II

(Acts whose publication is not obligatory)

COUNCIL

COUNCIL DIRECTIVE

of 15 July 1980

amending the Directives laying down the basic safety standards for the health protection of the general public and workers against the dangers of ionizing radiation

(80/836/Euratom)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Atomic Energy Community, and in particular Articles 31 and 32 thereof,

Having regard to the proposal from the Commission, drawn up after obtaining the opinion of a group of persons appointed by the Scientific and Technical Committee from among scientific experts in the Member States,

Having regard to the opinion of the European Parliament (1),

Having regard to the opinion of the Economic and Social Committee (2),

Whereas the Treaty establishing the European Atomic Energy Community prescribes that the basic standards for the protection of the health of the general public and workers against the dangers arising from ionizing radiation, as provided for in particular in Article 30 thereof, must be laid down in order to enable each Member State, in accordance with Article 33, to lay down the appropriate provisions, by legislation, regulation or administrative action, to ensure compliance with the basic standards, to take the necessary measures with regard to teaching, education and vocational training and to lay down such provisions in harmony with the provisions applicable in this field in the other Member States;

Whereas on 2 Feburary 1959, the Council adopted Directives laying down such basic standards (3), which were last amended by Directive 76/579/Euratom (4);

Whereas the usefulness of some review of these Directives has become apparent in the light of the development of scientific knowledge concerning radiation protection;

Whereas the protection of the health of workers and the general public requires that any activity involving danger arising from ionizing radiation must be made subject to regulation;

Whereas the basic standards must be adapted to the conditions under which nuclear energy is used; whereas they vary according to whether they are concerned with the individual safety of workers exposed to ionizing radiation or with the protection of the general public;

Whereas the protection of the health of workers exposed to ionizing radiation requires, on the one hand, the organization of measures to prevent exposure and procedures for measuring exposure and, on the other hand, an adequate degree of medical surveillance;

---

(1) OJ No C 140, 5. 6. 1979, p. 174.
(2) OJ No C 128, 21. 5. 1979, p. 31.
(3) OJ No 11, 20. 2. 1959, p. 221/59.
(4) OJ No L 187, 12. 7. 1976, p. 1.

Whereas the protection of the health of the general public entails a system of surveillance, inspection and, in the case of accident, intervention;

Whereas the studies conducted on the risks of ionizing radiation are of an exemplary nature, particularly in relation to those carried out on other risks; whereas the positive results achieved in radiation protection are important; whereas it is clear that Community harmonization of basic standards has a role to play;

Whereas the Member States are obliged to take the measures necessary to comply with Directive 76/579/Euratom before 3 June 1980; whereas some of the basic standards laid down in this Directive and in the aforementioned Directive are common to both Directives; whereas amendments to national laws in this field at excessively short intervals should be avoided; whereas it is necessary, therefore, to authorize Member States not to comply with the aforementioned Directive and to prescribe a sufficiently long period to comply with this Directive for Member States that do not take advantage of this authorization and a shorter period for those that do take advantage of it,

HAS ADOPTED THIS DIRECTIVE:

TITLE I

DEFINITIONS

Article 1

For the purposes of this Directive, the following terms have the meaning hereby assigned to them:

(a) **Physical terms, quantities and units**

Ionizing radiation: radiation consisting of photons or of particles capable of producing ions directly or indirectly.

Activity (A): the quotient of dN by dt, where dN is the number of spontaneous nuclear transformations which occur in a quantity of a radionuclide in the time interval dt.

$$A = \frac{dN}{dt}$$

This definition does not apply to the words 'activity' and 'activities' in Articles 2, 3, 4, 6 and 13.

Becquerel (Bq): the special name of the SI unit of activity.

$$1\ Bq = 1\ s^{-1}$$

In this Directive the values to be used when the activity is expressed in curies are also given.

$$1\ Ci = 3{\cdot}7 \times 10^{10}\ Bq \text{ (exactly)}$$
$$1\ Bq = 2{\cdot}7027 \times 10^{-11}\ Ci$$

Absorbed dose (D): the quotient of $d\bar{\varepsilon}$ by dm, where $d\bar{\varepsilon}$ is the mean energy imparted by ionizing radiation to matter in a volume element and dm is the mass of matter in that volume element.

$$D = \frac{d\bar{\varepsilon}}{dm}$$

Gray (Gy): the special name of the SI unit of absorbed dose.

$$1\ Gy = 1\ J\ kg^{-1}$$

In this Directive the values to be used when the absorbed dose is expressed in rads are also given.

$$1\ rd = 10^{-2}\ Gy$$
$$1\ Gy = 100\ rads$$

Linear energy transfer or restricted linear collision stopping power (L_Δ): the quotient of dE by dl, where dl is the distance traversed by a charged particle in a medium and dE is the mean energy loss due to collisions with energy transfers less than a given value 'Δ'.

$$L_\Delta = \left(\frac{dE}{dl}\right)_\Delta$$

For radiation protection calculations, all the transferred energies are included, so that

$$L_\Delta = L_\infty$$

(Particle) fluence (Φ): the quotient of dN by da, where dN is the number of particles which enter a sphere of cross-sectional area da.

$$\Phi = \frac{dN}{da}$$

(Particle) fluence rate (φ): the quotient of $d\Phi$ by dt, where $d\Phi$ is the increment of particle fluence in the time interval dt.

$$\varphi = \frac{d\Phi}{dt}$$

(b) **Radiological, biological and medical terms**

Exposure: any exposure of persons to ionizing radiation. A distinction is made between:

— external exposure: exposure resulting from sources outside the body;

— internal exposure: exposure resulting from sources inside the body;

— total exposure: the sum of external and internal exposure.

Continuous exposure: prolonged external exposure the intensity of which may, however, vary with time, or internal exposure due to continuous intake although its level may vary with time.

Single exposure: external exposure of short duration, or internal exposure resulting from the intake of radionuclides over a short period.

Quality factor (Q): a function of linear energy transfer (L_∞), used to weight absorbed doses in such a way as to indicate their significance for radiation protection purposes. The values of the quality factors to be used in evaluating dose equivalent for different types of radiation shall be those laid down in Annex II.

Effective quality factor ($\overline{Q}$): average value of the quality factor where the dose absorbed is delivered by particles with different L_∞ values. It is calculated according to the expression

$$\overline{Q} = \frac{1}{D} \int_0^\infty Q \frac{dD}{dL_\infty} dL_\infty$$

Dose equivalent (H): the product of the absorbed dose (D), the quality factor (Q) and the product of all other modifying factors (N). Where the word 'dose' is used alone the meaning is always that of 'dose equivalent'.

Sievert (Sv): the special name of the SI unit of dose equivalent.

$$1\ Sv = 1\ J\ kg^{-1}$$

In this Directive the values to be used when the dose equivalent is expressed in rems are also given.

$$1\ rem = 10^{-2}\ Sv$$
$$1\ Sv = 100\ rems$$

Deep dose equivalent index ($H_{I,d}$) *at a point:* the maximum dose equivalent within the 28-cm-diameter core of a 30-cm-diameter sphere centred at this point and consisting of material equivalent to soft tissue with a density of $1\ g \cdot cm^{-3}$.

Shallow dose equivalent index ($H_{I,s}$) *at a point:* the maximum dose equivalent within the volume between 0·07 mm and 1 cm from the surface of a 30-cm-diameter sphere centred at this point and consisting of material equivalent to soft tissue with a density of $1\ g \cdot cm^{-3}$. It is not necessary to determine the dose equivalent in the outer layer of thickness 0·07 mm.

Effective dose: the sum of the weighted average dose equivalents in the various organs or tissues.

Whole body exposure: exposure regarded as uniform throughout the body.

Partial body exposure: exposure predominantly of part of the body or of one or more organs or tissues, or exposure which is not regarded as uniform throughout the body.

Committed dose: the dose to an organ or to a tissue over a period of 50 years, resulting from an intake of one or more radionuclides.

Genetic dose: the genetic dose to a population is the dose which, if it were received by each person from conception to the mean age of reproduction, would result in the same genetic burden to the whole population as do the actual doses received by the individuals of this population. The genetic dose can be assessed as the annual genetically significant dose multiplied by the mean age of reproduction, which is taken to be 30 years.

Annual genetically significant dose: the average dose to a population of the individual annual gonad doses, weighted in the case of each individual dose for the probable number of children conceived subsequent to irradiation.

Collective dose: the collective dose (S) to a population or group is given by the summation

$$S = \sum_i H_i P_i$$

where H_i is the dose to the whole body or to a specified organ averaged over the P_i members of the i^{th} subgroup of the population or group.

Radioactive contamination: the contamination of any material, surface or environment or of a person by radioactive substances. In the specific case of the human body, this radioactive contamination includes both external skin contamination and internal contamination irrespective of method of intake.

Dose limits: the limits laid down in this Directive for the doses resulting from the exposure of exposed workers, apprentices and students, and members of the public, excluding the doses resulting from natural background radiation and exposure of individuals as a result of medical examination and treatment undergone by them. The dose limits apply to the sum of the doses received from external exposure during the period considered and the committed doses resulting from the intake of radionuclides during the same period.

Intake: the activity entering the body from the external environment.

Limit of annual intake: for a given individual, the activity which, when introduced into the body, results in a committed dose equal to the appropriate limit of annual dose laid down in Articles 8, 9, 10 and 12.

Derived limit of concentration of radionuclides in inhaled air: the annual mean concentration in the air expressed in units of activity per unit volume which, inhaled over 2 000 hours of work per year, gives an intake equal to the limit of annual intake.

Radiotoxicity: the toxicity attributable to ionizing radiation emitted by an incorporated radionuclide and its daughters; radiotoxicity is related not only to the radioactive characteristics of the radionuclide but also to its chemical and physical state and to the metabolism of the element in the body or in the organ.

(c) **Other terms**

Source: an apparatus or substance capable of emitting ionizing radiation.

Sealed source: a source consisting of radioactive substances firmly incorporated in solid and effectively inactive materials, or sealed in an inactive container of sufficient strength to prevent, under normal conditions of use, any dispersion of radioactive substances.

Radioactive substance: any substance that contains one or more radionuclides, the activity or the concentration of which cannot be disregarded as far as radiation protection is concerned.

Natural background radiation: all ionizing radiation from natural terrestrial and cosmic sources, to the extent that the exposure which it causes is not significantly increased by man.

Critical assembly: an assembly of fissile materials in which it is feasible to maintain a chain reaction.

Whole population: the entire population, including exposed workers, apprentices, students and members of the public.

Exposed workers: persons subjected, as a result of their work, to an exposure liable to result in annual doses exceeding one-tenth of the annual dose limits laid down for workers.

Reference groups (critical groups) of the population: groups comprising persons whose exposure is reasonably uniform and representative of that of the more highly exposed individuals in the population.

Members of the public: individuals in the population, excluding exposed workers, apprentices and students during their working hours.

Controlled area: an area subject to special rules for the purposes of protection against ionizing radiation and to which access is controlled.

Supervised area: an area subject to appropriate supervision for the purpose of protection against ionizing radiation.

Intervention level: a value of absorbed dose or dose equivalent or a derived value fixed in connection with the drawing-up of emergency plans.

Approved medical practitioner: a medical practitioner responsible for the medical surveillance of workers of category A as defined in Article 23, whose capacity to act in this respect is recognized by the competent authorities.

Qualified expert: person having the knowledge and training needed to carry out physical or technical tests, or radiochemical tests, or to give advice in order to ensure effective protection of individuals and correct operation of protective installations, as the case may be, whose capacity to act as a qualified expert is recognized by the competent authorities.

Accident: an unforeseen event that causes damage to an installation or disrupts the normal operation of an installation, and is likely to result for one or more persons in a dose exceeding the dose limits.

Planned special exposure: an exposure causing an annual dose to exceed one of the annual dose limits laid down for exposed workers, permitted exceptionally in certain situations during normal operations when alternative techniques which do not involve such exposures cannot be used.

Accidental exposure: exposure which is of a fortuitous and involuntary nature and whereby one of the dose limits laid down for exposed workers is exceeded.

Emergency exposure: an exposure justified in abnormal conditions in the interests of bringing help to endangered individuals, preventing exposure of a large number of people or saving a valuable installation, whereby one of the dose limits laid down for exposed workers is exceeded, and whereby the limits for planned special exposures may also be exceeded. Emergency exposures shall apply only to volunteers.

Apprentice: a person receiving training and instruction within an undertaking with a view to exercising a specific skill.

TITLE II

SCOPE, REPORTING AND AUTHORIZATION

Article 2

This Directive shall apply to the production, processing, handling, use, holding, storage, transport and disposal of natural and artificial radioactive substances and to any other activity which involves a hazard arising from ionizing radiation.

Article 3

Each Member State shall make the reporting of the activities referred to in Article 2 compulsory. Without prejudice to Article 5 and in the light of possible dangers and other relevant considerations, these activities shall be subject to prior authorization in cases decided upon by each Member State.

Article 4

Without prejudice to Article 5, these requirements for reporting and obtaining prior authorization need not be applied to activities involving

(a) radioactive substances where the quantities involved do not exceed in total the values given in Annex I;

(b) radioactive substances of a concentration of less than 100 Bq g^{-1} (0·0027 µCi g^{-1}), this limit being increased to 500 Bq g^{-1} (0·014 µCi g^{-1}) for solid natural radioactive substances;

(c) the use of navigation instruments or timepieces containing radioluminescent paint, but not their manufacture or repair except as provided for in (a);

(d) apparatus emitting ionizing radiation and containing radioactive substances in quantities exceeding the values specified in (a), provided that:

1. it is of a type approved by the competent authority;

2. it possesses advantages in relation to the potential hazard that, in the opinion of the competent authority, justify its use;

3. it is constructed in the form of sealed sources ensuring effective protection against any contact with the radioactive substances and against any leakage of them; and

4. it does not cause, at any point situated at a distance of 0·1 m from the accessible surface of the apparatus and under normal operating conditions, a dose rate exceeding

1 µSv h^{-1} (0·1 mrem h^{-1});

(e) apparatus other than that referred to in (f) emitting ionizing radiation but not containing any radioactive substances, provided that:

1. it is of a type approved by the competent authority;

2. it possesses advantages in relation to the potential hazard that, in the opinion of the competent authority, justify its use; and

3. it does not cause, at any point situated at a distance of 0·1 m from the accessible surface of the apparatus and under normal operating conditions, a dose rate exceeding

1 µSv h^{-1} (0·1 mrem h^{-1});

(f) cathode ray tubes intended for the display of visual images which do not cause, at any point situated at a distance of 0·05 m from the accessible surface of the apparatus, a dose rate exceeding

$$5\ \mu Sv\ h^{-1}\ (0{\cdot}5\ mrem\ h^{-1})$$

Article 5

Apart from the prohibitions provided for by national law, and irrespective of the degree of danger involved, a system of prior authorization must be applied in respect of:

(a) the administration of radioactive substances to persons for purposes of diagnosis, treatment or research;

(b) the use of radioactive substances in toys and the importation of toys containing radioactive substances;

(c) the addition of radioactive substances in the production and manufacture of foodstuffs, medicinal products, cosmetics and products for household use (except for the instruments and timepieces referred to in Article 4 (c)) and the importation for commercial purposes of such goods if they contain radioactive substances.

TITLE III

LIMITATION OF DOSES FOR CONTROLLABLE EXPOSURES

Article 6

The limitation of individual and collective doses resulting from controllable exposures shall be based on the following general principles:

(a) every activity resulting in an exposure to ionizing radiation shall be justified by the advantages which it produces;

(b) all exposures shall be kept as low as reasonably achievable;

(c) without prejudice to Article 11, the sum of the doses and committed doses received shall not exceed the dose limits laid down in this Title for exposed workers, apprentices and students and members of the public.

The principles set out in (a) and (b) shall apply to all exposures to ionizing radiation and include medical exposures. The principle set out in (c) shall not apply to the exposure of individuals as a result of medical examination and treatment undergone by them.

CHAPTER I

LIMITATION OF DOSES FOR EXPOSED WORKERS

Article 7

1. Workers under 18 years of age may not be assigned to any work which would result in their being exposed workers.

2. Nursing mothers shall not be employed in work involving a high risk of radioactive contamination; if necessary, a special watch will be kept for bodily radioactive contamination.

Article 8

Whole body exposure

1. The dose limit for whole body exposure of exposed workers shall be 50 mSv (5 rems) in a year.

2. For women of reproductive capacity, the dose to the abdomen shall not exceed 13 mSv (1·3 rems) in a quarter.

3. As soon as pregnancy is declared, measures shall be taken to ensure that exposure of the woman concerned in the context of her employment is such that the dose to the foetus, accumulated over the period of time between declaration of pregnancy and the date of delivery, remains as small as is reasonably practicable and in no case exceeds 10 mSv (1 rem). In general, this limitation can be achieved by employing the women in working conditions appropriate to category B workers.

Article 9

Partial body exposure

In the case of partial body exposure:

(a) the effective dose limit evaluated by the method set out in Annex II, Section E, shall be 50 mSv (5 rems) in a year; the average dose in each of the organs or tissues involved shall not exceed 500 mSv (50 rems) in a year.

(b) In addition:

— the dose limit for the lens of the eye shall be 300 mSv (30 rems) in a year;

— the dose limit for the skin shall be 500 mSv (50 rems) in a year. Where exposure is the result of radioactive contamination of the skin, this limit shall apply to the dose averaged over any area of 100 cm^2;

— the dose limit for the hands, forearms, feet and ankles shall be 500 mSv (50 rems) in a year.

CHAPTER II

LIMITATION OF DOSES FOR APPRENTICES AND STUDENTS

Article 10

1. The dose limits for apprentices and students aged 18 years or over who are training for employment involving exposure to ionizing radiation or who, in the course of their studies, are obliged to use sources shall be equal to the dose limits for exposed workers laid down in Articles 8 and 9.

2. The dose limits for apprentices and students aged between 16 and 18 years who are training for employment involving exposure to ionizing radiation or who, in the course of their studies, are obliged to use sources, shall be equal to three-tenths of the annual dose limits for exposed workers laid down in Articles 8 and 9.

3. The dose limits for apprentices and students aged 16 years or over who are not subject to the provisions of paragraphs 1 and 2 and for apprentices and students aged less than 16 years shall be the same as the dose limits for members of the public specified in Article 12. However, the contribution to the annual doses that they are liable to receive by virtue of their training shall not exceed one-tenth of the dose limits specified in Article 12 and the dose during each single exposure shall not exceed one-hundredth of those dose limits.

CHAPTER III

PLANNED SPECIAL EXPOSURES

Article 11

1. Only workers of category A defined in Article 23 may be subjected to planned special exposures. All planned special exposure must be subject to appropriate authorization.

Such authorization shall be given only in exceptional situations during normal operations when alternative techniques which do not involve such exposure cannot be used. Account shall be taken of the age and health of the workers involved.

2. The doses or committed doses received in the course of planned special exposures must not in any year exceed twice the annual dose limits laid down in Articles 8 and 9 and, in a lifetime, five times those dose limits.

3. Planned special exposures shall not be authorized:

(a) if, during the previous 12 months, the worker has received an exposure giving rise to doses in excess of the annual dose limits laid down in Articles 8 and 9, or

(b) if the worker has previously received accidental or emergency exposures giving rise to doses the sum of which exceeds five times the annual dose limits laid down in Articles 8 and 9, or

(c) if the worker is a woman of reproductive capacity.

4. The exceeding of dose limits as a result of planned special exposure shall not in itself be a reason for excluding the worker from his usual occupation. Subsequent conditions of exposure shall be subject to the agreement of the approved medical practitioner.

5. All planned special exposures must be entered in the medical record provided for in Article 36, in which the estimated value of the dose and that of the activities taken into the body shall also be entered.

6. Before receiving a planned special exposure, the worker shall be given appropriate information about the risks involved and the precautions to be taken during the operation.

CHAPTER IV

LIMITATION OF DOSES FOR THE POPULATION

Article 12

Dose limits for members of the public

1. The following dose limits for members of the public shall be complied with without prejudice to Article 13.

2. In the case of whole body exposure the dose limit shall be 5 mSv (0·5 rem) in a year.

3. In the case of partial body exposure:

(a) the limit for the effective dose evaluated by the method set out in Annex II, Section E, shall be 5 mSv (0·5 rem) in a year; the average dose in each of the organs or tissues involved shall not exceed 50 mSv (5 rems) in a year.

(b) In addition:

— the dose limit for the lens of the eye shall be 30 mSv (3 rems) in a year;

— the dose limit for the skin shall be 50 mSv (5 rems) in a year;

— the dose limit for the hands, forearms, feet and ankles shall be 50 mSv (5 rems) in a year.

Article 13

Exposure of the population as a whole

1. Each Member State shall ensure that the contribution to the exposure of the population as a whole from each activity is kept to the minimum amount necessitated by that activity, taking account of the principles set out in Article 6 (a) and (b).

2. The total of all such contributions shall be kept under review and in particular the genetic dose resulting from all these contributions shall be estimated.

3. Member States shall regularly transmit the results of these reviews and estimates to the Commission.

TITLE IV

DERIVED LIMITS

Article 14

Use of the derived limits laid down in this Title is a means of ensuring that the dose limits defined in Title III are complied with; however, other methods may be used to achieve this end.

Article 15

External exposure only

In the case of external exposure of the whole body or of a substantial fraction of the body, the dose limits laid down in Articles 8, 9 and 12 shall be deemed to be complied with if the requirements laid down in Annex II are met.

Article 16

Internal exposure only

In the case of internal exposure, the dose limits laid down in Articles 8, 9 and 12 shall be deemed to be complied with if the values of intake and concentration of radionuclides in the air do not exceed the values laid down in Annex III.

(a) The tables in Annex III give:

— the limits of annual intake by inhalation of radionuclides for exposed workers;

— the derived limits of concentration of radionuclides in the air inhaled for exposed workers. These must be considered as average values for one year;

— the limits of annual intake by inhalation and ingestion of radionuclides for members of the public.

(b) Where there is a mixture of radionuclides, the methods given in Annex III, paragraph 2, shall be used.

Article 17

Combinations of external and internal exposure

In the case of combinations of external exposure of the whole body or a substantial fraction of the body and internal radioactive contamination by one or more radionuclides, the limits laid down in Articles 8, 9 and 12 shall be deemed to be complied with if the requirements laid down in Annex II are met.

TITLE V

ACCIDENTAL AND EMERGENCY EXPOSURES OF WORKERS

Article 18

All accidental and emergency exposures shall be entered in the medical record of the worker provided for in Article 36. Wherever possible, doses and committed doses received in the course of accidental and emergency exposures must be recorded separately on the exposure record provided for in Article 31. The procedures set out in Article 37 shall also be applied. Only volunteers may be subjected to emergency exposures.

TITLE VI

FUNDAMENTAL PRINCIPLES GOVERNING OPERATIONAL PROTECTION OF EXPOSED WORKERS

Article 19

Operational protection of exposed workers shall be based on the following principles:

(a) classification of places of work into different areas;

(b) classification of workers into different categories;

(c) implementation of control measures and monitoring relating to these different areas and to the different categories of workers.

These principles of protection shall also apply to the apprentices and students referred to in Article 10 (1) and (2).

CHAPTER I

MEASURES FOR THE RESTRICTION OF EXPOSURE

Section 1

Classification and delineation of areas

Article 20

For the purposes of radiation protection, each Member State shall make arrangements as regards all places of work where there is a risk of exposure to ionizing radiation.

In working areas where the doses are not liable to exceed one-tenth of the annual dose limits laid down for exposed workers, it shall not be necessary to make special arrangements for the purposes of radiation protection.

In working areas where the doses are liable to exceed one-tenth of the annual dose limits laid down for exposed workers, the arrangements must be appropriate to the nature of the installation and sources and to the magnitude and nature of the hazards. The scope of the precautions and monitoring, as well as their type and quality, must be appropriate to the hazards associated with the work involving exposure to ionizing radiation.

A distinction shall be made between:

(a) controlled areas

Any area in which doses are liable to exceed three-tenths of the annual dose limits laid down for exposed workers shall constitute or be included in a controlled area.

Annex IV lists examples of establishments and plants in which the presence of generators or sources liable to be the cause of exposure generally justifies the delineation of one or more controlled areas;

(b) supervised areas

Any area which is not considered as a controlled area and in which doses are liable to exceed one-tenth of the annual dose limits laid down for exposed workers shall be considered as a supervised area.

Article 21

Controlled areas must be delineated.

Taking into account the nature and extent of the radiation hazards:

(a) radiological environmental surveillance shall be organized in controlled and supervised areas, and, in particular, activities, doses and dose rates as the case may be shall be monitored and results recorded;

(b) in controlled and supervised areas, working instructions appropriate to the radiation hazard shall be laid down;

(c) the hazards inherent in the sources shall be indicated in controlled areas;

(d) signs indicating sources shall be displayed in controlled and supervised areas.

Qualified experts shall be concerned in the discharge of these duties.

Article 22

The minimum requirement for a controlled area shall be the control of access by appropriate identification.

Section 2

Classification of exposed workers

Article 23

For the purposes of monitoring and surveillance, a distinction shall be made between two categories of exposed workers:

— category A: those who are liable to receive a dose greater than three-tenths of one of the annual dose limits;

— category B: those who are not liable to receive this dose.

Article 24

Exposed workers and the apprentices and students referred to in Article 10 (1) and (2) shall be informed of the health risks involved in their work, the precautions to be taken and the importance of complying with the technical and medical requirements and shall also be given appropriate training in the field of radiation protection.

Section 3

Examination and testing of protective devices and measuring instruments

Article 25

The examination and testing of protective devices and measuring instruments shall be the responsibility of qualified experts.

The examination and testing shall comprise:

(a) prior critical examination of plans for installations from the point of view of radiation protection;

(b) the acceptance of new installations from the point of view of radiation protection;

(c) regular checking of the effectiveness of protective devices and techniques;

(d) regular checking that measuring instruments are serviceable and correctly used.

CHAPTER II

ASSESSMENT OF EXPOSURE

Article 26

The nature and frequency of assessment of exposure shall be such as to enable compliance with this Directive in each case.

Section 1

Collective monitoring

Article 27

Taking into account the radiological hazards, measurements shall be carried out:

(a) of dose rates and fluence rates, indicating the nature and the quality of the radiation in question;

(b) of the atmospheric concentration and surface density of contaminating radioactive substances, indicating their nature and their physical and chemical states.

Where appropriate, the results of these measurements shall be used for estimating individual doses.

Section 2

Individual monitoring

Article 28

The assessment of the individual doses shall be systematic for workers of category A. This assessment shall be based on individual measurements or, in cases where these are impossible or inadequate, on an estimate arrived at either from individual measurements made on other exposed workers, or from the results of the collective monitoring provided for in Article 27.

Article 29

In the case of accidental or emergency exposure, the absorbed doses shall be assessed, whether whole or partial body exposure has occurred.

Article 30

The results of individual monitoring shall be submitted to an approved medical practitioner whose responsibility it shall be to interpret their implications for human health. In an emergency the results shall be submitted immediately.

Section 3

Recording of results

Article 31

The following shall be kept in the archives for a period of at least 30 years:

(a) the results of collective monitoring measurements used to assess individual doses;

(b) the exposure record containing the data relating to the assessment of individual doses;

(c) in the case of accidental or emergency exposure, the reports relating to the circumstances and to the action taken.

For the documents referred to in (b) and (c), the period of 30 years shall start at the time of termination of the work involving exposure to ionizing radiation.

CHAPTER III

MEDICAL SURVEILLANCE OF EXPOSED WORKERS

Article 32

The medical surveillance of exposed workers shall be based on the principles that govern occupational medicine generally. It shall include, as appropriate, pre-employment medical examinations and periodic reviews of health, the frequency and the form of the latter being determined by the worker's state of health, the conditions of work and the incidents that may be associated with the work.

Article 33

No worker may be employed for any period as an exposed worker if the medical findings are unfavourable.

Section 1

Medical surveillance of workers of category A

Article 34

The medical surveillance of workers of category A shall be the responsibility of approved medical practitioners.

It shall include:

(a) a pre-employment medical examination

The purpose of this examination shall be to determine the worker's fitness for the first post for which he is being considered. It shall include an inquiry into his medical history including all known previous exposures to ionizing radiation resulting either from his employment or from medical examination and treatment, and also a clinical and any other investigations necessary for assessing his general state of health.

(b) general medical surveillance

The approved medical practitioner must have access to any information he requires in order to ascertain the state of health of workers under surveillance and to assess the environmental conditions existing in

the working premises in so far as they might affect the fitness of workers for the tasks assigned to them.

(c) periodic reviews of health

The health of workers shall be subject to review as a matter of routine to determine whether they remain fit to perform their duties. The nature of this review shall depend on the type and extent of exposure to ionizing radiation and on the individual worker's state of health. The state of health of each worker shall be reviewed at least once a year and more frequently if the worker's exposure conditions or state of health so require.

The approved medical practitioner may indicate the need for medical surveillance after cessation of work for as long as he considers it necessary to safeguard the health of the person concerned.

Article 35

The following medical classification shall be adopted with respect to fitness for work as a worker of category A:

— fit;

— fit, subject to certain conditions;

— unfit.

Article 36

1. A medical record shall be opened for each worker of category A and kept up to date so long as he remains a worker of that category. Thereafter it shall be retained in the archives for a period of at least 30 years from the termination of the work involving exposure to ionizing radiation.

2. The medical record shall include information regarding the nature of the employment, the results of the pre-employment medical examination and periodic reviews of health, a record of doses to check that the values laid down in Articles 8, 9 and 11 have not been exceeded, and the record of doses received in the course of accidental and emergency exposures.

Section 2

Special surveillance of exposed workers

Article 37

Special surveillance shall be provided in each case where the dose limits laid down in Articles 8 and 9 have been exceeded. Subsequent conditions of exposure shall be subject to the agreement of the approved medical practitioner.

Article 38

In addition to the periodic reviews of health provided for in Article 34, provision shall be made for any further examinations, decontamination measures or urgent remedial treatment considered necessary by the approved medical practitioner.

Section 3

Appeals

Article 39

Each Member State shall lay down the procedure for appeal against the findings and decisions made in pursuance of Articles 33 and 37.

CHAPTER IV

Article 40

1. Each Member State shall take all necessary measures to ensure the effective protection of exposed workers. It shall lay down provisions relating to the classification of places of work and of workers, to the implementation of arrangements aimed at restricting exposure and to monitoring. It shall also establish a system or systems of inspection to supervise the examinations and monitoring specified in this Directive and to initiate surveillance and intervention measures wherever necessary.

2. Each Member State shall ensure that workers have access to the results of the exposure measurements and the biological examinations concerning them.

3. Each Member State shall make the necessary arrangements to recognize the capacity of the experts responsible for the examination and testing of the various protective devices and measuring instruments and to approve medical practitioners responsible for the medical surveillance of category A workers. To this end, each Member State shall arrange for the training of such specialists.

4. Each Member State shall ensure that the means necessary for proper radiation protection are placed at the disposal of the departments responsible. The

creation of a specialized radiation protection unit shall be required for all establishments in which there is a serious risk of exposure or radioactive contamination. This unit, which may be shared by several establishments, shall be distinct from production and operation units.

5. Each Member State shall facilitate appropriate access within the Community to all relevant information concerning the posting of each exposed worker and the doses received.

6. For the guidance of medical practitioners responsible for the medical surveillance of exposed workers, each Member State shall draw up a list, which need not be exhaustive, of the criteria which should be taken into account when judging a worker's fitness to be exposed to ionizing radiation.

TITLE VII

FUNDAMENTAL PRINCIPLES GOVERNING OPERATIONAL PROTECTION OF THE POPULATION

Article 41

Each Member State shall adopt the provisions necessary for applying the fundamental principles governing operational protection of the population.

Article 42

Operational protection of the population means all arrangements and surveys for detecting and eliminating the factors which, in the production and use of ionizing radiation or in the course of any operation involving exposure to its effects, are liable to create an unjustifiable risk of exposure for the population. The extent of the precautions taken shall depend upon the magnitude of the risk of exposure, especially in the event of an accident, and upon demographic data. Operational protection has application in the medical field as well as in other fields. Protection shall include the examination and testing of protective arrangements and the dose determinations to be carried out for the protection of the population.

Article 43

The examination and testing of protective arrangements shall include:

(a) examination and approval of proposed installations involving an exposure hazard, and of the proposed siting of installations within the territory;

(b) acceptance into service of new installations with regard to protection against any exposure or radioactive contamination liable to extend beyond the perimeter of the establishment, taking into account demographic, meteorological, geological, hydrological and ecological conditions;

(c) checking the effectiveness of technical protective devices:

(d) acceptance, from the point of view of surveillance of radiological hazards, of equipment for measuring exposure and radioactive contamination;

(e) checking that measuring instruments are serviceable and correctly used;

(f) whenever necessary, the establishment of emergency plans and their approval;

(g) the establishment and application of waste discharge formulae and provisions to be laid down for measurement.

The tasks listed in (a) to (g) shall be carried out in accordance with rules laid down by the competent authorities on the basis of the extent of the exposure hazard involved.

Article 44

1. The health surveillance of the population shall be based, in particular, on the assessment of the doses received by the population, both in normal circumstances and in the event of an accident.

2. Surveillance shall be carried out:

(a) on the whole population of the area concerned;

(b) on reference groups of the population in all places where such groups may occur.

3. Taking into account the radiological hazards, the dose determinations to be carried out for the protection of the population shall include:

(a) assessment of external exposure, indicating, where appropriate, the quality of the radiation in question;

(b) assessment of radioactive contamination, indicating the nature and the physical and chemical state of the

radioactive contaminants and determination of their activity and their concentration;

(c) assessment of the doses that the reference groups of the population are liable to receive in normal or exceptional circumstances, and specification of the characteristics of these groups;

(d) assessment of the genetic dose and of the annual genetically significant dose, taking demographic characteristics into account. Doses due to exposure to various sources must be added together wherever possible;

(e) the frequency of assessments shall be such as to enable compliance with this Directive in each case;

(f) records relating to measurements of external exposure and radioactive contamination and the results of the assessment of the doses received by the population shall be kept in the archives and shall include accidental and emergency exposures.

Article 45

1. Each Member State shall establish a system of inspection to supervise the protection of the health of the population, to interpret, in terms of the effects on health, the results of the assessments provided for in Article 44 (3), and to check compliance with the dose limits laid down in Article 12.

2. Each Member State shall initiate action in regard to surveillance and intervention wherever necessary.

3. Each Member State shall take measures to ensure and effectively coordinate the health surveillance of the population, shall decide on the frequency of assessments and shall take all necessary steps to identify the reference groups of the population, taking into account the effective pathway of transmission of the radioactive material. These measures may, if necessary, be taken by one Member State jointly with other Member States.

4. In the event of accidents, each Member State shall stipulate:

(a) intervention levels, measures to be taken by the competent authorities and surveillance procedures with respect to the population groups that are liable to receive a dose in excess of the dose limits laid down in Article 12;

(b) the necessary resources both in personnel and in equipment to enable action to be taken to safeguard and maintain the health of the population. These measures may, if necessary, be taken by one Member State jointly with other Member States.

5. Any accident involving exposure of the population must be notified as a matter of urgency, when the circumstances so require, to neighbouring Member States and to the Commission.

Article 46

1. Member States shall be authorized not to take measures provided for in Article 40 (1) of Directive 76/579/Euratom, as amended by Directive 79/343/Euratom [1].

Member States which take advantage of this authorization shall take the measures necessary to comply with this Directive within 30 months from 3 June 1980.

Member States which do not take advantage of this authorization shall take the measures necessary to comply with this Directive within four years from 3 June 1980

2. Member States shall inform the Commission of the provisions they have adopted to comply with this Directive.

Article 47

This Directive is addressed to the Member States.

Done at Brussels, 15 July 1980.

For the Council

The President

J. SANTER

(1) OJ No L 83, 3. 4. 1979, p. 18.

ANNEX I

1. Values of activities not to be exceeded, in compliance with Article 4 (a), for radionuclides (1):

nuclides of very high radiotoxicity:	$5 \cdot 10^3$ Bq; $1{\cdot}4 \cdot 10^{-7}$ Ci (group 1);
nuclides of high radiotoxicity:	$5 \cdot 10^4$ Bq; $1{\cdot}4 \cdot 10^{-6}$ Ci (group 2);
nuclides of moderate radiotoxicity:	$5 \cdot 10^5$ Bq; $1{\cdot}4 \cdot 10^{-5}$ Ci (group 3);
nuclides of low radiotoxicity:	$5 \cdot 10^6$ Bq; $1{\cdot}4 \cdot 10^{-4}$ Ci (group 4).

2. The principal radioactive nuclides are classified as follows, according to their relative radiotoxicity:

(a) Very high radiotoxicity (group 1):

$^{210}_{82}$Pb	$^{210}_{84}$Po	$^{223}_{88}$Ra	$^{225}_{88}$Ra	$^{226}_{88}$Ra	$^{228}_{88}$Ra	$^{227}_{89}$Ac	$^{227}_{90}$Th
$^{228}_{90}$Th	$^{229}_{90}$Th	$^{230}_{90}$Th	$^{231}_{91}$Pa	$^{230}_{92}$U	$^{232}_{92}$U	$^{233}_{92}$U	$^{234}_{92}$U
$^{237}_{93}$Np	$^{236}_{94}$Pu	$^{238}_{94}$Pu	$^{239}_{94}$Pu	$^{240}_{94}$Pu	$^{241}_{94}$Pu	$^{242}_{94}$Pu	$^{241}_{95}$Am
$^{242m}_{95}$Am	$^{243}_{95}$Am	$^{240}_{96}$Cm	$^{242}_{96}$Cm	$^{243}_{96}$Cm	$^{244}_{96}$Cm	$^{245}_{96}$Cm	$^{246}_{96}$Cm
$^{247}_{96}$Cm	$^{248}_{96}$Cm	$^{248}_{98}$Cf	$^{249}_{98}$Cf	$^{250}_{98}$Cf	$^{251}_{98}$Cf	$^{252}_{98}$Cf	$^{254}_{98}$Cf
$^{254}_{99}$Es	$^{255}_{99}$Es						

(b) High radiotoxicity (group 2):

$^{222}_{11}$Na	$^{36}_{17}$Cl	$^{45}_{20}$Ca	$^{46}_{21}$Sc	$^{60}_{27}$Co	$^{90}_{38}$Sr	$^{91}_{39}$Y	$^{93}_{40}$Zr
$^{94}_{41}$Nb	$^{106}_{44}$Ru	$^{110m}_{47}$Ag	$^{115m}_{48}$Cd	$^{114m}_{49}$In	$^{124}_{51}$Sb	$^{125}_{51}$Sb	$^{124}_{53}$I
$^{125}_{53}$I	$^{126}_{53}$I	$^{131}_{53}$I	$^{134}_{55}$Cs	$^{140}_{56}$Ba	$^{144}_{58}$Ce	$^{152}_{63}$Eu(13a)	
$^{154}_{63}$Eu	$^{160}_{65}$Tb	$^{170}_{69}$Tm	$^{181}_{72}$Hf	$^{182}_{73}$Ta	$^{192}_{77}$Ir	$^{204}_{81}$Tl	$^{212}_{82}$Pb
$^{207}_{83}$Bi	$^{210}_{83}$Bi	$^{211}_{85}$At	$^{224}_{88}$Ra	$^{228}_{89}$Ac	$^{232}_{90}$Th	$_{90}$Th nat (*)	
$^{230}_{91}$Pa	$^{236}_{92}$U	$^{244}_{94}$Pu	$^{242}_{95}$Am	$^{241}_{96}$Cm	$^{249}_{97}$Bk	$^{246}_{98}$Cf	$^{253}_{98}$Cf
$^{253}_{99}$Es	$^{254m}_{99}$Es	$^{255}_{100}$Fm	$^{256}_{100}$Fm				

(c) Moderate radiotoxicity (group 3):

$^{7}_{4}$Be	$^{14}_{6}$C	$^{18}_{9}$F	$^{24}_{11}$Na	$^{31}_{14}$Si	$^{32}_{15}$P	$^{33}_{15}$P	$^{35}_{16}$S
$^{38}_{17}$Cl	$^{41}_{18}$Ar	$^{42}_{19}$K	$^{43}_{19}$K	$^{47}_{20}$Ca	$^{47}_{21}$Sc	$^{48}_{21}$Sc	$^{48}_{23}$V
$^{51}_{24}$Cr	$^{52}_{25}$Mn	$^{54}_{25}$Mn	$^{52}_{26}$Fe	$^{55}_{26}$Fe	$^{59}_{26}$Fe	$^{55}_{27}$Co	$^{56}_{27}$Co
$^{57}_{27}$Co	$^{58}_{27}$Co	$^{63}_{28}$Ni	$^{65}_{28}$Ni	$^{64}_{29}$Cu	$^{65}_{30}$Zn	$^{69m}_{30}$Zn	$^{72}_{31}$Ga
$^{73}_{33}$As	$^{74}_{33}$As	$^{76}_{33}$As	$^{77}_{33}$As	$^{75}_{34}$Se	$^{82}_{35}$Br	$^{74}_{36}$Kr	$^{77}_{36}$Kr
$^{87}_{36}$Kr	$^{88}_{36}$Kr	$^{86}_{37}$Rb	$^{83}_{38}$Sr	$^{85}_{38}$Sr	$^{89}_{38}$Sr	$^{91}_{38}$Sr	$^{92}_{38}$Sr
$^{90}_{39}$Y	$^{92}_{39}$Y	$^{93}_{39}$Y	$^{86}_{40}$Zr	$^{88}_{40}$Zr	$^{89}_{40}$Zr	$^{95}_{40}$Zr	$^{97}_{40}$Zr
$^{90}_{41}$Nb	$^{93m}_{41}$Nb	$^{95}_{41}$Nb	$^{95m}_{41}$Nb	$^{96}_{41}$Nb	$^{90}_{42}$Mo	$^{93}_{42}$Mo	$^{99}_{42}$Mo
$^{96}_{43}$Tc	$^{97m}_{43}$Tc	$^{97}_{43}$Tc	$^{99}_{43}$Tc	$^{97}_{44}$Ru	$^{103}_{44}$Ru	$^{105}_{44}$Ru	$^{105}_{45}$Rh
$^{103}_{46}$Pd	$^{109}_{46}$Pd	$^{105}_{47}$Ag	$^{111}_{47}$Ag	$^{109}_{48}$Cd	$^{115}_{48}$Cd	$^{115m}_{49}$In	$^{113}_{50}$Sn
$^{125}_{50}$Sn	$^{122}_{51}$Sb	$^{121}_{52}$Te	$^{121m}_{52}$Te	$^{123m}_{52}$Te	$^{125m}_{52}$Te	$^{127m}_{52}$Te	$^{129m}_{52}$Te
$^{131}_{52}$Te	$^{131m}_{52}$Te	$^{132}_{52}$Te	$^{133m}_{52}$Te	$^{134}_{52}$Te	$^{120}_{53}$I	$^{123}_{53}$I	$^{130}_{53}$I

(1) The alphabetical list of elements appears at the end of this Annex.

(*) One becquerel of natural thorium corresponds to 1 alpha disintegration per second (dps) (0·5 dps of Th^{-232} and 0·5 dps of Th^{-228}).
One curie of natural thorium corresponds to $3{\cdot}7 \cdot 10^{10}$ alpha disintegrations per second ($1{\cdot}85 \cdot 10^{10}$ dps of Th^{-232} and $1{\cdot}85 \cdot 10^{10}$ dps of Th^{-228}).

$^{132}_{53}I$	$^{132m}_{53}I$	$^{133}_{53}I$	$^{135}_{53}I$	$^{135}_{54}Xe$	$^{132}_{55}Cs$	$^{136}_{55}Cs$	$^{137}_{55}Cs$
$^{131}_{56}Ba$	$^{140}_{57}La$	$^{134}_{58}Ce$	$^{135}_{58}Ce$	$^{137m}_{58}Ce$	$^{139}_{58}Ce$	$^{141}_{58}Ce$	$^{143}_{58}Ce$
$^{142}_{59}Pr$	$^{143}_{59}Pr$	$^{147}_{60}Nd$	$^{149}_{60}Nd$	$^{147}_{61}Pm$	$^{149}_{61}Pm$	$^{151}_{62}Sm$	$^{153}_{62}Sm$
$^{152m}_{63}Eu$(9h)		$^{155}_{63}Eu$	$^{153}_{64}Gd$	$^{159}_{64}Gd$	$^{165}_{66}Dy$	$^{166}_{66}Dy$	$^{166}_{67}Ho$
$^{169}_{68}Er$	$^{171}_{68}Er$	$^{171}_{69}Tm$	$^{175}_{70}Yb$	$^{177}_{71}Lu$	$^{181}_{74}W$	$^{185}_{74}W$	$^{187}_{74}W$
$^{183}_{75}Re$	$^{186}_{75}Re$	$^{188}_{75}Re$	$^{185}_{76}Os$	$^{191}_{76}Os$	$^{193}_{76}Os$	$^{190}_{77}Ir$	$^{194}_{77}Ir$
$^{191}_{78}Pt$	$^{193}_{78}Pt$	$^{197}_{78}Pt$	$^{196}_{79}Au$	$^{198}_{79}Au$	$^{199}_{79}Au$	$^{197}_{80}Hg$	$^{197m}_{80}Hg$
$^{203}_{80}Hg$	$^{200}_{81}Tl$	$^{201}_{81}Tl$	$^{202}_{81}Tl$	$^{203}_{82}Pb$	$^{206}_{83}Bi$	$^{212}_{83}Bi$	$^{220}_{86}Rn$
$^{222}_{86}Rn$	$^{226}_{90}Th$	$^{231}_{90}Th$	$^{234}_{90}Th$	$^{233}_{91}Pa$	$^{231}_{92}U$	$^{237}_{92}U$	$^{240}_{92}U$
$^{240}_{92}U$ +	$^{240}_{93}Np$	$^{239}_{93}Np$	$^{234}_{94}Pu$	$^{237}_{94}Pu$	$^{245}_{94}Pu$	$^{238}_{95}Am$	$^{240}_{95}Am$
$^{244m}_{95}Am$	$^{244}_{95}Am$	$^{238}_{96}Cm$	$^{250}_{97}Bk$	$^{244}_{98}Cf$	$^{254}_{100}Fm$		

(d) Low radiotoxicity (group 4):

$^{3}_{1}H$	$^{15}_{8}O$	$^{37}_{18}Ar$	$^{51}_{25}Mn$	$^{52m}_{25}Mn$	$^{53}_{25}Mn$	$^{56}_{25}Mn$	$^{58m}_{27}Co$
$^{60m}_{27}Co$	$^{61}_{27}Co$	$^{62m}_{27}Co$	$^{59}_{28}Ni$	$^{69}_{30}Zn$	$^{71}_{32}Ge$	$^{76}_{36}Kr$	$^{79}_{36}Kr$
$^{81}_{36}Kr$	$^{83m}_{36}Kr$	$^{85m}_{36}Kr$	$^{85}_{36}Kr$	$^{80}_{38}Sr$	$^{81}_{38}Sr$	$^{85m}_{38}Sr$	$^{87m}_{38}Sr$
$^{91m}_{39}Y$	$^{88}_{41}Nb$	$^{89(66m)}_{41}Nb$		$^{89(122m)}_{41}Nb$		$^{97}_{41}Nb$	$^{98}_{41}Nb$
$^{93m}_{42}Mo$	$^{101}_{42}Mo$	$^{96m}_{43}Tc$	$^{99m}_{43}Tc$	$^{103m}_{45}Rh$	$^{113m}_{49}In$	$^{116}_{52}Te$	$^{123}_{52}Te$
$^{127}_{52}Te$	$^{129}_{52}Te$	$^{133}_{52}Te$	$^{120m}_{53}I$	$^{121}_{53}I$	$^{128}_{53}I$	$^{129}_{53}I$	$^{134}_{53}I$
$^{131m}_{54}Xe$	$^{133}_{54}Xe$	$^{125}_{55}Cs$	$^{127}_{55}Cs$	$^{129}_{55}Cs$	$^{130}_{55}Cs$	$^{131}_{55}Cs$	$^{134m}_{55}Cs$
$^{135}_{55}Cs$	$^{135m}_{55}Cs$	$^{138}_{55}Cs$	$^{137}_{58}Ce$	$^{191m}_{76}Os$	$^{193m}_{78}Pt$	$^{197m}_{78}Pt$	$^{203}_{84}Po$
$^{205}_{84}Po$	$^{207}_{84}Po$	$^{227}_{88}Ra$	$^{235}_{92}U$	$^{238}_{92}U$	$^{239}_{92}U$	$_{92}U$ nat (*)	
$^{235}_{94}Pu$	$^{243}_{94}Pu$	$^{237}_{95}Am$	$^{239}_{95}Am$	$^{245}_{95}Am$	$^{246m}_{95}Am$	$^{246}_{95}Am$	$^{249}_{96}Cm$

3. In the case of the nuclides ^{115}In, ^{144}Nd, ^{87}Rb, ^{187}Re and ^{147}Sm the requirement for reporting and obtaining prior authorization may be waived, irrespective of the quantities used.

4. In the case of a mixture of radionuclides other than Th-nat and U-nat belonging to different radiotoxicity groups, the requirements for reporting and obtaining prior authorization may be waived only if the sum of the ratios between the activity of each of the radionuclides and the limit laid down in paragraph 1 for the group to which it belongs is less than or equal to 1.

5. For radioluminescent paint, the requirements for reporting and obtaining prior authorization need not be applied if the overall activity in radioactive substances does not exceed $2 \cdot 10^9$ Bq of tritium ($5{\cdot}4 \cdot 10^{-2}$ Ci), $1 \cdot 10^8$ Bq of ^{147}Pm ($2{\cdot}7 \cdot 10^{-3}$ Ci) or $5 \cdot 10^5$ Bq of ^{226}Ra ($1{\cdot}4 \cdot 10^{-5}$ Ci) and where this paint is kept or used for the manufacture or repair of the instruments and timepieces referred to in Artikel 4 (c).

6. Radionuclides not included in this Annex shall, where necessary, be assigned to a toxicity group by the competent authority.

7. In the case of gas mantles impregnated with thorium, the requirements for reporting and obtaining prior authorization need not be applied except in respect of their manufacture.

(*) One becquerel of natural uranium corresponds to 1 alpha disintegration per second (0·489 dps of U^{-238}, 0·489 dps of U^{-234} and 0·022 dps of U^{-235}).
One curie of natural uranium corresponds to $3{\cdot}7 \cdot 10^{10}$ alpha disintegrations per second ($1{\cdot}81 \cdot 10^{10}$ dps of U^{-238}, $1{\cdot}81 \cdot 10^{10}$ dps of U^{-234} and $8{\cdot}31 \cdot 10^{8}$ dps of U^{-235}).

Alphabetical list of the elements

	Atomic Number	Name
Ac	89	Actinium
Ag	47	Silver
Al	13	Aluminium
Am	95	Americium
Ar	18	Argon
As	33	Arsenic
At	85	Astatine
Au	79	Gold
B	5	Boron
Ba	56	Barium
Be	4	Beryllium
Bi	83	Bismuth
Bk	97	Berkelium
Br	35	Bromine
C	6	Carbon
Ca	20	Calcium
Cd	48	Cadmium
Ce	58	Cerium
Cf	98	Californium
Cl	17	Chlorine
Cm	96	Curium
Co	27	Cobalt
Cr	24	Chromium
Cs	55	Caesium/Cesium
Cu	29	Copper
Dy	66	Dysprosium
Er	68	Erbium
Es	99	Einsteinium
Eu	63	Europium
F	9	Fluorine
Fe	26	Iron
Fm	100	Fermium
Fr	87	Francium
Ga	31	Gallium
Gd	64	Gadolinium
Ge	32	Germanium
H	1	Hydrogen
He	2	Helium
Hf	72	Hafnium
Hg	80	Mercury
Ho	67	Holmium
I	53	Iodine
In	49	Indium
Ir	77	Iridium
K	19	Potassium
Kr	36	Krypton
La	57	Lanthanum
Li	3	Lithium
Lu	71	Lutecium
Md	101	Mendelevium
Mg	12	Magnesium
Mn	25	Manganese
Mo	42	Molybdenum
N	7	Nitrogen
Na	11	Sodium
Nb	41	Niobium
Nd	60	Neodymium
Ne	10	Neon
Ni	28	Nickel
No	102	Nobelium
Np	93	Neptunium
O	8	Oxygen
Os	76	Osmium
P	15	Phosphorus
Pa	91	Protactinium
Pb	82	Lead
Pd	46	Palladium
Pm	61	Promethium
Po	84	Polonium
Pr	59	Praseodymium
Pt	78	Platinum
Pu	94	Plutonium
Ra	88	Radium
Rb	37	Rubidium
Re	75	Rhenium
Rh	45	Rhodium
Rn	86	Radon
Ru	44	Ruthenium
S	16	Sulphur
Sb	51	Antimony
Sc	21	Scandium
Se	34	Selenium
Si	14	Silicon
Sm	62	Samarium
Sn	50	Tin
Sr	38	Strontium
Ta	73	Tantalum
Tb	65	Terbium
Tc	43	Technetium
Te	52	Tellurium
Th	90	Thorium
Ti	22	Titanium
Tl	81	Thallium
Tm	69	Thulium
U	92	Uranium
V	23	Vanadium
W	74	Tungsten
Xe	54	Xenon
Y	39	Yttrium
Yb	70	Ytterbium
Zn	30	Zinc
Zr	40	Zirconium

ANNEX II

A. Relationship between the quality factor Q and linear energy transfer L_∞

L_∞ in water (ke V/μm)	Q (1)
3·5 and less	1
7	2
23	5
53	10
175 and above	20

(1) Intermediate values are to be obtained from the curve in Figure 1.

B. Values of effective quality factor $\overline{Q}$

Values of effective quality factor $\overline{Q}$ depend on the conditions of exposure, as well as on the type and energy of the incident radiation. For uniform exposure of the whole body by external radiation, the following values are to be applied. The same values will usually be adequate for other exposure conditions. If other values are needed, they are to be calculated from the values of Q given in A and from the curves in Figure 2.

Radiation	$\overline{Q}$
X-rays, γ rays, β rays, electrons and positrons	1
Neutrons of unknown energy	10

C. Conversion factors (neutron fluence rate, $cm^{-2}\ s^{-1}$, corresponding to a dose equivalent rate of 1 μSv h^{-1} and 1 mrem h^{-1}) and effective quality factor $\overline{Q}$ as functions of neutron energy (1). (The factors may also be used to relate neutron fluence rate and dose equivalent index rate).

Neutron energy MeV	Conversion factor (2) (3)		Effective quality factor $\overline{Q}$ (2) (3)
	($cm^{-2}\ s^{-1}$) per (μSv h^{-1})	($cm^{-2}\ s^{-1}$) per (mrem h^{-1})	
$2{\cdot}5 \cdot 10^{-8}$ (thermal)	26	260	2·3
$1 \cdot 10^{-7}$	24	240	2
$1 \cdot 10^{-6}$	22	220	2
$1 \cdot 10^{-5}$	23	230	2
$1 \cdot 10^{-4}$	24	240	2
$1 \cdot 10^{-3}$	27	270	2
$1 \cdot 10^{-2}$	28	280	2
$2 \cdot 10^{-2}$	17	170	3·3
$5 \cdot 10^{-2}$	8·5	85	5·7
$1 \cdot 10^{-1}$	4·8	48	7·4
$5 \cdot 10^{-1}$	1·4	14	11
1	0·85	8·5	10·6
2	0·70	7·0	9·3
5	0·68	6·8	7·8
10	0·68	6·8	6·8
20	0·65	6·5	6·0
50	0·61	6·1	5·0
$1 \cdot 10^{2}$	0·56	5·6	4·4
$2 \cdot 10^{2}$	0·51	5·1	3·8
$5 \cdot 10^{2}$	0·36	3·6	3·2
$1 \cdot 10^{3}$	0·22	2·2	2·8
$2 \cdot 10^{3}$	0·16	1·6	2·6
$3 \cdot 10^{3}$	0·14	1·4	2·5

(1) For unidirectional broad beams of monoenergetic neutrons at normal incidence.
(2) At the point where the dose equivalent rate is maximum.
(3) Intermediate values are to be obtained from the curves in Figures 3 and 4.

D. Conversion factors (proton fluence rate, $cm^{-2}\ s^{-1}$) corresponding to a dose equivalent rate of 1 μSv h^{-1} and 1 mrem h^{-1}) and effective quality factor $\overline{Q}$ as functions of proton energy (1). (The factors may also be used to relate proton fluence rate and dose equivalent index rate).

Proton energy MeV	Conversion factor (2) (3)		Effective quality factor $\overline{Q}$ (2)
	($cm^{-2}\ s^{-1}$) per (μSv h^{-1})	($cm^{-2}\ s^{-1}$) per (mrem h^{-1})	
2 to 60	0·040	0·40	1·4
$1 \cdot 10^2$	0·041	0·41	1·4
$1{\cdot}5 \cdot 10^2$	0·042	0·42	1·4
$2 \cdot 10^2$	0·043	0·43	1·4
$2{\cdot}5 \cdot 10^2$	0·21	2·1	1·4
$3 \cdot 10^2$	0·24	2·4	1·5
$4 \cdot 10^2$	0·25	2·5	1·6
$6 \cdot 10^2$	0·24	2·4	1·7
$8 \cdot 10^2$	0·22	2·2	1·8
$1 \cdot 10^3$	0·20	2·0	1·9
$1{\cdot}5 \cdot 10^3$	0·16	1·6	2·0
$2 \cdot 10^3$	0·14	1·4	2·1
$3 \cdot 10^3$	0·11	1·1	2·2

(1) For unidirectional broad beams of monoenergetic protons at normal incidence.
(2) At the point where the dose equivalent rate is maximum.
(3) Intermediate values are to be obtained from the curve in Figure 5.

E. The method of evaluating the effective dose.

The effective dose is equal to

$$\sum_T \omega_T H_T$$

Where H_T is the average dose equivalent in the organ or tissue T

ω_T is the weighting factor for the organ or tissue T.

The values of the weighting factors are shown below:

gonads	0·25
breast	0·15
red bone marrow	0·12
lung	0·12
thyroid	0·03
bone (surfaces)	0·03
remainder (1)	0·30.

F. The dose limits laid down in Articles 8, 9 and 12 may be deemed to be complied with if the deep dose equivalent index does not exceed the dose limit laid down for whole body exposure and if the shallow dose equivalent index does not exceed the dose limit laid down for the skin.

G. In the case of combinations of external and internal irradiation, the limits laid down in Articles 8, 9 and 12 may be deemed to be complied with if both the following conditions are satisfied:

(1) In assessing the contribution from this remainder, the average dose is to be evaluated for each of the five most highly exposed organs or tissues of the remainder (excluding the lens of the eye, the skin, and the hands, forearms, feet and ankles). A weighting factor of 0·06 is to be used for each of these organs or tissues. The exposure of all other organs can then be neglected.

(a) $$\frac{H_{I,d}}{H_L} + \sum_j \frac{I_j}{I_{j,L}} \leq 1$$

where

$H_{I,d}$ is the annual deep dose equivalent index,

H_L is the annual dose limit for the whole body,

I_j is the annual intake of the radionuclide j, and

$I_{j,L}$ is the limit of annual intake of that radionuclide;

(b) the dose limits laid down in Articles 9 (b) and 12 (3) (b), as appropriate, are complied with.

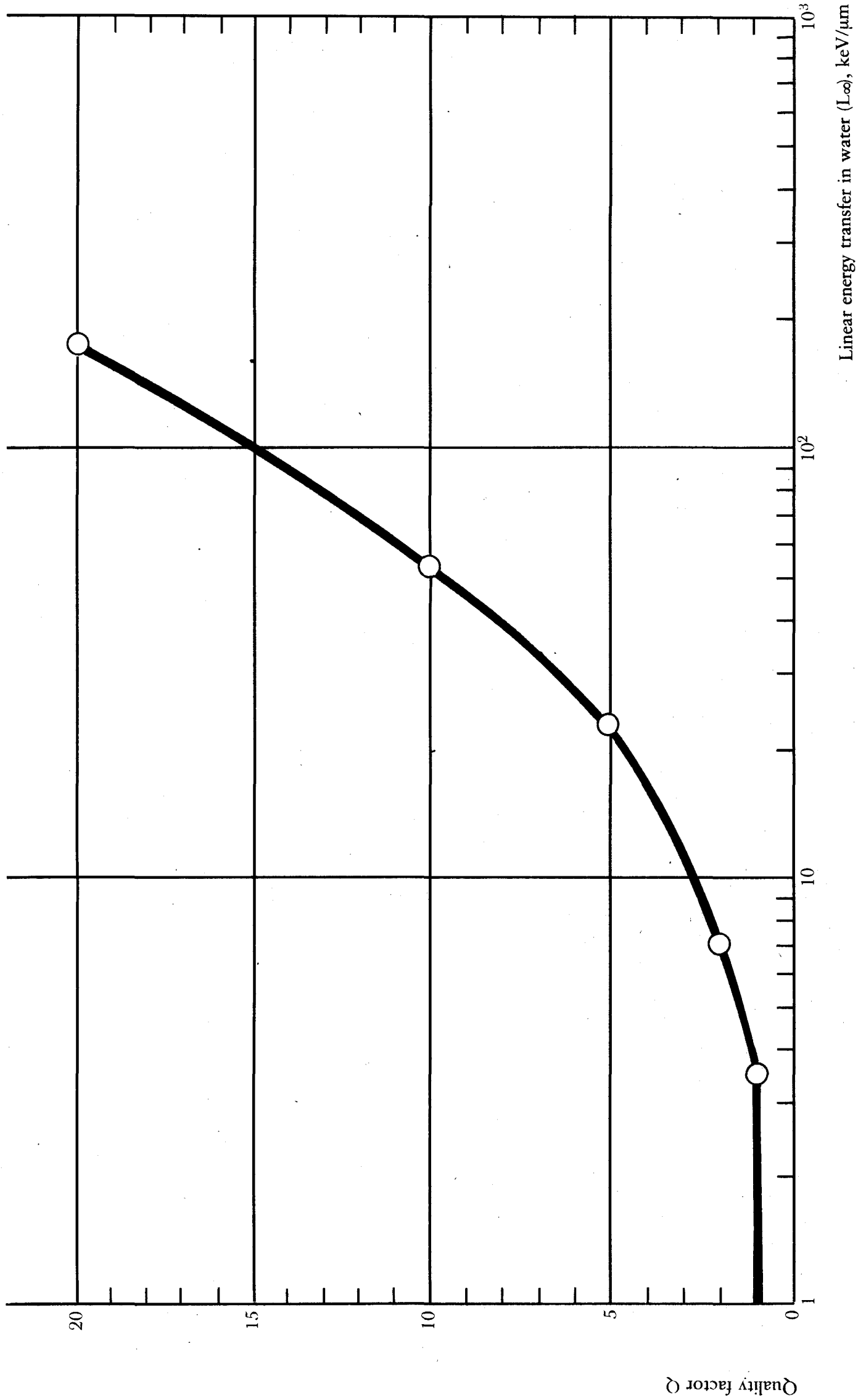


Figure 1

Quality factor as function of linear energy transfer in water (L_∞)

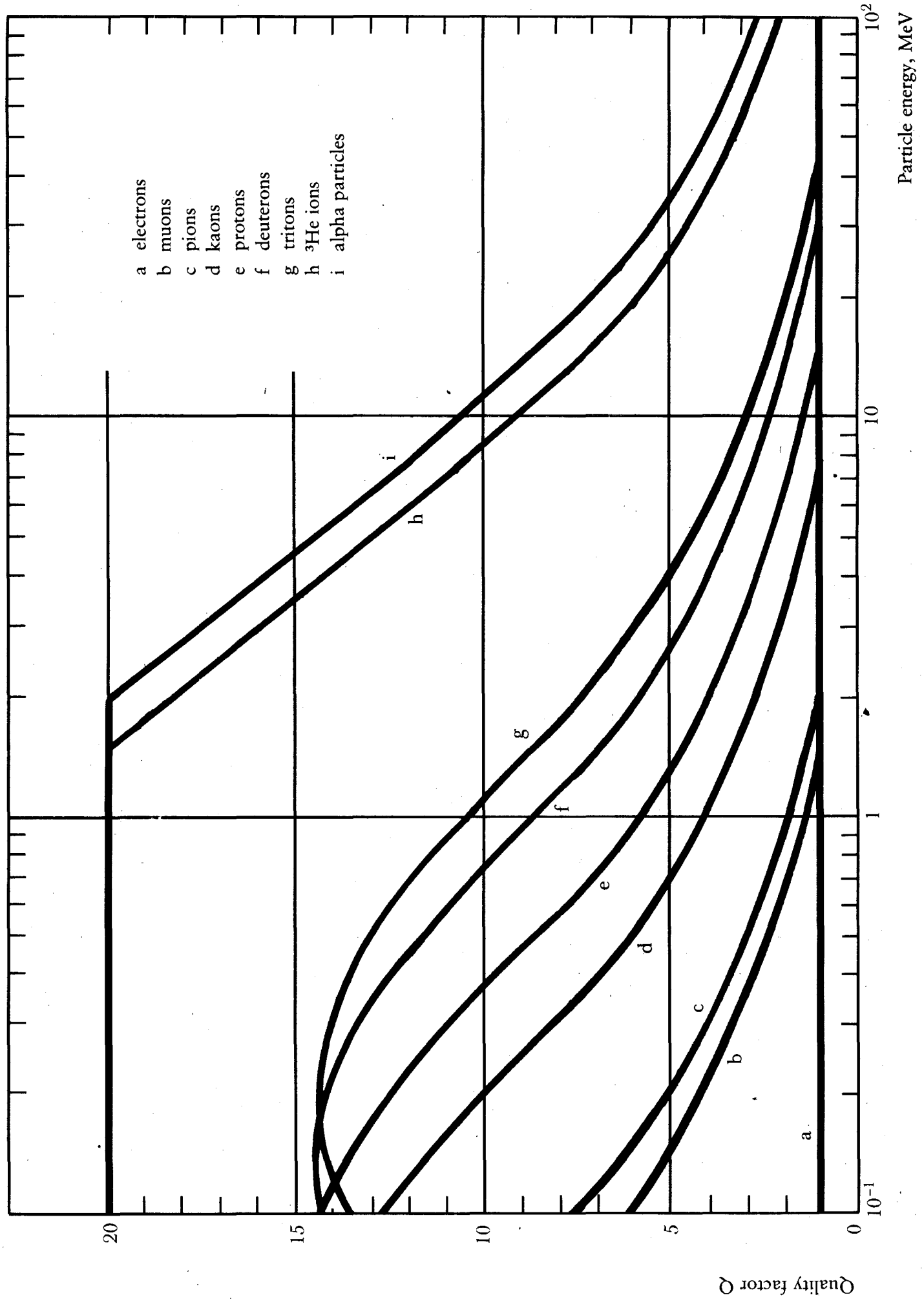


Figure 2

Quality factors of charged particles as a function of energy in the case of external exposure

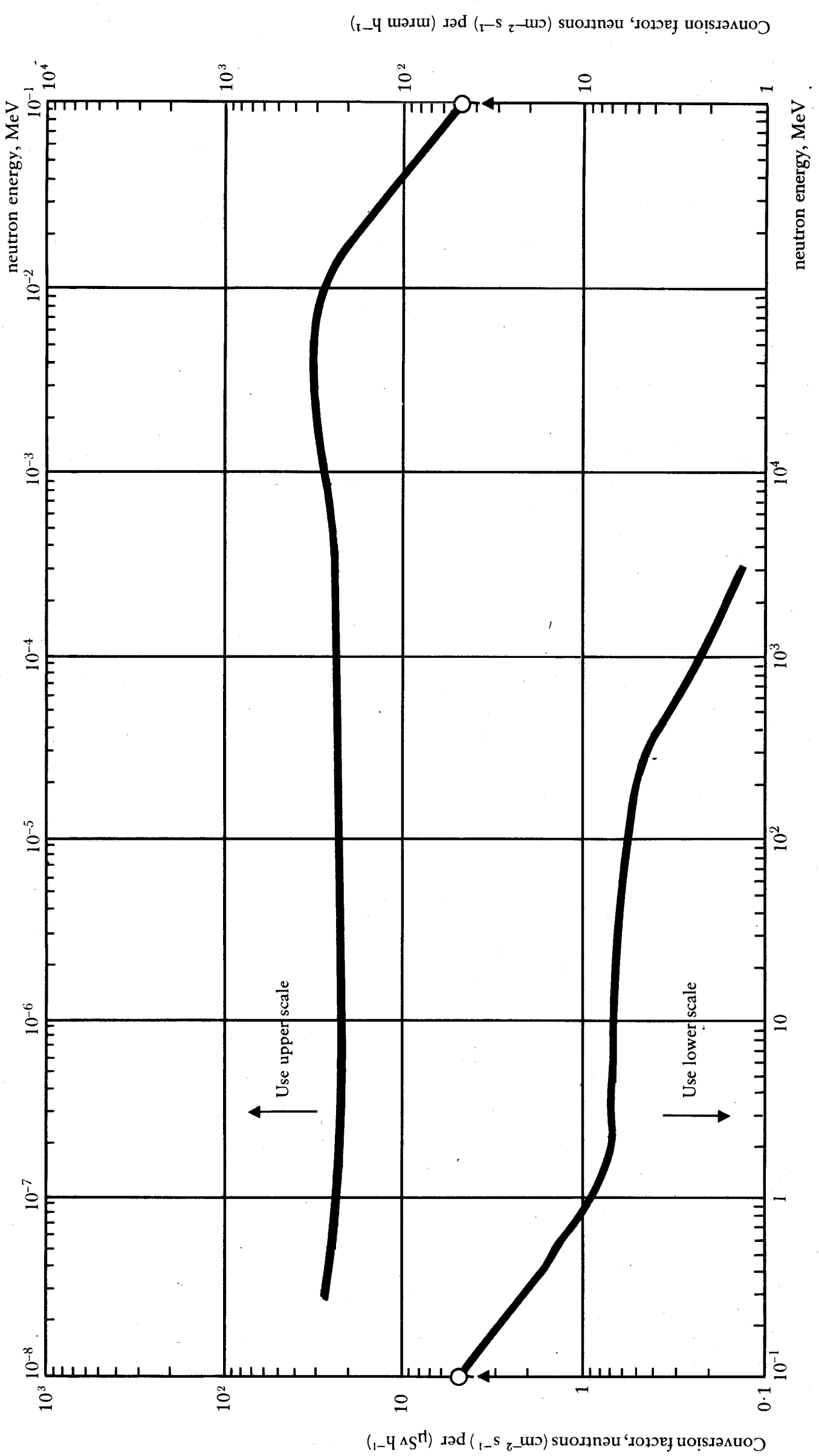


Figure 3

Factors for converting neutron fluence rate to dose equivalent rate

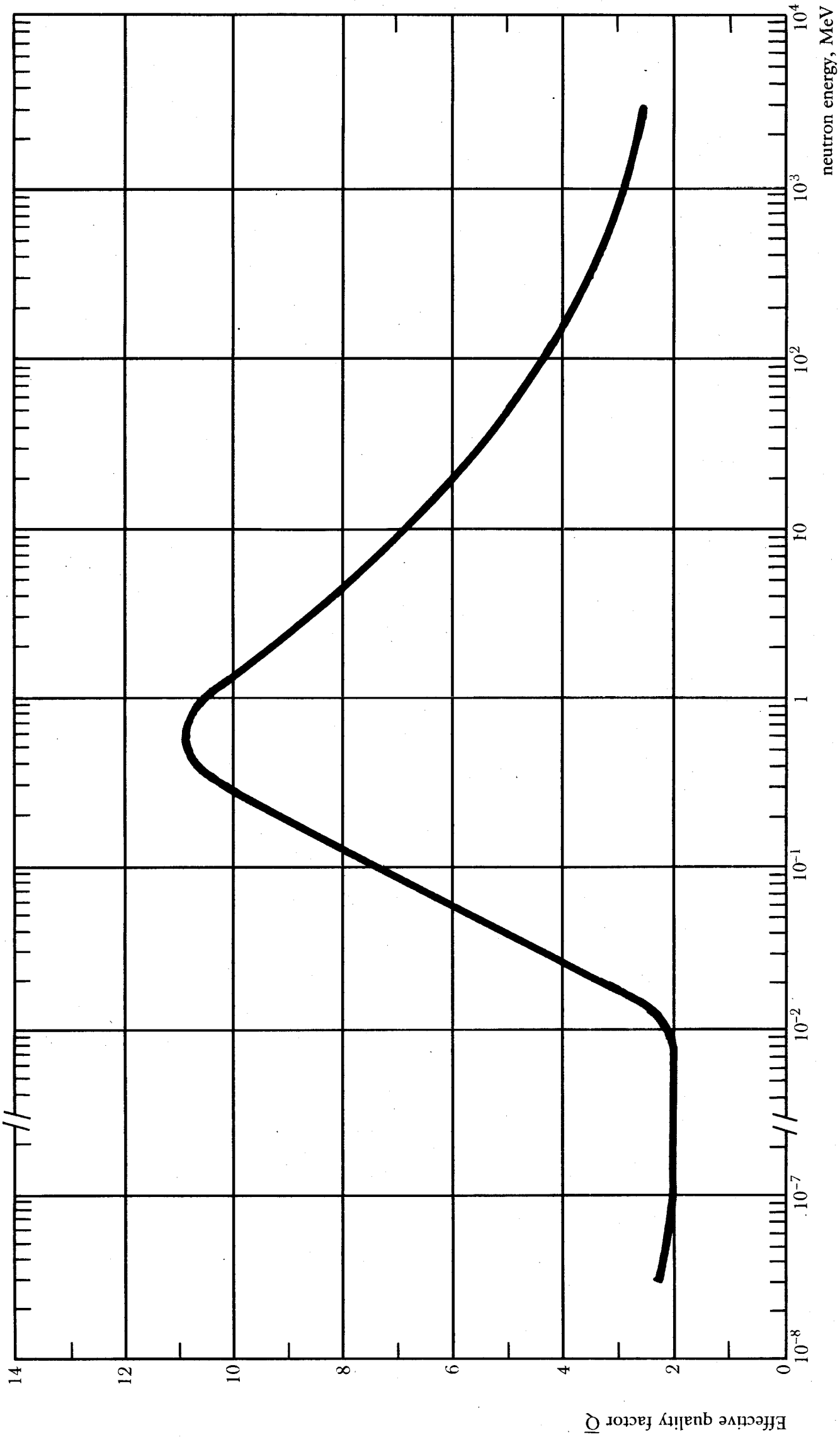


Figure 4

Effective quality factors for neutrons

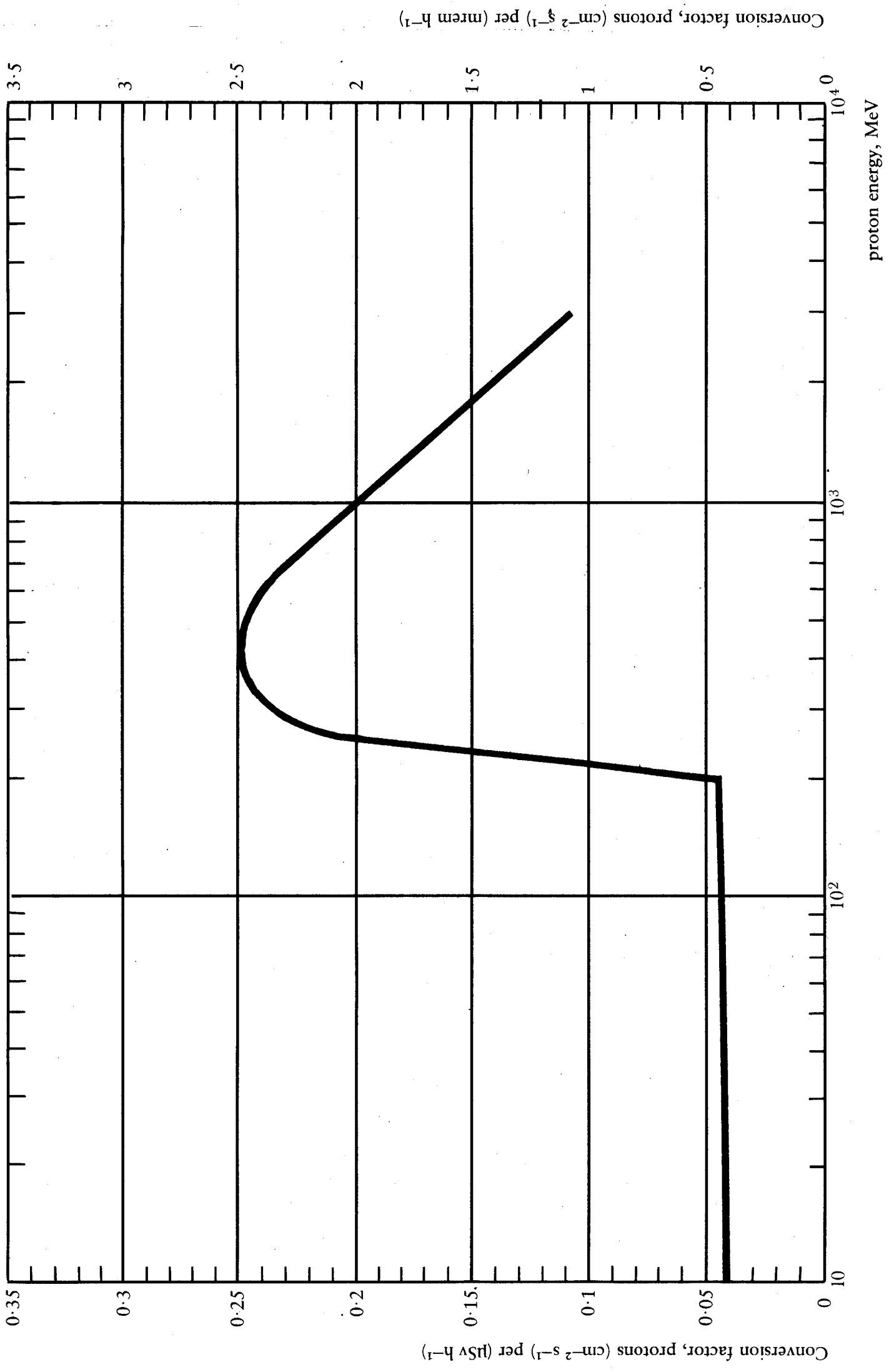


Figure 5

Factors for converting proton fluence rate to dose equivalent rate

ANNEX III

1. Limits of annual intake by inhalation, and derived limits of concentration of radionuclides in the air inhaled for exposed workers, and limits of annual intake by inhalation and ingestion for members of the public

The values in Tables 1a and 1b correspond to the annual dose limits laid down in Articles 8, 9 and 12 for exposed workers and members of the public.

The values in Table 2 are those laid down in Directive 76/579/Euratom of June 1976. They do not correspond exactly to the annual dose limits laid down in Articles 8, 9 and 12, but as an interim measure compliance with these values shall be deemed to ensure compliance with the annual dose limits laid down in Articles 8, 9 and 12.

The values in Tables 1 and 2 relate to adults. In the case of children account must be taken of anatomical and physiological characteristics which may require corrections to these values.

2. Mixture of radionuclides

(a) If the composition of the mixture is not known but the presence of certain radionuclides can be positively excluded, use shall be made of the lowest limit laid down for the radionuclides that may be present;

(b) if the exact composition of the mixture is not known, but the radionuclides in it have been identified, use shall be made of the lowest limit laid down for the radionuclides present;

(c) if the concentration and toxicity of one radionuclide in the mixture predominate, the limits of annual intakes to be used are those given for the radionuclide concerned in paragraph 1;

(d) when dealing with a radionuclide mixture of known composition, one of the following conditions shall be met:

$$\sum_j \frac{I_j}{I_{j,L}} \leq 1$$

or

$$\sum_j \frac{C_j}{C_{j,L}} \leq 1$$

where I_j is the annual intake of radionuclide j and $I_{j,L}$ is the limit of annual intake of that radionuclide, C_j is the annual average concentration in air of radionuclide j and $C_{j,L}$ is the derived limit of concentration of that radionuclide in air.

TABLE 1a

(Activities expressed in Becquerel)

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation	Derived limit of the concentration in air for an exposure of 2 000 h/year	Limit of annual intake by inhalation	Limit of annual intake by ingestion (**)
		Bq	Bq m^{-3}	Bq	Bq
1	2	3	4	5	6
$^{3}_{1}H$	Water	$3 \cdot 10^{9}$	$8 \cdot 10^{5}$	$3 \cdot 10^{8}$	$3 \cdot 10^{8}$
$^{3}_{1}H$	Element		$2 \cdot 10^{10}$		
$^{32}_{15}P$	D	$3 \cdot 10^{7}$	$1 \cdot 10^{4}$	$3 \cdot 10^{6}$	
	W	$1 \cdot 10^{7}$	$6 \cdot 10^{3}$	$1 \cdot 10^{6}$	$2 \cdot 10^{6}$
$^{33}_{15}P$	D	$3 \cdot 10^{8}$	$1 \cdot 10^{5}$	$3 \cdot 10^{7}$	
	W	$1 \cdot 10^{8}$	$4 \cdot 10^{4}$	$1 \cdot 10^{7}$	$2 \cdot 10^{7}$
$^{51}_{25}Mn$	D	$2 \cdot 10^{9}$	$8 \cdot 10^{5}$	$2 \cdot 10^{8}$	
	W	$2 \cdot 10^{9}$	$9 \cdot 10^{5}$	$2 \cdot 10^{8}$	$7 \cdot 10^{7}$
$^{52}_{25}Mn$	D	$4 \cdot 10^{7}$	$2 \cdot 10^{4}$	$4 \cdot 10^{6}$	
	W	$3 \cdot 10^{7}$	$1 \cdot 10^{4}$	$3 \cdot 10^{6}$	$3 \cdot 10^{6}$
$^{52m}_{25}Mn$	D	$3 \cdot 10^{9}$	$1 \cdot 10^{6}$	$3 \cdot 10^{8}$	
	W	$4 \cdot 10^{9}$	$2 \cdot 10^{6}$	$4 \cdot 10^{8}$	$1 \cdot 10^{8}$
$^{53}_{25}Mn$	D	$5 \cdot 10^{8}$	$2 \cdot 10^{5}$	$5 \cdot 10^{7}$	
	W	$4 \cdot 10^{8}$	$2 \cdot 10^{5}$	$4 \cdot 10^{7}$	$2 \cdot 10^{8}$
$^{54}_{25}Mn$	D	$3 \cdot 10^{7}$	$1 \cdot 10^{4}$	$3 \cdot 10^{6}$	
	W	$3 \cdot 10^{7}$	$1 \cdot 10^{4}$	$3 \cdot 10^{6}$	$7 \cdot 10^{6}$
$^{56}_{25}Mn$	D	$6 \cdot 10^{8}$	$2 \cdot 10^{5}$	$6 \cdot 10^{7}$	
	W	$8 \cdot 10^{8}$	$3 \cdot 10^{5}$	$8 \cdot 10^{7}$	$2 \cdot 10^{7}$

(*) (**) (***) See footnotes at the end of this table.

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{55}_{27}Co$	W	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	
	Y	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	
					(a) $4 \cdot 10^6$
					(b) $6 \cdot 10^6$
$^{56}_{27}Co$	W	$1 \cdot 10^7$	$5 \cdot 10^3$	$1 \cdot 10^6$	
	Y	$7 \cdot 10^6$	$3 \cdot 10^3$	$7 \cdot 10^5$	
					$2 \cdot 10^6$
$^{57}_{27}Co$	W	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	
	Y	$2 \cdot 10^7$	$1 \cdot 10^4$	$2 \cdot 10^6$	
					(a) $3 \cdot 10^7$
					(b) $2 \cdot 10^7$
$^{58}_{27}Co$	W	$4 \cdot 10^7$	$2 \cdot 10^4$	$4 \cdot 10^6$	
	Y	$3 \cdot 10^7$	$1 \cdot 10^4$	$3 \cdot 10^6$	
					(a) $6 \cdot 10^6$
					(b) $5 \cdot 10^6$
$^{58m}_{27}Co$	W	$3 \cdot 10^9$	$1 \cdot 10^6$	$3 \cdot 10^8$	
	Y	$2 \cdot 10^9$	$1 \cdot 10^6$	$2 \cdot 10^8$	
					$2 \cdot 10^8$
$^{60}_{27}Co$	W	$6 \cdot 10^6$	$3 \cdot 10^3$	$6 \cdot 10^5$	
	Y	$1 \cdot 10^6$	$5 \cdot 10^2$	$1 \cdot 10^5$	
					(a) $2 \cdot 10^6$
					(b) $7 \cdot 10^5$
$^{60m}_{27}Co$	W	$1 \cdot 10^{11}$	$6 \cdot 10^7$	$1 \cdot 10^{10}$	
	Y	$1 \cdot 10^{11}$	$4 \cdot 10^7$	$1 \cdot 10^{10}$	
					$4 \cdot 10^9$
$^{61}_{27}Co$	W	$2 \cdot 10^9$	$1 \cdot 10^6$	$2 \cdot 10^8$	
	Y	$2 \cdot 10^9$	$9 \cdot 10^5$	$2 \cdot 10^8$	
					(a) $7 \cdot 10^7$
					(b) $8 \cdot 10^7$
$^{62m}_{27}Co$	W	$6 \cdot 10^9$	$3 \cdot 10^6$	$6 \cdot 10^8$	
	Y	$6 \cdot 10^9$	$2 \cdot 10^6$	$6 \cdot 10^8$	
$^{74}_{36}Kr$			$1 \cdot 10^5$		$1 \cdot 10^8$
$^{76}_{36}Kr$			$3 \cdot 10^5$		

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{77}_{36}Kr$			$1 \cdot 10^5$		
$^{79}_{36}Kr$			$6 \cdot 10^5$		
$^{81}_{36}Kr$			$2 \cdot 10^7$		
$^{83m}_{36}Kr$			$9 \cdot 10^8$		
$^{85m}_{36}Kr$			$8 \cdot 10^5$		
$^{85}_{36}Kr$			$5 \cdot 10^6$		
$^{87}_{36}Kr$			$2 \cdot 10^5$		
$^{88}_{36}Kr$			$7 \cdot 10^4$		
$^{80}_{38}Sr$	D Y	$8 \cdot 10^{10}$ $9 \cdot 10^{10}$	$3 \cdot 10^7$ $4 \cdot 10^7$	$8 \cdot 10^9$ $9 \cdot 10^9$	$4 \cdot 10^9$
$^{81}_{38}Sr$	D Y	$3 \cdot 10^9$ $3 \cdot 10^9$	$1 \cdot 10^6$ $1 \cdot 10^6$	$3 \cdot 10^8$ $3 \cdot 10^8$	$9 \cdot 10^7$
$^{83}_{38}Sr$	D Y	$3 \cdot 10^8$ $1 \cdot 10^8$	$1 \cdot 10^5$ $5 \cdot 10^4$	$3 \cdot 10^7$ $1 \cdot 10^7$	(a) $1 \cdot 10^7$ (b) $8 \cdot 10^6$
$^{85m}_{38}Sr$	D Y	$2 \cdot 10^{10}$ $3 \cdot 10^{10}$	$9 \cdot 10^6$ $1 \cdot 10^7$	$2 \cdot 10^9$ $3 \cdot 10^9$	$8 \cdot 10^8$
$^{85}_{38}Sr$	D Y	$1 \cdot 10^8$ $6 \cdot 10^7$	$4 \cdot 10^4$ $2 \cdot 10^4$	$1 \cdot 10^7$ $6 \cdot 10^6$	(a) $9 \cdot 10^6$ (b) $1 \cdot 10^7$
$^{87m}_{38}Sr$	D Y	$5 \cdot 10^9$ $6 \cdot 10^9$	$2 \cdot 10^6$ $2 \cdot 10^6$	$5 \cdot 10^8$ $6 \cdot 10^8$	(a) $2 \cdot 10^8$ (b) $1 \cdot 10^8$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{89}_{38}Sr$	D	$3 \cdot 10^7$	$1 \cdot 10^4$	$3 \cdot 10^6$	
	Y	$5 \cdot 10^6$	$2 \cdot 10^3$	$5 \cdot 10^5$	
					$2 \cdot 10^6$
$^{90}_{38}Sr$	D	$7 \cdot 10^5$	$3 \cdot 10^2$	$7 \cdot 10^4$	
	Y	$1 \cdot 10^5$	$6 \cdot 10^1$	$1 \cdot 10^4$	
					(a) $1 \cdot 10^5$
					(b) $2 \cdot 10^6$
$^{91}_{38}Sr$	D	$2 \cdot 10^8$	$9 \cdot 10^4$	$2 \cdot 10^7$	
	Y	$1 \cdot 10^8$	$5 \cdot 10^4$	$1 \cdot 10^7$	
					(a) $8 \cdot 10^6$
					(b) $6 \cdot 10^6$
$^{92}_{38}Sr$	D	$3 \cdot 10^8$	$1 \cdot 10^5$	$3 \cdot 10^7$	
	Y	$2 \cdot 10^8$	$1 \cdot 10^5$	$2 \cdot 10^7$	
					$1 \cdot 10^7$
$^{86}_{40}Zr$	D	$1 \cdot 10^8$	$6 \cdot 10^4$	$1 \cdot 10^7$	
	W	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	
	Y	$9 \cdot 10^7$	$4 \cdot 10^4$	$9 \cdot 10^6$	
					$5 \cdot 10^6$
$^{88}_{40}Zr$	D	$8 \cdot 10^6$	$3 \cdot 10^3$	$8 \cdot 10^5$	
	W	$2 \cdot 10^7$	$7 \cdot 10^3$	$2 \cdot 10^6$	
	Y	$1 \cdot 10^7$	$5 \cdot 10^3$	$1 \cdot 10^6$	
					$1 \cdot 10^7$
$^{89}_{40}Zr$	D	$1 \cdot 10^8$	$5 \cdot 10^4$	$1 \cdot 10^7$	
	W	$9 \cdot 10^7$	$4 \cdot 10^4$	$9 \cdot 10^6$	
	Y	$9 \cdot 10^7$	$4 \cdot 10^4$	$9 \cdot 10^6$	
					$6 \cdot 10^6$
$^{93}_{40}Zr$	D	$2 \cdot 10^5$	$1 \cdot 10^2$	$2 \cdot 10^4$	
	W	$9 \cdot 10^5$	$4 \cdot 10^2$	$9 \cdot 10^4$	
	Y	$2 \cdot 10^6$	$9 \cdot 10^2$	$2 \cdot 10^5$	
					$5 \cdot 10^6$
$^{95}_{40}Zr$	D	$5 \cdot 10^6$	$2 \cdot 10^3$	$5 \cdot 10^5$	
	W	$1 \cdot 10^7$	$6 \cdot 10^3$	$1 \cdot 10^6$	
	Y	$1 \cdot 10^7$	$4 \cdot 10^3$	$1 \cdot 10^6$	
					$5 \cdot 10^6$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{97}_{40}Zr$	D	$7 \cdot 10^7$	$3 \cdot 10^4$	$7 \cdot 10^6$	
	W	$5 \cdot 10^7$	$2 \cdot 10^4$	$5 \cdot 10^6$	
	Y	$5 \cdot 10^7$	$2 \cdot 10^4$	$5 \cdot 10^6$	$2 \cdot 10^6$
$^{88}_{41}Nb$	W	$8 \cdot 10^9$	$4 \cdot 10^6$	$8 \cdot 10^8$	
	Y	$8 \cdot 10^9$	$3 \cdot 10^6$	$8 \cdot 10^8$	$2 \cdot 10^8$
$^{89}_{41}Nb$ (66 min)	W	$2 \cdot 10^9$	$6 \cdot 10^5$	$2 \cdot 10^8$	
	Y	$1 \cdot 10^9$	$6 \cdot 10^5$	$1 \cdot 10^8$	$4 \cdot 10^7$
$^{89}_{41}Nb$ (122 min)	W	$7 \cdot 10^8$	$3 \cdot 10^5$	$7 \cdot 10^7$	
	Y	$6 \cdot 10^8$	$2 \cdot 10^5$	$6 \cdot 10^7$	$2 \cdot 10^7$
$^{90}_{41}Nb$	W	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	
	Y	$9 \cdot 10^7$	$4 \cdot 10^4$	$9 \cdot 10^6$	$4 \cdot 10^6$
$^{93m}_{41}Nb$	W	$5 \cdot 10^7$	$2 \cdot 10^4$	$5 \cdot 10^6$	
	Y	$6 \cdot 10^6$	$3 \cdot 10^3$	$6 \cdot 10^5$	$3 \cdot 10^7$
$^{94}_{41}Nb$	W	$7 \cdot 10^6$	$3 \cdot 10^3$	$7 \cdot 10^5$	
	Y	$6 \cdot 10^5$	$2 \cdot 10^2$	$6 \cdot 10^4$	$4 \cdot 10^6$
$^{95}_{41}Nb$	W	$5 \cdot 10^7$	$2 \cdot 10^4$	$5 \cdot 10^6$	
	Y	$4 \cdot 10^7$	$2 \cdot 10^4$	$4 \cdot 10^6$	$8 \cdot 10^6$
$^{95m}_{41}Nb$	W	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	
	Y	$8 \cdot 10^7$	$3 \cdot 10^4$	$8 \cdot 10^6$	$8 \cdot 10^6$
$^{96}_{41}Nb$	W	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	
	Y	$9 \cdot 10^7$	$4 \cdot 10^4$	$9 \cdot 10^6$	$4 \cdot 10^6$
$^{97}_{41}Nb$	W	$3 \cdot 10^9$	$1 \cdot 10^6$	$3 \cdot 10^8$	
	Y	$3 \cdot 10^9$	$1 \cdot 10^6$	$3 \cdot 10^8$	$8 \cdot 10^7$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{98}_{41}Nb$	W	$2 \cdot 10^9$	$8 \cdot 10^5$	$2 \cdot 10^8$	
	Y	$2 \cdot 10^9$	$8 \cdot 10^5$	$2 \cdot 10^8$	$5 \cdot 10^7$
$^{90}_{42}Mo$	D	$3 \cdot 10^8$	$1 \cdot 10^5$	$3 \cdot 10^7$	
	Y	$2 \cdot 10^8$	$7 \cdot 10^4$	$2 \cdot 10^7$	(a) $2 \cdot 10^7$ (b) $7 \cdot 10^6$
$^{93}_{42}Mo$	D	$2 \cdot 10^8$	$8 \cdot 10^4$	$2 \cdot 10^7$	
	Y	$7 \cdot 10^6$	$3 \cdot 10^3$	$7 \cdot 10^5$	(a) $1 \cdot 10^7$ (b) $9 \cdot 10^7$
$^{93m}_{42}Mo$	D	$7 \cdot 10^8$	$3 \cdot 10^5$	$7 \cdot 10^7$	
	Y	$5 \cdot 10^8$	$2 \cdot 10^5$	$5 \cdot 10^7$	(a) $4 \cdot 10^7$ (b) $2 \cdot 10^7$
$^{99}_{42}Mo$	D	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	
	Y	$5 \cdot 10^7$	$2 \cdot 10^4$	$5 \cdot 10^6$	(a) $6 \cdot 10^6$ (b) $4 \cdot 10^6$
$^{101}_{42}Mo$	D	$5 \cdot 10^9$	$2 \cdot 10^6$	$5 \cdot 10^8$	
	Y	$6 \cdot 10^9$	$2 \cdot 10^6$	$6 \cdot 10^8$	$2 \cdot 10^8$
$^{116}_{52}Te$	D	$8 \cdot 10^8$	$3 \cdot 10^5$	$8 \cdot 10^7$	
	W	$1 \cdot 10^9$	$5 \cdot 10^5$	$1 \cdot 10^8$	$3 \cdot 10^7$
$^{121}_{52}Te$	D	$2 \cdot 10^8$	$6 \cdot 10^4$	$2 \cdot 10^7$	
	W	$1 \cdot 10^8$	$5 \cdot 10^4$	$1 \cdot 10^7$	$1 \cdot 10^7$
$^{121m}_{52}Te$	D	$7 \cdot 10^6$	$3 \cdot 10^3$	$7 \cdot 10^5$	
	W	$2 \cdot 10^7$	$6 \cdot 10^3$	$2 \cdot 10^6$	$2 \cdot 10^6$
$^{123}_{52}Te$	D	$7 \cdot 10^6$	$3 \cdot 10^3$	$7 \cdot 10^5$	
	W	$2 \cdot 10^7$	$7 \cdot 10^3$	$2 \cdot 10^6$	$2 \cdot 10^6$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{123m}_{52}Te$	D	$8 \cdot 10^6$	$3 \cdot 10^3$	$8 \cdot 10^5$	
	W	$2 \cdot 10^7$	$8 \cdot 10^3$	$2 \cdot 10^6$	$2 \cdot 10^6$
$^{125m}_{52}Te$	D	$2 \cdot 10^7$	$6 \cdot 10^3$	$2 \cdot 10^6$	
	W	$3 \cdot 10^7$	$1 \cdot 10^4$	$3 \cdot 10^6$	$4 \cdot 10^6$
$^{127}_{52}Te$	D	$8 \cdot 10^8$	$3 \cdot 10^5$	$8 \cdot 10^7$	
	W	$6 \cdot 10^8$	$3 \cdot 10^5$	$6 \cdot 10^7$	$3 \cdot 10^7$
$^{127m}_{52}Te$	D	$1 \cdot 10^7$	$4 \cdot 10^3$	$1 \cdot 10^6$	
	W	$9 \cdot 10^6$	$4 \cdot 10^3$	$9 \cdot 10^5$	$2 \cdot 10^6$
$^{129}_{52}Te$	D	$2 \cdot 10^9$	$1 \cdot 10^6$	$2 \cdot 10^8$	
	W	$3 \cdot 10^9$	$1 \cdot 10^6$	$3 \cdot 10^8$	$1 \cdot 10^8$
$^{129m}_{52}Te$	D	$2 \cdot 10^7$	$1 \cdot 10^4$	$2 \cdot 10^6$	
	W	$9 \cdot 10^6$	$4 \cdot 10^3$	$9 \cdot 10^5$	$2 \cdot 10^6$
$^{131}_{52}Te$	D	$2 \cdot 10^8$	$8 \cdot 10^4$	$2 \cdot 10^7$	
	W	$3 \cdot 10^8$	$1 \cdot 10^5$	$3 \cdot 10^7$	$2 \cdot 10^7$
$^{131m}_{52}Te$	D	$2 \cdot 10^7$	$1 \cdot 10^4$	$2 \cdot 10^6$	
	W	$3 \cdot 10^7$	$1 \cdot 10^4$	$3 \cdot 10^6$	$2 \cdot 10^6$
$^{132}_{52}Te$	D	$8 \cdot 10^6$	$4 \cdot 10^3$	$8 \cdot 10^5$	
	W	$7 \cdot 10^6$	$3 \cdot 10^3$	$7 \cdot 10^5$	$2 \cdot 10^5$
$^{133}_{52}Te$	D	$7 \cdot 10^8$	$3 \cdot 10^5$	$7 \cdot 10^7$	
	W	$1 \cdot 10^9$	$5 \cdot 10^5$	$1 \cdot 10^8$	$5 \cdot 10^7$
$^{133m}_{52}Te$	D	$1 \cdot 10^8$	$6 \cdot 10^4$	$1 \cdot 10^7$	
	W	$2 \cdot 10^8$	$1 \cdot 10^5$	$2 \cdot 10^7$	$1 \cdot 10^7$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{134}_{52}Te$	D	$1 \cdot 10^8$	$5 \cdot 10^4$	$1 \cdot 10^7$	
	W	$3 \cdot 10^8$	$1 \cdot 10^5$	$3 \cdot 10^7$	$2 \cdot 10^7$
$^{120}_{53}I$	D	$3 \cdot 10^8$	$1 \cdot 10^5$	$3 \cdot 10^7$	$1 \cdot 10^7$
$^{120m}_{53}I$	D	$8 \cdot 10^8$	$3 \cdot 10^5$	$8 \cdot 10^7$	$4 \cdot 10^7$
$^{121}_{53}I$	D	$7 \cdot 10^8$	$3 \cdot 10^5$	$7 \cdot 10^7$	$4 \cdot 10^7$
$^{123}_{53}I$	D	$2 \cdot 10^8$	$9 \cdot 10^4$	$2 \cdot 10^7$	$1 \cdot 10^7$
$^{124}_{53}I$	D	$3 \cdot 10^6$	$1 \cdot 10^3$	$3 \cdot 10^5$	$2 \cdot 10^5$
$^{125}_{53}I$	D	$2 \cdot 10^6$	$1 \cdot 10^3$	$2 \cdot 10^5$	$1 \cdot 10^5$
$^{126}_{53}I$	D	$1 \cdot 10^6$	$5 \cdot 10^2$	$1 \cdot 10^5$	$8 \cdot 10^4$
$^{128}_{53}I$	D	$4 \cdot 10^9$	$2 \cdot 10^6$	$4 \cdot 10^8$	$2 \cdot 10^8$
$^{129}_{53}I$	D	$3 \cdot 10^5$	$1 \cdot 10^2$	$3 \cdot 10^4$	$2 \cdot 10^4$
$^{130}_{53}I$	D	$3 \cdot 10^7$	$1 \cdot 10^4$	$3 \cdot 10^6$	$1 \cdot 10^6$
$^{131}_{53}I$	D	$2 \cdot 10^6$	$7 \cdot 10^2$	$2 \cdot 10^5$	$1 \cdot 10^5$
$^{132}_{53}I$	D	$3 \cdot 10^8$	$1 \cdot 10^5$	$3 \cdot 10^7$	$1 \cdot 10^7$
$^{132m}_{53}I$	D	$3 \cdot 10^8$	$1 \cdot 10^5$	$3 \cdot 10^7$	$1 \cdot 10^7$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{133}_{53}I$	D	$1 \cdot 10^7$	$4 \cdot 10^3$	$1 \cdot 10^6$	$5 \cdot 10^5$
$^{134}_{53}I$	D	$2 \cdot 10^9$	$7 \cdot 10^5$	$2 \cdot 10^8$	$8 \cdot 10^7$
$^{135}_{53}I$	D	$6 \cdot 10^7$	$2 \cdot 10^4$	$6 \cdot 10^6$	$3 \cdot 10^6$
$^{125}_{55}Cs$	D	$5 \cdot 10^9$	$2 \cdot 10^6$	$5 \cdot 10^8$	$2 \cdot 10^8$
$^{127}_{55}Cs$	D	$4 \cdot 10^9$	$1 \cdot 10^6$	$4 \cdot 10^8$	$2 \cdot 10^8$
$^{129}_{55}Cs$	D	$1 \cdot 10^9$	$5 \cdot 10^5$	$1 \cdot 10^8$	$9 \cdot 10^7$
$^{130}_{55}Cs$	D	$7 \cdot 10^9$	$3 \cdot 10^6$	$7 \cdot 10^8$	$2 \cdot 10^8$
$^{131}_{55}Cs$	D	$1 \cdot 10^9$	$5 \cdot 10^5$	$1 \cdot 10^8$	$8 \cdot 10^7$
$^{132}_{55}Cs$	D	$1 \cdot 10^8$	$6 \cdot 10^4$	$1 \cdot 10^7$	$1 \cdot 10^7$
$^{134}_{55}Cs$	D	$4 \cdot 10^6$	$2 \cdot 10^3$	$4 \cdot 10^5$	$3 \cdot 10^5$
$^{134m}_{55}Cs$	D	$5 \cdot 10^9$	$2 \cdot 10^6$	$5 \cdot 10^8$	$4 \cdot 10^8$
$^{135}_{55}Cs$	D	$4 \cdot 10^7$	$2 \cdot 10^4$	$4 \cdot 10^6$	$3 \cdot 10^6$
$^{135m}_{55}Cs$	D	$7 \cdot 10^9$	$3 \cdot 10^6$	$7 \cdot 10^8$	$4 \cdot 10^8$
$^{136}_{55}Cs$	D	$2 \cdot 10^7$	$1 \cdot 10^4$	$2 \cdot 10^6$	$2 \cdot 10^6$
$^{137}_{55}Cs$	D	$6 \cdot 10^6$	$2 \cdot 10^3$	$6 \cdot 10^5$	$4 \cdot 10^5$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{138}_{55}Cs$	D	$2 \cdot 10^9$	$9 \cdot 10^5$	$2 \cdot 10^8$	$7 \cdot 10^7$
$^{134}_{58}Ce$	W	$3 \cdot 10^7$	$1 \cdot 10^4$	$3 \cdot 10^6$	
	Y	$2 \cdot 10^7$	$1 \cdot 10^4$	$2 \cdot 10^6$	$2 \cdot 10^6$
$^{135}_{58}Ce$	W	$1 \cdot 10^8$	$6 \cdot 10^4$	$1 \cdot 10^7$	
	Y	$1 \cdot 10^8$	$5 \cdot 10^4$	$1 \cdot 10^7$	$6 \cdot 10^6$
$^{137}_{58}Ce$	W	$5 \cdot 10^9$	$2 \cdot 10^6$	$5 \cdot 10^8$	
	Y	$5 \cdot 10^9$	$2 \cdot 10^6$	$5 \cdot 10^8$	$2 \cdot 10^8$
$^{137m}_{58}Ce$	W	$2 \cdot 10^8$	$7 \cdot 10^4$	$2 \cdot 10^7$	
	Y	$1 \cdot 10^8$	$6 \cdot 10^4$	$1 \cdot 10^7$	$9 \cdot 10^6$
$^{139}_{58}Ce$	W	$3 \cdot 10^7$	$1 \cdot 10^4$	$3 \cdot 10^6$	
	Y	$2 \cdot 10^7$	$1 \cdot 10^4$	$2 \cdot 10^6$	$2 \cdot 10^7$
$^{141}_{58}Ce$	W	$3 \cdot 10^7$	$1 \cdot 10^4$	$3 \cdot 10^6$	
	Y	$2 \cdot 10^7$	$9 \cdot 10^3$	$2 \cdot 10^6$	$6 \cdot 10^6$
$^{143}_{58}Ce$	W	$7 \cdot 10^7$	$3 \cdot 10^4$	$7 \cdot 10^6$	
	Y	$6 \cdot 10^7$	$2 \cdot 10^4$	$5 \cdot 10^6$	$4 \cdot 10^6$
$^{144}_{58}Ce$	W	$9 \cdot 10^5$	$4 \cdot 10^2$	$9 \cdot 10^4$	
	Y	$5 \cdot 10^5$	$2 \cdot 10^2$	$5 \cdot 10^4$	$8 \cdot 10^5$
$^{203}_{84}Po$	D	$2 \cdot 10^9$	$1 \cdot 10^6$	$2 \cdot 10^8$	
	W	$3 \cdot 10^9$	$1 \cdot 10^6$	$3 \cdot 10^8$	$9 \cdot 10^7$
$^{205}_{84}Po$	D	$1 \cdot 10^9$	$6 \cdot 10^5$	$1 \cdot 10^8$	
	W	$3 \cdot 10^9$	$1 \cdot 10^6$	$3 \cdot 10^8$	$8 \cdot 10^7$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{207}_{84}Po$	D	$9 \cdot 10^8$	$4 \cdot 10^5$	$9 \cdot 10^7$	
	W	$1 \cdot 10^9$	$4 \cdot 10^5$	$1 \cdot 10^8$	$3 \cdot 10^7$
$^{210}_{84}Po$	D	$2 \cdot 10^4$	$1 \cdot 10^1$	$2 \cdot 10^3$	
	W	$2 \cdot 10^4$	$1 \cdot 10^1$	$2 \cdot 10^3$	$1 \cdot 10^4$
$^{223}_{88}Ra$	W	$3 \cdot 10^4$	$1 \cdot 10^1$	$3 \cdot 10^3$	$2 \cdot 10^4$
$^{224}_{88}Ra$	W	$6 \cdot 10^4$	$3 \cdot 10^1$	$6 \cdot 10^3$	$3 \cdot 10^4$
$^{225}_{88}Ra$	W	$2 \cdot 10^4$	$1 \cdot 10^1$	$2 \cdot 10^3$	$3 \cdot 10^4$
$^{226}_{88}Ra$	W	$2 \cdot 10^4$	$1 \cdot 10^1$	$2 \cdot 10^3$	$7 \cdot 10^3$
$^{227}_{88}Ra$	W	$5 \cdot 10^8$	$2 \cdot 10^5$	$5 \cdot 10^7$	$6 \cdot 10^7$
$^{228}_{88}Ra$	W	$4 \cdot 10^4$	$2 \cdot 10^1$	$4 \cdot 10^3$	$9 \cdot 10^3$
$^{226}_{90}Th$	W	$6 \cdot 10^6$	$2 \cdot 10^3$	$6 \cdot 10^5$	
	Y	$5 \cdot 10^6$	$2 \cdot 10^3$	$5 \cdot 10^5$	$2 \cdot 10^7$
$^{227}_{90}Th$	W	$1 \cdot 10^4$	$5 \cdot 10^0$	$1 \cdot 10^3$	
	Y	$1 \cdot 10^4$	$5 \cdot 10^0$	$1 \cdot 10^3$	$5 \cdot 10^5$
$^{228}_{90}Th$	W	$4 \cdot 10^2$	$2 \cdot 10^{-1}$	$4 \cdot 10^1$	
	Y	$6 \cdot 10^2$	$3 \cdot 10^{-1}$	$6 \cdot 10^1$	$2 \cdot 10^4$
$^{229}_{90}Th$	W	$3 \cdot 10^1$	$1 \cdot 10^{-2}$	$3 \cdot 10^0$	
	Y	$9 \cdot 10^1$	$4 \cdot 10^{-2}$	$9 \cdot 10^0$	$2 \cdot 10^3$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{230}_{90}Th$	W	$2 \cdot 10^{2}$	$1 \cdot 10^{-1}$	$2 \cdot 10^{1}$	
	Y	$6 \cdot 10^{2}$	$2 \cdot 10^{-1}$	$6 \cdot 10^{1}$	$1 \cdot 10^{4}$
$^{231}_{90}Th$	W	$2 \cdot 10^{8}$	$1 \cdot 10^{5}$	$2 \cdot 10^{7}$	
	Y	$2 \cdot 10^{8}$	$1 \cdot 10^{5}$	$2 \cdot 10^{7}$	$1 \cdot 10^{7}$
$^{232}_{90}Th$	W	$4 \cdot 10^{1}$	$2 \cdot 10^{-2}$	$4 \cdot 10^{0}$	
	Y	$1 \cdot 10^{2}$	$4 \cdot 10^{-2}$	$1 \cdot 10^{1}$	$3 \cdot 10^{3}$
$^{234}_{90}Th$	W	$7 \cdot 10^{6}$	$3 \cdot 10^{3}$	$7 \cdot 10^{5}$	
	Y	$6 \cdot 10^{6}$	$2 \cdot 10^{3}$	$6 \cdot 10^{5}$	$1 \cdot 10^{6}$
$_{90}Th$-nat	W	$7 \cdot 10^{1}$	$4 \cdot 10^{-2}$	$7 \cdot 10^{0}$	
	Y	$2 \cdot 10^{2}$	$7 \cdot 10^{-2}$	$2 \cdot 10^{1}$	$5 \cdot 10^{3}$
$^{230}_{92}U$ (***)	D	$2 \cdot 10^{4}$	$6 \cdot 10^{0}$	$2 \cdot 10^{3}$	
	W	$1 \cdot 10^{4}$	$5 \cdot 10^{0}$	$1 \cdot 10^{3}$	
	Y	$1 \cdot 10^{4}$	$4 \cdot 10^{0}$	$1 \cdot 10^{3}$	(a) $1 \cdot 10^{4}$ (b) $2 \cdot 10^{5}$
$^{231}_{92}U$ (***)	D	$3 \cdot 10^{8}$	$1 \cdot 10^{5}$	$3 \cdot 10^{7}$	
	W	$2 \cdot 10^{8}$	$9 \cdot 10^{4}$	$2 \cdot 10^{7}$	
	Y	$2 \cdot 10^{8}$	$7 \cdot 10^{4}$	$2 \cdot 10^{7}$	$2 \cdot 10^{7}$
$^{232}_{92}U$ (***)	D	$8 \cdot 10^{3}$	$3 \cdot 10^{0}$	$8 \cdot 10^{2}$	
	W	$1 \cdot 10^{4}$	$6 \cdot 10^{0}$	$1 \cdot 10^{3}$	
	Y	$3 \cdot 10^{2}$	$1 \cdot 10^{-1}$	$3 \cdot 10^{1}$	(a) $8 \cdot 10^{3}$ (b) $2 \cdot 10^{5}$
$^{233}_{92}U$ (***)	D	$4 \cdot 10^{4}$	$2 \cdot 10^{1}$	$4 \cdot 10^{3}$	
	W	$3 \cdot 10^{4}$	$1 \cdot 10^{1}$	$3 \cdot 10^{3}$	
	Y	$1 \cdot 10^{3}$	$6 \cdot 10^{-1}$	$1 \cdot 10^{2}$	(a) $4 \cdot 10^{4}$ (b) $7 \cdot 10^{5}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{234}_{92}U$ (***)	D	$5 \cdot 10^4$	$2 \cdot 10^1$	$5 \cdot 10^3$	
	W	$3 \cdot 10^4$	$1 \cdot 10^1$	$3 \cdot 10^3$	
	Y	$1 \cdot 10^3$	$6 \cdot 10^{-1}$	$1 \cdot 10^2$	
					(a) $4 \cdot 10^4$ (b) $7 \cdot 10^5$
$^{235}_{92}U$ (***)	D	$5 \cdot 10^4$	$2 \cdot 10^1$	$5 \cdot 10^3$	
	W	$3 \cdot 10^4$	$1 \cdot 10^1$	$3 \cdot 10^3$	
	Y	$2 \cdot 10^3$	$6 \cdot 10^{-1}$	$2 \cdot 10^2$	
					(a) $5 \cdot 10^4$ (b) $7 \cdot 10^5$
$^{236}_{92}U$ (***)	D	$5 \cdot 10^4$	$2 \cdot 10^1$	$5 \cdot 10^3$	
	W	$3 \cdot 10^4$	$1 \cdot 10^1$	$3 \cdot 10^3$	
	Y	$1 \cdot 10^3$	$6 \cdot 10^{-1}$	$1 \cdot 10^2$	
					(a) $5 \cdot 10^4$ (b) $8 \cdot 10^5$
$^{237}_{92}U$ (***)	D	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	
	W	$6 \cdot 10^7$	$3 \cdot 10^4$	$6 \cdot 10^6$	
	Y	$6 \cdot 10^7$	$2 \cdot 10^4$	$6 \cdot 10^6$	
					$6 \cdot 10^6$
$^{238}_{92}U$ (***)	D	$5 \cdot 10^4$	$2 \cdot 10^1$	$5 \cdot 10^3$	
	W	$3 \cdot 10^4$	$1 \cdot 10^1$	$3 \cdot 10^3$	
	Y	$2 \cdot 10^3$	$7 \cdot 10^{-1}$	$2 \cdot 10^2$	
					(a) $5 \cdot 10^4$ (b) $8 \cdot 10^5$
$^{239}_{92}U$ (***)	D	$7 \cdot 10^9$	$3 \cdot 10^6$	$7 \cdot 10^8$	
	W	$6 \cdot 10^9$	$3 \cdot 10^6$	$6 \cdot 10^8$	
	Y	$6 \cdot 10^9$	$2 \cdot 10^6$	$6 \cdot 10^8$	
					$2 \cdot 10^8$
$^{240}_{92}U$ (***)	D	$1 \cdot 10^8$	$6 \cdot 10^4$	$1 \cdot 10^7$	
	W	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	
	Y	$9 \cdot 10^7$	$4 \cdot 10^4$	$9 \cdot 10^6$	
					$5 \cdot 10^6$
$_{92}U$-nat (***)	D	$5 \cdot 10^4$	$2 \cdot 10^1$	$5 \cdot 10^3$	
	W	$3 \cdot 10^4$	$1 \cdot 10^1$	$3 \cdot 10^3$	
	Y	$1 \cdot 10^3$	$6 \cdot 10^{-1}$	$1 \cdot 10^2$	
					(a) $5 \cdot 10^4$ (b) $7 \cdot 10^5$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{234}_{94}Pu$	W	$8 \cdot 10^6$	$3 \cdot 10^3$	$8 \cdot 10^5$	
	Y	$7 \cdot 10^6$	$3 \cdot 10^3$	$7 \cdot 10^5$	$3 \cdot 10^7$
$^{235}_{94}Pu$	W	$1 \cdot 10^{11}$	$5 \cdot 10^7$	$1 \cdot 10^{10}$	
	Y	$9 \cdot 10^{10}$	$4 \cdot 10^7$	$9 \cdot 10^9$	$3 \cdot 10^9$
$^{236}_{94}Pu$	W	$7 \cdot 10^2$	$3 \cdot 10^{-1}$	$7 \cdot 10^1$	
	Y	$1 \cdot 10^3$	$6 \cdot 10^{-1}$	$1 \cdot 10^2$	(a) $8 \cdot 10^4$ (b) $6 \cdot 10^5$
$^{237}_{94}Pu$	W	$1 \cdot 10^8$	$5 \cdot 10^4$	$1 \cdot 10^7$	
	Y	$1 \cdot 10^8$	$5 \cdot 10^4$	$1 \cdot 10^7$	$5 \cdot 10^7$
$^{238}_{94}Pu$	W	$2 \cdot 10^2$	$9 \cdot 10^{-2}$	$2 \cdot 10^1$	
	Y	$6 \cdot 10^2$	$3 \cdot 10^{-1}$	$6 \cdot 10^1$	(a) $3 \cdot 10^4$ (b) $3 \cdot 10^5$
$^{239}_{94}Pu$	W	$2 \cdot 10^2$	$8 \cdot 10^{-2}$	$2 \cdot 10^1$	
	Y	$5 \cdot 10^2$	$2 \cdot 10^{-1}$	$5 \cdot 10^1$	(a) $2 \cdot 10^4$ (b) $2 \cdot 10^5$
$^{240}_{94}Pu$	W	$2 \cdot 10^2$	$8 \cdot 10^{-2}$	$2 \cdot 10^1$	
	Y	$5 \cdot 10^2$	$2 \cdot 10^{-1}$	$5 \cdot 10^1$	(a) $2 \cdot 10^4$ (b) $2 \cdot 10^5$
$^{241}_{94}Pu$	W	$1 \cdot 10^4$	$4 \cdot 10^0$	$1 \cdot 10^3$	
	Y	$2 \cdot 10^4$	$1 \cdot 10^1$	$2 \cdot 10^3$	(a) $1 \cdot 10^6$ (b) $1 \cdot 10^7$
$^{242}_{94}Pu$	W	$2 \cdot 10^2$	$9 \cdot 10^{-2}$	$2 \cdot 10^1$	
	Y	$6 \cdot 10^2$	$2 \cdot 10^{-1}$	$6 \cdot 10^1$	(a) $3 \cdot 10^4$ (b) $3 \cdot 10^5$
$^{243}_{94}Pu$	W	$1 \cdot 10^9$	$5 \cdot 10^5$	$1 \cdot 10^8$	
	Y	$1 \cdot 10^9$	$6 \cdot 10^5$	$1 \cdot 10^8$	$6 \cdot 10^7$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{244}_{94}Pu$	W Y	$2 \cdot 10^2$ $6 \cdot 10^2$	$9 \cdot 10^{-2}$ $2 \cdot 10^{-1}$	$2 \cdot 10^1$ $6 \cdot 10^1$	(a) $3 \cdot 10^4$ (b) $3 \cdot 10^5$
$^{245}_{94}Pu$	W Y	$2 \cdot 10^8$ $2 \cdot 10^8$	$7 \cdot 10^4$ $6 \cdot 10^4$	$2 \cdot 10^7$ $2 \cdot 10^7$	$8 \cdot 10^6$
$^{237}_{95}Am$	W	$1 \cdot 10^{10}$	$4 \cdot 10^6$	$1 \cdot 10^9$	$3 \cdot 10^8$
$^{238}_{95}Am$	W	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	$1 \cdot 10^8$
$^{239}_{95}Am$	W	$5 \cdot 10^8$	$2 \cdot 10^5$	$5 \cdot 10^7$	$2 \cdot 10^7$
$^{240}_{95}Am$	W	$1 \cdot 10^8$	$4 \cdot 10^4$	$1 \cdot 10^7$	$8 \cdot 10^6$
$^{241}_{95}Am$	W	$2 \cdot 10^2$	$8 \cdot 10^{-2}$	$2 \cdot 10^1$	$5 \cdot 10^3$
$^{242m}_{95}Am$	W	$2 \cdot 10^2$	$8 \cdot 10^{-2}$	$2 \cdot 10^1$	$5 \cdot 10^3$
$^{242}_{95}Am$	W	$3 \cdot 10^6$	$1 \cdot 10^3$	$3 \cdot 10^5$	$2 \cdot 10^7$
$^{243}_{95}Am$	W	$2 \cdot 10^2$	$8 \cdot 10^{-2}$	$2 \cdot 10^1$	$5 \cdot 10^3$
$^{244m}_{95}Am$	W	$1 \cdot 10^8$	$6 \cdot 10^4$	$1 \cdot 10^7$	$2 \cdot 10^8$
$^{244}_{95}Am$	W	$6 \cdot 10^6$	$3 \cdot 10^3$	$6 \cdot 10^5$	$1 \cdot 10^7$
$^{245}_{95}Am$	W	$3 \cdot 10^9$	$1 \cdot 10^6$	$3 \cdot 10^8$	$1 \cdot 10^8$
$^{246m}_{95}Am$	W	$6 \cdot 10^9$	$3 \cdot 10^6$	$6 \cdot 10^8$	$2 \cdot 10^8$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{246}_{95}Am$	W	$4 \cdot 10^9$	$2 \cdot 10^6$	$4 \cdot 10^8$	$1 \cdot 10^8$
$^{238}_{96}Cm$	W	$4 \cdot 10^7$	$2 \cdot 10^4$	$4 \cdot 10^6$	$6 \cdot 10^7$
$^{240}_{96}Cm$	W	$2 \cdot 10^4$	$8 \cdot 10^0$	$2 \cdot 10^3$	$4 \cdot 10^5$
$^{241}_{96}Cm$	W	$9 \cdot 10^5$	$4 \cdot 10^2$	$9 \cdot 10^4$	$5 \cdot 10^6$
$^{242}_{96}Cm$	W	$1 \cdot 10^4$	$4 \cdot 10^0$	$1 \cdot 10^3$	$2 \cdot 10^5$
$^{243}_{96}Cm$	W	$3 \cdot 10^2$	$1 \cdot 10^{-1}$	$3 \cdot 10^1$	$7 \cdot 10^3$
$^{244}_{96}Cm$	W	$4 \cdot 10^2$	$2 \cdot 10^{-1}$	$4 \cdot 10^1$	$9 \cdot 10^3$
$^{245}_{96}Cm$	W	$2 \cdot 10^2$	$8 \cdot 10^{-2}$	$2 \cdot 10^1$	$5 \cdot 10^3$
$^{246}_{96}Cm$	W	$2 \cdot 10^2$	$8 \cdot 10^{-2}$	$2 \cdot 10^1$	$5 \cdot 10^3$
$^{247}_{96}Cm$	W	$2 \cdot 10^2$	$9 \cdot 10^{-2}$	$2 \cdot 10^1$	$5 \cdot 10^3$
$^{248}_{96}Cm$	W	$5 \cdot 10^1$	$2 \cdot 10^{-2}$	$5 \cdot 10^0$	$1 \cdot 10^3$
$^{249}_{96}Cm$	W	$5 \cdot 10^8$	$2 \cdot 10^5$	$5 \cdot 10^7$	$2 \cdot 10^8$
$^{244}_{98}Cf$	W Y	$2 \cdot 10^7$ $2 \cdot 10^7$	$9 \cdot 10^3$ $9 \cdot 10^3$	$2 \cdot 10^6$ $2 \cdot 10^6$	$9 \cdot 10^7$
$^{246}_{98}Cf$	W Y	$4 \cdot 10^5$ $3 \cdot 10^5$	$2 \cdot 10^2$ $1 \cdot 10^2$	$4 \cdot 10^4$ $3 \cdot 10^4$	$1 \cdot 10^6$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Bq	Derived limit of the concentration in air for an exposure of 2 000 h/year Bq m^{-3}	Limit of annual intake by inhalation Bq	Limit of annual intake by ingestion (**) Bq
1	2	3	4	5	6
$^{248}_{98}Cf$	W	$3 \cdot 10^3$	$1 \cdot 10^0$	$3 \cdot 10^2$	
	Y	$4 \cdot 10^3$	$2 \cdot 10^0$	$4 \cdot 10^2$	
					$8 \cdot 10^4$
$^{249}_{98}Cf$	W	$2 \cdot 10^2$	$8 \cdot 10^{-2}$	$2 \cdot 10^1$	
	Y	$5 \cdot 10^2$	$2 \cdot 10^{-1}$	$5 \cdot 10^1$	
					$4 \cdot 10^3$
$^{250}_{98}Cf$	W	$5 \cdot 10^2$	$2 \cdot 10^{-1}$	$5 \cdot 10^1$	
	Y	$1 \cdot 10^3$	$4 \cdot 10^{-1}$	$1 \cdot 10^2$	
					$1 \cdot 10^4$
$^{251}_{98}Cf$	W	$2 \cdot 10^2$	$8 \cdot 10^{-2}$	$2 \cdot 10^1$	
	Y	$5 \cdot 10^2$	$2 \cdot 10^{-1}$	$5 \cdot 10^1$	
					$4 \cdot 10^3$
$^{252}_{98}Cf$	W	$1 \cdot 10^3$	$4 \cdot 10^{-1}$	$1 \cdot 10^2$	
	Y	$1 \cdot 10^3$	$6 \cdot 10^{-1}$	$1 \cdot 10^2$	
					$2 \cdot 10^4$
$^{253}_{98}Cf$	W	$7 \cdot 10^4$	$3 \cdot 10^1$	$7 \cdot 10^3$	
	Y	$6 \cdot 10^4$	$3 \cdot 10^1$	$6 \cdot 10^3$	
					$2 \cdot 10^6$
$^{254}_{98}Cf$	W	$8 \cdot 10^2$	$4 \cdot 10^{-1}$	$8 \cdot 10^1$	
	Y	$6 \cdot 10^2$	$3 \cdot 10^{-1}$	$6 \cdot 10^1$	
					$1 \cdot 10^4$

(*) For the use of D (= day), W (= week), Y (= year), see Table 1c.
(**) For explanation of '(a)' and '(b)', see Table 1d.
(***) In view of the chemical toxicity of water soluble compounds of uranium, inhalation and ingestion should not exceed 2·5 mg and 150 mg respectively in any day, regardless of the isotopic composition.

TABLE 1b

(Activities expressed in curies)

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{3}_{1}H$	Water	$8{\cdot}1 \cdot 10^{-2}$	$2{\cdot}2 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-3}$	$8{\cdot}1 \cdot 10^{-3}$
$^{3}_{1}H$	Element		$5{\cdot}4 \cdot 10^{-1}$		
$^{32}_{15}P$	D W	$8{\cdot}1 \cdot 10^{-4}$ $2{\cdot}7 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$ $1{\cdot}6 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-5}$ $2{\cdot}7 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-5}$
$^{33}_{15}P$	D W	$8{\cdot}1 \cdot 10^{-3}$ $2{\cdot}7 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$ $1{\cdot}1 \cdot 10^{-6}$	$8{\cdot}1 \cdot 10^{-4}$ $2{\cdot}7 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-4}$
$^{51}_{25}Mn$	D W	$5{\cdot}4 \cdot 10^{-2}$ $5{\cdot}4 \cdot 10^{-2}$	$2{\cdot}2 \cdot 10^{-5}$ $2{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-3}$ $5{\cdot}4 \cdot 10^{-3}$	$1{\cdot}9 \cdot 10^{-3}$
$^{52}_{25}Mn$	D W	$1{\cdot}1 \cdot 10^{-3}$ $8{\cdot}1 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-7}$ $2{\cdot}7 \cdot 10^{-7}$	$1{\cdot}1 \cdot 10^{-4}$ $8{\cdot}1 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-5}$
$^{52m}_{25}Mn$	D W	$8{\cdot}1 \cdot 10^{-2}$ $1{\cdot}1 \cdot 10^{-1}$	$2{\cdot}7 \cdot 10^{-5}$ $5{\cdot}4 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-3}$ $1{\cdot}1 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-3}$
$^{53}_{25}Mn$	D W	$1{\cdot}4 \cdot 10^{-2}$ $1{\cdot}1 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-6}$ $5{\cdot}4 \cdot 10^{-6}$	$1{\cdot}4 \cdot 10^{-3}$ $1{\cdot}1 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-3}$
$^{54}_{25}Mn$	D W	$8{\cdot}1 \cdot 10^{-4}$ $8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$ $2{\cdot}7 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-5}$ $8{\cdot}1 \cdot 10^{-6}$	$1{\cdot}9 \cdot 10^{-4}$
$^{56}_{25}Mn$	D W	$1{\cdot}6 \cdot 10^{-2}$ $2{\cdot}2 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-6}$ $8{\cdot}1 \cdot 10^{-6}$	$1{\cdot}6 \cdot 10^{-3}$ $2{\cdot}2 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-4}$

(*) (**) (***) See footnotes at the end of this table.

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{55}_{27}Co$	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	Y	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
					(a) $1{\cdot}1 \cdot 10^{-4}$
					(b) $1{\cdot}6 \cdot 10^{-4}$
$^{56}_{27}Co$	W	$2{\cdot}7 \cdot 10^{-4}$	$1{\cdot}4 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-5}$	
	Y	$1{\cdot}9 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$1{\cdot}9 \cdot 10^{-5}$	
					$5{\cdot}4 \cdot 10^{-5}$
$^{57}_{27}Co$	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	Y	$5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	
					(a) $8{\cdot}1 \cdot 10^{-4}$
					(b) $5{\cdot}4 \cdot 10^{-4}$
$^{58}_{27}Co$	W	$1{\cdot}1 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}1 \cdot 10^{-4}$	
	Y	$8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-5}$	
					(a) $1{\cdot}6 \cdot 10^{-4}$
					(b) $1{\cdot}4 \cdot 10^{-4}$
$^{58m}_{27}Co$	W	$8{\cdot}1 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-3}$	
	Y	$5{\cdot}4 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-3}$	
					$5{\cdot}4 \cdot 10^{-3}$
$^{60}_{27}Co$	W	$1{\cdot}6 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-5}$	
	Y	$2{\cdot}7 \cdot 10^{-5}$	$1{\cdot}4 \cdot 10^{-8}$	$2{\cdot}7 \cdot 10^{-6}$	
					(a) $5{\cdot}4 \cdot 10^{-5}$
					(b) $1{\cdot}9 \cdot 10^{-5}$
$^{60m}_{27}Co$	W	$2{\cdot}7 \cdot 10^{0}$	$1{\cdot}6 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-1}$	
	Y	$2{\cdot}7 \cdot 10^{0}$	$1{\cdot}1 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-1}$	
					$1{\cdot}1 \cdot 10^{-1}$
$^{61}_{27}Co$	W	$5{\cdot}4 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-3}$	
	Y	$5{\cdot}4 \cdot 10^{-2}$	$2{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-3}$	
					(a) $1{\cdot}9 \cdot 10^{-3}$
					(b) $2{\cdot}2 \cdot 10^{-3}$
$^{62m}_{27}Co$	W	$1{\cdot}6 \cdot 10^{-1}$	$8{\cdot}1 \cdot 10^{-5}$	$1{\cdot}6 \cdot 10^{-2}$	
	Y	$1{\cdot}6 \cdot 10^{-1}$	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}6 \cdot 10^{-2}$	
					$2{\cdot}7 \cdot 10^{-3}$
$^{74}_{36}Kr$			$2{\cdot}7 \cdot 10^{-6}$		
$^{76}_{36}Kr$			$8{\cdot}1 \cdot 10^{-6}$		

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{77}_{36}Kr$			$2{\cdot}7 \cdot 10^{-6}$		
$^{79}_{36}Kr$			$1{\cdot}6 \cdot 10^{-5}$		
$^{81}_{36}Kr$			$5{\cdot}4 \cdot 10^{-4}$		
$^{83m}_{36}Kr$			$2{\cdot}4 \cdot 10^{-2}$		
$^{85m}_{36}Kr$			$2{\cdot}2 \cdot 10^{-5}$		
$^{85}_{36}Kr$			$1{\cdot}4 \cdot 10^{-4}$		
$^{87}_{36}Kr$			$5{\cdot}4 \cdot 10^{-6}$		
$^{88}_{36}Kr$			$1{\cdot}9 \cdot 10^{-6}$		
$^{80}_{38}Sr$	D Y	$2{\cdot}2 \cdot 10^{0}$ $2{\cdot}4 \cdot 10^{0}$	$8{\cdot}1 \cdot 10^{-4}$ $1{\cdot}1 \cdot 10^{-3}$	$2{\cdot}2 \cdot 10^{-1}$ $2{\cdot}4 \cdot 10^{-1}$	$1{\cdot}1 \cdot 10^{-1}$
$^{81}_{38}Sr$	D Y	$8{\cdot}1 \cdot 10^{-2}$ $8{\cdot}1 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$ $2{\cdot}7 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-3}$ $8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}4 \cdot 10^{-3}$
$^{83}_{38}Sr$	D Y	$8{\cdot}1 \cdot 10^{-3}$ $2{\cdot}7 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$ $1{\cdot}4 \cdot 10^{-6}$	$8{\cdot}1 \cdot 10^{-4}$ $2{\cdot}7 \cdot 10^{-4}$	(a) $2{\cdot}7 \cdot 10^{-4}$ (b) $2{\cdot}2 \cdot 10^{-4}$
$^{85m}_{38}Sr$	D Y	$5{\cdot}4 \cdot 10^{-1}$ $8{\cdot}1 \cdot 10^{-1}$	$2{\cdot}4 \cdot 10^{-4}$ $2{\cdot}7 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-2}$ $8{\cdot}1 \cdot 10^{-2}$	$2{\cdot}2 \cdot 10^{-2}$
$^{85}_{38}Sr$	D Y	$2{\cdot}7 \cdot 10^{-3}$ $1{\cdot}6 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$ $5{\cdot}4 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-4}$ $1{\cdot}6 \cdot 10^{-4}$	(a) $2{\cdot}4 \cdot 10^{-4}$ (b) $2{\cdot}7 \cdot 10^{-4}$
$^{87m}_{38}Sr$	D Y	$1{\cdot}4 \cdot 10^{-1}$ $1{\cdot}6 \cdot 10^{-1}$	$5{\cdot}4 \cdot 10^{-5}$ $5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}4 \cdot 10^{-2}$ $1{\cdot}6 \cdot 10^{-2}$	(a) $5{\cdot}4 \cdot 10^{-3}$ (b) $2{\cdot}7 \cdot 10^{-3}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{89}_{38}Sr$	D	$8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-5}$	
	Y	$1{\cdot}4 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-8}$	$1{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-5}$
$^{90}_{38}Sr$	D	$1{\cdot}9 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-9}$	$1{\cdot}9 \cdot 10^{-6}$	
	Y	$2{\cdot}7 \cdot 10^{-6}$	$1{\cdot}6 \cdot 10^{-9}$	$2{\cdot}7 \cdot 10^{-7}$	(a) $2{\cdot}7 \cdot 10^{-6}$ (b) $5{\cdot}4 \cdot 10^{-5}$
$^{91}_{38}Sr$	D	$5{\cdot}4 \cdot 10^{-3}$	$2{\cdot}4 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	
	Y	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}4 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	(a) $2{\cdot}2 \cdot 10^{-4}$ (b) $1{\cdot}6 \cdot 10^{-4}$
$^{92}_{38}Sr$	D	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$	$8{\cdot}1 \cdot 10^{-4}$	
	Y	$5{\cdot}4 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-4}$
$^{86}_{40}Zr$	D	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}6 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	Y	$2{\cdot}4 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}4 \cdot 10^{-4}$	$1{\cdot}4 \cdot 10^{-4}$
$^{88}_{40}Zr$	D	$2{\cdot}2 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$2{\cdot}2 \cdot 10^{-5}$	
	W	$5{\cdot}4 \cdot 10^{-4}$	$1{\cdot}9 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	
	Y	$2{\cdot}7 \cdot 10^{-4}$	$1{\cdot}4 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-4}$
$^{89}_{40}Zr$	D	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}4 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	W	$2{\cdot}4 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}4 \cdot 10^{-4}$	
	Y	$2{\cdot}4 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}4 \cdot 10^{-4}$	$1{\cdot}6 \cdot 10^{-4}$
$^{93}_{40}Zr$	D	$5{\cdot}4 \cdot 10^{-6}$	$2 \cdot 10^{-9}$	$5{\cdot}4 \cdot 10^{-7}$	
	W	$2{\cdot}4 \cdot 10^{-5}$	$1{\cdot}1 \cdot 10^{-8}$	$2{\cdot}4 \cdot 10^{-6}$	
	Y	$5{\cdot}4 \cdot 10^{-5}$	$2{\cdot}4 \cdot 10^{-8}$	$5{\cdot}4 \cdot 10^{-6}$	$1{\cdot}4 \cdot 10^{-4}$
$^{95}_{40}Zr$	D	$1{\cdot}4 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-8}$	$1{\cdot}4 \cdot 10^{-5}$	
	W	$2{\cdot}7 \cdot 10^{-4}$	$1{\cdot}6 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-5}$	
	Y	$2{\cdot}7 \cdot 10^{-4}$	$1{\cdot}1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-5}$	$1{\cdot}4 \cdot 10^{-4}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{97}_{40}Zr$	D	$1{\cdot}9 \cdot 10^{-3}$	$8{\cdot}1 \cdot 10^{-7}$	$1{\cdot}9 \cdot 10^{-4}$	
	W	$1{\cdot}4 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}4 \cdot 10^{-4}$	
	Y	$1{\cdot}4 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}4 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-5}$
$^{88}_{41}Nb$	W	$2{\cdot}2 \cdot 10^{-1}$	$1{\cdot}1 \cdot 10^{-4}$	$2{\cdot}2 \cdot 10^{-2}$	
	Y	$2{\cdot}2 \cdot 10^{-1}$	$8{\cdot}1 \cdot 10^{-5}$	$2{\cdot}2 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-3}$
$^{89}_{41}Nb$ (66 min)	W	$5{\cdot}4 \cdot 10^{-2}$	$1{\cdot}6 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-3}$	
	Y	$2{\cdot}7 \cdot 10^{-2}$	$1{\cdot}6 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-3}$
$^{89}_{41}Nb$ (122 min)	W	$1{\cdot}9 \cdot 10^{-2}$	$8{\cdot}1 \cdot 10^{-6}$	$1{\cdot}9 \cdot 10^{-3}$	
	Y	$1{\cdot}6 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-6}$	$1{\cdot}6 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-4}$
$^{90}_{41}Nb$	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	Y	$2{\cdot}4 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}4 \cdot 10^{-4}$	$1{\cdot}1 \cdot 10^{-4}$
$^{93m}_{41}Nb$	W	$1{\cdot}4 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}4 \cdot 10^{-4}$	
	Y	$1{\cdot}6 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-4}$
$^{94}_{41}Nb$	W	$1{\cdot}9 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$1{\cdot}9 \cdot 10^{-5}$	
	Y	$1{\cdot}6 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-9}$	$1{\cdot}6 \cdot 10^{-6}$	$1{\cdot}1 \cdot 10^{-4}$
$^{95}_{41}Nb$	W	$1{\cdot}4 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}4 \cdot 10^{-4}$	
	Y	$1{\cdot}1 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}1 \cdot 10^{-4}$	$2{\cdot}2 \cdot 10^{-4}$
$^{95m}_{41}Nb$	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	Y	$2{\cdot}2 \cdot 10^{-3}$	$8{\cdot}1 \cdot 10^{-7}$	$2{\cdot}2 \cdot 10^{-4}$	$2{\cdot}2 \cdot 10^{-4}$
$^{96}_{41}Nb$	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	Y	$2{\cdot}4 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}4 \cdot 10^{-4}$	$1{\cdot}1 \cdot 10^{-4}$
$^{97}_{41}Nb$	W	$8{\cdot}1 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-3}$	
	Y	$8{\cdot}1 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}2 \cdot 10^{-3}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{98}_{41}Nb$	W	$5{\cdot}4 \cdot 10^{-2}$	$2{\cdot}2 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-3}$	
	Y	$5{\cdot}4 \cdot 10^{-2}$	$2{\cdot}2 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-3}$	$1{\cdot}4 \cdot 10^{-3}$
$^{90}_{42}Mo$	D	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$	$8{\cdot}1 \cdot 10^{-4}$	
	Y	$5{\cdot}4 \cdot 10^{-3}$	$1{\cdot}9 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	(a) $5{\cdot}4 \cdot 10^{-4}$ (b) $1{\cdot}9 \cdot 10^{-4}$
$^{93}_{42}Mo$	D	$5{\cdot}4 \cdot 10^{-3}$	$2{\cdot}2 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	
	Y	$1{\cdot}9 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$1{\cdot}9 \cdot 10^{-5}$	(a) $2{\cdot}7 \cdot 10^{-4}$ (b) $2{\cdot}4 \cdot 10^{-3}$
$^{93m}_{42}Mo$	D	$1{\cdot}9 \cdot 10^{-2}$	$8{\cdot}1 \cdot 10^{-6}$	$1{\cdot}9 \cdot 10^{-3}$	
	Y	$1{\cdot}4 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-6}$	$1{\cdot}4 \cdot 10^{-3}$	(a) $1{\cdot}1 \cdot 10^{-3}$ (b) $5{\cdot}4 \cdot 10^{-4}$
$^{99}_{42}Mo$	D	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	Y	$1{\cdot}4 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}4 \cdot 10^{-4}$	(a) $1{\cdot}6 \cdot 10^{-4}$ (b) $1{\cdot}1 \cdot 10^{-4}$
$^{101}_{42}Mo$	D	$1{\cdot}4 \cdot 10^{-1}$	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}4 \cdot 10^{-2}$	
	Y	$1{\cdot}6 \cdot 10^{-1}$	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}6 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-3}$
$^{116}_{52}Te$	D	$2{\cdot}2 \cdot 10^{-2}$	$8{\cdot}1 \cdot 10^{-6}$	$2{\cdot}2 \cdot 10^{-3}$	
	W	$2{\cdot}7 \cdot 10^{-2}$	$1{\cdot}4 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-3}$	$8{\cdot}1 \cdot 10^{-4}$
$^{121}_{52}Te$	D	$5{\cdot}4 \cdot 10^{-3}$	$1{\cdot}6 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	
	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}4 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-4}$
$^{121m}_{52}Te$	D	$1{\cdot}9 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$1{\cdot}9 \cdot 10^{-5}$	
	W	$5{\cdot}4 \cdot 10^{-4}$	$1{\cdot}6 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-5}$
$^{123}_{52}Te$	D	$1{\cdot}9 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$1{\cdot}9 \cdot 10^{-5}$	
	W	$5{\cdot}4 \cdot 10^{-4}$	$1{\cdot}9 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-5}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{123m}_{52}Te$	D	$2{\cdot}2 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$2{\cdot}2 \cdot 10^{-5}$	
	W	$5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}2 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-5}$
$^{125}_{52}Te$	D	$5{\cdot}4 \cdot 10^{-4}$	$1{\cdot}6 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	
	W	$8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-5}$	$1{\cdot}1 \cdot 10^{-4}$
$^{127}_{52}Te$	D	$2{\cdot}2 \cdot 10^{-2}$	$8{\cdot}1 \cdot 10^{-6}$	$2{\cdot}2 \cdot 10^{-3}$	
	W	$1{\cdot}6 \cdot 10^{-2}$	$8{\cdot}1 \cdot 10^{-6}$	$1{\cdot}6 \cdot 10^{-3}$	$8{\cdot}1 \cdot 10^{-4}$
$^{127m}_{52}Te$	D	$2{\cdot}7 \cdot 10^{-4}$	$1{\cdot}1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-5}$	
	W	$2{\cdot}4 \cdot 10^{-4}$	$1{\cdot}1 \cdot 10^{-7}$	$2{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-5}$
$^{129}_{52}Te$	D	$5{\cdot}4 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-3}$	
	W	$8{\cdot}1 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-3}$
$^{129m}_{52}Te$	D	$5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	
	W	$2{\cdot}4 \cdot 10^{-4}$	$1{\cdot}1 \cdot 10^{-7}$	$2{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-5}$
$^{131}_{52}Te$	D	$5{\cdot}4 \cdot 10^{-3}$	$2{\cdot}2 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	
	W	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$	$8{\cdot}1 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-4}$
$^{131m}_{52}Te$	D	$5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	
	W	$8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-5}$
$^{132}_{52}Te$	D	$2{\cdot}2 \cdot 10^{-4}$	$1{\cdot}1 \cdot 10^{-7}$	$2{\cdot}2 \cdot 10^{-5}$	
	W	$1{\cdot}9 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$1{\cdot}9 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-6}$
$^{133}_{52}Te$	D	$1{\cdot}9 \cdot 10^{-2}$	$8{\cdot}1 \cdot 10^{-6}$	$1{\cdot}9 \cdot 10^{-3}$	
	W	$2{\cdot}7 \cdot 10^{-2}$	$1{\cdot}4 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}4 \cdot 10^{-3}$
$^{133m}_{52}Te$	D	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}6 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	W	$5{\cdot}4 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-4}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{134}_{52}Te$	D W	$2{\cdot}7 \cdot 10^{-3}$ $8{\cdot}1 \cdot 10^{-3}$	$1{\cdot}4 \cdot 10^{-6}$ $2{\cdot}7 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$ $8{\cdot}1 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-4}$
$^{120}_{53}I$	D	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$	$8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-4}$
$^{120m}_{53}I$	D	$2{\cdot}2 \cdot 10^{-2}$	$8{\cdot}1 \cdot 10^{-6}$	$2{\cdot}2 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-3}$
$^{121}_{53}I$	D	$1{\cdot}9 \cdot 10^{-2}$	$8{\cdot}1 \cdot 10^{-6}$	$1{\cdot}9 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-3}$
$^{123}_{53}I$	D	$5{\cdot}4 \cdot 10^{-3}$	$2{\cdot}4 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-4}$
$^{124}_{53}I$	D	$8{\cdot}1 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-8}$	$8{\cdot}1 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-6}$
$^{125}_{53}I$	D	$5{\cdot}4 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-8}$	$5{\cdot}4 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-6}$
$^{126}_{53}I$	D	$2{\cdot}7 \cdot 10^{-5}$	$1{\cdot}4 \cdot 10^{-8}$	$2{\cdot}7 \cdot 10^{-6}$	$2{\cdot}2 \cdot 10^{-6}$
$^{128}_{53}I$	D	$1{\cdot}1 \cdot 10^{-1}$	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}1 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-3}$
$^{129}_{53}I$	D	$8{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-9}$	$8{\cdot}1 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-7}$
$^{130}_{53}I$	D	$8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-5}$
$^{131}_{53}I$	D	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}9 \cdot 10^{-8}$	$5{\cdot}4 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-6}$
$^{132}_{53}I$	D	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$	$8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-4}$
$^{132m}_{53}I$	D	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$	$8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-4}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{133}_{53}I$	D	$2{\cdot}7 \cdot 10^{-4}$	$1{\cdot}1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-5}$	$1{\cdot}4 \cdot 10^{-5}$
$^{134}_{53}I$	D	$5{\cdot}4 \cdot 10^{-2}$	$1{\cdot}9 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-3}$	$2{\cdot}2 \cdot 10^{-3}$
$^{135}_{53}I$	D	$1{\cdot}6 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}6 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-5}$
$^{125}_{55}Cs$	D	$1{\cdot}4 \cdot 10^{-1}$	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}4 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-3}$
$^{127}_{55}Cs$	D	$1{\cdot}1 \cdot 10^{-1}$	$2{\cdot}7 \cdot 10^{-5}$	$1{\cdot}1 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-3}$
$^{129}_{55}Cs$	D	$2{\cdot}7 \cdot 10^{-2}$	$1{\cdot}4 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-3}$	$2{\cdot}4 \cdot 10^{-3}$
$^{130}_{55}Cs$	D	$1{\cdot}9 \cdot 10^{-1}$	$8{\cdot}1 \cdot 10^{-5}$	$1{\cdot}9 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-3}$
$^{131}_{55}Cs$	D	$2{\cdot}7 \cdot 10^{-2}$	$1{\cdot}4 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-3}$	$2{\cdot}2 \cdot 10^{-3}$
$^{132}_{55}Cs$	D	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}6 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-4}$
$^{134}_{55}Cs$	D	$1{\cdot}1 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-8}$	$1{\cdot}1 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-6}$
$^{134m}_{55}Cs$	D	$1{\cdot}4 \cdot 10^{-1}$	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}4 \cdot 10^{-2}$	$1{\cdot}1 \cdot 10^{-2}$
$^{135}_{55}Cs$	D	$1{\cdot}1 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}1 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-5}$
$^{135m}_{55}Cs$	D	$1{\cdot}9 \cdot 10^{-1}$	$8{\cdot}1 \cdot 10^{-5}$	$1{\cdot}9 \cdot 10^{-2}$	$1{\cdot}1 \cdot 10^{-2}$
$^{136}_{55}Cs$	D	$5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-5}$
$^{137}_{55}Cs$	D	$1{\cdot}6 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-5}$	$1{\cdot}1 \cdot 10^{-5}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
^{138}Cs	D	$5{\cdot}4 \cdot 10^{-2}$	$2{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-3}$	$1{\cdot}9 \cdot 10^{-3}$
$^{134}_{58}Ce$	W	$8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-5}$	
	Y	$5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-5}$
$^{135}_{58}Ce$	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}6 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	Y	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}4 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	$1{\cdot}6 \cdot 10^{-4}$
$^{137}_{58}Ce$	W	$1{\cdot}4 \cdot 10^{-1}$	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}4 \cdot 10^{-2}$	
	Y	$1{\cdot}4 \cdot 10^{-1}$	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}4 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-3}$
$^{137m}_{58}Ce$	W	$5{\cdot}4 \cdot 10^{-3}$	$1{\cdot}9 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	
	Y	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}6 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	$2{\cdot}4 \cdot 10^{-4}$
$^{139}_{58}Ce$	W	$8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-5}$	
	Y	$5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-4}$
$^{141}_{58}Ce$	W	$8{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-5}$	
	Y	$5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}4 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}6 \cdot 10^{-4}$
$^{143}_{58}Ce$	W	$1{\cdot}9 \cdot 10^{-3}$	$8{\cdot}1 \cdot 10^{-7}$	$1{\cdot}9 \cdot 10^{-4}$	
	Y	$1{\cdot}6 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}6 \cdot 10^{-4}$	$1{\cdot}1 \cdot 10^{-4}$
$^{144}_{58}Ce$	W	$2{\cdot}4 \cdot 10^{-5}$	$1{\cdot}1 \cdot 10^{-8}$	$2{\cdot}4 \cdot 10^{-6}$	
	Y	$1{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-9}$	$1{\cdot}4 \cdot 10^{-6}$	$2{\cdot}2 \cdot 10^{-5}$
$^{203}_{84}Po$	D	$5{\cdot}4 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-3}$	
	W	$8{\cdot}1 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}4 \cdot 10^{-3}$
$^{205}_{84}Po$	D	$2{\cdot}7 \cdot 10^{-2}$	$1{\cdot}6 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-3}$	
	W	$8{\cdot}1 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}2 \cdot 10^{-3}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{207}_{84}$Po	D	$2{\cdot}4 \cdot 10^{-2}$	$1{\cdot}1 \cdot 10^{-5}$	$2{\cdot}4 \cdot 10^{-3}$	
	W	$2{\cdot}7 \cdot 10^{-2}$	$1{\cdot}1 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-3}$	$8{\cdot}1 \cdot 10^{-4}$
$^{210}_{84}$Po	D	$5{\cdot}4 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$5{\cdot}4 \cdot 10^{-8}$	
	W	$5{\cdot}4 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$5{\cdot}4 \cdot 10^{-8}$	$2{\cdot}7 \cdot 10^{-7}$
$^{223}_{88}$Ra	W	$8{\cdot}1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$8{\cdot}1 \cdot 10^{-8}$	$5{\cdot}4 \cdot 10^{-7}$
$^{224}_{88}$Ra	W	$1{\cdot}6 \cdot 10^{-6}$	$8{\cdot}1 \cdot 10^{-10}$	$1{\cdot}6 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-7}$
$^{225}_{88}$Ra	W	$5{\cdot}4 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$5{\cdot}4 \cdot 10^{-8}$	$8{\cdot}1 \cdot 10^{-7}$
$^{226}_{88}$Ra	W	$5{\cdot}4 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$5{\cdot}4 \cdot 10^{-8}$	$1{\cdot}9 \cdot 10^{-7}$
$^{227}_{88}$Ra	W	$1{\cdot}4 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-6}$	$1{\cdot}4 \cdot 10^{-3}$	$1{\cdot}6 \cdot 10^{-3}$
$^{228}_{88}$Ra	W	$1{\cdot}1 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}1 \cdot 10^{-7}$	$2{\cdot}4 \cdot 10^{-7}$
$^{226}_{90}$Th	W	$1{\cdot}6 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-5}$	
	Y	$1{\cdot}4 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-8}$	$1{\cdot}4 \cdot 10^{-5}$	$5{\cdot}4 \cdot 10^{-4}$
$^{227}_{90}$Th	W	$2{\cdot}7 \cdot 10^{-7}$	$1{\cdot}4 \cdot 10^{-10}$	$2{\cdot}7 \cdot 10^{-8}$	
	Y	$2{\cdot}7 \cdot 10^{-7}$	$1{\cdot}4 \cdot 10^{-10}$	$2{\cdot}7 \cdot 10^{-8}$	$1{\cdot}4 \cdot 10^{-5}$
$^{228}_{90}$Th	W	$1{\cdot}1 \cdot 10^{-8}$	$5{\cdot}4 \cdot 10^{-12}$	$1{\cdot}1 \cdot 10^{-9}$	
	Y	$1{\cdot}6 \cdot 10^{-8}$	$8{\cdot}1 \cdot 10^{-12}$	$1{\cdot}6 \cdot 10^{-9}$	$5{\cdot}4 \cdot 10^{-7}$
$^{229}_{90}$Th	W	$8{\cdot}1 \cdot 10^{-10}$	$2{\cdot}7 \cdot 10^{-13}$	$8{\cdot}1 \cdot 10^{-11}$	
	Y	$2{\cdot}4 \cdot 10^{-9}$	$1{\cdot}1 \cdot 10^{-12}$	$2{\cdot}4 \cdot 10^{-10}$	$5{\cdot}4 \cdot 10^{-8}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{230}_{90}Th$	W	$5{\cdot}4 \cdot 10^{-9}$	$2{\cdot}7 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	
	Y	$1{\cdot}6 \cdot 10^{-8}$	$5{\cdot}4 \cdot 10^{-12}$	$1{\cdot}6 \cdot 10^{-9}$	
					$2{\cdot}7 \cdot 10^{-7}$
$^{231}_{90}Th$	W	$5{\cdot}4 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	
	Y	$5{\cdot}4 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	
					$2{\cdot}7 \cdot 10^{-4}$
$^{232}_{90}Th$	W	$1{\cdot}1 \cdot 10^{-9}$	$5{\cdot}4 \cdot 10^{-13}$	$1{\cdot}1 \cdot 10^{-10}$	
	Y	$2{\cdot}7 \cdot 10^{-9}$	$1{\cdot}1 \cdot 10^{-12}$	$2{\cdot}7 \cdot 10^{-10}$	
					$8{\cdot}1 \cdot 10^{-8}$
$^{234}_{90}Th$	W	$1{\cdot}9 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$1{\cdot}9 \cdot 10^{-5}$	
	Y	$1{\cdot}6 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-5}$	
					$2{\cdot}7 \cdot 10^{-5}$
$_{90}$Th-nat	W	$1{\cdot}9 \cdot 10^{-9}$	$1{\cdot}1 \cdot 10^{-12}$	$1{\cdot}9 \cdot 10^{-10}$	
	Y	$5{\cdot}4 \cdot 10^{-9}$	$1{\cdot}9 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	
					$1{\cdot}4 \cdot 10^{-7}$
$^{230}_{92}U$ (***)	D	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}6 \cdot 10^{-10}$	$5{\cdot}4 \cdot 10^{-8}$	
	W	$2{\cdot}7 \cdot 10^{-7}$	$1{\cdot}4 \cdot 10^{-10}$	$2{\cdot}7 \cdot 10^{-8}$	
	Y	$2{\cdot}7 \cdot 10^{-7}$	$1{\cdot}1 \cdot 10^{-10}$	$2{\cdot}7 \cdot 10^{-8}$	
					(a) $2{\cdot}7 \cdot 10^{-7}$ (b) $5{\cdot}4 \cdot 10^{-6}$
$^{231}_{92}U$ (***)	D	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-6}$	$8{\cdot}1 \cdot 10^{-4}$	
	W	$5{\cdot}4 \cdot 10^{-3}$	$2{\cdot}4 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	
	Y	$5{\cdot}4 \cdot 10^{-3}$	$1{\cdot}9 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$	
					$5{\cdot}4 \cdot 10^{-4}$
$^{232}_{92}U$ (***)	D	$2{\cdot}2 \cdot 10^{-7}$	$8{\cdot}1 \cdot 10^{-11}$	$2{\cdot}2 \cdot 10^{-8}$	
	W	$2{\cdot}7 \cdot 10^{-7}$	$1{\cdot}6 \cdot 10^{-10}$	$2{\cdot}7 \cdot 10^{-8}$	
	Y	$8{\cdot}1 \cdot 10^{-9}$	$2{\cdot}7 \cdot 10^{-12}$	$8{\cdot}1 \cdot 10^{-10}$	
					(a) $2{\cdot}2 \cdot 10^{-7}$ (b) $5{\cdot}4 \cdot 10^{-6}$
$^{233}_{92}U$ (***)	D	$1{\cdot}1 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}1 \cdot 10^{-7}$	
	W	$8{\cdot}1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$8{\cdot}1 \cdot 10^{-8}$	
	Y	$2{\cdot}7 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-11}$	$2{\cdot}7 \cdot 10^{-9}$	
					(a) $1{\cdot}1 \cdot 10^{-6}$ (b) $1{\cdot}9 \cdot 10^{-5}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{234}_{92}U$ (***)	D	$1{\cdot}4 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}4 \cdot 10^{-7}$	
	W	$8{\cdot}1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$8{\cdot}1 \cdot 10^{-8}$	
	Y	$2{\cdot}7 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-11}$	$2{\cdot}7 \cdot 10^{-9}$	
					(a) $1{\cdot}1 \cdot 10^{-6}$
					(b) $1{\cdot}9 \cdot 10^{-5}$
$^{235}_{92}U$ (***)	D	$1{\cdot}4 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}4 \cdot 10^{-7}$	
	W	$8{\cdot}1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$8{\cdot}1 \cdot 10^{-8}$	
	Y	$5{\cdot}4 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-11}$	$5{\cdot}4 \cdot 10^{-9}$	
					(a) $1{\cdot}4 \cdot 10^{-6}$
					(b) $1{\cdot}9 \cdot 10^{-5}$
$^{236}_{92}U$ (***)	D	$1{\cdot}4 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}4 \cdot 10^{-7}$	
	W	$8{\cdot}1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$8{\cdot}1 \cdot 10^{-8}$	
	Y	$2{\cdot}7 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-11}$	$2{\cdot}7 \cdot 10^{-9}$	
					(a) $1{\cdot}4 \cdot 10^{-6}$
					(b) $2{\cdot}2 \cdot 10^{-5}$
$^{237}_{92}U$ (***)	D	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	W	$1{\cdot}6 \cdot 10^{-3}$	$8{\cdot}1 \cdot 10^{-7}$	$1{\cdot}6 \cdot 10^{-4}$	
	Y	$1{\cdot}6 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}6 \cdot 10^{-4}$	
					$1{\cdot}6 \cdot 10^{-4}$
$^{238}_{92}U$ (***)	D	$1{\cdot}4 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}4 \cdot 10^{-7}$	
	W	$8{\cdot}1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$8{\cdot}1 \cdot 10^{-8}$	
	Y	$5{\cdot}4 \cdot 10^{-8}$	$1{\cdot}9 \cdot 10^{-11}$	$5{\cdot}4 \cdot 10^{-9}$	
					(a) $1{\cdot}4 \cdot 10^{-6}$
					(b) $2{\cdot}2 \cdot 10^{-5}$
$^{239}_{92}U$ (***)	D	$1{\cdot}9 \cdot 10^{-1}$	$8{\cdot}1 \cdot 10^{-5}$	$1{\cdot}9 \cdot 10^{-2}$	
	W	$1{\cdot}6 \cdot 10^{-1}$	$8{\cdot}1 \cdot 10^{-5}$	$1{\cdot}6 \cdot 10^{-2}$	
	Y	$1{\cdot}6 \cdot 10^{-1}$	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}6 \cdot 10^{-2}$	
					$5{\cdot}4 \cdot 10^{-3}$
$^{240}_{92}U$ (***)	D	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}6 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	Y	$2{\cdot}4 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}4 \cdot 10^{-4}$	
					$1{\cdot}4 \cdot 10^{-4}$
$_{92}U$-nat (***)	D	$1{\cdot}4 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}4 \cdot 10^{-7}$	
	W	$8{\cdot}1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$8{\cdot}1 \cdot 10^{-8}$	
	Y	$2{\cdot}7 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-11}$	$2{\cdot}7 \cdot 10^{-9}$	
					(a) $1{\cdot}4 \cdot 10^{-6}$
					(b) $1{\cdot}9 \cdot 10^{-5}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/ year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{234}_{94}Pu$	W	$2{\cdot}2 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$2{\cdot}2 \cdot 10^{-5}$	
	Y	$1{\cdot}9 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$1{\cdot}9 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-4}$
$^{235}_{94}Pu$	W	$2{\cdot}7 \cdot 10^{0}$	$1{\cdot}4 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-1}$	
	Y	$2{\cdot}4 \cdot 10^{0}$	$1{\cdot}1 \cdot 10^{-3}$	$2{\cdot}4 \cdot 10^{-1}$	$8{\cdot}1 \cdot 10^{-2}$
$^{236}_{94}Pu$	W	$1{\cdot}9 \cdot 10^{-8}$	$8{\cdot}1 \cdot 10^{-12}$	$1{\cdot}9 \cdot 10^{-9}$	
	Y	$2{\cdot}7 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-11}$	$2{\cdot}7 \cdot 10^{-9}$	(a) $2{\cdot}2 \cdot 10^{-6}$ (b) $1{\cdot}6 \cdot 10^{-5}$
$^{237}_{94}Pu$	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}4 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	
	Y	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}4 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	$1{\cdot}4 \cdot 10^{-3}$
$^{238}_{94}Pu$	W	$5{\cdot}4 \cdot 10^{-9}$	$2{\cdot}4 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	
	Y	$1{\cdot}6 \cdot 10^{-8}$	$8{\cdot}1 \cdot 10^{-12}$	$1{\cdot}6 \cdot 10^{-9}$	(a) $8{\cdot}1 \cdot 10^{-7}$ (b) $8{\cdot}1 \cdot 10^{-6}$
$^{239}_{94}Pu$	W	$5{\cdot}4 \cdot 10^{-9}$	$2{\cdot}2 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	
	Y	$1{\cdot}4 \cdot 10^{-8}$	$5{\cdot}4 \cdot 10^{-12}$	$1{\cdot}4 \cdot 10^{-9}$	(a) $5{\cdot}4 \cdot 10^{-7}$ (b) $5{\cdot}4 \cdot 10^{-6}$
$^{240}_{94}Pu$	W	$5{\cdot}4 \cdot 10^{-9}$	$2{\cdot}2 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	
	Y	$1{\cdot}4 \cdot 10^{-8}$	$5{\cdot}4 \cdot 10^{-12}$	$1{\cdot}4 \cdot 10^{-9}$	(a) $5{\cdot}4 \cdot 10^{-7}$ (b) $5{\cdot}4 \cdot 10^{-6}$
$^{241}_{94}Pu$	W	$2{\cdot}7 \cdot 10^{-7}$	$1{\cdot}1 \cdot 10^{-10}$	$2{\cdot}7 \cdot 10^{-8}$	
	Y	$5{\cdot}4 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-10}$	$5{\cdot}4 \cdot 10^{-8}$	(a) $2{\cdot}7 \cdot 10^{-5}$ (b) $2{\cdot}7 \cdot 10^{-4}$
$^{242}_{94}Pu$	W	$5{\cdot}4 \cdot 10^{-9}$	$2{\cdot}4 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	
	Y	$1{\cdot}6 \cdot 10^{-8}$	$5{\cdot}4 \cdot 10^{-12}$	$1{\cdot}6 \cdot 10^{-9}$	(a) $8{\cdot}1 \cdot 10^{-7}$ (b) $8{\cdot}1 \cdot 10^{-6}$
$^{243}_{94}Pu$	W	$2{\cdot}7 \cdot 10^{-2}$	$1{\cdot}4 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-3}$	
	Y	$2{\cdot}7 \cdot 10^{-2}$	$1{\cdot}6 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}6 \cdot 10^{-3}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{244}_{94}Pu$	W Y	$5{\cdot}4 \cdot 10^{-9}$ $1{\cdot}6 \cdot 10^{-8}$	$2{\cdot}4 \cdot 10^{-12}$ $5{\cdot}4 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$ $1{\cdot}6 \cdot 10^{-9}$	(a) $8{\cdot}1 \cdot 10^{-7}$ (b) $8{\cdot}1 \cdot 10^{-6}$
$^{245}_{94}Pu$	W Y	$5{\cdot}4 \cdot 10^{-3}$ $5{\cdot}4 \cdot 10^{-3}$	$1{\cdot}9 \cdot 10^{-6}$ $1{\cdot}6 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$ $5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}2 \cdot 10^{-4}$
$^{237}_{95}Am$	W	$2{\cdot}7 \cdot 10^{-1}$	$1{\cdot}1 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-2}$	$8{\cdot}1 \cdot 10^{-3}$
$^{238}_{95}Am$	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	$2{\cdot}7 \cdot 10^{-3}$
$^{239}_{95}Am$	W	$1{\cdot}4 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-6}$	$1{\cdot}4 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-4}$
$^{240}_{95}Am$	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	$2{\cdot}2 \cdot 10^{-4}$
$^{241}_{95}Am$	W	$5{\cdot}4 \cdot 10^{-9}$	$2{\cdot}2 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}4 \cdot 10^{-7}$
$^{242m}_{95}Am$	W	$5{\cdot}4 \cdot 10^{-9}$	$2{\cdot}2 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}4 \cdot 10^{-7}$
$^{242}_{95}Am$	W	$8{\cdot}1 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-8}$	$8{\cdot}1 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-4}$
$^{243}_{95}Am$	W	$5{\cdot}4 \cdot 10^{-9}$	$2{\cdot}2 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}4 \cdot 10^{-7}$
$^{244m}_{95}Am$	W	$2{\cdot}7 \cdot 10^{-3}$	$1{\cdot}6 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{-4}$	$5{\cdot}4 \cdot 10^{-3}$
$^{244}_{95}Am$	W	$1{\cdot}6 \cdot 10^{-4}$	$8{\cdot}1 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{-5}$	$2{\cdot}7 \cdot 10^{-4}$
$^{245}_{95}Am$	W	$8{\cdot}1 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-5}$	$8{\cdot}1 \cdot 10^{-3}$	$2{\cdot}7 \cdot 10^{-3}$
$^{246m}_{95}Am$	W	$1{\cdot}6 \cdot 10^{-1}$	$8{\cdot}1 \cdot 10^{-5}$	$1{\cdot}6 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-3}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{246}_{95}Am$	W	$1{\cdot}1 \cdot 10^{-1}$	$5{\cdot}4 \cdot 10^{-5}$	$1{\cdot}1 \cdot 10^{-2}$	$2{\cdot}7 \cdot 10^{-3}$
$^{238}_{96}Cm$	W	$1{\cdot}1 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-7}$	$1{\cdot}1 \cdot 10^{-4}$	$1{\cdot}6 \cdot 10^{-3}$
$^{240}_{96}Cm$	W	$5{\cdot}4 \cdot 10^{-7}$	$2{\cdot}2 \cdot 10^{-10}$	$5{\cdot}4 \cdot 10^{-8}$	$1{\cdot}1 \cdot 10^{-5}$
$^{241}_{96}Cm$	W	$2{\cdot}4 \cdot 10^{-5}$	$1{\cdot}1 \cdot 10^{-8}$	$2{\cdot}4 \cdot 10^{-6}$	$1{\cdot}4 \cdot 10^{-4}$
$^{242}_{96}Cm$	W	$2{\cdot}7 \cdot 10^{-7}$	$1{\cdot}1 \cdot 10^{-10}$	$2{\cdot}7 \cdot 10^{-8}$	$5{\cdot}4 \cdot 10^{-6}$
$^{243}_{96}Cm$	W	$8{\cdot}1 \cdot 10^{-9}$	$2{\cdot}7 \cdot 10^{-12}$	$8{\cdot}1 \cdot 10^{-10}$	$1{\cdot}9 \cdot 10^{-7}$
$^{244}_{96}Cm$	W	$1{\cdot}1 \cdot 10^{-8}$	$5{\cdot}4 \cdot 10^{-12}$	$1{\cdot}1 \cdot 10^{-9}$	$2{\cdot}4 \cdot 10^{-7}$
$^{245}_{96}Cm$	W	$5{\cdot}4 \cdot 10^{-9}$	$2{\cdot}2 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}4 \cdot 10^{-7}$
$^{246}_{96}Cm$	W	$5{\cdot}4 \cdot 10^{-9}$	$2{\cdot}2 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}4 \cdot 10^{-7}$
$^{247}_{96}Cm$	W	$5{\cdot}4 \cdot 10^{-9}$	$2{\cdot}4 \cdot 10^{-12}$	$5{\cdot}4 \cdot 10^{-10}$	$1{\cdot}4 \cdot 10^{-7}$
$^{248}_{96}Cm$	W	$1{\cdot}4 \cdot 10^{-9}$	$5{\cdot}4 \cdot 10^{-13}$	$1{\cdot}4 \cdot 10^{-10}$	$2{\cdot}7 \cdot 10^{-8}$
$^{249}_{96}Cm$	W	$1{\cdot}4 \cdot 10^{-2}$	$5{\cdot}4 \cdot 10^{-6}$	$1{\cdot}4 \cdot 10^{-3}$	$5{\cdot}4 \cdot 10^{-3}$
$^{244}_{98}Cf$	W Y	$5{\cdot}4 \cdot 10^{-4}$ $5{\cdot}4 \cdot 10^{-4}$	$2{\cdot}4 \cdot 10^{-7}$ $2{\cdot}4 \cdot 10^{-7}$	$5{\cdot}4 \cdot 10^{-5}$ $5{\cdot}4 \cdot 10^{-5}$	$2{\cdot}4 \cdot 10^{-3}$
$^{246}_{98}Cf$	W Y	$1{\cdot}1 \cdot 10^{-5}$ $8{\cdot}1 \cdot 10^{-6}$	$5{\cdot}4 \cdot 10^{-9}$ $2{\cdot}7 \cdot 10^{-9}$	$1{\cdot}1 \cdot 10^{-6}$ $8{\cdot}1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{-5}$

Radionuclides	Form (*)	Exposed workers		Members of the public	
		Limit of annual intake by inhalation Ci	Derived limit of the concentration in air for an exposure of 2 000 h/year Ci m^{-3}	Limit of annual intake by inhalation Ci	Limit of annual intake by ingestion (**) Ci
1	2	3	4	5	6
$^{248}_{98}Cf$	W	$8 \cdot 1 \cdot 10^{-8}$	$2 \cdot 7 \cdot 10^{-11}$	$8 \cdot 1 \cdot 10^{-9}$	
	Y	$1 \cdot 1 \cdot 10^{-7}$	$5 \cdot 4 \cdot 10^{-11}$	$1 \cdot 1 \cdot 10^{-8}$	$2 \cdot 2 \cdot 10^{-6}$
$^{249}_{98}Cf$	W	$5 \cdot 4 \cdot 10^{-9}$	$2 \cdot 2 \cdot 10^{-12}$	$5 \cdot 4 \cdot 10^{-10}$	
	Y	$1 \cdot 4 \cdot 10^{-8}$	$5 \cdot 4 \cdot 10^{-12}$	$1 \cdot 4 \cdot 10^{-9}$	$1 \cdot 1 \cdot 10^{-7}$
$^{250}_{98}Cf$	W	$1 \cdot 4 \cdot 10^{-8}$	$5 \cdot 4 \cdot 10^{-12}$	$1 \cdot 4 \cdot 10^{-9}$	
	Y	$2 \cdot 7 \cdot 10^{-8}$	$1 \cdot 1 \cdot 10^{-11}$	$2 \cdot 7 \cdot 10^{-9}$	$2 \cdot 7 \cdot 10^{-7}$
$^{251}_{98}Cf$	W	$5 \cdot 4 \cdot 10^{-9}$	$2 \cdot 2 \cdot 10^{-12}$	$5 \cdot 4 \cdot 10^{-10}$	
	Y	$1 \cdot 4 \cdot 10^{-8}$	$5 \cdot 4 \cdot 10^{-12}$	$1 \cdot 4 \cdot 10^{-9}$	$1 \cdot 1 \cdot 10^{-7}$
$^{252}_{98}Cf$	W	$2 \cdot 7 \cdot 10^{-8}$	$1 \cdot 1 \cdot 10^{-11}$	$2 \cdot 7 \cdot 10^{-9}$	
	Y	$2 \cdot 7 \cdot 10^{-8}$	$1 \cdot 6 \cdot 10^{-11}$	$2 \cdot 7 \cdot 10^{-9}$	$5 \cdot 4 \cdot 10^{-7}$
$^{253}_{98}Cf$	W	$1 \cdot 9 \cdot 10^{-6}$	$8 \cdot 1 \cdot 10^{-10}$	$1 \cdot 9 \cdot 10^{-7}$	
	Y	$1 \cdot 6 \cdot 10^{-6}$	$8 \cdot 1 \cdot 10^{-10}$	$1 \cdot 6 \cdot 10^{-7}$	$5 \cdot 4 \cdot 10^{-5}$
$^{254}_{98}Cf$	W	$2 \cdot 2 \cdot 10^{-8}$	$1 \cdot 1 \cdot 10^{-11}$	$2 \cdot 2 \cdot 10^{-9}$	
	Y	$1 \cdot 6 \cdot 10^{-8}$	$8 \cdot 1 \cdot 10^{-12}$	$1 \cdot 6 \cdot 10^{-9}$	$2 \cdot 7 \cdot 10^{-7}$

(*) For the use of D (= day), W (= week), Y (= year), see Table 1c.

(**) For explanation of '(a)' and '(b)', see Table 1d.

(***) In view of the chemical toxicity of water soluble compounds of uranium, inhalation and ingestion should not exceed 2·5 mg and 150 mg respectively in any day, regardless of the isotopic composition.

TABLE 1c

Element	Form	Compounds
$_{1}H$	—	—
$_{15}P$	W	Phosphates
	D	All other compounds
$_{25}Mn$	W	Oxides, hydroxides, halides, nitrates
	D	All other compounds
$_{27}Co$	Y	Oxides, hydroxides, halides, nitrates
	W	All other compounds
$_{36}Kr$	—	—
$_{38}Sr$	Y	$SrTiO_3$
	D	Soluble compounds
$_{40}Zr$	Y	Carbide
	W	Oxides, hydroxides, halides, nitrates
	D	All other compounds
$_{41}Nb$	Y	Oxides, hydroxides
	W	All other compounds
$_{42}Mo$	Y	Oxides, hydroxides, MoS_2
	D	All other compounds
$_{52}Te$	W	Oxides, hydroxides, nitrates
	D	All other compounds
$_{53}I$	D	All
$_{55}Cs$	D	All
$_{58}Ce$	Y	Oxides, hydroxides, fluorides
	W	All other compounds
$_{84}Po$	W	Oxides, hydroxides, nitrates
	D	All other compounds
$_{88}Ra$	W	All
$_{90}Th$	Y	Oxides, hydroxides
	W	All other compounds

Element	Form	Compounds
$_{92}U$	D	UF_6, UO_2F_2 and $UO_2(NO_3)_2$
	W	Less soluble such as UO_3, UF_4 and UCl_4
	Y	Highly insoluble oxides, i.e. UO_2 and U_3O_8
$_{94}Pu$	Y	PuO_2
	W	All other compounds
$_{95}Am$	W	All compounds
$_{96}Cm$	W	All compounds
$_{98}Cf$	Y	Oxides, hydroxides
	W	All other compounds

TABLE 1d

Element	Compounds
$_{27}$Co	(a) Oxides, hydroxides and all other inorganic compounds ingested in tracer quantities (b) Organically complexed compounds and all inorganic compounds except oxides and hydroxides in the presence of carrier material
$_{38}$Sr	(a) Soluble salts (b) $SrTiO_3$
$_{42}$Mo	(a) All compounds except MoS_2 (b) MoS_2
$_{92}$U	(a) Water soluble inorganic compounds (hexavalent uranium) (b) Relatively insoluble compounds such as UF_4, UO_2 and U_3O_8 (tetravalent uranium)
$_{94}$Pu	(a) All compounds, except oxides and hydroxides (b) Oxides and hydroxides

TABLE 2

Radionuclides	Form	Exposed workers		Members of public	
		Limits of annual intake by inhalation µCi	Derived limits of concentration in the air for an exposure of 2 000 h/year Ci/m³	Limits of annual intake by inhalation µCi	Limits of annual intake by ingestion µCi
1	2	3	4	5	6
$^{7}_{4}Be$	soluble	$1{\cdot}4 \cdot 10^{4}$	$6 \cdot 10^{-6}$	$1{\cdot}4 \cdot 10^{3}$	$1{\cdot}4 \cdot 10^{3}$
	insoluble	$3{\cdot}0 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$3{\cdot}0 \cdot 10^{2}$	$1{\cdot}4 \cdot 10^{3}$
$^{14}_{6}C\ (Co_2)$	soluble insoluble	$8{\cdot}7 \cdot 10^{3}$	$4 \cdot 10^{-6}$	$8{\cdot}7 \cdot 10^{2}$	$6{\cdot}6 \cdot 10^{2}$
$^{18}_{9}F$	soluble	$1{\cdot}3 \cdot 10^{4}$	$5 \cdot 10^{-6}$	$1{\cdot}3 \cdot 10^{3}$	$6{\cdot}6 \cdot 10^{2}$
	insoluble	$6{\cdot}4 \cdot 10^{3}$	$3 \cdot 10^{-6}$	$6{\cdot}4 \cdot 10^{2}$	$4{\cdot}0 \cdot 10^{2}$
$^{22}_{11}Na$	soluble	$4{\cdot}3 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}3 \cdot 10^{1}$	$3{\cdot}2 \cdot 10^{1}$
	insoluble	$2{\cdot}1 \cdot 10^{1}$	$9 \cdot 10^{-9}$	$2{\cdot}1$	$2{\cdot}4 \cdot 10^{1}$
$^{24}_{11}Na$	soluble	$3{\cdot}1 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$3{\cdot}1 \cdot 10^{2}$	$1{\cdot}5 \cdot 10^{2}$
	insoluble	$3{\cdot}6 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}6 \cdot 10^{1}$	$2{\cdot}2 \cdot 10^{1}$
$^{31}_{14}Si$	soluble	$1{\cdot}4 \cdot 10^{4}$	$6 \cdot 10^{-6}$	$1{\cdot}4 \cdot 10^{3}$	$7{\cdot}0 \cdot 10^{2}$
	insoluble	$2{\cdot}5 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$2{\cdot}5 \cdot 10^{2}$	$1{\cdot}5 \cdot 10^{2}$
$^{35}_{16}S$	soluble	$6{\cdot}8 \cdot 10^{2}$	$3 \cdot 10^{-7}$	$6{\cdot}8 \cdot 10^{1}$	$5{\cdot}0 \cdot 10^{1}$
	insoluble	$6{\cdot}3 \cdot 10^{2}$	$3 \cdot 10^{-7}$	$6{\cdot}3 \cdot 10^{1}$	$2{\cdot}2 \cdot 10^{2}$
$^{36}_{17}Cl$	soluble	$8{\cdot}7 \cdot 10^{2}$	$4 \cdot 10^{-7}$	$8{\cdot}7 \cdot 10^{1}$	$6{\cdot}6 \cdot 10^{1}$
	insoluble	$5{\cdot}7 \cdot 10^{1}$	$2 \cdot 10^{-8}$	$5{\cdot}7$	$4{\cdot}6 \cdot 10^{1}$
$^{38}_{17}Cl$	soluble	$6{\cdot}4 \cdot 10^{3}$	$3 \cdot 10^{-6}$	$6{\cdot}4 \cdot 10^{2}$	$3{\cdot}2 \cdot 10^{2}$
	insoluble	$5{\cdot}1 \cdot 10^{3}$	$2 \cdot 10^{-6}$	$5{\cdot}1 \cdot 10^{2}$	$3{\cdot}2 \cdot 10^{2}$
$^{37}_{18}Ar$			$6 \cdot 10^{-3}$		
$^{41}_{18}Ar$			$2 \cdot 10^{-6}$		
$^{42}_{19}K$	soluble	$5{\cdot}0 \cdot 10^{3}$	$2 \cdot 10^{-6}$	$5{\cdot}0 \cdot 10^{2}$	$2{\cdot}5 \cdot 10^{2}$
	insoluble	$2{\cdot}7 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{1}$	$1{\cdot}6 \cdot 10^{1}$
$^{45}_{20}Ca$	soluble	$8{\cdot}0 \cdot 10^{1}$	$3 \cdot 10^{-8}$	8	$7{\cdot}3$
	insoluble	$3{\cdot}0 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}0 \cdot 10^{1}$	$1{\cdot}4 \cdot 10^{2}$
$^{47}_{20}Ca$	soluble	$4{\cdot}3 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}3 \cdot 10^{1}$	$4{\cdot}0 \cdot 10^{1}$
	insoluble	$4{\cdot}2 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}2 \cdot 10^{1}$	$2{\cdot}6 \cdot 10^{1}$
$^{46}_{21}Sc$	soluble	$6{\cdot}0 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$6{\cdot}0 \cdot 10^{1}$	$3{\cdot}0 \cdot 10^{1}$
	insoluble	$6{\cdot}0 \cdot 10^{1}$	$2 \cdot 10^{-8}$	6	$3{\cdot}0 \cdot 10^{1}$
$^{47}_{21}Sc$	soluble	$1{\cdot}5 \cdot 10^{3}$	$6 \cdot 10^{-7}$	$1{\cdot}5 \cdot 10^{2}$	$7{\cdot}1 \cdot 10^{1}$
	insoluble	$1{\cdot}2 \cdot 10^{3}$	$5 \cdot 10^{-7}$	$1{\cdot}2 \cdot 10^{2}$	$7{\cdot}1 \cdot 10^{1}$
$^{48}_{21}Sc$	soluble	$4{\cdot}3 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}3 \cdot 10^{1}$	$2{\cdot}2 \cdot 10^{1}$
	insoluble	$3{\cdot}5 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}5 \cdot 10^{1}$	$2{\cdot}2 \cdot 10^{1}$
$^{48}_{23}V$	soluble	$4{\cdot}5 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}5 \cdot 10^{1}$	$2{\cdot}3 \cdot 10^{1}$
	insoluble	$1{\cdot}4 \cdot 10^{2}$	$6 \cdot 10^{-8}$	$1{\cdot}4 \cdot 10^{1}$	$2{\cdot}3 \cdot 10^{1}$
$^{51}_{24}Cr$	soluble	$2{\cdot}6 \cdot 10^{4}$	$1 \cdot 10^{-5}$	$2{\cdot}6 \cdot 10^{3}$	$1{\cdot}3 \cdot 10^{3}$
	insoluble	$5{\cdot}6 \cdot 10^{3}$	$2 \cdot 10^{-6}$	$5{\cdot}6 \cdot 10^{2}$	$1{\cdot}2 \cdot 10^{3}$

Radionuclides	Form	Exposed workers		Members of public	
		Limits of annual intake by inhalation µCi	Derived limits of concentration in the air for an exposure of 2 000 h/year Ci/m³	Limits of annual intake by inhalation µCi	Limits of annual intake by ingestion µCi
1	2	3	4	5	6
$^{55}_{26}Fe$	soluble insoluble	$2{\cdot}1 \cdot 10^{3}$ $2{\cdot}6 \cdot 10^{3}$	$9 \cdot 10^{-7}$ $1 \cdot 10^{-6}$	$2{\cdot}1 \cdot 10^{2}$ $2{\cdot}6 \cdot 10^{2}$	$6{\cdot}3 \cdot 10^{2}$ $1{\cdot}8 \cdot 10^{3}$
$^{59}_{26}Fe$	soluble insoluble	$3{\cdot}7 \cdot 10^{2}$ $1{\cdot}3 \cdot 10^{2}$	$1 \cdot 10^{-7}$ $5 \cdot 10^{-8}$	$3{\cdot}7 \cdot 10^{1}$ $1{\cdot}3 \cdot 10^{1}$	$4{\cdot}7 \cdot 10^{1}$ $4{\cdot}2 \cdot 10^{1}$
$^{59}_{28}Ni$	soluble insoluble	$1{\cdot}2 \cdot 10^{3}$ $1{\cdot}9 \cdot 10^{3}$	$5 \cdot 10^{-7}$ $8 \cdot 10^{-7}$	$1{\cdot}2 \cdot 10^{2}$ $1{\cdot}9 \cdot 10^{2}$	$1{\cdot}6 \cdot 10^{2}$ $1{\cdot}6 \cdot 10^{3}$
$^{63}_{28}Ni$	soluble insoluble	$1{\cdot}6 \cdot 10^{2}$ $7{\cdot}0 \cdot 10^{2}$	$6 \cdot 10^{-8}$ $3 \cdot 10^{-7}$	$1{\cdot}6 \cdot 10^{1}$ $7{\cdot}0 \cdot 10^{1}$	$2{\cdot}2 \cdot 10^{1}$ $5{\cdot}7 \cdot 10^{2}$
$^{65}_{28}Ni$	soluble insoluble	$2{\cdot}3 \cdot 10^{3}$ $1{\cdot}3 \cdot 10^{3}$	$9 \cdot 10^{-7}$ $5 \cdot 10^{-7}$	$2{\cdot}3 \cdot 10^{2}$ $1{\cdot}3 \cdot 10^{2}$	$1{\cdot}1 \cdot 10^{2}$ $8{\cdot}0 \cdot 10^{1}$
$^{64}_{29}Cu$	soluble insoluble	$5{\cdot}3 \cdot 10^{3}$ $2{\cdot}6 \cdot 10^{3}$	$2 \cdot 10^{-6}$ $1 \cdot 10^{-6}$	$5{\cdot}3 \cdot 10^{2}$ $2{\cdot}6 \cdot 10^{2}$	$2{\cdot}6 \cdot 10^{2}$ $1{\cdot}7 \cdot 10^{2}$
$^{65}_{30}Zn$	soluble insoluble	$2{\cdot}6 \cdot 10^{2}$ $1{\cdot}5 \cdot 10^{2}$	$1 \cdot 10^{-7}$ $6 \cdot 10^{-8}$	$2{\cdot}6 \cdot 10^{1}$ $1{\cdot}5 \cdot 10^{1}$	$7{\cdot}9 \cdot 10^{1}$ $1{\cdot}4 \cdot 10^{2}$
$^{69m}_{30}Zn$	soluble insoluble	$9{\cdot}5 \cdot 10^{2}$ $8{\cdot}0 \cdot 10^{2}$	$4 \cdot 10^{-7}$ $3 \cdot 10^{-7}$	$9{\cdot}5 \cdot 10^{1}$ $8{\cdot}0 \cdot 10^{1}$	$5{\cdot}4 \cdot 10^{1}$ $4{\cdot}9 \cdot 10^{1}$
$^{69}_{30}Zn$	soluble insoluble	$1{\cdot}8 \cdot 10^{4}$ $2{\cdot}3 \cdot 10^{4}$	$7 \cdot 10^{-6}$ $9 \cdot 10^{-6}$	$1{\cdot}8 \cdot 10^{3}$ $2{\cdot}3 \cdot 10^{3}$	$1{\cdot}4 \cdot 10^{3}$ $1{\cdot}4 \cdot 10^{3}$
$^{72}_{31}Ga$	soluble insoluble	$5{\cdot}9 \cdot 10^{2}$ $4{\cdot}7 \cdot 10^{2}$	$2 \cdot 10^{-7}$ $2 \cdot 10^{-7}$	$5{\cdot}9 \cdot 10^{1}$ $4{\cdot}7 \cdot 10^{1}$	$3{\cdot}0 \cdot 10^{1}$ $3{\cdot}0 \cdot 10^{1}$
$^{71}_{32}Ge$	soluble insoluble	$2{\cdot}6 \cdot 10^{4}$ $1{\cdot}6 \cdot 10^{4}$	$1 \cdot 10^{-5}$ $6 \cdot 10^{-6}$	$2{\cdot}6 \cdot 10^{3}$ $1{\cdot}6 \cdot 10^{3}$	$1{\cdot}3 \cdot 10^{3}$ $1{\cdot}3 \cdot 10^{3}$
$^{73}_{33}As$	soluble insoluble	$5{\cdot}1 \cdot 10^{3}$ $9{\cdot}5 \cdot 10^{2}$	$2 \cdot 10^{-6}$ $4 \cdot 10^{-7}$	$5{\cdot}1 \cdot 10^{2}$ $9{\cdot}5 \cdot 10^{1}$	$3{\cdot}8 \cdot 10^{2}$ $3{\cdot}7 \cdot 10^{2}$
$^{74}_{33}As$	soluble insoluble	$8{\cdot}7 \cdot 10^{2}$ $3{\cdot}1 \cdot 10^{2}$	$3 \cdot 10^{-7}$ $1 \cdot 10^{-7}$	$8{\cdot}7 \cdot 10^{1}$ $3{\cdot}1 \cdot 10^{1}$	$4{\cdot}2 \cdot 10^{1}$ $4{\cdot}2 \cdot 10^{1}$
$^{76}_{33}As$	soluble insoluble	$3{\cdot}2 \cdot 10^{2}$ $2{\cdot}5 \cdot 10^{2}$	$1 \cdot 10^{-7}$ $1 \cdot 10^{-7}$	$3{\cdot}2 \cdot 10^{1}$ $2{\cdot}5 \cdot 10^{1}$	$1{\cdot}6 \cdot 10^{1}$ $1{\cdot}5 \cdot 10^{1}$
$^{77}_{33}As$	soluble insoluble	$1{\cdot}3 \cdot 10^{3}$ $1{\cdot}0 \cdot 10^{3}$	$5 \cdot 10^{-7}$ $4 \cdot 10^{-7}$	$1{\cdot}3 \cdot 10^{2}$ $1{\cdot}0 \cdot 10^{2}$	$6{\cdot}6 \cdot 10^{1}$ $6{\cdot}4 \cdot 10^{1}$
$^{75}_{34}Se$	soluble insoluble	$3{\cdot}1 \cdot 10^{3}$ $3{\cdot}1 \cdot 10^{2}$	$1 \cdot 10^{-6}$ $1 \cdot 10^{-7}$	$3{\cdot}1 \cdot 10^{2}$ $3{\cdot}1 \cdot 10^{1}$	$2{\cdot}4 \cdot 10^{2}$ $2{\cdot}2 \cdot 10^{2}$
$^{82}_{35}Br$	soluble insoluble	$2{\cdot}8 \cdot 10^{3}$ $4{\cdot}7 \cdot 10^{2}$	$1 \cdot 10^{-6}$ $2 \cdot 10^{-7}$	$2{\cdot}8 \cdot 10^{2}$ $4{\cdot}7 \cdot 10^{1}$	$2{\cdot}1 \cdot 10^{2}$ $3{\cdot}0 \cdot 10^{1}$
$^{86}_{37}Rb$	soluble insoluble	$7{\cdot}1 \cdot 10^{2}$ $1{\cdot}7 \cdot 10^{2}$	$3 \cdot 10^{-7}$ $7 \cdot 10^{-8}$	$7{\cdot}1 \cdot 10^{1}$ $1{\cdot}7 \cdot 10^{1}$	$5{\cdot}4 \cdot 10^{1}$ $1{\cdot}9 \cdot 10^{1}$
$^{90}_{39}Y$	soluble insoluble	$3{\cdot}2 \cdot 10^{2}$ $2{\cdot}6 \cdot 10^{2}$	$1 \cdot 10^{-7}$ $1 \cdot 10^{-7}$	$3{\cdot}2 \cdot 10^{1}$ $2{\cdot}6 \cdot 10^{1}$	$1{\cdot}6 \cdot 10^{1}$ $1{\cdot}6 \cdot 10^{1}$
$^{91m}_{39}Y$	soluble insoluble	$5{\cdot}5 \cdot 10^{4}$ $4{\cdot}3 \cdot 10^{4}$	$2 \cdot 10^{-5}$ $2 \cdot 10^{-5}$	$5{\cdot}5 \cdot 10^{3}$ $4{\cdot}3 \cdot 10^{3}$	$2{\cdot}7 \cdot 10^{3}$ $2{\cdot}7 \cdot 10^{3}$
$^{91}_{39}Y$	soluble insoluble	$8{\cdot}7 \cdot 10^{1}$ $8{\cdot}0 \cdot 10^{1}$	$4 \cdot 10^{-8}$ $3 \cdot 10^{-8}$	8·7 8·0	$2{\cdot}1 \cdot 10^{1}$ $2{\cdot}1 \cdot 10^{1}$

Radionuclides	Form	Exposed workers		Members of public	
		Limits of annual intake by inhalation µCi	Derived limits of concentration in the air for an exposure of 2 000 h/year Ci/m³	Limits of annual intake by inhalation µCi	Limits of annual intake by ingestion µCi
1	2	3	4	5	6
$^{92}_{39}Y$	soluble insoluble	$9{\cdot}5 \cdot 10^{2}$ $7{\cdot}3 \cdot 10^{2}$	$4 \cdot 10^{-7}$ $3 \cdot 10^{-7}$	$9{\cdot}5 \cdot 10^{1}$ $7{\cdot}3 \cdot 10^{1}$	$4{\cdot}6 \cdot 10^{1}$ $4{\cdot}6 \cdot 10^{1}$
$^{93}_{39}Y$	soluble insoluble	$4{\cdot}3 \cdot 10^{2}$ $3{\cdot}4 \cdot 10^{2}$	$2 \cdot 10^{-7}$ $1 \cdot 10^{-7}$	$4{\cdot}3 \cdot 10^{1}$ $3{\cdot}4 \cdot 10^{1}$	$2{\cdot}2 \cdot 10^{1}$ $2{\cdot}2 \cdot 10^{1}$
$^{96m}_{43}Tc$	soluble insoluble	$1{\cdot}9 \cdot 10^{5}$ $7{\cdot}3 \cdot 10^{4}$	$8 \cdot 10^{-5}$ $3 \cdot 10^{-5}$	$1{\cdot}9 \cdot 10^{4}$ $7{\cdot}3 \cdot 10^{3}$	$9{\cdot}6 \cdot 10^{3}$ $8{\cdot}0 \cdot 10^{3}$
$^{96}_{43}Tc$	soluble insoluble	$1{\cdot}6 \cdot 10^{3}$ $6{\cdot}0 \cdot 10^{2}$	$6 \cdot 10^{-7}$ $2 \cdot 10^{-7}$	$1{\cdot}6 \cdot 10^{2}$ $6{\cdot}0 \cdot 10^{1}$	$7{\cdot}8 \cdot 10^{1}$ $3{\cdot}8 \cdot 10^{1}$
$^{97m}_{43}Tc$	soluble insoluble	$5{\cdot}8 \cdot 10^{3}$ $3{\cdot}8 \cdot 10^{2}$	$2 \cdot 10^{-6}$ $2 \cdot 10^{-7}$	$5{\cdot}8 \cdot 10^{2}$ $3{\cdot}8 \cdot 10^{1}$	$2{\cdot}8 \cdot 10^{2}$ $1{\cdot}4 \cdot 10^{2}$
$^{97}_{43}Tc$	soluble insoluble	$2{\cdot}7 \cdot 10^{4}$ $7{\cdot}3 \cdot 10^{2}$	$1 \cdot 10^{-5}$ $3 \cdot 10^{-7}$	$2{\cdot}7 \cdot 10^{3}$ $7{\cdot}3 \cdot 10^{1}$	$1{\cdot}4 \cdot 10^{3}$ $6{\cdot}4 \cdot 10^{2}$
$^{99m}_{43}Tc$	soluble insoluble	$9{\cdot}5 \cdot 10^{4}$ $3{\cdot}5 \cdot 10^{4}$	$4 \cdot 10^{-5}$ $1 \cdot 10^{-5}$	$9{\cdot}5 \cdot 10^{3}$ $3{\cdot}5 \cdot 10^{3}$	$4{\cdot}6 \cdot 10^{3}$ $2{\cdot}2 \cdot 10^{3}$
$^{99}_{43}Tc$	soluble insoluble	$5{\cdot}3 \cdot 10^{3}$ $1{\cdot}5 \cdot 10^{2}$	$2 \cdot 10^{-6}$ $6 \cdot 10^{-8}$	$5{\cdot}3 \cdot 10^{2}$ $1{\cdot}5 \cdot 10^{1}$	$2{\cdot}6 \cdot 10^{2}$ $1{\cdot}3 \cdot 10^{2}$
$^{97}_{44}Ru$	soluble insoluble	$5{\cdot}8 \cdot 10^{3}$ $4{\cdot}4 \cdot 10^{3}$	$2 \cdot 10^{-6}$ $2 \cdot 10^{-6}$	$5{\cdot}8 \cdot 10^{2}$ $4{\cdot}4 \cdot 10^{2}$	$2{\cdot}9 \cdot 10^{2}$ $2{\cdot}8 \cdot 10^{2}$
$^{103}_{44}Ru$	soluble insoluble	$1{\cdot}3 \cdot 10^{3}$ $2{\cdot}1 \cdot 10^{2}$	$5 \cdot 10^{-7}$ $8 \cdot 10^{-8}$	$1{\cdot}3 \cdot 10^{2}$ $2{\cdot}1 \cdot 10^{1}$	$6{\cdot}6 \cdot 10^{1}$ $6{\cdot}4 \cdot 10^{1}$
$^{105}_{44}Ru$	soluble insoluble	$1{\cdot}8 \cdot 10^{3}$ $1{\cdot}3 \cdot 10^{3}$	$7 \cdot 10^{-7}$ $5 \cdot 10^{-7}$	$1{\cdot}8 \cdot 10^{2}$ $1{\cdot}3 \cdot 10^{2}$	$8{\cdot}8 \cdot 10^{1}$ $8{\cdot}0 \cdot 10^{1}$
$^{106}_{44}Ru$	soluble insoluble	$1{\cdot}9 \cdot 10^{2}$ $1{\cdot}4 \cdot 10^{1}$	$8 \cdot 10^{-8}$ $6 \cdot 10^{-9}$	$1{\cdot}9 \cdot 10^{1}$ 1·4	9·6 9·6
$^{103m}_{45}Rh$	soluble insoluble	$1{\cdot}9 \cdot 10^{5}$ $1{\cdot}5 \cdot 10^{5}$	$8 \cdot 10^{-5}$ $6 \cdot 10^{-5}$	$1{\cdot}9 \cdot 10^{4}$ $1{\cdot}5 \cdot 10^{4}$	$9{\cdot}6 \cdot 10^{3}$ $9{\cdot}6 \cdot 10^{3}$
$^{105}_{45}Rh$	soluble insoluble	$2{\cdot}1 \cdot 10^{3}$ $1{\cdot}3 \cdot 10^{3}$	$8 \cdot 10^{-7}$ $5 \cdot 10^{-7}$	$2{\cdot}1 \cdot 10^{2}$ $1{\cdot}3 \cdot 10^{2}$	$1{\cdot}0 \cdot 10^{2}$ $8{\cdot}0 \cdot 10^{1}$
$^{103}_{46}Pd$	soluble insoluble	$3{\cdot}4 \cdot 10^{3}$ $1{\cdot}9 \cdot 10^{3}$	$1 \cdot 10^{-6}$ $7 \cdot 10^{-7}$	$3{\cdot}4 \cdot 10^{2}$ $1{\cdot}9 \cdot 10^{2}$	$2{\cdot}7 \cdot 10^{2}$ $2{\cdot}2 \cdot 10^{2}$
$^{109}_{46}Pd$	soluble insoluble	$1{\cdot}4 \cdot 10^{3}$ $8{\cdot}7 \cdot 10^{2}$	$6 \cdot 10^{-7}$ $4 \cdot 10^{-7}$	$1{\cdot}4 \cdot 10^{2}$ $8{\cdot}7 \cdot 10^{1}$	$7{\cdot}0 \cdot 10^{1}$ $5{\cdot}6 \cdot 10^{1}$
$^{105}_{47}Ag$	soluble insoluble	$1{\cdot}5 \cdot 10^{3}$ $2{\cdot}0 \cdot 10^{2}$	$6 \cdot 10^{-7}$ $8 \cdot 10^{-8}$	$1{\cdot}5 \cdot 10^{2}$ $2{\cdot}0 \cdot 10^{1}$	$7{\cdot}8 \cdot 10^{1}$ $7{\cdot}7 \cdot 10^{1}$
$^{110m}_{47}Ag$	soluble insoluble	$4{\cdot}8 \cdot 10^{2}$ $2{\cdot}6 \cdot 10^{1}$	$2 \cdot 10^{-7}$ $1 \cdot 10^{-8}$	$4{\cdot}8 \cdot 10^{1}$ 2·6	$2{\cdot}4 \cdot 10^{1}$ $2{\cdot}4 \cdot 10^{1}$
$^{111}_{47}Ag$	soluble insoluble	$7{\cdot}1 \cdot 10^{2}$ $5{\cdot}5 \cdot 10^{2}$	$3 \cdot 10^{-7}$ $2 \cdot 10^{-7}$	$7{\cdot}1 \cdot 10^{1}$ $5{\cdot}5 \cdot 10^{1}$	$3{\cdot}5 \cdot 10^{1}$ $3{\cdot}4 \cdot 10^{1}$
$^{109}_{48}Cd$	soluble insoluble	$1{\cdot}3 \cdot 10^{2}$ $1{\cdot}8 \cdot 10^{2}$	$5 \cdot 10^{-8}$ $7 \cdot 10^{-8}$	$1{\cdot}3 \cdot 10^{1}$ $1{\cdot}8 \cdot 10^{1}$	$1{\cdot}4 \cdot 10^{2}$ $1{\cdot}4 \cdot 10^{2}$
$^{115m}_{48}Cd$	soluble insoluble	$8{\cdot}7 \cdot 10^{1}$ $8{\cdot}7 \cdot 10^{1}$	$4 \cdot 10^{-8}$ $4 \cdot 10^{-8}$	8·7 8·7	$2{\cdot}0 \cdot 10^{1}$ $2{\cdot}0 \cdot 10^{1}$

Radionuclides	Form	Exposed workers		Members of public	
		Limits of annual intake by inhalation µCi	Derived limits of concentration in the air for an exposure of 2 000 h/year Ci/m³	Limits of annual intake by inhalation µCi	Limits of annual intake by ingestion µCi
1	2	3	4	5	6
$^{115}_{48}Cd$	soluble	$5{\cdot}5 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$5{\cdot}5 \cdot 10^{1}$	$2{\cdot}7 \cdot 10^{1}$
	insoluble	$4{\cdot}6 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}6 \cdot 10^{1}$	$2{\cdot}9 \cdot 10^{1}$
$^{113m}_{49}In$	soluble	$2{\cdot}1 \cdot 10^{4}$	$8 \cdot 10^{-6}$	$2{\cdot}1 \cdot 10^{3}$	$1{\cdot}0 \cdot 10^{3}$
	insoluble	$1{\cdot}7 \cdot 10^{4}$	$7 \cdot 10^{-6}$	$1{\cdot}7 \cdot 10^{3}$	$1{\cdot}0 \cdot 10^{3}$
$^{114m}_{49}In$	soluble	$2{\cdot}6 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$2{\cdot}6 \cdot 10^{1}$	$1{\cdot}4 \cdot 10^{1}$
	insoluble	$5{\cdot}4 \cdot 10^{1}$	$2 \cdot 10^{-8}$	$5{\cdot}4$	$1{\cdot}4 \cdot 10^{1}$
$^{115m}_{49}In$	soluble	$5{\cdot}9 \cdot 10^{3}$	$2 \cdot 10^{-6}$	$5{\cdot}9 \cdot 10^{2}$	$3{\cdot}0 \cdot 10^{2}$
	insoluble	$4{\cdot}7 \cdot 10^{3}$	$2 \cdot 10^{-6}$	$4{\cdot}7 \cdot 10^{2}$	$3{\cdot}0 \cdot 10^{2}$
$^{113}_{50}Sn$	soluble	$8{\cdot}7 \cdot 10^{2}$	$4 \cdot 10^{-7}$	$8{\cdot}7 \cdot 10^{1}$	$6{\cdot}8 \cdot 10^{1}$
	insoluble	$1{\cdot}3 \cdot 10^{2}$	$5 \cdot 10^{-8}$	$1{\cdot}3 \cdot 10^{1}$	$6{\cdot}5 \cdot 10^{1}$
$^{125}_{50}Sn$	soluble	$2{\cdot}9 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$2{\cdot}9 \cdot 10^{1}$	$1{\cdot}4 \cdot 10^{1}$
	insoluble	$2{\cdot}1 \cdot 10^{2}$	$8 \cdot 10^{-8}$	$2{\cdot}1 \cdot 10^{1}$	$1{\cdot}4 \cdot 10^{1}$
$^{122}_{51}Sb$	soluble	$4{\cdot}7 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}7 \cdot 10^{1}$	$2{\cdot}3 \cdot 10^{1}$
	insoluble	$3{\cdot}6 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}6 \cdot 10^{1}$	$2{\cdot}3 \cdot 10^{1}$
$^{124}_{51}Sb$	soluble	$3{\cdot}7 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$3{\cdot}7 \cdot 10^{1}$	$1{\cdot}8 \cdot 10^{1}$
	insoluble	$4{\cdot}8 \cdot 10^{1}$	$2 \cdot 10^{-8}$	$4{\cdot}8$	$1{\cdot}8 \cdot 10^{1}$
$^{125}_{51}Sb$	soluble	$1{\cdot}3 \cdot 10^{3}$	$5 \cdot 10^{-7}$	$1{\cdot}3 \cdot 10^{2}$	$8{\cdot}0 \cdot 10^{1}$
	insoluble	$6{\cdot}6 \cdot 10^{1}$	$3 \cdot 10^{-8}$	$6{\cdot}6$	$7{\cdot}9 \cdot 10^{1}$
$^{131m}_{54}Xe$			$2 \cdot 10^{-5}$		
$^{133}_{54}Xe$			$1 \cdot 10^{-5}$		
$^{135}_{54}Xe$			$4 \cdot 10^{-6}$		
$^{131}_{56}Ba$	soluble	$2{\cdot}9 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$2{\cdot}9 \cdot 10^{2}$	$1{\cdot}4 \cdot 10^{2}$
	insoluble	$8{\cdot}7 \cdot 10^{2}$	$4 \cdot 10^{-7}$	$8{\cdot}7 \cdot 10^{1}$	$1{\cdot}4 \cdot 10^{2}$
$^{140}_{56}Ba$	soluble	$3{\cdot}2 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}2 \cdot 10^{1}$	$2{\cdot}1 \cdot 10^{1}$
	insoluble	$1{\cdot}1 \cdot 10^{2}$	$4 \cdot 10^{-8}$	$1{\cdot}1 \cdot 10^{1}$	$2{\cdot}0 \cdot 10^{1}$
$^{140}_{57}La$	soluble	$3{\cdot}9 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$3{\cdot}9 \cdot 10^{1}$	$1{\cdot}9 \cdot 10^{1}$
	insoluble	$3{\cdot}1 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}1 \cdot 10^{1}$	$1{\cdot}9 \cdot 10^{1}$
$^{142}_{59}Pr$	soluble	$4{\cdot}8 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}8 \cdot 10^{1}$	$2{\cdot}4 \cdot 10^{1}$
	insoluble	$3{\cdot}9 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$3{\cdot}9 \cdot 10^{1}$	$2{\cdot}4 \cdot 10^{1}$
$^{143}_{59}Pr$	soluble	$8{\cdot}0 \cdot 10^{2}$	$3 \cdot 10^{-7}$	$8{\cdot}0 \cdot 10^{1}$	$3{\cdot}9 \cdot 10^{1}$
	insoluble	$4{\cdot}4 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}4 \cdot 10^{1}$	$3{\cdot}9 \cdot 10^{1}$
$^{147}_{60}Nd$	soluble	$8{\cdot}7 \cdot 10^{2}$	$4 \cdot 10^{-7}$	$8{\cdot}7 \cdot 10^{1}$	$4{\cdot}9 \cdot 10^{1}$
	insoluble	$5{\cdot}7 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$5{\cdot}7 \cdot 10^{1}$	$4{\cdot}9 \cdot 10^{1}$
$^{149}_{60}Nd$	soluble	$4{\cdot}5 \cdot 10^{3}$	$2 \cdot 10^{-6}$	$4{\cdot}5 \cdot 10^{2}$	$2{\cdot}2 \cdot 10^{2}$
	insoluble	$3{\cdot}6 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$3{\cdot}6 \cdot 10^{2}$	$2{\cdot}2 \cdot 10^{2}$
$^{147}_{61}Pm$	soluble	$1{\cdot}6 \cdot 10^{2}$	$6 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{1}$	$1{\cdot}8 \cdot 10^{2}$
	insoluble	$2{\cdot}4 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$2{\cdot}4 \cdot 10^{1}$	$1{\cdot}8 \cdot 10^{2}$
$^{149}_{61}Pm$	soluble	$7{\cdot}1 \cdot 10^{2}$	$3 \cdot 10^{-7}$	$7{\cdot}1 \cdot 10^{1}$	$3{\cdot}5 \cdot 10^{1}$
	insoluble	$5{\cdot}6 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$5{\cdot}6 \cdot 10^{1}$	$3{\cdot}5 \cdot 10^{1}$

Radionuclides	Form	Exposed workers		Members of public	
		Limits of annual intake by inhalation µCi	Derived limits of concentration in the air for an exposure of 2 000 h/year Ci/m³	Limits of annual intake by inhalation µCi	Limits of annual intake by ingestion µCi
1	2	3	4	5	6
$^{151}_{62}$Sm	soluble	$1{\cdot}6 \cdot 10^{2}$	$6 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{1}$	$3{\cdot}0 \cdot 10^{2}$
	insoluble	$3{\cdot}5 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}5 \cdot 10^{1}$	$3{\cdot}0 \cdot 10^{2}$
$^{153}_{62}$Sm	soluble	$1{\cdot}2 \cdot 10^{3}$	$5 \cdot 10^{-7}$	$1{\cdot}2 \cdot 10^{2}$	$6{\cdot}2 \cdot 10^{1}$
	insoluble	$1{\cdot}0 \cdot 10^{3}$	$4 \cdot 10^{-7}$	$1{\cdot}0 \cdot 10^{2}$	$6{\cdot}2 \cdot 10^{1}$
$^{152m}_{63}$Eu	soluble	$1{\cdot}0 \cdot 10^{3}$	$4 \cdot 10^{-7}$	$1{\cdot}0 \cdot 10^{2}$	$5{\cdot}0 \cdot 10^{1}$
	insoluble	$8{\cdot}0 \cdot 10^{2}$	$3 \cdot 10^{-7}$	$8{\cdot}0 \cdot 10^{1}$	$5{\cdot}0 \cdot 10^{1}$
$^{152}_{63}$Eu	soluble	$3{\cdot}1 \cdot 10^{1}$	$1 \cdot 10^{-8}$	$3{\cdot}1$	$6{\cdot}1 \cdot 10^{1}$
	insoluble	$4{\cdot}6 \cdot 10^{1}$	$2 \cdot 10^{-8}$	$4{\cdot}6$	$6{\cdot}1 \cdot 10^{1}$
$^{154}_{63}$Eu	soluble	$9{\cdot}5$	$4 \cdot 10^{-9}$	$9{\cdot}5 \cdot 10^{1}$	$1{\cdot}8 \cdot 10^{1}$
	insoluble	$1{\cdot}8 \cdot 10^{1}$	$7 \cdot 10^{-9}$	$1{\cdot}8$	$1{\cdot}8 \cdot 10^{1}$
$^{155}_{63}$Eu	soluble	$2{\cdot}3 \cdot 10^{2}$	$9 \cdot 10^{-8}$	$2{\cdot}3 \cdot 10^{1}$	$1{\cdot}6 \cdot 10^{2}$
	insoluble	$1{\cdot}8 \cdot 10^{2}$	$7 \cdot 10^{-8}$	$1{\cdot}8 \cdot 10^{1}$	$1{\cdot}6 \cdot 10^{2}$
$^{153}_{64}$Gd	soluble	$5{\cdot}6 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$5{\cdot}6 \cdot 10^{1}$	$1{\cdot}7 \cdot 10^{2}$
	insoluble	$2{\cdot}3 \cdot 10^{2}$	$9 \cdot 10^{-8}$	$2{\cdot}3 \cdot 10^{1}$	$1{\cdot}7 \cdot 10^{2}$
$^{159}_{64}$Gd	soluble	$1{\cdot}2 \cdot 10^{3}$	$5 \cdot 10^{-7}$	$1{\cdot}2 \cdot 10^{2}$	$6{\cdot}2 \cdot 10^{1}$
	insoluble	$1{\cdot}0 \cdot 10^{3}$	$4 \cdot 10^{-7}$	$1{\cdot}0 \cdot 10^{2}$	$6{\cdot}2 \cdot 10^{1}$
$^{160}_{65}$Tb	soluble	$2{\cdot}5 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$2{\cdot}5 \cdot 10^{1}$	$3{\cdot}5 \cdot 10^{1}$
	insoluble	$8{\cdot}0 \cdot 10^{1}$	$3 \cdot 10^{-8}$	$8{\cdot}0$	$3{\cdot}6 \cdot 10^{1}$
$^{165}_{66}$Dy	soluble	$6{\cdot}4 \cdot 10^{3}$	$3 \cdot 10^{-6}$	$6{\cdot}4 \cdot 10^{2}$	$3{\cdot}2 \cdot 10^{2}$
	insoluble	$5{\cdot}2 \cdot 10^{3}$	$2 \cdot 10^{-6}$	$5{\cdot}2 \cdot 10^{2}$	$3{\cdot}2 \cdot 10^{2}$
$^{166}_{66}$Dy	soluble	$6{\cdot}1 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$6{\cdot}1 \cdot 10^{1}$	$3{\cdot}0 \cdot 10^{1}$
	insoluble	$4{\cdot}9 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}9 \cdot 10^{1}$	$3{\cdot}0 \cdot 10^{1}$
$^{166}_{67}$Ho	soluble	$5{\cdot}0 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$5{\cdot}0 \cdot 10^{1}$	$2{\cdot}5 \cdot 10^{1}$
	insoluble	$4{\cdot}1 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}1 \cdot 10^{1}$	$2{\cdot}5 \cdot 10^{1}$
$^{169}_{68}$Er	soluble	$1{\cdot}5 \cdot 10^{3}$	$6 \cdot 10^{-7}$	$1{\cdot}5 \cdot 10^{2}$	$7{\cdot}4 \cdot 10^{1}$
	insoluble	$9{\cdot}5 \cdot 10^{2}$	$4 \cdot 10^{-7}$	$9{\cdot}5 \cdot 10^{1}$	$7{\cdot}4 \cdot 10^{1}$
$^{171}_{68}$Er	soluble	$1{\cdot}8 \cdot 10^{3}$	$7 \cdot 10^{-7}$	$1{\cdot}8 \cdot 10^{2}$	$8{\cdot}8 \cdot 10^{1}$
	insoluble	$1{\cdot}5 \cdot 10^{3}$	$6 \cdot 10^{-7}$	$1{\cdot}5 \cdot 10^{2}$	$8{\cdot}8 \cdot 10^{1}$
$^{170}_{69}$Tm	soluble	$8{\cdot}7 \cdot 10^{1}$	$4 \cdot 10^{-8}$	$8{\cdot}7$	$3{\cdot}7 \cdot 10^{1}$
	insoluble	$8{\cdot}7 \cdot 10^{1}$	$3 \cdot 10^{-8}$	$8{\cdot}7$	$3{\cdot}7 \cdot 10^{1}$
$^{171}_{69}$Tm	soluble	$2{\cdot}8 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$2{\cdot}8 \cdot 10^{1}$	$4{\cdot}1 \cdot 10^{2}$
	insoluble	$5{\cdot}8 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$5{\cdot}8 \cdot 10^{1}$	$4{\cdot}1 \cdot 10^{2}$
$^{175}_{70}$Yb	soluble	$1{\cdot}8 \cdot 10^{3}$	$7 \cdot 10^{-7}$	$1{\cdot}8 \cdot 10^{2}$	$8{\cdot}8 \cdot 10^{1}$
	insoluble	$1{\cdot}5 \cdot 10^{3}$	$6 \cdot 10^{-7}$	$1{\cdot}5 \cdot 10^{2}$	$8{\cdot}8 \cdot 10^{1}$
$^{177}_{71}$Lu	soluble	$1{\cdot}6 \cdot 10^{3}$	$6 \cdot 10^{-7}$	$1{\cdot}6 \cdot 10^{2}$	$8{\cdot}0 \cdot 10^{1}$
	insoluble	$1{\cdot}3 \cdot 10^{3}$	$5 \cdot 10^{-7}$	$1{\cdot}3 \cdot 10^{2}$	$8{\cdot}0 \cdot 10^{1}$
$^{181}_{72}$Hf	soluble	$9{\cdot}5 \cdot 10^{1}$	$4 \cdot 10^{-8}$	$9{\cdot}5$	$5{\cdot}6 \cdot 10^{1}$
	insoluble	$1{\cdot}8 \cdot 10^{2}$	$7 \cdot 10^{-8}$	$1{\cdot}8 \cdot 10^{1}$	$5{\cdot}6 \cdot 10^{1}$
$^{182}_{73}$Ta	soluble	$9{\cdot}5 \cdot 10^{1}$	$4 \cdot 10^{-8}$	$9{\cdot}5$	$3{\cdot}2 \cdot 10^{1}$
	insoluble	$5{\cdot}5 \cdot 10^{1}$	$2 \cdot 10^{-8}$	$5{\cdot}5$	$3{\cdot}2 \cdot 10^{1}$
$^{181}_{74}$W	soluble	$5{\cdot}8 \cdot 10^{3}$	$2 \cdot 10^{-6}$	$5{\cdot}8 \cdot 10^{2}$	$2{\cdot}9 \cdot 10^{2}$
	insoluble	$3{\cdot}1 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}1 \cdot 10^{1}$	$2{\cdot}6 \cdot 10^{2}$

Radionuclides	Form	Exposed workers		Members of public	
		Limits of annual intake by inhalation µCi	Derived limits of concentration in the air for an exposure of 2 000 h/year Ci/m³	Limits of annual intake by inhalation µCi	Limits of annual intake by ingestion µCi
1	2	3	4	5	6
$^{185}_{74}W$	soluble	$1{\cdot}9 \cdot 10^{3}$	$8 \cdot 10^{-7}$	$1{\cdot}9 \cdot 10^{2}$	$9{\cdot}6 \cdot 10^{1}$
	insoluble	$2{\cdot}8 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$2{\cdot}8 \cdot 10^{1}$	$8{\cdot}8 \cdot 10^{1}$
$^{187}_{74}W$	soluble	$1{\cdot}1 \cdot 10^{3}$	$4 \cdot 10^{-7}$	$1{\cdot}1 \cdot 10^{2}$	$5{\cdot}4 \cdot 10^{1}$
	insoluble	$8{\cdot}0 \cdot 10^{2}$	$3 \cdot 10^{-7}$	$8{\cdot}0 \cdot 10^{1}$	$5{\cdot}0 \cdot 10^{1}$
$^{183}_{75}Re$	soluble	$6{\cdot}4 \cdot 10^{3}$	$3 \cdot 10^{-6}$	$6{\cdot}4 \cdot 10^{2}$	$4{\cdot}5 \cdot 10^{2}$
	insoluble	$3{\cdot}9 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$3{\cdot}9 \cdot 10^{1}$	$2{\cdot}2 \cdot 10^{2}$
$^{186}_{75}Re$	soluble	$1{\cdot}5 \cdot 10^{3}$	$6 \cdot 10^{-7}$	$1{\cdot}5 \cdot 10^{2}$	$7{\cdot}4 \cdot 10^{1}$
	insoluble	$6{\cdot}0 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$6{\cdot}0 \cdot 10^{1}$	$3{\cdot}8 \cdot 10^{1}$
$^{188}_{75}Re$	soluble	$1{\cdot}0 \cdot 10^{3}$	$4 \cdot 10^{-7}$	$1{\cdot}0 \cdot 10^{2}$	$5{\cdot}0 \cdot 10^{1}$
	insoluble	$4{\cdot}0 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}0 \cdot 10^{1}$	$2{\cdot}5 \cdot 10^{1}$
$^{185}_{76}Os$	soluble	$1{\cdot}2 \cdot 10^{3}$	$5 \cdot 10^{-7}$	$1{\cdot}2 \cdot 10^{2}$	$5{\cdot}9 \cdot 10^{1}$
	insoluble	$1{\cdot}2 \cdot 10^{2}$	$5 \cdot 10^{-8}$	$1{\cdot}2 \cdot 10^{1}$	$5{\cdot}3 \cdot 10^{1}$
$^{191m}_{76}Os$	soluble	$4{\cdot}0 \cdot 10^{4}$	$2 \cdot 10^{-5}$	$4{\cdot}0 \cdot 10^{3}$	$2{\cdot}0 \cdot 10^{3}$
	insoluble	$2{\cdot}3 \cdot 10^{4}$	$9 \cdot 10^{-6}$	$2{\cdot}3 \cdot 10^{3}$	$1{\cdot}9 \cdot 10^{3}$
$^{191}_{76}Os$	soluble	$2{\cdot}7 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{2}$	$1{\cdot}4 \cdot 10^{2}$
	insoluble	$1{\cdot}0 \cdot 10^{3}$	$4 \cdot 10^{-7}$	$1{\cdot}0 \cdot 10^{2}$	$1{\cdot}3 \cdot 10^{2}$
$^{193}_{76}Os$	soluble	$9{\cdot}5 \cdot 10^{2}$	$4 \cdot 10^{-7}$	$9{\cdot}5 \cdot 10^{1}$	$4{\cdot}7 \cdot 10^{1}$
	insoluble	$6{\cdot}8 \cdot 10^{2}$	$3 \cdot 10^{-7}$	$6{\cdot}8 \cdot 10^{1}$	$4{\cdot}2 \cdot 10^{1}$
$^{190}_{77}Ir$	soluble	$3{\cdot}2 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$3{\cdot}2 \cdot 10^{2}$	$1{\cdot}6 \cdot 10^{2}$
	insoluble	$1{\cdot}0 \cdot 10^{3}$	$4 \cdot 10^{-7}$	$1{\cdot}0 \cdot 10^{2}$	$1{\cdot}4 \cdot 10^{2}$
$^{192}_{77}Ir$	soluble	$3{\cdot}1 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}1 \cdot 10^{1}$	$3{\cdot}2 \cdot 10^{1}$
	insoluble	$6{\cdot}4 \cdot 10^{1}$	$3 \cdot 10^{-8}$	$6{\cdot}4$	$3{\cdot}0 \cdot 10^{1}$
$^{194}_{77}Ir$	soluble	$5{\cdot}5 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$5{\cdot}5 \cdot 10^{1}$	$2{\cdot}7 \cdot 10^{1}$
	insoluble	$3{\cdot}9 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$3{\cdot}9 \cdot 10^{1}$	$2{\cdot}4 \cdot 10^{1}$
$^{191}_{78}Pt$	soluble	$1{\cdot}9 \cdot 10^{3}$	$8 \cdot 10^{-7}$	$1{\cdot}9 \cdot 10^{2}$	$9{\cdot}6 \cdot 10^{1}$
	insoluble	$1{\cdot}4 \cdot 10^{3}$	$6 \cdot 10^{-7}$	$1{\cdot}4 \cdot 10^{2}$	$8{\cdot}8 \cdot 10^{1}$
$^{193m}_{78}Pt$	soluble	$1{\cdot}8 \cdot 10^{4}$	$7 \cdot 10^{-6}$	$1{\cdot}8 \cdot 10^{3}$	$8{\cdot}8 \cdot 10^{2}$
	insoluble	$1{\cdot}3 \cdot 10^{4}$	$5 \cdot 10^{-6}$	$1{\cdot}3 \cdot 10^{3}$	$8{\cdot}0 \cdot 10^{2}$
$^{193}_{78}Pt$	soluble	$2{\cdot}6 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$2{\cdot}6 \cdot 10^{2}$	$7{\cdot}5 \cdot 10^{2}$
	insoluble	$8{\cdot}0 \cdot 10^{2}$	$3 \cdot 10^{-7}$	$8{\cdot}0 \cdot 10^{1}$	$1{\cdot}2 \cdot 10^{3}$
$^{197m}_{78}Pt$	soluble	$1{\cdot}6 \cdot 10^{4}$	$6 \cdot 10^{-6}$	$1{\cdot}6 \cdot 10^{3}$	$8{\cdot}0 \cdot 10^{2}$
	insoluble	$1{\cdot}2 \cdot 10^{4}$	$5 \cdot 10^{-6}$	$1{\cdot}2 \cdot 10^{3}$	$7{\cdot}4 \cdot 10^{2}$
$^{197}_{78}Pt$	soluble	$1{\cdot}9 \cdot 10^{3}$	$8 \cdot 10^{-7}$	$1{\cdot}9 \cdot 10^{2}$	$9{\cdot}6 \cdot 10^{1}$
	insoluble	$1{\cdot}4 \cdot 10^{3}$	$6 \cdot 10^{-7}$	$1{\cdot}4 \cdot 10^{2}$	$8{\cdot}8 \cdot 10^{1}$
$^{196}_{79}Au$	soluble	$2{\cdot}6 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$2{\cdot}6 \cdot 10^{2}$	$1{\cdot}3 \cdot 10^{2}$
	insoluble	$1{\cdot}5 \cdot 10^{3}$	$6 \cdot 10^{-7}$	$1{\cdot}5 \cdot 10^{2}$	$1{\cdot}2 \cdot 10^{2}$
$^{198}_{79}Au$	soluble	$8{\cdot}0 \cdot 10^{2}$	$3 \cdot 10^{-7}$	$8{\cdot}0 \cdot 10^{1}$	$4{\cdot}1 \cdot 10^{1}$
	insoluble	$5{\cdot}9 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$5{\cdot}9 \cdot 10^{1}$	$3{\cdot}7 \cdot 10^{1}$
$^{199}_{79}Au$	soluble	$2{\cdot}7 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$2{\cdot}7 \cdot 10^{2}$	$1{\cdot}4 \cdot 10^{2}$
	insoluble	$2{\cdot}0 \cdot 10^{3}$	$8 \cdot 10^{-7}$	$2{\cdot}0 \cdot 10^{2}$	$1{\cdot}3 \cdot 10^{2}$
$^{197m}_{80}Hg$	soluble	$1{\cdot}8 \cdot 10^{3}$	$7 \cdot 10^{-7}$	$1{\cdot}8 \cdot 10^{2}$	$1{\cdot}5 \cdot 10^{2}$
	insoluble	$2{\cdot}1 \cdot 10^{3}$	$8 \cdot 10^{-7}$	$2{\cdot}1 \cdot 10^{2}$	$1{\cdot}4 \cdot 10^{2}$

Radionuclides	Form	Exposed workers		Members of public	
		Limits of annual intake by inhalation µCi	Derived limits of concentration in the air for an exposure of 2 000 h/year Ci/m³	Limits of annual intake by inhalation µCi	Limits of annual intake by ingestion µCi
1	2	3	4	5	6
$^{197}_{80}Hg$	soluble	$2{\cdot}9 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$2{\cdot}9 \cdot 10^{2}$	$2{\cdot}4 \cdot 10^{2}$
	insoluble	$6{\cdot}2 \cdot 10^{3}$	$3 \cdot 10^{-6}$	$6{\cdot}2 \cdot 10^{2}$	$3{\cdot}9 \cdot 10^{2}$
$^{203}_{80}Hg$	soluble	$1{\cdot}8 \cdot 10^{2}$	$7 \cdot 10^{-8}$	$1{\cdot}8 \cdot 10^{1}$	$1{\cdot}4 \cdot 10^{1}$
	insoluble	$3{\cdot}1 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}1 \cdot 10^{1}$	$8{\cdot}8 \cdot 10^{1}$
$^{200}_{81}Tl$	soluble	$6{\cdot}6 \cdot 10^{3}$	$3 \cdot 10^{-6}$	$6{\cdot}6 \cdot 10^{2}$	$3{\cdot}5 \cdot 10^{2}$
	insoluble	$2{\cdot}8 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$2{\cdot}8 \cdot 10^{2}$	$1{\cdot}8 \cdot 10^{2}$
$^{201}_{81}Tl$	soluble	$5{\cdot}0 \cdot 10^{3}$	$2 \cdot 10^{-6}$	$5{\cdot}0 \cdot 10^{2}$	$2{\cdot}5 \cdot 10^{2}$
	insoluble	$2{\cdot}2 \cdot 10^{3}$	$9 \cdot 10^{-7}$	$2{\cdot}2 \cdot 10^{2}$	$1{\cdot}4 \cdot 10^{2}$
$^{202}_{81}Tl$	soluble	$1{\cdot}9 \cdot 10^{3}$	$8 \cdot 10^{-7}$	$1{\cdot}9 \cdot 10^{2}$	$9{\cdot}6 \cdot 10^{1}$
	insoluble	$6{\cdot}0 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$6{\cdot}0 \cdot 10^{1}$	$5{\cdot}6 \cdot 10^{1}$
$^{204}_{81}Tl$	soluble	$1{\cdot}5 \cdot 10^{3}$	$6 \cdot 10^{-7}$	$1{\cdot}5 \cdot 10^{2}$	$8{\cdot}8 \cdot 10^{1}$
	insoluble	$6{\cdot}6 \cdot 10^{1}$	$3 \cdot 10^{-8}$	$6{\cdot}6$	$4{\cdot}9 \cdot 10^{1}$
$^{203}_{82}Pb$	soluble	$6{\cdot}3 \cdot 10^{3}$	$3 \cdot 10^{-6}$	$6{\cdot}3 \cdot 10^{2}$	$3{\cdot}1 \cdot 10^{2}$
	insoluble	$4{\cdot}5 \cdot 10^{3}$	$2 \cdot 10^{-6}$	$4{\cdot}5 \cdot 10^{2}$	$2{\cdot}8 \cdot 10^{2}$
$^{210}_{82}Pb$	soluble	$3{\cdot}1 \cdot 10^{-1}$	$1 \cdot 10^{-10}$	$3{\cdot}1 \cdot 10^{-2}$	$9{\cdot}6 \cdot 10^{-2}$
	insoluble	$6{\cdot}0 \cdot 10^{-1}$	$2 \cdot 10^{-10}$	$6{\cdot}0 \cdot 10^{-2}$	$1{\cdot}4 \cdot 10^{2}$
$^{212}_{82}Pb$	soluble	$4{\cdot}4 \cdot 10^{1}$	$2 \cdot 10^{-8}$	$4{\cdot}4$	$1{\cdot}5 \cdot 10^{1}$
	insoluble	$4{\cdot}8 \cdot 10^{1}$	$2 \cdot 10^{-8}$	$4{\cdot}8$	$1{\cdot}4 \cdot 10^{1}$
$^{206}_{83}Bi$	soluble	$4{\cdot}7 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}7 \cdot 10^{1}$	$3{\cdot}0 \cdot 10^{1}$
	insoluble	$3{\cdot}6 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}6 \cdot 10^{1}$	$3{\cdot}0 \cdot 10^{1}$
$^{207}_{83}Bi$	soluble	$4{\cdot}2 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}2 \cdot 10^{1}$	$5{\cdot}1 \cdot 10^{1}$
	insoluble	$3{\cdot}4 \cdot 10^{1}$	$1 \cdot 10^{-8}$	$3{\cdot}4$	$5{\cdot}0 \cdot 10^{1}$
$^{210}_{83}Bi$	soluble	$1{\cdot}6 \cdot 10^{1}$	$6 \cdot 10^{-9}$	$1{\cdot}6$	$3{\cdot}3 \cdot 10^{1}$
	insoluble	$1{\cdot}5 \cdot 10^{1}$	$6 \cdot 10^{-9}$	$1{\cdot}5$	$3{\cdot}3 \cdot 10^{1}$
$^{212}_{83}Bi$	soluble	$2{\cdot}4 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$2{\cdot}4 \cdot 10^{1}$	$2{\cdot}8 \cdot 10^{2}$
	insoluble	$5{\cdot}0 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$5{\cdot}0 \cdot 10^{1}$	$2{\cdot}8 \cdot 10^{2}$
$^{211}_{85}At$ (*)	soluble	$1{\cdot}8 \cdot 10^{1}$	$7 \cdot 10^{-9}$	$1{\cdot}8$	$1{\cdot}4$
	insoluble	$8{\cdot}7 \cdot 10^{1}$	$3 \cdot 10^{-8}$	$8{\cdot}7$	$5{\cdot}8 \cdot 10^{1}$
$^{220}_{86}Rn$ (**)		$7{\cdot}3 \cdot 10^{2}$	$3 \cdot 10^{-7}$	$7{\cdot}3 \cdot 10^{1}$	–
$^{222}_{86}Rn$ (*)		$7{\cdot}3 \cdot 10^{2}$	$3 \cdot 10^{-7}$	$7{\cdot}3 \cdot 10^{1}$	–
$^{227}_{89}Ac$	soluble	$5{\cdot}8 \cdot 10^{-3}$	$2 \cdot 10^{-12}$	$5{\cdot}8 \cdot 10^{-4}$	$1{\cdot}5$
	insoluble	$6{\cdot}5 \cdot 10^{-2}$	$3 \cdot 10^{-11}$	$6{\cdot}5 \cdot 10^{-3}$	$2{\cdot}4 \cdot 10^{2}$
$^{228}_{89}Ac$	soluble	$1{\cdot}9 \cdot 10^{2}$	$8 \cdot 10^{-8}$	$1{\cdot}9 \cdot 10^{1}$	$7{\cdot}0 \cdot 10^{1}$
	insoluble	$4{\cdot}2 \cdot 10^{1}$	$2 \cdot 10^{-8}$	$4{\cdot}2$	$7{\cdot}0 \cdot 10^{1}$
$^{230}_{91}Pa$	soluble	$4{\cdot}2$	$2 \cdot 10^{-9}$	$4{\cdot}2 \cdot 10^{-1}$	$1{\cdot}9 \cdot 10^{2}$
	insoluble	$2{\cdot}0$	$8 \cdot 10^{-10}$	$2{\cdot}0 \cdot 10^{-1}$	$2{\cdot}0 \cdot 10^{2}$

(*) Applies only to persons of 16 years or over.

(**) Daughter products of $^{220}_{86}$ Rn and $^{222}_{86}$ Rn are assumed to be present in the same quantities as in unfiltered air. In the case of all the other isotopes, daughter products are not considered to be present in the quantities absorbed; if they are found to be present, the rules for mixtures (see 2) must be applied.

Radionuclides	Form	Exposed workers		Members of public	
		Limits of annual intake by inhalation µCi	Derived limits of concentration in the air for an exposure of 2 000 h/year Ci/m³	Limits of annual intake by inhalation µCi	Limits of annual intake by ingestion µCi
1	2	3	4	5	6
$^{231}_{91}Pa$	soluble	$2{\cdot}8 \cdot 10^{-3}$	$1 \cdot 10^{-12}$	$2{\cdot}8 \cdot 10^{-4}$	$7{\cdot}0 \cdot 10^{-1}$
	insoluble	$2{\cdot}7 \cdot 10^{-1}$	$1 \cdot 10^{-10}$	$2{\cdot}7 \cdot 10^{-2}$	$2{\cdot}2 \cdot 10^{1}$
$^{233}_{91}Pa$	soluble	$1{\cdot}5 \cdot 10^{3}$	$6 \cdot 10^{-7}$	$1{\cdot}5 \cdot 10^{2}$	$9{\cdot}6 \cdot 10^{1}$
	insoluble	$4{\cdot}4 \cdot 10^{2}$	$2 \cdot 10^{-7}$	$4{\cdot}4 \cdot 10^{1}$	$9{\cdot}6 \cdot 10^{1}$
$^{237}_{93}Np$	soluble	$1{\cdot}0 \cdot 10^{-2}$	$4 \cdot 10^{-12}$	$1{\cdot}0 \cdot 10^{-3}$	$2{\cdot}5$
	insoluble	$3{\cdot}0 \cdot 10^{-1}$	$4 \cdot 10^{-10}$	$3{\cdot}0 \cdot 10^{-2}$	$2{\cdot}8 \cdot 10^{1}$
$^{239}_{93}Np$	soluble	$2{\cdot}1 \cdot 10^{3}$	$8 \cdot 10^{-7}$	$2{\cdot}1 \cdot 10^{2}$	$1{\cdot}0 \cdot 10^{2}$
	insoluble	$1{\cdot}7 \cdot 10^{3}$	$7 \cdot 10^{-7}$	$1{\cdot}7 \cdot 10^{2}$	$1{\cdot}0 \cdot 10^{2}$
$^{249}_{97}Bk$	soluble	$2{\cdot}3$	$9 \cdot 10^{-10}$	$2{\cdot}3 \cdot 10^{-1}$	$4{\cdot}7 \cdot 10^{2}$
	insoluble	$3{\cdot}0 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}0 \cdot 10^{1}$	$4{\cdot}7 \cdot 10^{2}$
$^{250}_{97}Bk$	soluble	$3{\cdot}6 \cdot 10^{2}$	$1 \cdot 10^{-7}$	$3{\cdot}6 \cdot 10^{1}$	$1{\cdot}8 \cdot 10^{2}$
	insoluble	$2{\cdot}8 \cdot 10^{3}$	$1 \cdot 10^{-6}$	$2{\cdot}8 \cdot 10^{2}$	$1{\cdot}8 \cdot 10^{2}$
$^{253}_{99}Es$	soluble	$1{\cdot}9$	$8 \cdot 10^{-10}$	$1{\cdot}9 \cdot 10^{-1}$	$1{\cdot}8 \cdot 10^{1}$
	insoluble	$1{\cdot}5$	$6 \cdot 10^{-10}$	$1{\cdot}5 \cdot 10^{-1}$	$1{\cdot}8 \cdot 10^{1}$
$^{254m}_{99}Es$	soluble	$1{\cdot}3 \cdot 10^{1}$	$5 \cdot 10^{-9}$	$1{\cdot}3$	$1{\cdot}5 \cdot 10^{1}$
	insoluble	$1{\cdot}5 \cdot 10^{1}$	$6 \cdot 10^{-9}$	$1{\cdot}5$	$1{\cdot}5 \cdot 10^{1}$
$^{254}_{99}Es$	soluble	$4{\cdot}7 \cdot 10^{-2}$	$2 \cdot 10^{-11}$	$4{\cdot}7 \cdot 10^{-3}$	$1{\cdot}1 \cdot 10^{1}$
	insoluble	$2{\cdot}7 \cdot 10^{-1}$	$1 \cdot 10^{-10}$	$2{\cdot}7 \cdot 10^{-2}$	$1{\cdot}1 \cdot 10^{1}$
$^{255}_{99}Es$	soluble	$1{\cdot}2$	$5 \cdot 10^{-10}$	$1{\cdot}2 \cdot 10^{-1}$	$2{\cdot}2 \cdot 10^{1}$
	insoluble	$1{\cdot}0$	$4 \cdot 10^{-10}$	$1{\cdot}0 \cdot 10^{-1}$	$2{\cdot}2 \cdot 10^{1}$
$^{254}_{100}Fm$	soluble	$1{\cdot}6 \cdot 10^{2}$	$6 \cdot 10^{-8}$	$1{\cdot}6 \cdot 10^{1}$	$9{\cdot}6 \cdot 10^{1}$
	insoluble	$1{\cdot}8 \cdot 10^{2}$	$7 \cdot 10^{-8}$	$1{\cdot}8 \cdot 10^{1}$	$9{\cdot}6 \cdot 10^{1}$
$^{255}_{100}Fm$	soluble	$4{\cdot}1 \cdot 10^{1}$	$2 \cdot 10^{-8}$	$4{\cdot}1$	$2{\cdot}6 \cdot 10^{1}$
	insoluble	$2{\cdot}7 \cdot 10^{1}$	$1 \cdot 10^{-8}$	$2{\cdot}7$	$2{\cdot}6 \cdot 10^{1}$
$^{256}_{100}Fm$	soluble	$6{\cdot}9$	$3 \cdot 10^{-9}$	$6{\cdot}9 \cdot 10^{-1}$	$7{\cdot}1 \cdot 10^{-1}$
	insoluble	$4{\cdot}4$	$2 \cdot 10^{-9}$	$4{\cdot}4 \cdot 10^{-1}$	$7{\cdot}1 \cdot 10^{-1}$

ANNEX IV

Establishments and plants referred to in the second subparagraph of Article 20 (a)

1. Establishments and plants including reactors and critical assemblies

2. Establishments and plants including accelerators and X-ray generators

3. Establishments and plants including sealed sources used in radiotherapy, gammagraphy, and industrial irradiators

4. Industrial plants involving work with thorium and natural or enriched uranium:

   — uranium refining plants

   — ore concentration plants

5. Plants for manufacturing fuel elements

6. Plants for processing irradiated fuels

7. Uranium and thorium mine workings

8. Radioactive waste processing plants and storage sites

9. High activity laboratories and plants