As authorized pursuant to 4.34, 4.35, 4.36, 4.37 or 4.39.2

4.33.2 A person shall be specifically licensed or registered to receive waste containing licensed or registered material from other persons for:

4.33.2.1 Treatment prior to disposal; or

4.33.2.2 Treatment or disposal by incineration; or

4.33.2.3 Decay in storage; or

4.33.2.4 Disposal at a land disposal facility pursuant to Part 14 of these regulations or as authorized under Parts 3 or 18 of these regulations; or

4.33.2.5 Storage until transferred to a storage or disposal facility authorized to receive the waste.

* * *

4.48 Records of Waste Disposal.

Comment [JJ5]:
For consistency, the added language puts forth equivalent requirements (for all licensees) that are identical to the requirements contained in Part 7, Section 7.29 (which is only applicable to medical/healing arts licensees).

The proposed change is not required by NRC regulation but is necessary to address a programmatic need to ensure consistency between medical and non-medical licensees with respect to decay in storage.

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4.48.1 Each licensee or registrant shall maintain records of the disposal of licensed or registered materials made pursuant to 4.34, 4.35, 4.36, 4.37, Part 14 of these regulations, and disposal by burial in soil, including burials authorized before December 30, 1985.

4.48.2 The licensee or registrant shall retain the records required by 4.48.1 in accordance with 3.15.4 until the Department terminates each pertinent license or registration requiring the record.

4.48.3 For radioactive material disposed in accordance with 4.33.1.2, the licensee shall retain a record of each decay in storage disposal for 3 years. The record must include the date of the disposal, the survey instrument used, the background radiation level, the radiation level measured at the surface of each waste container, and the name of the individual who performed the survey.

Comment [JJ6]:
For consistency, the added language puts forth equivalent requirements (for all licensees) that are identical to the requirements contained in Part 7, Section 7.29 (which is only applicable to medical/healing arts licensees).

The proposed change is not required by NRC regulation but is necessary to address a programmatic need to ensure consistency between medical and non-medical licensees with respect to decay in storage disposal records.

* * *

4.61 Radiological Criteria For License Termination.

4.61.1 The criteria in this section apply to the decommissioning of facilities licensed under Parts 3, 5, 7, 14, 16, and 19 of these regulations. For low-level waste disposal facilities licensed under Part 14, the criteria apply only to the ancillary surface facilities that support radioactive waste disposal activities.

4.61.1.1 The criteria in this section do not apply to uranium and thorium recovery facilities already subject to Appendix ~~18~~A of Part 18; uranium solution extraction facilities; sites which have been decommissioned and the license terminated prior to July 1, 1999; or sites which submitted a decommissioning plan prior to July 1, 2000 and received Department approval of that decommissioning plan prior to July 1, 2001.

Comment [JJ7]:
This corrects a typographical cross-reference error. Currently, Appendix A of Part 18 is titled Appendix A, and not Appendix "18A".

* * *

PART 4, APPENDIX 4B: ANNUAL LIMITS ON INTAKE (ALI) AND DERIVED AIR CONCENTRATIONS (DAC) OF RADIONUCLIDES FOR OCCUPATIONAL EXPOSURE; EFFLUENT CONCENTRATIONS; CONCENTRATIONS FOR RELEASE TO SANITARY SEWERAGE

~~**ANNUAL LIMITS ON INTAKE (ALI) AND DERIVED AIR CONCENTRATIONS (DAC) OF RADIONUCLIDES FOR OCCUPATIONAL EXPOSURE; EFFLUENT CONCENTRATIONS; CONCENTRATIONS FOR RELEASE TO SANITARY SEWERAGE**~~

Comment [JJ8]: A redundant (duplicative) section title is removed.

Introduction

For each radionuclide, Table 4B1 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, micron, 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 half times for D if less than 10 days, for W from 10 to 100 days, and for Y greater than 100 days. Table 4B2 provides concentration limits for airborne and liquid effluents released to the general environment. Table 4B3 provides concentration limits for discharges to sanitary sewerage.

Note:

The values in Table 4B1, Table 4B2, and Table 4B3 are presented in the computer "E" notation. In this notation a value of 6E-02 represents a value of 6×10^{-2} or 0.06, 6E+2 represents 6×10^{2} or 600, and 6E+0 represents 6×10^{0} or 6.

Table 4B1 "Occupational Values"

Note that the columns in Table 4B1 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 given radionuclide by "reference man" which would result in either (1) a committed effective dose equivalent of 0.05 Sv (5 rem), stochastic ALI, or (2) a committed dose equivalent of 0.5 Sv (50 rem) 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 0.05 Sv (5 rem). 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 4.3. 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 portions 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 an extremity, 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 0.5 Sv (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 equivalent 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 t he organ receiving the highest dose does not exceed unity, that is, $\sum$ (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 ≤ 1.0.

Note that the dose equivalents for an extremity, 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.

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 x 60 minutes/hour x 2 x 10^4 ml per minute) = (ALI/2.4 x 10^9) µCi/ml, where 2 x 10^4 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. DACs 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 include contributions to exposure by the single radionuclide named and any in-growth of decay product radionuclides produced in the body by decay of the parent. However, intakes that include both the parent and decay product radionuclides should be treated by the general method appropriate for mixtures.

The values 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 irradiation. See 4.7. When an individual is exposed to radioactive materials which fall under several of the translocation classifications of the same radionuclide, such as, Class D, Class W, or Class Y, 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 radionuclides. For this reason, values are given for Class D, W, and Y compounds, even for very short-lived radionuclides.

Table 4B2 "Effluent Concentrations"

The columns in Table 4B2 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 4.15.

The concentration values given in Columns 1 and 2 of Table 4B2 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 0.5 mSv (0.05 rem).

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 or below 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 4B2. For this reason, the DAC and airborne effluent limits are not always proportional as they were in Appendix A of Part D of the Eighth Edition of Volume I of the Suggested State Regulations for Control of Radiation, April 2004.

The air concentration values listed in Table 4B2, 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 2.4×10^9, 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 0.05 Sv (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, that is external dose, is limiting, the occupational DAC in Table 4B1, 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 7.3×10^7. The factor of 7.3×10^7 (ml) includes the following components: the factors of 50 and 2 described above and a factor of 7.3×10^5 (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 releases to sewer, 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 as being present either from knowledge of the radionuclide composition of the source or from actual measurements.

Table 4B3 "Releases to Sewerage"

The monthly average concentrations for release to sanitary sewerage are applicable to the provisions in 4.35. The concentration values were derived by taking the most restrictive occupational stochastic oral ingestion ALI and dividing by 7.3×10^6 (ml). The factor of 7.3×10^6 (ml) is composed of a factor of 7.3×10^5 (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 off 0.5 rem.

Table 4B1, Table 4B2, and Table 4B3 ~~are found at~~

~~http://www.colorado.gov/cs/Satellite/CDPHE-Main/CBON/1251607674329~~

Comment [JJ9]: The reference to this URL link is no longer valid due to 2014 changes to the CDPHE website and the link is therefore removed from the rule.

Tables 4B1, 4B2, and 4B3 will be inserted directly into the rule in the final published version. (Due to complex formatting of these tables, versions in WORD format will be two separate files).

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
89	Actinium-224	D, all compounds except those given for W and Y	2E+3 LLI wall (2E+3)	3E+1 Bone surf (4E+1)	1E-8 -	- 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 LLI wall (5E+1)	3E-1 Bone surf (5E-1)	1E-10 -	- 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 LLI wall (1E+2)	3E+0 Bone surf (4E+0)	1E-9 -	- 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 Bone surf (4E-1)	4E-4 Bone surf (8E-4)	2E-13 -	- 1E-15	- 5E-9	- 5E-8
		W, see ^{224}Ac	-	2E-3 Bone surf (3E-3)	7E-13 -	- 4E-15	- -	- -
		Y, see ^{224}Ac	-	4E-3	2E-12	6E-15	-	-
89	Actinium-228	D, see ^{224}Ac	2E+3 -	9E+0 Bone surf (2E+1)	4E-9 -	- 2E-11	3E-5 -	3E-4 -
		W, see ^{224}Ac	-	4E+1 Bone surf (6E+1)	2E-8 -	- 8E-11	- -	- -
		Y, see ^{224}Ac	-	4E+1	2E-8	6E-11	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values			Table 4B2 Effluent Concentrations		Table 4B3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				
			ALI (µCi)	ALI (µCi)	DAC (µCi/ml)	Air (µCi/ml)	Water (µCi/ml)	Monthly Average Concentration (µCi/ml)
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-242	W, all compounds	4E+3	8E+1	4E-8	-	5E-5	5E-4
			-	Bone surf (9E+1)	-	1E-10	-	-
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-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-244	W, all compounds	3E+3	2E+2	8E-8	-	4E-5	4E-4
			-	Bone surf (3E+2)	-	4E-10	-	-
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-245	W, all compounds	3E+4	8E+4	3E-5	1E-7	4E-4	4E-3
95	Americium-246[2]	W, all compounds	3E+4	1E+5	4E-5	1E-7	4E-4	4E-3
95	Americium-246m[2]	W, all compounds	5E+4	2E+5	8E-5	3E-7	-	-
			St wall (6E+4)	-	-	-	8E-4	8E-3

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-116[2]	D, see ^{115}Sb	7E+4 St wall (9E+4)	3E+5	1E-4	4E-7	-	-
		W, see ^{115}Sb	-	3E+5	1E-4	5E-7	1E-3 -	1E-2 -
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-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	-	-
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 (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-120[2] (16 min)	D, see ^{115}Sb	1E+5 St wall (2E+5)	4E+5	2E-4	6E-7	-	-
		W, see ^{115}Sb	-	5E+5	2E-4	7E-7	2E-3 -	2E-2 -
51	Antimony-122	D, see ^{115}Sb	8E+2 LLI wall (8E+2)	2E+3	1E-6	3E-9	-	-
		W, see ^{115}Sb	7E+2	1E+3	4E-7	2E-9	1E-5 -	1E-4 -
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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-126m[2]	D, see ^{115}Sb	5E+4 St wall (7E+4)	2E+5	8E-5	3E-7	-	-
		W, see ^{115}Sb	-	2E+5	8E-5	3E-7	9E-4 -	9E-3 -
51	Antimony-127	D, see ^{115}Sb	8E+2 LLI wall (8E+2)	2E+3	9E-7	3E-9	-	-
		W, see ^{115}Sb	7E+2	9E+2	4E-7	1E-9	1E-5 -	1E-4 -
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-128[2] (10.4 min)	D, see ^{115}Sb	8E+4 St wall (1E+5)	4E+5	2E-4	5E-7	-	-
		W, see ^{115}Sb	-	4E+5	2E-4	6E-7	1E-3 -	1E-2 -
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 Thyroid (2E+4)	2E+4 Thyroid (4E+4)	1E-5 -	- 6E-8	- 2E-4	- 2E-3
		W, see ^{115}Sb	- -	2E+4 Thyroid (4E+4)	1E-5 -	6E-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average 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
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	-	-
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-131	D, all compounds	3E+3	8E+3	3E-6	1E-8	4E-5	4E-4
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-133	D, all compounds	2E+3	7E+2	3E-7	9E-10	2E-5	2E-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-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

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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
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
97	Berkelium-250	W, all compounds	9E+3	3E+2	1E-7	-	1E-4	1E-3
			-	Bone surf (7E+2)	-	1E-9	-	-
4	Beryllium-10	W, see ^{7}Be	1E+3	2E+2	6E-8	2E-10	-	-
			LLI wall (1E+3)	-	-	-	2E-5	2E-4
		Y, see ^{7}Be	-	1E+1	6E-9	2E-11	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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	-	-
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-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-210m	D, see ^{200}Bi	4E+1	5E+0	2E-9	-	-	-
			Kidneys	Kidneys				
			(6E+1)	(6E+0)	-	9E-12	8E-7	8E-6
		W, see ^{200}Bi	-	7E-1	3E-10	9E-13	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-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 lantha-nides, 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-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-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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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 Kidneys (4E+2)	4E+1 Kidneys (5E+1)	1E-8	-	-	-
		W, see ^{104}Cd	-	1E+2 Kidneys (1E+2)	5E-8	7E-11	6E-6	6E-5
		Y, see ^{104}Cd	-	1E+2	5E-8	2E-10	-	-
48	Cadmium-113	D, see ^{104}Cd	2E+1 Kidneys (3E+1)	2E+0 Kidneys (3E+0)	9E-10	-	-	-
		W, see ^{104}Cd	-	8E+0 Kidneys (1E+1)	3E-9	5E-12	4E-7	4E-6
		Y, see ^{104}Cd	-	1E+1	6E-9	2E-11	-	-
48	Cadmium-113m	D, see ^{104}Cd	2E+1 Kidneys (4E+1)	2E+0 Kidneys (4E+0)	1E-9	-	-	-
		W, see ^{104}Cd	-	8E+0 Kidneys (1E+1)	4E-9	5E-12	5E-7	5E-6
		Y, see ^{104}Cd	-	1E+1	5E-9	2E-11	-	-
48	Cadmium-115	D, see ^{104}Cd	9E+2 LLI wall (1E+3)	1E+3	6E-7	2E-9	-	-
		W, see ^{104}Cd	-	1E+3	5E-7	2E-9	1E-5	1E-4
		Y, see ^{104}Cd	-	1E+3	6E-7	2E-9	-	-
48	Cadmium-115m	D, see ^{104}Cd	3E+2	5E+1 Kidneys (8E+1)	2E-8	-	4E-6	4E-5
		W, see ^{104}Cd	-	1E+2	5E-8	1E-10	-	-
		Y, see ^{104}Cd	-	1E+2	6E-8	2E-10	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 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	-	-
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	-	-
20	Calcium-41	W, all compounds	3E+3 Bone surf (4E+3)	4E+3 Bone surf (4E+3)	2E-6 -	- 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
98	Californium-244[2]	W, all compounds except those given for Y	3E+4 St wall (3E+4)	6E+2 -	2E-7 -	8E-10 -	- 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 Bone surf (2E+1)	6E-2 Bone surf (1E-1)	3E-11 -	- 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 Bone surf (1E+0)	4E-3 Bone surf (9E-3)	2E-12 -	- 1E-14	- 2E-8	- 2E-7
		Y, see ^{244}Cf	- -	1E-2 Bone surf (1E-2)	4E-12 -	- 2E-14	- -	- -
98	Californium-250	W, see ^{244}Cf	1E+0 Bone surf (2E+0)	9E-3 Bone surf (2E-2)	4E-12 -	- 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 Bone surf (1E+0)	4E-3 Bone surf (9E-3)	2E-12 -	- 1E-14	- 2E-8	- 2E-7
		Y, see ^{244}Cf	- -	1E-2 Bone surf (1E-2)	4E-12 -	- 2E-14	- -	- -

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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	-	-
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
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-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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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	-	-
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	-	-
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
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-134	D, all compounds	7E+1	1E+2	4E-8	2E-10	9E-7	9E-6
55	Cesium-134m	D, all compounds	1E+5	1E+5	6E-5	2E-7	-	-
			St wall (1E+5)	-	-	-	2E-3	2E-2
55	Cesium-135	D, all compounds	7E+2	1E+3	5E-7	2E-9	1E-5	1E-4
55	Cesium-135m[2]	D, all compounds	1E+5	2E+5	8E-5	3E-7	1E-3	1E-2
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

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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 lantha-nides, 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	-	-
17	Chlorine-38[2]	D, see ^{36}Cl	2E+4 St wall (3E+4)	4E+4 -	2E-5 -	6E-8 -	- 3E-4	- 3E-3
		W, see ^{36}Cl	-	5E+4	2E-5	6E-8	-	-
17	Chlorine-39[2]	D, see ^{36}Cl	2E+4 St wall (4E+4)	5E+4 -	2E-5 -	7E-8 -	- 5E-4	- 5E-3
		W, see ^{36}Cl	-	6E+4	2E-5	8E-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	-	-
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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-60m[2]	W, see ^{55}Co	1E+6 St wall (1E+6)	4E+6 -	2E-3 -	6E-6 -	- 2E-2	- 2E-1
		Y, see ^{55}Co	-	3E+6	1E-3	4E-6	-	-
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 St wall (5E+4)	2E+5 -	7E-5 -	2E-7 -	- 7E-4	- 7E-3
		Y, see ^{55}Co	-	2E+5	6E-5	2E-7	-	-
29	Copper-60[2]	D, all compounds except those given for W and Y	3E+4 St wall (3E+4)	9E+4 -	4E-5 -	1E-7 -	- 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	-	-
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 Bone surf (8E+1)	6E-1 Bone surf (6E-1)	2E-10 -	- 9E-13	- 1E-6	- 1E-5
96	Curium-241	W, all compounds	1E+3 -	3E+1 Bone surf (4E+1)	1E-8 -	- 5E-11	2E-5 -	2E-4 -
96	Curium-242	W, all compounds	3E+1 Bone surf (5E+1)	3E-1 Bone surf (3E-1)	1E-10 -	- 4E-13	- 7E-7	- 7E-6
96	Curium-243	W, all compounds	1E+0 Bone surf (2E+0)	9E-3 Bone surf (2E-2)	4E-12 -	- 2E-14	- 3E-8	- 3E-7

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
96	Curium-244	W, all compounds	1E+0 Bone surf (3E+0)	1E-2 Bone surf (2E-2)	5E-12 -	- 3E-14	- 3E-8	- 3E-7
96	Curium-245	W, all compounds	7E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 -	- 2E-14	- 2E-8	- 2E-7
96	Curium-246	W, all compounds	7E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 -	- 2E-14	- 2E-8	- 2E-7
96	Curium-247	W, all compounds	8E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 -	- 2E-14	- 2E-8	- 2E-7
96	Curium-248	W, all compounds	2E-1 Bone surf (4E-1)	2E-3 Bone surf (3E-3)	7E-13 -	- 4E-15	- 5E-9	- 5E-8
96	Curium-249[2]	W, all compounds	5E+4 -	2E+4 Bone surf (3E+4)	7E-6 -	- 4E-8	7E-4 -	7E-3 -
96	Curium-250	W, all compounds	4E-2 Bone surf (6E-2)	3E-4 Bone surf (5E-4)	1E-13 -	- 8E-16	- 9E-10	- 9E-9
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 LLI wall (8E+2)	7E+2 -	3E-7 -	1E-9 -	- 1E-5	- 1E-4
99	Einsteinium-250	W, all compounds	4E+4 -	5E+2 Bone surf (1E+3)	2E-7 -	- 2E-9	6E-4 -	6E-3 -
99	Einsteinium-251	W, all compounds	7E+3 -	9E+2 Bone surf (1E+3)	4E-7 -	- 2E-9	1E-4 -	1E-3 -
99	Einsteinium-253	W, all compounds	2E+2	1E+0	6E-10	2E-12	2E-6	2E-5

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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
99	Einsteinium-254m	W, all compounds	3E+2	1E+1	4E-9	1E-11	-	-
			LLI wall (3E+2)	-	-	-	4E-6	4E-5
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
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 (E+3)	-	-	-	2E-5	2E-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-152	W, all compounds	8E+2	2E+1	1E-8	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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
63	Europium-156	W, all compounds	6E+2	5E+2	2E-7	6E-10	8E-6	8E-5
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
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 Bone surf (4E+1)	2E-1 Bone surf (2E-1)	7E-11 -	- 3E-13	- 5E-7	- 5E-6
9	Fluorine-18[2]	D, fluorides of H, Li, Na, K, Rb, Cs, and Fr	5E+4 St wall (5E+4)	7E+4 -	3E-5 -	1E-7 -	- 7E-4	- 7E-3
		W, fluorides of Be, Mg, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, As, Sb, Bi, Fe, Ru, Os, Co, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, V, Nb, Ta, Mn, Tc, and Re	-	9E+4	4E-5	1E-7	-	-
		Y, lanthanum fluoride	-	8E+4	3E-5	1E-7	-	-
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
64	Gadolinium-145[2]	D, all compounds except those given for W	5E+4 St wall (5E+4)	2E+5 -	6E-5 -	2E-7 -	- 6E-4	- 6E-3
		W, oxides, hydroxides, and fluorides	-	2E+5	7E-5	2E-7	-	-
64	Gadolinium-146	D, see ^{145}Gd W, see ^{145}Gd	1E+3 -	1E+2 3E+2	5E-8 1E-7	2E-10 4E-10	2E-5 -	2E-4 -
64	Gadolinium-147	D, see ^{145}Gd W, see ^{145}Gd	2E+3 -	4E+3 4E+3	2E-6 1E-6	6E-9 5E-9	3E-5 -	3E-4 -

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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	-	-
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	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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 St wall (4E+4)	9E+4	4E-5	1E-7	-	-
				-	-	-	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 St wall (7E+4)	8E+4	3E-5	1E-7	-	-
				-	-	-	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 St wall (2E+4)	2E+4	9E-6	3E-8	-	-
				-	-	-	3E-4	3E-3
		W, see ^{66}Ge	-	2E+4	9E-6	3E-8	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-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-199	D, see ^{193}Au	3E+3 LLI wall (3E+3)	9E+3	4E-6	1E-8	-	-
				-	-	-	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-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-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-201[2]	D, see ^{193}Au	7E+4 St wall (9E+4)	2E+5	9E-5	3E-7	-	-
				-	-	-	1E-3	1E-2
		W, see ^{193}Au	-	2E+5	1E-4	3E-7	-	-
		Y, see ^{193}Au	-	2E+5	9E-5	3E-7	-	-
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 Bone surf	4E-9	-	2E-5	2E-4
			-	(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 Bone surf	4E-7	-	4E-5	4E-4
			-	(1E+3)	-	1E-9	-	-
		W, see ^{170}Hf	-	1E+3	5E-7	2E-9	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-182	D, see ^{170}Hf	2E+2 Bone surf (4E+2)	8E-1 Bone surf (2E+0)	3E-10	-	-	-
					-	2E-12	5E-6	5E-5
		W, see ^{170}Hf	-	3E+0	1E-9	-	-	-
			-	Bone surf (7E+0)	-	1E-11	-	-
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-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	-	-
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

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-162m[2]	W, all compounds	5E+4	3E+5	1E-4	4E-7	7E-4	7E-3
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-164m[2]	W, all compounds	1E+5	3E+5	1E-4	4E-7	1E-3	1E-2
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
67	Holmium-166m	W, all compounds	6E+2	7E+0	3E-9	9E-12	9E-6	9E-5
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.						
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 (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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values			Table 4B2 Effluent Concentrations		Table 4B3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				
			ALI (µCi)	ALI (µCi)	DAC (µCi/ml)	Air (µCi/ml)	Water (µCi/ml)	Monthly Average Concentration (µCi/ml)
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-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-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-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-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-119m[2]	D, see ^{109}In	4E+4 St wall (5E+4)	1E+5	5E-5	2E-7	-	-
				-	-	-	7E-4	7E-3
		W, see ^{109}In	-	1E+5	6E-5	2E-7	-	-
53	Iodine-120[2]	D, all compounds	4E+3 Thyroid (8E+3)	9E+3 Thyroid (1E+4)	4E-6	-	-	-
					-	2E-8	1E-4	1E-3
53	Iodine-120m[2]	D, all compounds	1E+4 Thyroid (1E+4)	2E+4	9E-6	3E-8	-	-
				-	-	-	2E-4	2E-3
53	Iodine-121	D, all compounds	1E+4 Thyroid (3E+4)	2E+4 Thyroid (5E+4)	8E-6	-	-	-
					-	7E-8	4E-4	4E-3
53	Iodine-123	D, all compounds	3E+3 Thyroid (1E+4)	6E+3 Thyroid (2E+4)	3E-6	-	-	-
					-	2E-8	1E-4	1E-3
53	Iodine-124	D, all compounds	5E+1 Thyroid (2E+2)	8E+1 Thyroid (3E+2)	3E-8	-	-	-
					-	4E-10	2E-6	2E-5
53	Iodine-125	D, all compounds	4E+1 Thyroid (1E+2)	6E+1 Thyroid (2E+2)	3E-8	-	-	-
					-	3E-10	2E-6	2E-5
53	Iodine-126	D, all compounds	2E+1 Thyroid (7E+1)	4E+1 Thyroid (1E+2)	1E-8	-	-	-
					-	2E-10	1E-6	1E-5
53	Iodine-128[2]	D, all compounds	4E+4 St wall (6E+4)	1E+5	5E-5	2E-7	-	-
				-	-	-	8E-4	8E-3

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
53	Iodine-129	D, all compounds	5E+0 Thyroid (2E+1)	9E+0 Thyroid (3E+1)	4E-9 -	- 4E-11	- 2E-7	- 2E-6
53	Iodine-130	D, all compounds	4E+2 Thyroid (1E+3)	7E+2 Thyroid (2E+3)	3E-7 -	- 3E-9	- 2E-5	- 2E-4
53	Iodine-131	D, all compounds	3E+1 Thyroid (9E+1)	5E+1 Thyroid (2E+2)	2E-8 -	- 2E-10	- 1E-6	- 1E-5
53	Iodine-132	D, all compounds	4E+3 Thyroid (9E+3)	8E+3 Thyroid (1E+4)	3E-6 -	- 2E-8	- 1E-4	- 1E-3
53	Iodine-132m[2]	D, all compounds	4E+3 Thyroid (1E+4)	8E+3 Thyroid (2E+4)	4E-6 -	- 3E-8	- 1E-4	- 1E-3
53	Iodine-133	D, all compounds	1E+2 Thyroid (5E+2)	3E+2 Thyroid (9E+2)	1E-7 -	- 1E-9	- 7E-6	- 7E-5
53	Iodine-134[2]	D, all compounds	2E+4 Thyroid (3E+4)	5E+4 -	2E-5 -	6E-8 -	- 4E-4	- 4E-3
53	Iodine-135	D, all compounds	8E+2 Thyroid (3E+3)	2E+3 Thyroid (4E+3)	7E-7 -	- 6E-9	- 3E-5	- 3E-4
77	Iridium-182[2]	D, all compounds except those given for W and Y	4E+4 St wall (4E+4)	1E+5 -	6E-5 -	2E-7 -	- 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	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-9	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	5E+3	5E+3	2E-6	7E-9	-	-
			LLI wall (5E+3)	-	-	-	7E-5	7E-4
		W, see ^{182}Ir	-	4E+3	2E-6	5E-9	-	-
		Y, see ^{182}Ir	-	4E+3	1E-6	5E-9	-	-
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-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-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	9E-8	3E-10	-	-
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-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-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-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	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 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	-	-
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	-	-
36	Krypton-83m[2]	Submersion[1]	-	-	1E-2	5E-5	-	-
36	Krypton-85	Submersion[1]	-	-	1E-4	7E-7	-	-
36	Krypton-85m	Submersion[1]	-	-	2E-5	1E-7	-	-
36	Krypton-87[2]	Submersion[1]	-	-	5E-6	2E-8	-	-
36	Krypton-88	Submersion[1]	-	-	2E-6	9E-9	-	-
57	Lanthanum-131[2]	D, all compounds except those given for W	5E+4	1E+5	5E-5	2E-7	6E-4	6E-3
		W, oxides and hydroxides	-	2E+5	7E-5	2E-7	-	-
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 Liver	3E-8	-	2E-4	2E-3
			-	(7E+1)	-	1E-10	-	-
		W, see ^{131}La	-	3E+2 Liver	1E-7	-	-	-
			-	(3E+2)	-	4E-10	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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 St wall (4E+4)	1E+5	4E-5	1E-7	-	-
				-	-	-	5E-4	5E-3
		W, see ^{131}La	-	9E+4	4E-5	1E-7	-	-
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-202	D, all compounds	1E+2	5E+1	2E-8	7E-11	2E-6	2E-5
82	Lead-202m	D, all compounds	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
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	6E1 Bone surf (1E+0)	2E1 Bone surf (4E-1)	1E-10	-	-	-
				-	-	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 Bone surf (1E+2)	3E+1	1E-8	5E-11	-	-
				-	-	-	2E-6	2E-5
82	Lead-214[2]	D, all compounds	9E+3	8E+2	3E-7	1E-9	1E-4	1E-3

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 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-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-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-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-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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
71	Lutetium-178[2]	W, see ^{169}Lu	4E+4 St wall (4E+4)	1E+5 -	5E-5 -	2E-7 -	- 6E-4	- 6E-3
		Y, see ^{169}Lu	-	1E+5	5E-5	2E-7	-	-
71	Lutetium-178m[2]	W, see ^{169}Lu	5E+4 St. wall (6E+4)	2E+5 -	8E-5 -	3E-7 -	- 8E-4	- 8E-3
		Y, see ^{169}Lu	-	2E+5	7E-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	-	-
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	-	-
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-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-52m[2]	D, see ^{51}Mn	3E+4 St wall (4E+4)	9E+4 -	4E-5 -	1E-7 -	- 5E-4	- 5E-3
		W, see ^{51}Mn	-	1E+5	4E-5	1E-7	-	-
25	Manganese-53	D, see ^{51}Mn	5E+4 -	1E+4 Bone surf (2E+4)	5E-6 -	- 3E-8	7E-4 -	7E-3 -
		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	-	-
101	Mendelevium-257	W, all compounds	7E+3 -	8E+1 Bone surf (9E+1)	4E-8 -	- 1E-10	1E-4 -	1E-3 -
101	Mendelevium-258	W, all compounds	3E+1 Bone surf (5E+1)	2E-1 Bone surf (3E-1)	1E-10 -	- 5E-13	- 6E-7	- 6E-6

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-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-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-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-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-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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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	-	-
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	2E+3	5E+3	2E-6	6E-9	-	-
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-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-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	-	-
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-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-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	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-236 (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
93	Neptunium-238	W, all compounds	1E+3	6E+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
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	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Col. 2 Inhalation ALI (µCi)	Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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 LLI wall (5E+2)	2E+3	7E-7	2E-9	-	-
				-	-	-	6E-6	6E-5
		W, see ^{56}Ni	-	6E+2	3E-7	9E-10	-	-
		Vapor	-	3E+3	1E-6	4E-9	-	-
41	Niobium-88[2]	W, all compounds except those given for Y	5E+4 St wall (7E+4)	2E+5	9E-5	3E-7	-	-
				-	-	-	1E-3	1E-2
		Y, oxides and hydroxides	-	2E+5	9E-5	3E-7	-	-
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-89[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-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 LLI wall (1E+4)	2E+3	8E-7	3E-9	-	-
				-	-	-	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-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-95m	W, see ^{88}Nb	2E+3 LLI wall (2E+3)	3E+3	1E-6	4E-9	-	-
				-	-	-	3E-5	3E-4
		Y, see ^{88}Nb	-	2E+3	9E-7	3E-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
7	Nitrogen-13[2]	Submersion[1]	-	-	4E-6	2E-8	-	-
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-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-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-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	-	-
8	Oxygen-15[2]	Submersion[1]	-	-	4E-6	2E-8	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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	-	-
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	-	-
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	-	-
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
78	Platinum-193	D, all compounds	4E+4	2E+4	1E-5	3E-8	-	-
			LLI wall (5E+4)	-	-	-	6E-4	6E-3
78	Platinum-193m	D, all compounds	3E+3	6E+3	3E-6	8E-9	-	-
			LLI wall (3E+4)	-	-	-	4E-5	4E-4
78	Platinum-195m	D, all compounds	2E+3	4E+3	2E-6	6E-9	-	-
			LLI wall (2E+3)	-	-	-	3E-5	3E-4
78	Platinum-197	D, all compounds	3E+3	1E+4	4E-6	1E-8	4E-5	4E-4
78	Platinum-197m[2]	D, all compounds	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3
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

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
94	Plutonium-234	W, all compounds except PuO	8E+3	2E+2	9E-8	3E-10	1E-4	1E-3
		Y, PuO	-	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 Bone surf (4E+0)	2E-2 Bone surf (4E-2)	8E-12 -	- 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 Bone surf (2E+0)	7E-3 Bone surf (1E-2)	3E-12 -	- 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 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 -	- 2E-14	- 2E-8	- 2E-7
		Y, see ^{234}Pu	- -	2E-2 Bone surf (2E-2)	7E-12 -	- 2E-14	- -	- -
94	Plutonium-240	W, see ^{234}Pu	8E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 -	- 2E-14	- 2E-8	- 2E-7
		Y, see ^{234}Pu	- -	2E-2 Bone surf (2E-2)	7E-12 -	- 2E-14	- -	- -
94	Plutonium-241	W, see ^{234}Pu	4E+1 Bone surf (7E+1)	3E-1 Bone surf (6E-1)	1E-10 -	- 8E-13	- 1E-6	- 1E-5
		Y, see ^{234}Pu	- -	8E-1 Bone surf (1E+0)	3E-10 -	- 1E-12	- -	- -
94	Plutonium-242	W, see ^{234}Pu	8E-1 Bone surf (1E+0)	7E-3 Bone surf (1E-2)	3E-12 -	- 2E-14	- 2E-8	- 2E-7
		Y, see ^{234}Pu	- -	2E-2 Bone surf (2E-2)	7E-12 -	- 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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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	-	-
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	-	-
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
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values			Table 4B2 Effluent Concentrations		Table 4B3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				
			ALI (µCi)	ALI (µCi)	DAC (µCi/ml)	Air (µCi/ml)	Water (µCi/ml)	Monthly Average Concentration (µCi/ml)
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-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-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-143	W, see ^{136}Pr	9E+2 LLI wall (1E+3)	8E+2	3E-7	1E-9	-	-
				-	-	-	2E-5	2E-4
		Y, see ^{136}Pr	-	7E+2	3E-7	9E-10	-	-
59	Praseodymium-144[2]	W, see ^{136}Pr	3E+4 St wall (4E+4)	1E+5	5E-5	2E-7	-	-
				-	-	-	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 St wall (8E+4)	2E+5	8E-5	3E-7	-	-
				-	-	-	1E-3	1E-2
		Y, see ^{136}Pr	-	2E+5	8E-5	3E-7	-	-
61	Promethium-141[2]	W, all compounds except those given for Y	5E+4 St wall (6E+4)	2E+5	8E-5	3E-7	-	-
				-	-	-	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 Bone surf (2E+2)	7E-8	-	1E-4	1E-3
			-	-	-	3E-10	-	-
		Y, see ^{141}Pm	-	2E+2	8E-8	3E-10	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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 LLI wall (5E+3)	1E+2 Bone surf (2E+2)	5E-8 -	- 3E-10	- 7E-5	- 7E-4
		Y, see ^{141}Pm	-	1E+2	6E-8	2E-10	-	-
61	Promethium-148	W, see ^{141}Pm	4E+2 LLI wall (5E+2)	5E+2 -	2E-7 -	8E-10 -	- 7E-6	- 7E-5
		Y, see ^{141}Pm	-	5E+2	2E-7	7E-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-149	W, see ^{141}Pm	1E+3 LLI wall (1E+3)	2E+3 -	8E-7 -	3E-9 -	- 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	-	-
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 Bone surf (2E+1)	5E-9 -	- 3E-11	2E-5 -	2E-4 -
		Y, see ^{227}Pa	-	1E+1	5E-9	2E-11	-	-
91	Protactinium-230	W, see ^{227}Pa	6E+2 Bone surf (9E+2)	5E+0 -	2E-9 -	7E-12 -	- 1E-5	- 1E-4
		Y, see ^{227}Pa	-	4E+0	1E-9	5E-12	-	-
91	Protactinium-231	W, see ^{227}Pa	2E-1 Bone surf (5E-1)	2E-3 Bone surf (4E-3)	6E-13 -	- 6E-15	- 6E-9	- 6E-8
		Y, see ^{227}Pa	-	4E-3 Bone surf (6E-3)	2E-12 -	- 8E-15	- -	- -

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
91	Protactinium-232	W, see ^{227}Pa	1E+3	2E+1 Bone surf	9E-9	-	2E-5	2E-4
			-	(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	-	-
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
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	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
75	Rhenium-177[2]	D, all compounds except those given for W	9E+4	3E+5	1E-4	4E-7	-	-
			St wall (1E+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	-	9E+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-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-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-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-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-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-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	-	-
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-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	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-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-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-102m	D, see ^{99m}Rh	1E+3 LLI wall (1E+3)	5E+2	2E-7	7E-10	-	-
				-	-	-	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-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 LLI wall (4E+3)	1E+4	5E-6	2E-8	-	-
				-	-	-	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 St wall (9E+4)	2E+5	1E-4	3E-7	-	-
				-	-	-	1E-3	1E-2
		W, see ^{99m}Rh	-	3E+5	1E-4	4E-7	-	-
		Y, see ^{99m}Rh	-	3E+5	1E-4	3E-7	-	-
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	-	-
45	Rhodium-99m	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	-	-
37	Rubidium-79[2]	D, all compounds	4E+4 St wall (6E+4)	1E+5	5E-5	2E-7	-	-
				-	-	-	8E-4	8E-3

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
37	Rubidium-81	D, all compounds	4E+4	5E+4	2E-5	7E-8	5E-4	5E-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-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
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	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-141m[2]	W, all compounds	3E+4	1E+5	4E-5	1E-7	4E-4	4E-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	4E2	1E-11	-	-	-
			Bone surf (3E+1)	Bone surf (6E-2)	-	9E-14	3E-7	3E-6
62	Samarium-147	W, all compounds	2E+1	4E2	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
21	Scandium-43	Y, all compounds	7E+3	2E+4	9E-6	3E-8	1E-4	1E-3
21	Scandium-44	Y, all compounds	4E+3	1E+4	5E-6	2E-8	5E-5	5E-4
21	Scandium-44m	Y, all compounds	5E+2	7E+2	3E-7	1E-9	7E-6	7E-5
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

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-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-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-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-81[2]	D, see ^{70}Se	6E+4 St wall (8E+4)	2E+5 -	9E-5 -	3E-7 -	- 1E-3	- 1E-2
		W, see ^{70}Se	-	2E+5	1E-4	3E-7	-	-
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-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	-	-
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 LLI wall (3E+3)	2E+2 -	1E-7 -	3E-10 -	- 4E-5	- 4E-4
		W, see ^{31}Si	-	1E+2	5E-8	2E-10	-	-
		Y, see ^{31}Si	-	5E+0	2E-9	7E-12	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-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-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-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-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-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-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 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 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	-	-
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
38	Strontium-80[2]	D, all soluble compounds except SrTiO	4E+3	1E+4	5E-6	2E-8	6E-5	6E-4
		Y, all insoluble compounds and SrTi0	-	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-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-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-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	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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	-	-
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-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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-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	-	-
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	-	-
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-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-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-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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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-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-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-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	-	-
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-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-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	-	-
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-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-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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
52	Tellurium-125m	D, see ^{116}Te	1E+3 Bone surf (1E+3)	4E+2 Bone surf (1E+3)	2E-7 -	- 1E-9	- 2E-5	- 2E-4
		W, see ^{116}Te	-	7E+2	3E-7	1E-9	-	-
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-127m	D, see ^{116}Te	6E+2	3E+2 Bone surf (4E+2)	1E-7 -	- 6E-10	9E-6 -	9E-5 -
		W, see ^{116}Te	-	3E+2	1E-7	4E-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-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-131[2]	D, see ^{116}Te	3E+3 Thyroid (6E+3)	5E+3 Thyroid (1E+4)	2E-6 -	- 2E-8	- 8E-5	- 8E-4
		W, see ^{116}Te	- -	5E+3 Thyroid (1E+4)	2E-6 -	- 2E-8	- -	- -
52	Tellurium-131m	D, see ^{116}Te	3E+2 Thyroid (6E+2)	4E+2 Thyroid (1E+3)	2E-7 -	- 2E-9	- 8E-6	- 8E-5
		W, see ^{116}Te	- -	4E+2 Thyroid (9E+2)	2E-7 -	- 1E-9	- -	- -
52	Tellurium-132	D, see ^{116}Te	2E+2 Thyroid (7E+2)	2E+2 Thyroid (8E+2)	9E-8 -	- 1E-9	- 9E-6	- 9E-5
		W, see ^{116}Te	- -	2E+2 Thyroid (6E+2)	9E-8 -	- 9E-10	- -	- -
52	Tellurium-133[2]	D, see ^{116}Te	1E+4 Thyroid (3E+4)	2E+4 Thyroid (6E+4)	9E-6 -	- 8E-8	- 4E-4	- 4E-3
		W, see ^{116}Te	- -	2E+4 Thyroid (6E+4)	9E-6 -	- 8E-8	- -	- -
52	Tellurium-133m[2]	D, see ^{116}Te	3E+3 Thyroid (6E+3)	5E+3 Thyroid (1E+4)	2E-6 -	- 2E-8	- 9E-5	- 9E-4
		W, see ^{116}Te	- -	5E+3 Thyroid (1E+4)	2E-6 -	- 2E-8	- -	- -

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
52	Tellurium-134[2]	D, see ^{116}Te	2E+4 Thyroid (2E+4)	2E+4 Thyroid (5E+4)	1E-5 -	- 7E-8	- 3E-4	- 3E-3
		W, see ^{116}Te	- -	2E+4 Thyroid (5E+4)	1E-5 -	- 7E-8	- -	- -
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-156	W, all compounds	1E+3	1E+3	6E-7	2E-9	1E-5	1E-4
65	Terbium-156m (5.0 h)	W, all compounds	2E+4	3E+4	1E-5	4E-8	2E-4	2E-3
65	Terbium-156m (24.4 h)	W, all compounds	7E+3	8E+3	3E-6	1E-8	1E-4	1E-3
65	Terbium-157	W, all compounds	5E+4 LLI wall (5E+4)	3E+2 Bone surf (6E+2)	1E-7 -	- 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 LLI wall (2E+3)	2E+3 -	7E-7 -	2E-9 -	- 3E-5	- 3E-4
81	Thallium-194[2]	D, all compounds	3E+5 St wall (3E+5)	6E+5 -	2E-4 -	8E-7 -	- 4E-3	- 4E-2
81	Thallium-194m[2]	D, all compounds	5E+4 St wall (7E+4)	2E+5 -	6E-5 -	2E-7 -	- 1E-3	- 1E-2
81	Thallium-195[2]	D, all compounds	6E+4	1E+5	5E-5	2E-7	9E-4	9E-3

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
81	Thallium-197	D, all compounds	7E+4	1E+5	5E-5	2E-7	1E-3	1E-2
81	Thallium-198	D, all compounds	2E+4	3E+4	1E-5	5E-8	3E-4	3E-3
81	Thallium-198m[2]	D, all compounds	3E+4	5E+4	2E-5	8E-8	4E-4	4E-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
90	Thorium-226[2]	W, all compounds except those given for Y	5E+3 St wall (5E+3)	2E+2 -	6E-8 -	2E-10 -	- 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 Bone surf (1E+1)	1E-2 Bone surf (2E-2)	4E-12 -	- 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 Bone surf (1E+0)	9E-4 Bone surf (2E-3)	4E-13 -	- 3E-15	- 2E-8	- 2E-7
		Y, see ^{226}Th	- -	2E-3 Bone surf (3E-3)	1E-12 -	- 4E-15	- -	- -
90	Thorium-230	W, see ^{226}Th	4E+0 Bone surf (9E+0)	6E-3 Bone surf (2E-2)	3E-12 -	- 2E-14	- 1E-7	- 1E-6
		Y, see ^{226}Th	- -	2E-2 Bone surf (2E-2)	6E-12 -	- 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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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	-	-
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
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average 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-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-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-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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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, SrTi0	-	6E+0	2E-9	8E-12	-	-
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	-	-
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
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+5	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
92	Uranium-230	D, UF, UOF, UO(NO)	4E+0	4E-1	2E-10	-	-	-
			Bone surf (6E+0)	Bone surf (6E-1)	-	8E-13	8E-8	8E-7
		W, UO, UF, UCl	-	4E-1	1E-10	5E-13	-	-
		Y, UO, UO	-	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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
92	Uranium-233	D, see ^{230}U	1E+1 Bone surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10	-	-	-
		W, see ^{230}U	-	7E-1	3E-10	3E-12	3E-7	3E-6
		Y, see ^{230}U	-	4E-2	2E-11	1E-12	-	-
92	Uranium-234[3]	D, see ^{230}U	1E+1 Bone surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10	-	-	-
		W, see ^{230}U	-	7E-1	3E-10	3E-12	3E-7	3E-6
		Y, see ^{230}U	-	4E-2	2E-11	1E-12	-	-
92	Uranium-235[3]	D, see ^{230}U	1E+1 Bone surf (2E+1)	1E+0 Bone surf (2E+0)	6E-10	-	-	-
		W, see ^{230}U	-	8E-1	3E-10	3E-12	3E-7	3E-6
		Y, see ^{230}U	-	4E-2	2E-11	1E-12	-	-
92	Uranium-236	D, see ^{230}U	1E+1 Bone surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10	-	-	-
		W, see ^{230}U	-	8E-1	3E-10	3E-12	3E-7	3E-6
		Y, see ^{230}U	-	4E-2	2E-11	1E-12	-	-
92	Uranium-237	D, see ^{230}U	2E+3 LLI wall (2E+3)	3E+3	1E-6	4E-9	-	-
		W, see ^{230}U	-	2E+3	7E-7	2E-9	3E-5	3E-4
		Y, see ^{230}U	-	2E+3	6E-7	2E-9	-	-
92	Uranium-238[3]	D, see ^{230}U	1E+1 Bone surf (2E+1)	1E+0 Bone surf (2E+0)	6E-10	-	-	-
		W, see ^{230}U	-	8E-1	3E-10	3E-12	3E-7	3E-6
		Y, see ^{230}U	-	4E-2	2E-11	1E-12	-	-
92	Uranium-239[2]	D, see ^{230}U	7E+4	2E+5	8E-5	6E-14	-	-
		W, see ^{230}U	-	2E+5	7E-5	3E-7	9E-4	9E-3
		Y, see ^{230}U	-	2E+5	6E-5	2E-7	-	-
92	Uranium-240	D, see ^{230}U	1E+3	4E+3	2E-6	2E-7	-	-
		W, see ^{230}U	-	3E+3	1E-6	5E-9	2E-5	2E-4
		Y, see ^{230}U	-	2E+3	1E-6	4E-9	-	-
92	Uranium-natural[3]	D, see ^{230}U	1E+1 Bone surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10	-	-	-
		W, see ^{230}U	-	8E-1	3E-10	3E-12	3E-7	3E-6
		Y, see ^{230}U	-	5E-2	2E-11	9E-13	-	-
						9E-14	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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	-	-
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-133	Submersion[1]	-	-	1E-4	5E-7	-	-
54	Xenon-133m	Submersion[1]	-	-	1E-4	6E-7	-	-
54	Xenon-135	Submersion[1]	-	-	1E-5	7E-8	-	-
54	Xenon-135m[2]	Submersion[1]	-	-	9E-6	4E-8	-	-
54	Xenon-138[2]	Submersion[1]	-	-	4E-6	2E-8	-	-
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values			Table 4B2 Effluent Concentrations		Table 4B3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				
			ALI (µCi)	ALI (µCi)	DAC (µCi/ml)	Air (µCi/ml)	Water (µCi/ml)	Monthly Average Concentration (µCi/ml)
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	-	-
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-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-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-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-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-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-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-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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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	-	-
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-69[2]	Y, all compounds	6E+4	1E+5	6E-5	2E-7	8E-4	8E-3
30	Zinc-69m	Y, all compounds	4E+3	7E+3	3E-6	1E-8	6E-5	6E-4
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
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	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
40	Zirconium-95	D, see ^{86}Zr	1E+3	1E+2 Bone surf	5E-8	-	2E-5	2E-4
			-	(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	-	-
-	Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fis sion 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 fis sion and with radioactive half-life greater than 2 hour		-	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 mix-ture for which either the identity or the concentration of any radio-nuclide in the mixture is not known		-	4E-4	2E-13	1E-15	2E-9	2E-8

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers Monthly Average Concentration (µCi/ml)
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							
	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	-	-	-
	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	-	-	-

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values: Col. 1 Oral Ingestion ALI (µCi)	Table 4B1 Occupational Values: Col. 2 Inhalation ALI (µCi)	Table 4B1 Occupational Values: Col. 3 Inhalation DAC (µCi/ml)	Table 4B2 Effluent Concentrations: Col. 1 Air (µCi/ml)	Table 4B2 Effluent Concentrations: Col. 2 Water (µCi/ml)	Table 4B3 Releases to Sewers: Monthly Average Concentration (µCi/ml)
		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 to '' 20.1001 - 20.2401 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 CA, CB, and CC, 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:

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

Atomic No.	Radionuclide	Class	Table 4B1 Occupational Values			Table 4B2 Effluent Concentrations		Table 4B3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Monthly Average Concentration (μCi/ml)

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-7 curies/gram U U-depleted

$SA = [0.4 + 0.38 (enrichment) + 0.0034 (enrichment)^2] E-6$, enrichment ≥ 0.72

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

PART 4, APPENDIX 4C: QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

QUANTITIES[j] OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

~~* To convert µCi to kBq, multiply the µCi value by 37.~~

Comment [JJ10]: Due to a past typographical error in the spelling of the isotope "Gadolinium" in Table 4C and the complexity of formatting a single page, the Table 4C will be replaced in its entirety.

There are no changes to the table numerical values or isotopes in the table.

Comment [JJ11]: The revised table contains this information at the top of each table page.

Radionuclide	Quantity (µCi)*	Radionuclide	Quantity (µCi)*
Actinium-224	1	Barium-126	1,000
Actinium-225	0.01	Barium-128	100
Actinium-226	0.1	Barium-131	100
Actinium-227	0.001	Barium-131m	1,000
Actinium-228	1	Barium-133	100
Aluminum-26	10	Barium-133m	100
Americium-237	1,000	Barium-135m	100
Americium-238	100	Barium-139	1,000
Americium-239	1,000	Barium-140	100
Americium-240	100	Barium-141	1,000
Americium-241	0.001	Barium-142	1,000
Americium-242	10	Berkelium-245	100
Americium-242m	0.001	Berkelium-246	100
Americium-243	0.001	Berkelium-247	0.001
Americium-244	10	Berkelium-249	0.1
Americium-244m	100	Berkelium-250	10
Americium-245	1,000	Beryllium-10	1
Americium-246	1,000	Beryllium-7	1,000
Americium-246	1,000	Bismuth-200	1,000
Antimony-115	1,000	Bismuth-201	1,000
Antimony-116	1,000	Bismuth-202	1,000
Antimony-116m	1,000	Bismuth-203	100
Antimony-117	1,000	Bismuth-205	100
Antimony-118m	1,000	Bismuth-206	100
Antimony-119	1,000	Bismuth-207	10

Antimony-120(16m)	1,000	.	Bismuth-210	1
Antimony-120(5.76d)	100	.	Bismuth-210m	0.1
Antimony-122	100	.	Bismuth-212	10
Antimony-124	10	.	Bismuth-213	10
Antimony-124m	1,000	.	Bismuth-214	100
Antimony-125	100	.	Bromine-74	1,000
Antimony-126	100	.	Bromine-74m	1,000
Antimony-126m	1,000	.	Bromine-75	1,000
Antimony-127	100	.	Bromine-76	100
Antimony-128(10.4m)	1,000	.	Bromine-77	1,000
Antimony-128(9.01 h)	100	.	Bromine-80	1,000
Antimony-129	100	.	Bromine-80m	1,000
Antimony-130	1,000	.	Bromine-82	100
Antimony-131	1,000	.	Bromine-83	1,000
Argon-39	1,000	.	Bromine-84	1,000
Argon-41	1,000	.	Cadmium-104	1,000
Arsenic-69	1,000	.	Cadmium-107	1,000
Arsenic-70	1,000	.	Cadmium-109	1
Arsenic-71	100	.	Cadmium-113	100
Arsenic-72	100	.	Cadmium-113m	0.1
Arsenic-73	100	.	Cadmium-115	100
Arsenic-74	100	.	Cadmium-115m	10
Arsenic-76	100	.	Cadmium-117	1,000
Arsenic-77	100	.	Cadmium-117m	1,000
Arsenic-78	1,000	.	Calcium-41	100
Astatine-207	100	.	Calcium-45	100

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Astatine-211	10	.	Calcium-47	100
Californium-244	100	.	Curium-245	0.001
Californium-246	1	.	Curium-246	0.001
Californium-244	100	.	Curium-245	0.001
Californium-246	1	.	Curium-246	0.001
Californium-248	0.01	.	Curium-247	0.001
Californium-249	0.001	.	Curium-248	0.001
Californium-250	0.001	.	Curium-249	1,000
Californium-251	0.001	.	Dysprosium-155	1,000
Californium-252	0.001	.	Dysprosium-157	1,000
Californium-253	0.1	.	Dysprosium-159	100
Californium-254	0.001	.	Dysprosium-165	1,000
Carbon-11	1,000	.	Dysprosium-166	100
Carbon-14	1,000	.	Einsteinium-250	100
Cerium-134	100	.	Einsteinium-251	100
Cerium-135	100	.	Einsteinium-253	0.1
Cerium-137	1,000	.	Einsteinium-254	0.01
Cerium-137m	100	.	Einsteinium-254m	1
Cerium-139	100	.	Erbium-161	1,000
Cerium-141	100	.	Erbium-165	1,000
Cerium-143	100	.	Erbium-169	100
Cerium-144	1	.	Erbium-171	100
Cesium-125	1,000	.	Erbium-172	100
Cesium-127	1,000	.	Europium-145	100
Cesium-129	1,000	.	Europium-146	100
Cesium-130	1,000	.	Europium-147	100
Cesium-131	1,000	.	Europium-148	10

Cesium-132	100		Europium-149	100
Cesium-134	10		Europium-150 (12.62h)	100
Cesium-134m	1,000		Europium-150 (34.2y)	1
Cesium-135	100		Europium-152	1
Cesium-135m	1,000		Europium-152m	100
Cesium-136	10		Europium-154	1
Cesium-137	10		Europium-155	10
Cesium-138	1,000		Europium-156	100
Chlorine-36	10		Europium-157	100
Chlorine-38	1,000		Europium-158	1,000
Chlorine-39	1,000		Fermium-252	1
Chromium-48	1,000		Fermium-253	1
Chromium-49	1,000		Fermium-254	10
Chromium-51	1,000		Fermium-255	1
Cobalt-55	100		Fermium-257	0.01
Cobalt-56	10		Fluorine-18	1,000
Cobalt-57	100		Francium-222	100
Cobalt-58	100		Francium-223	100
Cobalt-58m	1,000		Gandolinium-145	1,000
Cobalt-60	1		Gandolinium-146	10
Cobalt-60m	1,000		Gandolinium-147	100
Cobalt-61	1,000		Gandolinium-148	0.001
Cobalt-62m	1,000		Gandolinium-149	100
Copper-60	1,000		Gandolinium-151	10
Copper-61	1,000		Gandolinium-152	100
Copper-64	1,000		Gandolinium-153	10
Copper-67	1,000		Gandolinium-159	100

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Curium-238	100		Gallium-65	1,000
Curium-240	0.1		Gallium-66	100
Curium-241	1		Gallium-67	1,000
Curium-242	0.01		Gallium-68	1,000
Curium-243	0.001		Gallium-70	1,000
Curium-244	0.001		Gallium-72	100
Gallium-73	1,000		Indium-119m	1,000
Germanium-66	1,000		Iodine-120	100
Germanium-67	1,000		Iodine-120m	1,000
Germanium-68	10		Iodine-121	1,000
Germanium-69	1,000		Iodine-123	100
Germanium-71	1,000		Iodine-124	10
Germanium-75	1,000		Iodine-125	1
Germanium-77	1,000		Iodine-126	1
Germanium-78	1,000		Iodine-128	1,000
Gold-193	1,000		Iodine-129	1
Gold-194	100		Iodine-130	10
Gold-195	10		Iodine-131	1
Gold-198	100		Iodine-132	100
Gold-198m	100		Iodine-132m	100
Gold-199	100		Iodine-133	10
Gold-200	1,000		Iodine-134	1,000
Gold-200m	100		Iodine-135	100
Gold-201	1,000		Iridium-182	1,000
Hafnium-170	100		Iridium-184	1,000
Hafnium-172	1		Iridium-185	1,000
Hafnium-173	1,000		Iridium-186	100

Hafnium-175	100	.	Iridium-187	1,000
Hafnium-177m	1,000	.	Iridium-188	100
Hafnium-178m	0.1	.	Iridium-189	100
Hafnium-179m	10	.	Iridium-190	100
Hafnium-180m	1,000	.	Iridium-190m	1,000
Hafnium-181	10	.	Iridium-192 (73.8d)	1
Hafnium-182	0.1	.	Iridium-192m (1.4m)	10
Hafnium-182m	1,000	.	Iridium-194	100
Hafnium-183	1,000	.	Iridium-194m	10
Hafnium-184	100	.	Iridium-195	1,000
Holmium-155	1,000	.	Iridium-195m	1,000
Holmium-157	1,000	.	Iron-52	100
Holmium-159	1,000	.	Iron-55	100
Holmium-161	1,000	.	Iron-59	10
Holmium-162	1,000	.	Iron-60	1
Holmium-162m	1,000	.	Krypton-74	1,000
Holmium-164	1,000	.	Krypton-76	1,000
Holmium-164m	1,000	.	Krypton-77	1,000
Holmium-166	100	.	Krypton-79	1,000
Holmium-166m	1	.	Krypton-81	1,000
Holmium-167	1,000	.	Krypton-83m	1,000
Hydrogen-3	1,000	.	Krypton-85	1,000
Indium-109	1,000	.	Krypton-85m	1,000
Indium-110 (69.1m)	1,000	.	Krypton-87	1,000
Indium-110m (4.9h)	1,000	.	Krypton-88	1,000
Indium-111	100	.	Lanthanum-131	1,000
Indium-112	1,000	.	Lanthanum-132	100

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Indium-113m	1,000	Lanthanum-135	1,000
Indium-114m	10	Lanthanum-137	10
Indium-115	100	Lanthanum-138	100
Indium-115m	1,000	Lanthanum-14	1,000
Indium-116m	1,000	Lanthanum-140	100
Indium-117	1,000	Lanthanum-141	100
Indium-117m	1,000	Lanthanum-143	1,000
Lead-195m	1,000	Neodymium-147	100
Lead-198	1,000	Neodymium-149	1,000
Lead-199	1,000	Neodymium-151	1,000
Lead-200	100	Neptunium-232	100
Lead-201	1,000	Neptunium-233	1,000
Lead-202	10	Neptunium-235	100
Lead-202m	1,000	Neptunium-236 (1.15E+5y)	0.001
Lead-203	1,000	Neptunium-236 (22.5h)	1
Lead-205	100	Neptunium-237	0.001
Lead-209	1,000	Neptunium-238	10
Lead-210	0.01	Neptunium-239	100
Lead-211	100	Neptunium-240	1,000
Lead-212	1	Neptunium-234	100
Lead-214	100	Nickel-56	100
Lutetium-169	100	Nickel-57	100
Lutetium-170	100	Nickel-59	100
Lutetium-171	100	Nickel-63	100
Lutetium-172	100	Nickel-65	1,000
Lutetium-173	10	Nickel-66	10
Lutetium-174	10	Niobium-88	1,000

Lutetium-174m	10	.	Niobium-89 (122 min)	1,000
Lutetium-176	100	.	Niobium-89m (66 min)	1,000
Lutetium-176m	1,000	.	Niobium-90	100
Lutetium-177	100	.	Niobium-93m	10
Lutetium-177m	10	.	Niobium-94	1
Lutetium-178	1,000	.	Niobium-95	100
Lutetium-178m	1,000	.	Niobium-95m	100
Lutetium-179	1,000	.	Niobium-96	100
Magnesium-28	100	.	Niobium-97	1,000
Manganese-51	1,000	.	Niobium-98	1,000
Manganese-52	100	.	Osmium-180	1,000
Manganese-52m	1,000	.	Osmium-181	1,000
Manganese-53	1,000	.	Osmium-182	100
Manganese-54	100	.	Osmium-185	100
Manganese-56	1,000	.	Osmium-189m	1,000
Mendelevium-257	10	.	Osmium-191	100
Mendelevium-258	0.01	.	Osmium-191m	1,000
Mercury-193	1,000	.	Osmium-193	100
Mercury-193m	100	.	Osmium-194	1
Mercury-194	1	.	Palladium-100	100
Mercury-195	1,000	.	Palladium-101	1,000
Mercury-195m	100	.	Palladium-103	100
Mercury-197	1,000	.	Palladium-107	10
Mercury-197m	100	.	Palladium-109	100
Mercury-199m	1,000	.	Phosphorus-32	10
Mercury-203	100	.	Phosphorus-33	100
Molybdenum-101	1,000	.	Platinum-186	1,000

Molybdenum-90	100		Platinum-188	100
Molybdenum-93	10		Platinum-189	1,000
Molybdenum-93m	100		Platinum-191	100
Molybdenum-99	100		Platinum-193	1,000
Neodymium-136	1,000		Platinum-193m	100
Neodymium-138	100		Platinum-195m	100
Neodymium-139	1,000		Platinum-197	100
Neodymium-139m	1,000		Platinum-197m	1,000
Neodymium-141	1,000			
Platinum-199	1,000		Radium-225	0.1
Platinum-200	100		Radium-226	0.1
Plutonium-234	10		Radium-227	1,000
Plutonium-235	1,000		Radium-228	0.1
Plutonium-236	0.001		Radon-220	1
Plutonium-237	100		Radon-222	1
Plutonium-238	0.001		Rhenium-177	1,000
Plutonium-239	0.001		Rhenium-178	1,000
Plutonium-240	0.001		Rhenium-181	1,000
Plutonium-241	0.01		Rhenium–182 (12.7h)	1,000
Plutonium-242	0.001		Rhenium–182 (64.0h)	100
Plutonium-243	1,000		Rhenium-184	100
Plutonium-244	0.001		Rhenium-184m	10
Plutonium-245	100		Rhenium-186	100
Polonium-203	1,000		Rhenium-186m	10
Polonium-205	1,000		Rhenium-187	1,000
Polonium-207	1,000		Rhenium-188	100
Polonium-210	0.1		Rhenium-188m	1,000

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Potassium-40	100		Rhenium-189	100
Potassium-42	1,000		Rhodium-100	100
Potassium-43	1,000		Rhodium-101	10
Potassium-44	1,000		Rhodium-101m	1,000
Potassium-45	1,000		Rhodium-102	10
Praseodymium-136	1,000		Rhodium-102m	10
Praseodymium-137	1,000		Rhodium-103m	1,000
Praseodymium-138m	1,000		Rhodium-105	100
Praseodymium-139	1,000		Rhodium-106m	1,000
Praseodymium-142	100		Rhodium-107	1,000
Praseodymium-142m	1,000		Rhodium-99	100
Praseodymium-143	100		Rhodium-99m	1,000
Praseodymium-144	1,000		Rubidium-79	1,000
Praseodymium-145	100		Rubidium-81	1,000
Praseodymium-147	1,000		Rubidium-81m	1,000
Promethium-141	1,000		Rubidium-82m	1,000
Promethium-143	100		Rubidium-83	100
Promethium-144	10		Rubidium-84	100
Promethium-145	10		Rubidium-86	100
Promethium-146	1		Rudidium-87	100
Promethium-147	10		Rubidium-88	1,000
Promethium-148	10		Rubidium-89	1,000
Promethium-148m	10		Ruthenium-103	100
Promethium-149	100		Ruthenium-105	1,000
Promethium-150	1,000		Ruthenium-106	1
Promethium-151	100		Ruthenium-94	1,000
Protactinium-227	10		Ruthenium-97	1,000

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Protactinium-228	1		Samarium-141	1,000
Protactinium-230	0.1		Samarium-141m	1,000
Protactinium-231	0.001		Samarium-142	1,000
Protactinium-232	1		Samarium-145	100
Protactinium-233	100		Samarium-146	1
Protactinium-234	100		Samarium-147	100
Radium-223	0.1		Samarium-151	10
Radium-224	0.1		Samarium-153	100
Samarium-155	1,000		Tantalum-182m	1,000
Samarium-156	1,000		Tantalum-183	100
Scandium-43	1,000		Tantalum-184	100
Scandium-44	100		Tantalum-185	1,000
Scandium-44m	100		Tantalum-186	1,000
Scandium-46	10		Technetium-101	1,000
Scandium-47	100		Technetium-104	1,000
Scandium-48	10		Technetium-93	1,000
Scandium-49	1,000		Technetium-93m	1,000
Selenium-70	1,000		Technetium-94	1,000
Selenium-73	100		Technetium-94m	1,000
Selenium-73m	1,000		Technetium-96	100
Selenium-75	100		Technetium-96m	1,000
Selenium-79	100		Technetium-97	1,000
Selenium-81	1,000		Technetium-97m	100
Selenium-81m	1,000		Technetium-98	10
Selenium-83	1,000		Technetium-99	100
Silicon-2	1		Technetium-99m	1,000
Silicon-31	1,000		Tellurium-116	1,000

Silver-102	1,000		Tellurium-121	100
Silver-103	1,000		Tellurium-121m	10
Silver-104	1,000		Tellurium-123	100
Silver-104m	1,000		Tellurium-123m	10
Silver-105	100		Tellurium-125m	10
Silver-106	1,000		Tellurium-127	1,000
Silver-106m	100		Tellurium-127m	10
Silver-108m	1		Tellurium-129	1,000
Silver-111	100		Tellurium-129m	10
Silver-112	100		Tellurium-131	100
Silver-115	1,000		Tellurium-131m	10
Silver-110m	10		Tellurium-132	10
Sodium-22	10		Tellurium-133	1,000
Sodium-24	100		Tellurium-133m	100
Strontium-80	100		Tellurium-134	1,000
Strontium-81	1,000		Terbium-147	1,000
Strontium-83	100		Terbium-149	100
Strontium-85	100		Terbium-150	1,000
Strontium-85m	1,000		Terbium-151	100
Strontium-87m	1,000		Terbium-153	1,000
Strontium-89	10		Terbium-154	100
Strontium-90	0.1		Terbium-155	1,000
Strontium-91	100		Terbium-156	100
Strontium-92	100		Terbium-156m (5.0h)	1,000
Sulfur-35	100		Terbium-156m (24.4h)	1,000
Tantalum-172	1,000		Terbium-157	10
Tantalum-173	1,000		Terbium-158	1

Tantalum-174	1,000	.	Terbium-160	10
Tantalum-175	1,000	.	Terbium-161	100
Tantalum-176	100	.	Thallium-194	1,000
Tantalum-177	1,000	.	Thallium-194m	1,000
Tantalum-178	1,000	.	Thallium-195	1,000
Tantalum-179	100	.	Thallium-197	1,000
Tantalum-180	100	.	Thallium-198	1,000
Tantalum-180m	1,000	.	Thallium-198m	1,000
Tantalum-182	10	.	Thallium-199	1,000
Thallium-200	1,000	.	Uranium-231	100
Thallium-201	1,000	.	Uranium-232	0.001
Thallium-202	100	.	Uranium-233	0.001
Thallium-204	100	.	Uranium-234	0.001
Thorium-226	10	.	Uranium-235	0.001
Thorium-227	0.01	.	Uranium-236	0.001
Thorium-228	0.001	.	Uranium-237	100
Thorium-229	0.001	.	Uranium-238	100
Thorium-230	0.001	.	Uranium-239	1,000
Thorium-231	100	.	Uranium-240	100
Thorium-232	100	.	Uranium-natural	100
Thorium-234	10	.	Vanadium-47	1,000
Thorium-natural	100	.	Vanadium-48	100
Thulium-162	1,000	.	Vanadium-49	1,000
Thulium-166	100	.	Xenon-120	1,000
Thulium-167	100	.	Xenon-121	1,000
Thulium-170	10	.	Xenon-122	1,000
Thulium-171	10	.	Xenon-123	1,000

Thulium-172	100	.	Xenon-125	1,000
Thulium-173	100	.	Xenon-127	1,000
Thulium-175	1,000	.	Xenon-129m	1,000
Tin-110	100	.	Xenon-131m	1,000
Tin-111	1,000	.	Xenon-133	1,000
Tin-113	100	.	Xenon-133m	1,000
Tin-117m	100	.	Xenon-135	1,000
Tin-119m	100	.	Xenon-135m	1,000
Tin-121	1,000	.	Xenon-138	1,000
Tin-121m	100	.	Ytterbium-162	1,000
Tin-123	10	.	Ytterbium-166	100
Tin-123m	1,000	.	Ytterbium-167	1,000
Tin-125	10	.	Ytterbium-169	100
Tin-126	10	.	Ytterbium-175	100
Tin-127	1,000	.	Ytterbium-177	1,000
Tin-128	1,000	.	Ytterbium-178	1,000
Titanium-44	1	.	Yttrium-86	100
Titanium-45	1,000	.	Yttrium-86m	1,000
Tungsten-176	1,000	.	Yttrium-87	100
Tungsten-177	1,000	.	Yttrium-88	10
Tungsten-178	1,000	.	Yttrium-90	10
Tungsten-179	1,000	.	Yttrium-90m	1,000
Tungsten-18	100	.	Yttrium-91	10
Tungsten-181	1,000	.	Yttrium-91m	1,000
Tungsten-187	100	.	Yttrium-92	100
Tungsten-188	10	.	Yttrium-93	100
Uranium-230	0.01	.	Yttrium-94	1,000

		Yttrium-95	1,000
Zinc-62	100		
Zinc-63	1,000		
Zinc-65	10		
Zinc-69	1,000		
Zinc-69m	100		
Zinc-71m	1,000		
Zinc-72	100		
Zirconium-86	100		
Zirconium-88	10		
Zirconium-89	100		
Zirconium-93	1		
Zirconium-95	10		
Zirconium-97	100		
Any alpha-emitting radionuclide not listed above or mixtures of alpha emitters of unknown composition	0.001	Any radionuclide other than alpha-emitting radionuclides not listed above, or mixtures of beta emitters of unknown composition	0.01

Radionuclide	Quantity (µCi)*	Radionuclide	Quantity (µCi)*
* To convert µCi to kBq, multiply the µCi value by 37.			
Actinium-224	1	Barium-126	1,000
Actinium-225	0.01	Barium-128	100
Actinium-226	0.1	Barium-131	100
Actinium-227	0.001	Barium-131m	1,000
Actinium-228	1	Barium-133	100
Aluminum-26	10	Barium-133m	100
Americium-237	1,000	Barium-135m	100
Americium-238	100	Barium-139	1,000
Americium-239	1,000	Barium-140	100
Americium-240	100	Barium-141	1,000
Americium-241	0.001	Barium-142	1,000
Americium-242	10	Berkelium-245	100
Americium-242m	0.001	Berkelium-246	100
Americium-243	0.001	Berkelium-247	0.001
Americium-244	10	Berkelium-249	0.1
Americium-244m	100	Berkelium-250	10
Americium-245	1,000	Beryllium-10	1

Comment [JJ12]:

This new table will replace Table 4C in its entirety to correct the typographical error with the isotope "Gadolinium".

Radionuclide	Quantity (µCi)*	Radionuclide	Quantity (µCi)*
Americium-246	1,000	Beryllium-7	1,000
Americium-246	1,000	Bismuth-200	1,000
Antimony-115	1,000	Bismuth-201	1,000
Antimony-116	1,000	Bismuth-202	1,000
Antimony-116m	1,000	Bismuth-203	100
Antimony-117	1,000	Bismuth-205	100
Antimony-118m	1,000	Bismuth-206	100
Antimony-119	1,000	Bismuth-207	10
Antimony-120(16m)	1,000	Bismuth-210	1
Antimony-120(5.76d)	100	Bismuth-210m	0.1
Antimony-122	100	Bismuth-212	10
Antimony-124	10	Bismuth-213	10
Antimony-124m	1,000	Bismuth-214	100
Antimony-125	100	Bromine-74	1,000
Antimony-126	100	Bromine-74m	1,000
Antimony-126m	1,000	Bromine-75	1,000
Antimony-127	100	Bromine-76	100
Antimony-128(10.4m)	1,000	Bromine-77	1,000
Antimony-128(9.01 h)	100	Bromine-80	1,000
Antimony-129	100	Bromine-80m	1,000
Antimony-130	1,000	Bromine-82	100
Antimony-131	1,000	Bromine-83	1,000
Argon-39	1,000	Bromine-84	1,000
Argon-41	1,000	Cadmium-104	1,000
Arsenic-69	1,000	Cadmium-107	1,000
Arsenic-70	1,000	Cadmium-109	1
Arsenic-71	100	Cadmium-113	100
Arsenic-72	100	Cadmium-113m	0.1
Arsenic-73	100	Cadmium-115	100
Arsenic-74	100	Cadmium-115m	10
Arsenic-76	100	Cadmium-117	1,000
Arsenic-77	100	Cadmium-117m	1,000
Arsenic-78	1,000	Calcium-41	100
Astatine-207	100	Calcium-45	100
Astatine-211	10	Calcium-47	100
Californium-244	100	Curium-245	0.001
Californium-246	1	Curium-246	0.001
Californium-244	100	Curium-245	0.001
Californium-246	1	Curium-246	0.001
Californium-248	0.01	Curium-247	0.001
Californium-249	0.001	Curium-248	0.001
Californium-250	0.001	Curium-249	1,000
Californium-251	0.001	Dysprosium-155	1,000
Californium-252	0.001	Dysprosium-157	1,000

Radionuclide	Quantity (µCi)*	Radionuclide	Quantity (µCi)*
Californium-253	0.1	Dysprosium-159	100
Californium-254	0.001	Dysprosium-165	1,000
Carbon-11	1,000	Dysprosium-166	100
Carbon-14	1,000	Einsteinium-250	100
Cerium-134	100	Einsteinium-251	100
Cerium-135	100	Einsteinium-253	0.1
Cerium-137	1,000	Einsteinium-254	0.01
Cerium-137m	100	Einsteinium-254m	1
Cerium-139	100	Erbium-161	1,000
Cerium-141	100	Erbium-165	1,000
Cerium-143	100	Erbium-169	100
Cerium-144	1	Erbium-171	100
Cesium-125	1,000	Erbium-172	100
Cesium-127	1,000	Europium-145	100
Cesium-129	1,000	Europium-146	100
Cesium-130	1,000	Europium-147	100
Cesium-131	1,000	Europium-148	10
Cesium-132	100	Europium-149	100
Cesium-134	10	Europium-150 (12.62h)	100
Cesium-134m	1,000	Europium-150 (34.2y)	1
Cesium-135	100	Europium-152	1
Cesium-135m	1,000	Europium-152m	100
Cesium-136	10	Europium-154	1
Cesium-137	10	Europium-155	10
Cesium-138	1,000	Europium-156	100
Chlorine-36	10	Europium-157	100
Chlorine-38	1,000	Europium-158	1,000
Chlorine-39	1,000	Fermium-252	1
Chromium-48	1,000	Fermium-253	1
Chromium-49	1,000	Fermium-254	10
Chromium-51	1,000	Fermium-255	1
Cobalt-55	100	Fermium-257	0.01
Cobalt-56	10	Fluorine-18	1,000
Cobalt-57	100	Francium-222	100
Cobalt-58	100	Francium-223	100
Cobalt-58m	1,000	Gadolinium-145	1,000
Cobalt-60	1	Gadolinium-146	10
Cobalt-60m	1,000	Gadolinium-147	100
Cobalt-61	1,000	Gadolinium-148	0.001
Cobalt-62m	1,000	Gadolinium-149	100
Copper-60	1,000	Gadolinium-151	10
Copper-61	1,000	Gadolinium-152	100
Copper-64	1,000	Gadolinium-153	10
Copper-67	1,000	Gadolinium-159	100

Comment [JJ13]: The isotope Gadolinium is is spelled incorrectly in the current Table 4C.

The proposed change corrects this typographical error.

Radionuclide	Quantity (µCi)*	Radionuclide	Quantity (µCi)*
Curium-238	100	Gallium-65	1,000
Curium-240	0.1	Gallium-66	100
Curium-241	1	Gallium-67	1,000
Curium-242	0.01	Gallium-68	1,000
Curium-243	0.001	Gallium-70	1,000
Curium-244	0.001	Gallium-72	100
Gallium-73	1,000	Indium-119m	1,000
Germanium-66	1,000	Iodine-120	100
Germanium-67	1,000	Iodine-120m	1,000
Germanium-68	10	Iodine-121	1,000
Germanium-69	1,000	Iodine-123	100
Germanium-71	1,000	Iodine-124	10
Germanium-75	1,000	Iodine-125	1
Germanium-77	1,000	Iodine-126	1
Germanium-78	1,000	Iodine-128	1,000
Gold-193	1,000	Iodine-129	1
Gold-194	100	Iodine-130	10
Gold-195	10	Iodine-131	1
Gold-198	100	Iodine-132	100
Gold-198m	100	Iodine-132m	100
Gold-199	100	Iodine-133	10
Gold-200	1,000	Iodine-134	1,000
Gold-200m	100	Iodine-135	100
Gold-201	1,000	Iridium-182	1,000
Hafnium-170	100	Iridium-184	1,000
Hafnium-172	1	Iridium-185	1,000
Hafnium-173	1,000	Iridium-186	100
Hafnium-175	100	Iridium-187	1,000
Hafnium-177m	1,000	Iridium-188	100
Hafnium-178m	0.1	Iridium-189	100
Hafnium-179m	10	Iridium-190	100
Hafnium-180m	1,000	Iridium-190m	1,000
Hafnium-181	10	Iridium-192 (73.8d)	1
Hafnium-182	0.1	Iridium-192m (1.4m)	10
Hafnium-182m	1,000	Iridium-194	100
Hafnium-183	1,000	Iridium-194m	10
Hafnium-184	100	Iridium-195	1,000
Holmium-155	1,000	Iridium-195m	1,000
Holmium-157	1,000	Iron-52	100
Holmium-159	1,000	Iron-55	100
Holmium-161	1,000	Iron-59	10
Holmium-162	1,000	Iron-60	1
Holmium-162m	1,000	Krypton-74	1,000
Holmium-164	1,000	Krypton-76	1,000

Radionuclide	Quantity (µCi)*	Radionuclide	Quantity (µCi)*
Holmium-164m	1,000	Krypton-77	1,000
Holmium-166	100	Krypton-79	1,000
Holmium-166m	1	Krypton-81	1,000
Holmium-167	1,000	Krypton-83m	1,000
Hydrogen-3	1,000	KryTpton-85	1,000
Indium-109	1,000	Krypton-85m	1,000
Indium-110 (69.1m)	1,000	Krypton-87	1,000
Indium-110m (4.9h)	1,000	Krypton-88	1,000
Indium-111	100	Lanthanum-131	1,000
Indium-112	1,000	Lanthanum-132	100
Indium-113m	1,000	Lanthanum-135	1,000
Indium-114m	10	Lanthanum-137	10
Indium-115	100	Lanthanum-138	100
Indium-115m	1,000	Lanthanum-14	1,000
Indium-116m	1,000	Lanthanum-140	100
Indium-117	1,000	Lanthanum-141	100
Indium-117m	1,000	Lanthanum-143	1,000
Lead-195m	1,000	Neodymium-147	100
Lead-198	1,000	Neodymium-149	1,000
Lead-199	1,000	Neodymium-151	1,000
Lead-200	100	Neptunium-232	100
Lead-201	1,000	Neptunium-233	1,000
Lead-202	10	Neptunium-235	100
Lead-202m	1,000	Neptunium-236 (1.15E+5y)	0.001
Lead-203	1,000	Neptunium-236 (22.5h)	1
Lead-205	100	Neptunium-237	0.001
Lead-209	1,000	Neptunium-238	10
Lead-210	0.01	Neptunium-239	100
Lead-211	100	Neptunium-240	1,000
Lead-212	1	Neptunium-234	100
Lead-214	100	Nickel-56	100
Lutetium-169	100	Nickel-57	100
Lutetium-170	100	Nickel-59	100
Lutetium-171	100	Nickel-63	100
Lutetium-172	100	Nickel-65	1,000
Lutetium-173	10	Nickel-66	10
Lutetium-174	10	Niobium-88	1,000
Lutetium-174m	10	Niobium-89 (122 min)	1,000
Lutetium-176	100	Niobium-89m (66 min)	1,000
Lutetium-176m	1,000	Niobium-90	100
Lutetium-177	100	Niobium-93m	10
Lutetium-177m	10	Niobium-94	1
Lutetium-178	1,000	Niobium-95	100
Lutetium-178m	1,000	Niobium-95m	100

Radionuclide	Quantity (µCi)*	Radionuclide	Quantity (µCi)*
Lutetium-179	1,000	Niobium-96	100
Magnesium-28	100	Niobium-97	1,000
Manganese-51	1,000	Niobium-98	1,000
Manganese-52	100	Osmium-180	1,000
Manganese-52m	1,000	Osmium-181	1,000
Manganese-53	1,000	Osmium-182	100
Manganese-54	100	Osmium-185	100
Manganese-56	1,000	Osmium-189m	1,000
Mendelevium-257	10	Osmium-191	100
Mendelevium-258	0.01	Osmium-191m	1,000
Mercury-193	1,000	Osmium-193	100
Mercury-193m	100	Osmium-194	1
Mercury-194	1	Palladium-100	100
Mercury-195	1,000	Palladium-101	1,000
Mercury-195m	100	Palladium-103	100
Mercury-197	1,000	Palladium-107	10
Mercury-197m	100	Palladium-109	100
Mercury-199m	1,000	Phosphorus-32	10
Mercury-203	100	Phosphorus-33	100
Molybdenum-101	1,000	Platinum-186	1,000
Molybdenum-90	100	Platinum-188	100
Molybdenum-93	10	Platinum-189	1,000
Molybdenum-93m	100	Platinum-191	100
Molybdenum-99	100	Platinum-193	1,000
Neodymium-136	1,000	Platinum-193m	100
Neodymium-138	100	Platinum-195m	100
Neodymium-139	1,000	Platinum-197	100
Neodymium-139m	1,000	Platinum-197m	1,000
Neodymium-141	1,000		
Platinum-199	1,000	Radium-225	0.1
Platinum-200	100	Radium-226	0.1
Plutonium-234	10	Radium-227	1,000
Plutonium-235	1,000	Radium-228	0.1
Plutonium-236	0.001	Radon-220	1
Plutonium-237	100	Radon-222	1
Plutonium-238	0.001	Rhenium-177	1,000
Plutonium-239	0.001	Rhenium-178	1,000
Plutonium-240	0.001	Rhenium-181	1,000
Plutonium-241	0.01	Rhenium–182 (12.7h)	1,000
Plutonium-242	0.001	Rhenium–182 (64.0h)	100
Plutonium-243	1,000	Rhenium-184	100
Plutonium-244	0.001	Rhenium-184m	10
Plutonium-245	100	Rhenium-186	100
Polonium-203	1,000	Rhenium-186m	10

Radionuclide	Quantity (µCi)*	Radionuclide	Quantity (µCi)*
Polonium-205	1,000	Rhenium-187	1,000
Polonium-207	1,000	Rhenium-188	100
Polonium-210	0.1	Rhenium-188m	1,000
Potassium-40	100	Rhenium-189	100
Potassium-42	1,000	Rhodium-100	100
Potassium-43	1,000	Rhodium-101	10
Potassium-44	1,000	Rhodium-101m	1,000
Potassium-45	1,000	Rhodium-102	10
Praseodymium-136	1,000	Rhodium-102m	10
Praseodymium-137	1,000	Rhodium-103m	1,000
Praseodymium-138m	1,000	Rhodium-105	100
Praseodymium-139	1,000	Rhodium-106m	1,000
Praseodymium-142	100	Rhodium-107	1,000
Praseodymium-142m	1,000	Rhodium-99	100
Praseodymium-143	100	Rhodium-99m	1,000
Praseodymium-144	1,000	Rubidium-79	1,000
Praseodymium-145	100	Rubidium-81	1,000
Praseodymium-147	1,000	Rubidium-81m	1,000
Promethium-141	1,000	Rubidium-82m	1,000
Promethium-143	100	Rubidium-83	100
Promethium-144	10	Rubidium-84	100
Promethium-145	10	Rubidium-86	100
Promethium-146	1	Rudidium-87	100
Promethium-147	10	Rubidium-88	1,000
Promethium-148	10	Rubidium-89	1,000
Promethium-148m	10	Ruthenium-103	100
Promethium-149	100	Ruthenium-105	1,000
Promethium-150	1,000	Ruthenium-106	1
Promethium-151	100	Ruthenium-94	1,000
Protactinium-227	10	Ruthenium-97	1,000
Protactinium-228	1	Samarium-141	1,000
Protactinium-230	0.1	Samarium-141m	1,000
Protactinium-231	0.001	Samarium-142	1,000
Protactinium-232	1	Samarium-145	100
Protactinium-233	100	Samarium-146	1
Protactinium-234	100	Samarium-147	100
Radium-223	0.1	Samarium-151	10
Radium-224	0.1	Samarium-153	100
Samarium-155	1,000	Tantalum-182m	1,000
Samarium-156	1,000	Tantalum-183	100
Scandium-43	1,000	Tantalum-184	100
Scandium-44	100	Tantalum-185	1,000
Scandium-44m	100	Tantalum-186	1,000
Scandium-46	10	Technetium-101	1,000

Radionuclide	Quantity (µCi)*	Radionuclide	Quantity (µCi)*
Scandium-47	100	Technetium-104	1,000
Scandium-48	10	Technetium-93	1,000
Scandium-49	1,000	Technetium-93m	1,000
Selenium-70	1,000	Technetium-94	1,000
Selenium-73	100	Technetium-94m	1,000
Selenium-73m	1,000	Technetium-96	100
Selenium-75	100	Technetium-96m	1,000
Selenium-79	100	Technetium-97	1,000
Selenium-81	1,000	Technetium-97m	100
Selenium-81m	1,000	Technetium-98	10
Selenium-83	1,000	Technetium-99	100
Silicon-2	1	Technetium-99m	1,000
Silicon-31	1,000	Tellurium-116	1,000
Silver-102	1,000	Tellurium-121	100
Silver-103	1,000	Tellurium-121m	10
Silver-104	1,000	Tellurium-123	100
Silver-104m	1,000	Tellurium-123m	10
Silver-105	100	Tellurium-125m	10
Silver-106	1,000	Tellurium-127	1,000
Silver-106m	100	Tellurium-127m	10
Silver-108m	1	Tellurium-129	1,000
Silver-111	100	Tellurium-129m	10
Silver-112	100	Tellurium-131	100
Silver-115	1,000	Tellurium-131m	10
Silver-110m	10	Tellurium-132	10
Sodium-22	10	Tellurium-133	1,000
Sodium-24	100	Tellurium-133m	100
Strontium-80	100	Tellurium-134	1,000
Strontium-81	1,000	Terbium-147	1,000
Strontium-83	100	Terbium-149	100
Strontium-85	100	Terbium-150	1,000
Strontium-85m	1,000	Terbium-151	100
Strontium-87m	1,000	Terbium-153	1,000
Strontium-89	10	Terbium-154	100
Strontium-90	0.1	Terbium-155	1,000
Strontium-91	100	Terbium-156	100
Strontium-92	100	Terbium-156m (5.0h)	1,000
Sulfur-35	100	Terbium-156m (24.4h)	1,000
Tantalum-172	1,000	Terbium-157	10
Tantalum-173	1,000	Terbium-158	1
Tantalum-174	1,000	Terbium-160	10
Tantalum-175	1,000	Terbium-161	100
Tantalum-176	100	Thallium-194	1,000
Tantalum-177	1,000	Thallium-194m	1,000

Radionuclide	Quantity (µCi)*	Radionuclide	Quantity (µCi)*
Tantalum-178	1,000	Thallium-195	1,000
Tantalum-179	100	Thallium-197	1,000
Tantalum-180	100	Thallium-198	1,000
Tantalum-180m	1,000	Thallium-198m	1,000
Tantalum-182	10	Thallium-199	1,000
Thallium-200	1,000	Uranium-231	100
Thallium-201	1,000	Uranium-232	0.001
Thallium-202	100	Uranium-233	0.001
Thallium-204	100	Uranium-234	0.001
Thorium-226	10	Uranium-235	0.001
Thorium-227	0.01	Uranium-236	0.001
Thorium-228	0.001	Uranium-237	100
Thorium-229	0.001	Uranium-238	100
Thorium-230	0.001	Uranium-239	1,000
Thorium-231	100	Uranium-240	100
Thorium-232	100	Uranium-natural	100
Thorium-234	10	Vanadium-47	1,000
Thorium-natural	100	Vanadium-48	100
Thulium-162	1,000	Vanadium-49	1,000
Thulium-166	100	Xenon-120	1,000
Thulium-167	100	Xenon-121	1,000
Thulium-170	10	Xenon-122	1,000
Thulium-171	10	Xenon-123	1,000
Thulium-172	100	Xenon-125	1,000
Thulium-173	100	Xenon-127	1,000
Thulium-175	1,000	Xenon-129m	1,000
Tin-110	100	Xenon-131m	1,000
Tin-111	1,000	Xenon-133	1,000
Tin-113	100	Xenon-133m	1,000
Tin-117m	100	Xenon-135	1,000
Tin-119m	100	Xenon-135m	1,000
Tin-121	1,000	Xenon-138	1,000
Tin-121m	100	Ytterbium-162	1,000
Tin-123	10	Ytterbium-166	100
Tin-123m	1,000	Ytterbium-167	1,000
Tin-125	10	Ytterbium-169	100
Tin-126	10	Ytterbium-175	100
Tin-127	1,000	Ytterbium-177	1,000
Tin-128	1,000	Ytterbium-178	1,000
Titanium-44	1	Yttrium-86	100
Titanium-45	1,000	Yttrium-86m	1,000
Tungsten-176	1,000	Yttrium-87	100
Tungsten-177	1,000	Yttrium-88	10
Tungsten-178	1,000	Yttrium-90	10

Radionuclide	Quantity (µCi)*	Radionuclide	Quantity (µCi)*
Tungsten-179	1,000	Yttrium-90m	1,000
Tungsten-18	100	Yttrium-91	10
Tungsten-181	1,000	Yttrium-91m	1,000
Tungsten-187	100	Yttrium-92	100
Tungsten-188	10	Yttrium-93	100
Uranium-230	0.01	Yttrium-94	1,000
		Yttrium-95	1,000
Zinc-62	100		
Zinc-63	1,000		
Zinc-65	10		
Zinc-69	1,000		
Zinc-69m	100		
Zinc-71m	1,000		
Zinc-72	100		
Zirconium-86	100		
Zirconium-88	10		
Zirconium-89	100		
Zirconium-93	1		
Zirconium-95	10		
Zirconium-97	100		
Any alpha-emitting radionuclide not listed above or mixtures of alpha emitters of unknown composition	0.001	Any radionuclide other than alpha-emitting radionuclides not listed above, or mixtures of beta emitters of unknown composition	0.01

Note: For purposes of 4.28.5, 4.31.1, and 4.51.1, where there is involved a combination of radionuclides in known amounts, the limit for the combination shall be derived as follows: determine, for each radionuclide in the combination, the ratio between the quantity present in the combination and the limit otherwise established for the specific radionuclide when not in combination. The sum of such ratios for all radionuclides in the combination may not exceed “1” - that is, unity.

j The quantities listed above were derived by taking 1/10th of the most restrictive ALI listed in Table 4B1, Columns 1 and 2, of Appendix 4B, rounding to the nearest factor of 10, and constraining the values listed between 37 Bq and 37 MBq (0.001 and 1,000 µCi). Values of 3.7 MBq (100 µCi) have been assigned for radionuclides having a radioactive half-life in excess of E+9 years, except Rhenium, 37 MBq (1,000 µCi), to take into account their low specific activity.

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