9.7.62 OFFICIAL JOURNAL OF THE EUROPEAN COMMUNITIES 1633/62

DIRECTIVE

amending Annexes 1 and 3 to the Directives laying down the basic standards for health protection

THE COUNCIL OF THE EUROPEAN ATOMIC ENERGY COMMUNITY,

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

Having regard to the Directives laying down the basic standards for the protection of the health of workers and the general public against the dangers arising from ionising radiations, issued on 2 February 1959 *(Official Journal of the European Communities,* No 11, 20 February 1959);

Having regard to the opinion of the specialist group appointed by the Scientific and Technical Committee from among scientific experts in the Member States;

Having regard to the proposal from the Commission;

Having regard to the Opinion of the Economic and Social Committee;

After consulting the European Parliament;

Whereas the Directives laying down the basic standards, and in particular the Annexes thereto, must be adjusted in accordance with the most recent scientific data;

Whereas Annex 1 to the basic standards must be supplemented so as to take account of such data;

Whereas Annex 3 was drawn up in a provisional form and its amendment in the light of the further conclusions of the International Commission on Radiological Protection had been provided for;

HAS ADOPTED THIS DIRECTIVE:

Article 1

The Directives of 2 February 1959 laying down the basic standards for the protection of the health of workers and the general public against the dangers arising from ionising radiations shall be amended as follows:

Annex 1 and Annex 3 shall be replaced by the Annex 1 and the Annex 3 attached to this Directive.

Article 2

This Directive is addressed to all Member States.

Done at Brussels, 5 March 1962.

For the Council

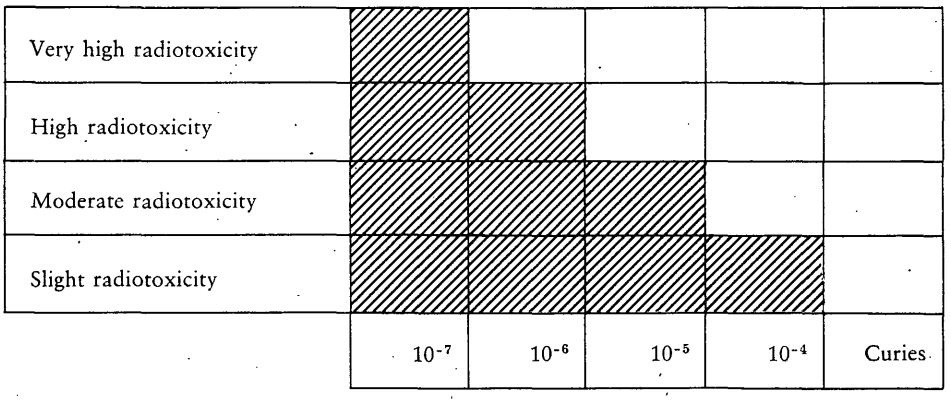
The President

M. COUVE de MURVILLE

ANNEX 1

Activity below which the requirements for reporting and obtaining prior authorisation may be waived

§ 1. The activities represented by hatching are those in respect of which the requirements for reporting and obtaining prior authorisation may be waived



(Ordinates show relative radiotoxicity of nuclides and abscissae the activity in curies)

§ 2. The principle radioactive nuclides may be classified according to their relative radiotoxicity as follows:

(a) *Very high radiotoxicity:*

Sr^{90} + Y^{90}, Po^{210}, At^{211}, Ra^{226}, Ac^{227}, Ra^{228}, Th^{228}, Th^{230}, Th^{232}, Np^{237}, Pu^{238}, Pu^{239}, Pu^{240}, Am^{241}, Pu^{242}, Cm^{242}, Am^{243}, Cm^{243}, Cm^{244}, Cm^{245}, Cm^{246}, Cf^{249}, Cf^{250}, Cf^{252}.

(b) *High radiotoxicity:*

Ca^{45}, Ca^{47}, Fe^{59}, Sr^{89}, Y^{91}, Ru^{106} + Rh^{106}, I^{126}, I^{129}, I^{131}, Ba^{140} + La^{140}, Ce^{144} + Pr^{144}, Sm^{151}, Eu^{152}(13 ans), Eu^{154}, Eu^{155}, Tm^{170}, Hg^{203}, Bi^{206}, Bi^{207}, Pb^{210} + daughter products, Bi^{210}, Bi^{212}, Pb^{212}, Ra^{223}, Ra^{224}, Th^{227}, Ac^{228}, Pa^{230}, U^{230}, U^{233}, Th^{234} + Pa^{234}, $U^{235}(U^{234})$*, U^{236}, U^{238}, Pu^{241}, Bk^{249}.

(c) *Moderate radiotoxicity:*

Na^{22}, Na^{24}, P^{32}, S^{35}, Cl^{36}, A^{41}, K^{42}, Sc^{46}, Sc^{47}, Sc^{48}, V^{48}, Mn^{52}, Mn^{54}, Fe^{55}, Mn^{56}, Co^{57}, Co^{58}, Co^{58m}, Co^{60}, Ni^{59}, Ni^{63}, Cu^{64}, Ni^{65}, Zn^{65}, Zn^{69}, Zn^{69m}, Ga^{72}, As^{73}, As^{74}, Se^{75}, As^{76}, As^{77}, Br^{82}, Kr^{85m}, Rb^{86}, Kr^{87}, Y^{90}, Sr^{91} + Y^{91}, Sr^{92} + Y^{92}, Y^{92}, Y^{93}, Zr^{93}, Nb^{93m}, Zr^{95} + Nb^{95}, Nb^{95}, Tc^{96}, Tc^{97}, Tc^{97m}, Ru^{97}, Mo^{99}, Tc^{99}, Ru^{103}, Pd^{103} + Rh^{103}, Ru^{105}, Rh^{105}, Ag^{105}, Cd^{109} + Ag^{109}, Pd^{109} + Ag^{109m}, Ag^{110m}, Ag^{111}, Sn^{113}, In^{114m}, Cd^{115m}, Cd^{115}, Sb^{122}, Sb^{124}, Sb^{125}, Sn^{125}, Te^{125m}, Te^{127m}, Te^{127}, Te^{129m}, Te^{129}, Ba^{131}, Te^{131m}, I^{132}, Xe^{133}, I^{133}, Cs^{134}, I^{134}, Cs^{135}, I^{135}, Xe^{135}, Cs^{136}, Cs^{137} + Ba^{137m}, La^{140}, Ce^{141}, Pr^{142}, Ce^{143}, Pr^{143}, Nd^{147}, Pm^{147}, Pm^{149}, Eu^{152} (9 h), Sm^{153}, Gd^{153}, Tb^{160}, Ho^{166}, Dy^{166}, Er^{169}, Tm^{171}, Yb^{175}, Lu^{177}, Hf^{181}, W^{181}, Ta^{182}, Re^{183}, W^{185}, Os^{185}, Re^{186}, Re^{188}, Ir^{190}, Os^{191}, Pt^{191}, Ir^{192}, Os^{193}, Pt^{193m}, Pt^{193}, Ir^{194}, Au^{196}, Pt^{197}, Hg^{197m}, Hg^{197}, Au^{198}, Au^{199}, Tl^{200}, Tl^{202}, Pb^{203}, Tl^{204}, Rn^{220}, Th^{231}, Pa^{233}, Np^{239}.

(d) *Slight radiotoxicity:*

H^3, Be^7, C^{14}, F^{18}, Si^{31}, A^{37}, Cl^{38}, Cr^{51}, Ge^{71}, Kr^{85}, Tc^{96m}, Zr^{97} + Nb^{97}, Nb^{97}, Tc^{99m}, Rh^{103}, In^{113m}, In^{115m}, Cs^{131}, Cs^{134m}, Nd^{149}, Gd^{159}, Dy^{165}, Er^{171}, Os^{191m}, Pt^{197m}, Tl^{201}.

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* Hazard depending on U^{234} content.
m = metastable.

§ 3. In the case of natural uranium and natural thorium, the limits are set at $1 . 10^{-4}$ and $1 . 10^{-6}$ curies respectively.

By custom one curie of natural uranium corresponds to:

$3{\cdot}7 . 10^{10}$ dis/sec of U^{238},

$3{\cdot}7 . 10^{10}$ dis/sec of U^{234} and

$1{\cdot}7 . 10^{9}$ dis/sec of U^{235}.

By custom one curie of natural thorium corresponds to:

$3{\cdot}7 . 10^{10}$ dis/sec of Th^{232} and

$3{\cdot}7 . 10^{10}$ dis/sec of Th^{228}.

§ 4. In the case of the radioactive nuclides Nd^{144}, Sm^{147}, Rb^{87}, In^{115}, Re^{187}, the requirements for reporting and obtaining prior authorisation may be waived, irrespective of the quantities used.

§ 5. In the case of a mixture of radioactive nuclides of differing radiotoxicity, the radiotoxicity of the mixture is determined as follows: the ratio is calculated for each component radionuclide in the mixture, between the quantity present expressed in curies and the limit laid down in the Radiotoxicity Table in §§ 1 and 2 for the nuclide concerned. The sum of these ratios for all the nuclides in the mixture may not exceed 1.

§ 6. Radionuclides not shown in the radiotoxicity groups in § 2 and the radiotoxicity of which is uncertain or unknown must be considered to belong to the highest radiotoxicity category.

ANNEX 3[a]

A. Maximum permissible concentration (MPC) of identified radionuclides in drinking water and in air inhaled for continuous exposure of occupationally exposed persons

(Table based on values recommended by the International Commission on Radiological Protection (ICRP) in 1959)

Element (Atomic number)	Radionuclide	Form [b]	MPC in water [c]	MPC in air [c]
Actinium (89)	Ac^{227}	sol. insol.	$2 \cdot 10^{-5}$ $3 \cdot 10^{-3}$	$8 \cdot 10^{-13}$ $9 \cdot 10^{-12}$
	Ac^{228}	sol. insol.	$9 \cdot 10^{-4}$ $9 \cdot 10^{-4}$	$3 \cdot 10^{-8}$ $6 \cdot 10^{-9}$
Americium (95)	Am^{241}	sol. insol.	$4 \cdot 10^{-5}$ $3 \cdot 10^{-4}$	$2 \cdot 10^{-12}$ $4 \cdot 10^{-11}$
	Am^{243}	sol. insol.	$4 \cdot 10^{-5}$ $3 \cdot 10^{-4}$	$2 \cdot 10^{-12}$ $4 \cdot 10^{-11}$
Antimony (51)	Sb^{122}	sol. insol.	$3 \cdot 10^{-4}$ $3 \cdot 10^{-4}$	$6 \cdot 10^{-8}$ $5 \cdot 10^{-8}$
	Sb^{124}	sol. insol.	$2 \cdot 10^{-4}$ $2 \cdot 10^{-4}$	$5 \cdot 10^{-8}$ $7 \cdot 10^{-9}$
	Sb^{125}	sol. insol.	$1 \cdot 10^{-3}$ $1 \cdot 10^{-3}$	$2 \cdot 10^{-7}$ $9 \cdot 10^{-9}$
Argon (18)	A^{37}	—	/	$1 \cdot 10^{-3}$
	A^{41}	—	/	$4 \cdot 10^{-7}$
Arsenic (33)	As^{73}	sol. insol.	$5 \cdot 10^{-3}$ $5 \cdot 10^{-3}$	$7 \cdot 10^{-7}$ $1 \cdot 10^{-7}$
	As^{74}	sol. insol.	$5 \cdot 10^{-4}$ $5 \cdot 10^{-4}$	$1 \cdot 10^{-7}$ $4 \cdot 10^{-8}$
	As^{76}	sol. insol.	$2 \cdot 10^{-4}$ $2 \cdot 10^{-4}$	$4 \cdot 10^{-8}$ $3 \cdot 10^{-8}$
	As^{77}	sol. insol.	$8 \cdot 10^{-4}$ $8 \cdot 10^{-4}$	$2 \cdot 10^{-7}$ $1 \cdot 10^{-7}$
Astate (85)	At^{211}	sol. insol.	$1 \cdot 10^{-5}$ $7 \cdot 10^{-4}$	$1 \cdot 10^{-9}$ $1 \cdot 10^{-8}$

[a] The figures shown in this Annex refer to continuous exposure, calculated on the basis of 168 hours per week, of occupationally exposed persons in a controlled area.
These values are multiplied by 3 for a working week of 40–48 hours.
Outside a controlled area, the MPC values are set at one-tenth of those in these Tables.

[b] Table A contains distinct values, having regard to the fact that the chemical form in which the radionuclide occurs may be either soluble or insoluble, this being assessed in accordance with biological criteria. Solubility or insolubility must be demonstrated in compliance with the procedure laid down by the competent authorities; in case of doubt, the most restrictive value must be taken into consideration.

[c] Concentrations are expressed in microcuries per millilitre. The values relate to the critical organs in respect of which the MPC is the most restrictive. They ensure broad compliance with the permissible MPCs for a single radionuclide and, for practical purposes, by the use of the formula

$$\sum_{1}^{n} \frac{Ci}{(MPC)\,i} \leq \frac{1}{K}$$

shown in section C of this Annex, they also ensure compliance with Article 14 (4), (5) and (6) as regards known mixtures irradiating one or more organs.

Element (Atomic number)	Radionuclide	Form	MPC in water	MPC in air
Barium (56)	Ba^{131}	sol.	$2 . 10^{-3}$	$4 . 10^{-7}$
		insol.	$2 . 10^{-3}$	$1 . 10^{-7}$
	Ba^{140}	sol.	$3 . 10^{-4}$	$4 . 10^{-8}$
		insol.	$2 . 10^{-4}$	$1 . 10^{-8}$
Berkelium (97)	Bk^{249}	sol.	$6 . 10^{-3}$	$3 . 10^{-10}$
		insol.	$6 . 10^{-3}$	$4 . 10^{-8}$
Beryllium (4)	Be^{7}	sol.	$2 . 10^{-2}$	$2 . 10^{-6}$
		insol.	$2 . 10^{-2}$	$4 . 10^{-7}$
Bismuth (83)	Bi^{206}	sol.	$4 . 10^{-4}$	$6 . 10^{-8}$
		insol.	$4 . 10^{-4}$	$5 . 10^{-8}$
	Bi^{207}	sol.	$6 . 10^{-4}$	$6 . 10^{-8}$
		insol.	$6 . 10^{-4}$	$5 . 10^{-9}$
	Bi^{210}	sol.	$4 . 10^{-4}$	$2 . 10^{-9}$
		insol.	$4 . 10^{-4}$	$2 . 10^{-9}$
	Bi^{212}	sol.	$4 . 10^{-3}$	$3 . 10^{-8}$
		insol.	$4 . 10^{-3}$	$7 . 10^{-8}$
Bromine (35)	Br^{82}	sol.	$3 . 10^{-3}$	$4 . 10^{-7}$
		insol.	$4 . 10^{-4}$	$6 . 10^{-8}$
Cadmium (48)	Cd^{109}	sol.	$2 . 10^{-3}$	$2 . 10^{-8}$
		insol.	$2 . 10^{-3}$	$3 . 10^{-8}$
	Cd^{115m}	sol.	$3 . 10^{-4}$	$1 . 10^{-8}$
		insol.	$3 . 10^{-4}$	$1 . 10^{-8}$
	Cd^{115}	sol.	$3 . 10^{-4}$	$8 . 10^{-8}$
		insol.	$4 . 10^{-4}$	$6 . 10^{-8}$
Calcium (20)	Ca^{45}	sol.	$9 . 10^{-5}$	$1 . 10^{-8}$
		insol.	$2 . 10^{-3}$	$4 . 10^{-8}$
	Ca^{47}	sol.	$5 . 10^{-4}$	$6 . 10^{-8}$
		insol.	$3 . 10^{-4}$	$6 . 10^{-8}$
Californium (98)	Cf^{249}	sol.	$4 . 10^{-5}$	$5 . 10^{-13}$
		insol.	$2 . 10^{-4}$	$3 . 10^{-11}$
	Cf^{250}	sol.	$1 . 10^{-4}$	$2 . 10^{-12}$
		insol.	$3 . 10^{-4}$	$3 . 10^{-11}$
	Cf^{252}	sol.	$7 . 10^{-5}$	$2 . 10^{-12}$
		insol.	$7 . 10^{-5}$	$1 . 10^{-11}$
Caesium (55)	Cs^{131}	sol.	$2 . 10^{-2}$	$4 . 10^{-6}$
		insol.	$9 . 10^{-3}$	$1 . 10^{-6}$
	Cs^{134m}	sol.	$6 . 10^{-2}$	$1 . 10^{-5}$
		insol.	$1 . 10^{-2}$	$2 . 10^{-6}$
	Cs^{134}	sol.	$9 . 10^{-5}$	$1 . 10^{-8}$
		insol.	$4 . 10^{-4}$	$4 . 10^{-9}$
	Cs^{135}	sol.	$1 . 10^{-3}$	$2 . 10^{-7}$
		insol.	$2 . 10^{-3}$	$3 . 10^{-8}$
	Cs^{136}	sol.	$9 . 10^{-4}$	$1 . 10^{-7}$
		insol.	$6 . 10^{-4}$	$6 . 10^{-8}$
	Cs^{137}	sol.	$2 . 10^{-4}$	$2 . 10^{-8}$
		insol.	$4 . 10^{-4}$	$5 . 10^{-9}$