COUNCIL DIRECTIVE

of 3 September 1984

amending Directive 80/836/Euratom as regards the basic safety standards for the health protection of the general public and workers against the dangers of ionizing radiation

(84/467/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 by legislation, regulation or administrative action the appropriate provisions 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 February 1959 the Council adopted Directives laying down such basic standards (3), which were last amended by Directive 80/836/Euratom (4);

Whereas the advantage of some review of Annexes I and III to Directive 80/836/Euratom 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 these standards 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 values laid down in Annexes I and III to Directive 80/836/Euratom take account, only in part, of the latest scientific knowledge available;

Whereas in order to establish some of these values it was necessary provisionally to use values laid down previously in the 1959, 1962 and 1966 Directives for the maximum permissible concentration;

Whereas in 1980 it was not possible to carry out calculations for all radionuclides under consideration;

Whereas, in its opinion of 7 July 1983, the Economic and Social Committee considered it necessary to amend, in Articles 9 and 12 of Directive 80/836/Euratom, the annual dose limits for the lens of the eye, in line with the most recent recommendations of the International Commission on Radiological Protection, a step which involves amending the original values in Annex III for krypton intake limits; whereas these amendments should be adopted,

HAS ADOPTED THIS DIRECTIVE:

Article 1

Directive 80/836/Euratom is hereby amended as follows:

(1) OJ No C 127, 14. 5. 1984, p. 120.
(2) OJ No C 286, 24. 10. 1983, p. 15.
(3) OJ No 11, 20. 2. 1959, p. 221/59.
(4) OJ No L 246, 17. 9. 1980, p. 1.

1. in Article 1 (b) (radiological, biological and medical terms), the term 'dose effective' in the French text is replaced by the term 'dose efficace';

2. Article 6 (a) is replaced by the following:

'(a) the various types of activity resulting in an exposure to ionizing radiation shall have been justified in advance by the advantages which they produce (1);

(1) Account being taken, for medical activities, of Council Direcitve 84/466/Euratom of 3 September 1984, laying down basic measures relating to the radiation protection of persons undergoing medical examination or treatment (OJ No L 265, 5. 10. 1984, p. 1).';

3. Article 9 (a) is replaced by the following:

'(a) the effective dose limit mainly used to estimate internal exposure in practice (1) 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:

(1) This effective dose limit shall be taken into account in calculating the limits of annual intake set out in Annex III which enable the derived limits of concentration, including in air and water, to be determined.';

4. In Article 9 (b), the first indent is replaced by the following:

'— the dose limit for the lens of the eye shall be 150 mSv (15 rems) in a year,';

5. Article 12 (3) (a) is replaced by the following:

'(a) the effective dose limit mainly used to estimate internal exposure in practice (1), 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;

(1) This effective dose limit shall be taken into account in calculating the limits of annual intake set out in Annex III which enable the derived limits of concentration, including in air and water, to be determined.';

6. in Article 12 (3) (b), the first indent is replaced by the following:

'— the dose limit for the lens of the eye shall be 15 mSv (1,5 rems) in a year,';

7. Annex I is replaced by Annex I hereto;

8. in Annex II, Section E, first and second lines, the term 'dose effective' in the French text is replaced by the term 'dose efficace';

9. Annex III is replaced by Annex III hereto.

Article 2

Member States shall take the measures necessary to comply with this Directive within 18 months of its publication.

Member States shall inform the Commission of the provisions which they have adopted pursuant to this Directive.

Article 3

This Directive is addressed to the Member States.

Done at Brussels, 3 September 1984.

For the Council

The President

P. BARRY

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

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

(a) **Very high radiotoxicity** (group 1):

$^{148}_{64}$Gd	$^{210}_{82}$Pb	$^{210}_{84}$Po	$^{223}_{88}$Ra	$^{225}_{88}$Ra	$^{226}_{88}$Ra	$^{228}_{88}$Ra	$^{225}_{89}$Ac
$^{227}_{89}$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	$^{236}_{93}$Np ($1{,}15 \cdot 10^5$ y)		$^{237}_{93}$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	$^{247}_{97}$Bk	$^{248}_{98}$Cf
$^{249}_{98}$Cf	$^{250}_{98}$Cf	$^{251}_{98}$Cf	$^{252}_{98}$Cf	$^{254}_{98}$Cf	$^{254}_{99}$Es	$^{257}_{100}$Fm	$^{258}_{101}$Md

(b) **High radiotoxicity** (group 2):

$^{10}_{4}$Be	$^{26}_{13}$Al	$^{32}_{14}$Si	$^{44}_{22}$Ti	$^{60}_{26}$Fe	$^{60}_{27}$Co	$^{68}_{32}$Ge	$^{90}_{38}$Sr
$^{91}_{39}$Y	$^{93}_{40}$Zr	$^{94}_{41}$Nb	$^{106}_{44}$Ru	$^{102m}_{45}$Rh	$^{102}_{45}$Rh	$^{108m}_{47}$Ag	$^{110m}_{47}$Ag
$^{109}_{48}$Cd	$^{113m}_{48}$Cd	$^{115m}_{48}$Cd	$^{114m}_{49}$In	$^{126}_{50}$Sn	$^{124}_{53}$I	$^{125}_{53}$I	$^{126}_{53}$I
$^{131}_{53}$I	$^{134}_{55}$Cs	$^{137}_{57}$La	$^{144}_{58}$Ce	$^{144}_{61}$Pm	$^{146}_{61}$Pm	$^{146}_{62}$Sm	$^{151}_{62}$Sm
$^{150}_{63}$Eu (34,2 y)		$^{152}_{63}$Eu	$^{154}_{63}$Eu	$^{155}_{63}$Eu	$^{158}_{65}$Tb	$^{166m}_{67}$Ho	$^{174}_{71}$Lu
$^{177m}_{71}$Lu	$^{172}_{72}$Hf	$^{178m}_{72}$Hf	$^{182}_{72}$Hf	$^{194}_{76}$Os	$^{192m}_{77}$Ir	$^{194m}_{77}$Ir	$^{194}_{80}$Hg
$^{202}_{82}$Pb	$^{212}_{82}$Pb	$^{210m}_{83}$Bi	$^{210}_{83}$Bi	$^{211}_{85}$At	$^{224}_{88}$Ra	$^{224}_{89}$Ac	$^{226}_{89}$Ac
$^{228}_{89}$Ac	$^{232}_{90}$Th	$_{90}$Th nat		$^{227}_{91}$Pa	$^{228}_{91}$Pa	$^{230}_{91}$Pa	$^{232}_{91}$Pa
$^{236}_{92}$U	$^{236}_{93}$Np (22,5 h)		$^{238}_{93}$Np	$^{244}_{94}$Pu	$^{242}_{95}$Am	$^{241}_{96}$Cm	$^{249}_{97}$Bk
$^{246}_{98}$Cf	$^{253}_{98}$Cf	$^{253}_{99}$Es	$^{254m}_{99}$Es	$^{252}_{100}$Fm	$^{253}_{100}$Fm	$^{254}_{100}$Fm	$^{255}_{100}$Fm
$^{257}_{101}$Md							

(c) **Moderate radiotoxicity** (group 3):

$^{14}_{6}$C	$^{22}_{11}$Na	$^{24}_{11}$Na	$^{28}_{12}$Mg	$^{32}_{15}$P	$^{33}_{15}$P	$^{36}_{17}$Cl	$^{41}_{18}$Ar
$^{42}_{19}$K	$^{43}_{19}$K	$^{45}_{20}$Ca	$^{47}_{20}$Ca	$^{44m}_{21}$Sc	$^{44}_{21}$Sc	$^{46}_{21}$Sc	$^{47}_{21}$Sc
$^{48}_{21}$Sc	$^{48}_{23}$V	$^{48}_{24}$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	$^{56}_{28}$Ni	$^{57}_{28}$Ni	$^{63}_{28}$Ni	$^{66}_{28}$Ni
$^{67}_{29}$Cu	$^{62}_{30}$Zn	$^{65}_{30}$Zn	$^{69m}_{30}$Zn	$^{72}_{30}$Zn	$^{66}_{31}$Ga	$^{67}_{31}$Ga	$^{72}_{31}$Ga
$^{69}_{32}$Ge	$^{77}_{32}$Ge	$^{71}_{33}$As	$^{72}_{33}$As	$^{73}_{33}$As	$^{74}_{33}$As	$^{76}_{33}$As	$^{77}_{33}$As
$^{73}_{34}$Se	$^{75}_{34}$Se	$^{79}_{34}$Se	$^{76}_{35}$Br	$^{82}_{35}$Br	$^{74}_{36}$Kr	$^{77}_{36}$Kr	$^{87}_{36}$Kr
$^{88}_{36}$Kr	$^{83}_{37}$Rb	$^{84}_{37}$Rb	$^{86}_{37}$Rb	$^{83}_{38}$Sr	$^{85}_{38}$Sr	$^{89}_{38}$Sr	$^{91}_{38}$Sr
$^{92}_{38}$Sr	$^{86}_{39}$Y	$^{87}_{39}$Y	$^{88}_{39}$Y	$^{90m}_{39}$Y	$^{90}_{39}$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	$^{97}_{44}$Ru
$^{103}_{44}$Ru	$^{105}_{44}$Ru	$^{99}_{45}$Rh	$^{100}_{45}$Rh	$^{101m}_{45}$Rh	$^{101}_{45}$Rh	$^{105}_{45}$Rh	$^{100}_{46}$Pd
$^{103}_{46}$Pd	$^{109}_{46}$Pd	$^{105}_{47}$Ag	$^{106m}_{47}$Ag	$^{111}_{47}$Ag	$^{112}_{47}$Ag	$^{115}_{48}$Cd	$^{117}_{48}$Cd
$^{111}_{49}$In	$^{110}_{50}$Sn	$^{113}_{50}$Sn	$^{117m}_{50}$Sn	$^{119m}_{50}$Sn	$^{121m}_{50}$Sn	$^{121}_{50}$Sn	$^{123}_{50}$Sn

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

$^{125}_{50}$Sn	$^{120}_{51}$Sb (5,76 d)	$^{122}_{51}$Sb	$^{124}_{51}$Sb	$^{125}_{51}$Sb	$^{126}_{51}$Sb	$^{127}_{51}$Sb
$^{128}_{51}$Sb (9,01 h)	$^{129}_{51}$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	$^{120}_{53}$I	$^{123}_{53}$I	$^{130}_{53}$I
$^{132}_{53}$I	$^{132m}_{53}$I	$^{133}_{53}$I	$^{135}_{53}$I	$^{121}_{54}$Xe	$^{123}_{54}$Xe	$^{138}_{54}$Xe	$^{132}_{55}$Cs
$^{136}_{55}$Cs	$^{137}_{55}$Cs	$^{128}_{56}$Ba	$^{131}_{56}$Ba	$^{133m}_{56}$Ba	$^{133}_{56}$Ba	$^{135m}_{56}$Ba	$^{140}_{56}$Ba
$^{132}_{57}$La	$^{140}_{57}$La	$^{141}_{57}$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	$^{145}_{59}$Pr	$^{138}_{60}$Nd	$^{147}_{60}$Nd	$^{143}_{61}$Pm	$^{145}_{61}$Pm
$^{147}_{61}$Pm	$^{148m}_{61}$Pm	$^{148}_{61}$Pm	$^{149}_{61}$Pm	$^{151}_{61}$Pm	$^{145}_{62}$Sm	$^{153}_{62}$Sm	$^{156}_{62}$Sm
$^{145}_{63}$Eu	$^{146}_{63}$Eu	$^{147}_{63}$Eu	$^{148}_{63}$Eu	$^{149}_{63}$Eu	$^{150}_{63}$Eu (12,62 h)		$^{152m}_{63}$Eu
$^{156}_{63}$Eu	$^{157}_{63}$Eu	$^{146}_{64}$Gd	$^{147}_{64}$Gd	$^{149}_{64}$Gd	$^{151}_{64}$Gd	$^{153}_{64}$Gd	$^{159}_{64}$Gd
$^{149}_{65}$Tb	$^{151}_{65}$Tb	$^{153}_{65}$Tb	$^{154}_{65}$Tb	$^{155}_{65}$Tb	$^{156m}_{65}$Tb (24,4 h)		$^{156}_{65}$Tb
$^{157}_{65}$Tb	$^{160}_{65}$Tb	$^{161}_{65}$Tb	$^{159}_{66}$Dy	$^{166}_{66}$Dy	$^{166}_{67}$Ho	$^{169}_{68}$Er	$^{171}_{68}$Er
$^{172}_{68}$Er	$^{167}_{69}$Tm	$^{170}_{69}$Tm	$^{171}_{69}$Tm	$^{172}_{69}$Tm	$^{173}_{69}$Tm	$^{166}_{70}$Yb	$^{169}_{70}$Yb
$^{175}_{70}$Yb	$^{169}_{71}$Lu	$^{170}_{71}$Lu	$^{171}_{71}$Lu	$^{172}_{71}$Lu	$^{173}_{71}$Lu	$^{174m}_{71}$Lu	$^{177}_{71}$Lu
$^{170}_{72}$Hf	$^{173}_{72}$Hf	$^{175}_{72}$Hf	$^{179m}_{72}$Hf	$^{181}_{72}$Hf	$^{184}_{72}$Hf	$^{176}_{73}$Ta	$^{179}_{73}$Ta
$^{182}_{73}$Ta	$^{183}_{73}$Ta	$^{184}_{73}$Ta	$^{185}_{74}$W	$^{187}_{74}$W	$^{188}_{74}$W	$^{181}_{75}$Re	$^{182}_{75}$Re (64 h)
$^{184m}_{75}$Re	$^{184}_{75}$Re	$^{186}_{75}$Re	$^{188}_{75}$Re	$^{189}_{75}$Re	$^{182}_{76}$Os	$^{185}_{76}$Os	$^{191}_{76}$Os
$^{193}_{76}$Os	$^{185}_{77}$Ir	$^{186}_{77}$Ir	$^{188}_{77}$Ir	$^{189}_{77}$Ir	$^{190}_{77}$Ir	$^{192}_{77}$Ir	$^{194}_{77}$Ir
$^{188}_{78}$Pt	$^{191}_{78}$Pt	$^{193m}_{78}$Pt	$^{195m}_{78}$Pt	$^{197}_{78}$Pt	$^{200}_{78}$Pt	$^{194}_{79}$Au	$^{195}_{79}$Au
$^{198m}_{79}$Au	$^{198}_{79}$Au	$^{199}_{79}$Au	$^{200m}_{79}$Au	$^{193m}_{80}$Hg	$^{195m}_{80}$Hg	$^{197m}_{80}$Hg	$^{197}_{80}$Hg
$^{203}_{80}$Hg	$^{200}_{81}$Tl	$^{202}_{81}$Tl	$^{204}_{81}$Tl	$^{200}_{82}$Pb	$^{203}_{82}$Pb	$^{211}_{82}$Pb	$^{214}_{82}$Pb
$^{203}_{83}$Bi	$^{205}_{83}$Bi	$^{206}_{83}$Bi	$^{207}_{83}$Bi	$^{212}_{83}$Bi	$^{213}_{83}$Bi	$^{214}_{83}$Bi	$^{207}_{85}$At
$^{222}_{86}$Rn	$^{222}_{87}$Fr	$^{223}_{87}$Fr	$^{226}_{90}$Th	$^{231}_{90}$Th	$^{234}_{90}$Th	$^{233}_{91}$Pa	$^{234}_{91}$Pa
$^{231}_{92}$U	$^{237}_{92}$U	$^{240}_{92}$U	$^{232}_{93}$Np	$^{234}_{93}$Np	$^{235}_{93}$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	$^{245}_{97}$Bk
$^{246}_{97}$Bk	$^{250}_{97}$Bk	$^{244}_{98}$Cf	$^{250}_{99}$Es	$^{251}_{99}$Es			

(d) **Low radiotoxicity** (group 4):

$^{3}_{1}$H	$^{7}_{4}$Be	$^{11}_{6}$C	$^{18}_{9}$F	$^{31}_{14}$Si	$^{35}_{16}$S	$^{38}_{17}$Cl	$^{39}_{17}$Cl
$^{37}_{18}$Ar	$^{39}_{18}$Ar	$^{40}_{19}$K	$^{44}_{19}$K	$^{45}_{19}$K	$^{41}_{20}$Ca	$^{43}_{21}$Sc	$^{49}_{21}$Sc
$^{45}_{22}$Ti	$^{47}_{23}$V	$^{49}_{23}$V	$^{49}_{24}$Cr	$^{51}_{24}$Cr	$^{51}_{25}$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	$^{65}_{28}$Ni	$^{60}_{29}$Cu
$^{61}_{29}$Cu	$^{64}_{29}$Cu	$^{63}_{30}$Zn	$^{69}_{30}$Zn	$^{71m}_{30}$Zn	$^{65}_{31}$Ga	$^{68}_{31}$Ga	$^{70}_{31}$Ga
$^{73}_{31}$Ga	$^{66}_{32}$Ge	$^{67}_{32}$Ge	$^{71}_{32}$Ge	$^{75}_{32}$Ge	$^{78}_{32}$Ge	$^{69}_{33}$As	$^{70}_{33}$As
$^{78}_{33}$As	$^{70}_{34}$Se	$^{73m}_{34}$Se	$^{81m}_{34}$Se	$^{81}_{34}$Se	$^{83}_{34}$Se	$^{74m}_{35}$Br	$^{74}_{35}$Br
$^{75}_{35}$Br	$^{77}_{35}$Br	$^{80m}_{35}$Br	$^{80}_{35}$Br	$^{83}_{35}$Br	$^{84}_{35}$Br	$^{76}_{36}$Kr	$^{79}_{36}$Kr
$^{81}_{36}$Kr	$^{83m}_{36}$Kr	$^{85m}_{36}$Kr	$^{85}_{36}$Kr	$^{79}_{37}$Rb	$^{81m}_{37}$Rb	$^{81}_{37}$Rb	$^{82m}_{37}$Rb
$^{87}_{37}$Rb	$^{88}_{37}$Rb	$^{89}_{37}$Rb	$^{80}_{38}$Sr	$^{81}_{38}$Sr	$^{85m}_{38}$Sr	$^{87m}_{38}$Sr	$^{86m}_{39}$Y
$^{91m}_{39}$Y	$^{94}_{39}$Y	$^{95}_{39}$Y	$^{88}_{41}$Nb	$^{89}_{41}$Nb (66 min)		$^{89}_{41}$Nb (122 min)	
$^{97}_{41}$Nb	$^{98}_{41}$Nb	$^{93m}_{42}$Mo	$^{101}_{42}$Mo	$^{93m}_{43}$Tc	$^{93}_{43}$Tc	$^{94m}_{43}$Tc	$^{94}_{43}$Tc
$^{96m}_{43}$Tc	$^{97}_{43}$Tc	$^{98}_{43}$Tc	$^{99m}_{43}$Tc	$^{99}_{43}$Tc	$^{101}_{43}$Tc	$^{104}_{43}$Tc	$^{94}_{44}$Ru
$^{99m}_{45}$Rh	$^{103m}_{45}$Rh	$^{106m}_{45}$Rh	$^{107}_{45}$Rh	$^{101}_{46}$Pd	$^{107}_{46}$Pd	$^{102}_{47}$Ag	$^{103}_{47}$Ag
$^{104m}_{47}$Ag	$^{104}_{47}$Ag	$^{106}_{47}$Ag	$^{115}_{47}$Ag	$^{104}_{48}$Cd	$^{107}_{48}$Cd	$^{113}_{48}$Cd	$^{117m}_{48}$Cd
$^{109}_{49}$In	$^{110}_{49}$In (69,1 min)		$^{110}_{49}$In (4 h)		$^{112}_{49}$In	$^{113m}_{49}$In	$^{115m}_{49}$In
$^{115}_{49}$In	$^{116m}_{49}$In	$^{117m}_{49}$In	$^{117}_{49}$In	$^{119m}_{49}$In	$^{111}_{50}$Sn	$^{123m}_{50}$Sn	$^{127}_{50}$Sn
$^{128}_{50}$Sn	$^{115}_{51}$Sb	$^{116m}_{51}$Sb	$^{116}_{51}$Sb	$^{117}_{51}$Sb	$^{118m}_{51}$Sb	$^{119}_{51}$Sb	$^{120}_{51}$Sb (15,89 min)
$^{124m}_{51}$Sb	$^{126m}_{51}$Sb	$^{128}_{51}$Sb (10,4 min)		$^{130}_{51}$Sb	$^{131}_{51}$Sb	$^{116}_{52}$Te	$^{123}_{52}$Te
$^{127}_{52}$Te	$^{129}_{52}$Te	$^{133}_{52}$Te	$^{134}_{52}$Te	$^{120m}_{53}$I	$^{121}_{53}$I	$^{128}_{53}$I	$^{129}_{53}$I

$^{134}_{53}$I	$^{120}_{54}$Xe	$^{122}_{54}$Xe	$^{125}_{54}$Xe	$^{127}_{54}$Xe	$^{129m}_{54}$Xe	$^{131m}_{54}$Xe	$^{133m}_{54}$Xe
$^{133}_{54}$Xe	$^{135m}_{54}$Xe	$^{135}_{54}$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	$^{126}_{56}$Ba	$^{131m}_{56}$Ba	$^{139}_{56}$Ba	$^{141}_{56}$Ba
$^{142}_{56}$Ba	$^{131}_{57}$La	$^{135}_{57}$La	$^{138}_{57}$La	$^{142}_{57}$La	$^{143}_{57}$La	$^{137}_{58}$Ce	$^{136}_{59}$Pr
$^{137}_{59}$Pr	$^{138m}_{59}$Pr	$^{139}_{59}$Pr	$^{142m}_{59}$Pr	$^{144}_{59}$Pr	$^{147}_{59}$Pr	$^{136}_{60}$Nd	$^{139m}_{60}$Nd
$^{139}_{60}$Nd	$^{141}_{60}$Nd	$^{149}_{60}$Nd	$^{151}_{60}$Nd	$^{141}_{61}$Pm	$^{150}_{61}$Pm	$^{141m}_{62}$Sm	$^{141}_{62}$Sm
$^{142}_{62}$Sm	$^{147}_{62}$Sm	$^{155}_{62}$Sm	$^{158}_{63}$Eu	$^{145}_{64}$Gd	$^{152}_{64}$Gd	$^{147}_{65}$Tb	$^{150}_{65}$Tb
$^{156m}_{65}$Tb (5 h)		$^{155}_{66}$Dy	$^{157}_{66}$Dy	$^{165}_{66}$Dy	$^{155}_{67}$Ho	$^{157}_{67}$Ho	$^{159}_{67}$Ho
$^{161}_{67}$Ho	$^{162m}_{67}$Ho	$^{162}_{67}$Ho	$^{164m}_{67}$Ho	$^{164}_{67}$Ho	$^{167}_{67}$Ho	$^{161}_{68}$Er	$^{165}_{68}$Er
$^{162}_{69}$Tm	$^{166}_{69}$Tm	$^{175}_{69}$Tm	$^{162}_{70}$Yb	$^{167}_{70}$Yb	$^{177}_{70}$Yb	$^{178}_{70}$Yb	$^{176m}_{71}$Lu
$^{176}_{71}$Lu	$^{178m}_{71}$Lu	$^{178}_{71}$Lu	$^{179}_{71}$Lu	$^{177m}_{72}$Hf	$^{180m}_{72}$Hf	$^{182m}_{72}$Hf	$^{183}_{72}$Hf
$^{172}_{73}$Ta	$^{173}_{73}$Ta	$^{174}_{73}$Ta	$^{175}_{73}$Ta	$^{177}_{73}$Ta	$^{178}_{73}$Ta	$^{180m}_{73}$Ta	$^{180}_{73}$Ta
$^{182m}_{73}$Ta	$^{185}_{73}$Ta	$^{186}_{73}$Ta	$^{176}_{74}$W	$^{177}_{74}$W	$^{178}_{74}$W	$^{179}_{74}$W	$^{181}_{74}$W
$^{177}_{75}$Re	$^{178}_{75}$Re	$^{182}_{75}$Re (12,7 h)		$^{186m}_{75}$Re	$^{187}_{75}$Re	$^{188m}_{75}$Re	$^{180}_{76}$Os
$^{181}_{76}$Os	$^{189m}_{76}$Os	$^{191m}_{76}$Os	$^{182}_{77}$Ir	$^{184}_{77}$Ir	$^{187}_{77}$Ir	$^{190m}_{77}$Ir	$^{195m}_{77}$Ir
$^{195}_{77}$Ir	$^{186}_{78}$Pt	$^{189}_{78}$Pt	$^{193}_{78}$Pt	$^{197m}_{78}$Pt	$^{199}_{78}$Pt	$^{193}_{79}$Au	$^{200}_{79}$Au
$^{201}_{79}$Au	$^{193}_{80}$Hg	$^{195}_{80}$Hg	$^{199m}_{80}$Hg	$^{194m}_{81}$Tl	$^{194}_{81}$Tl	$^{195}_{81}$Tl	$^{197}_{81}$Tl
$^{198m}_{81}$Tl	$^{198}_{81}$Tl	$^{199}_{81}$Tl	$^{201}_{81}$Tl	$^{195m}_{82}$Pb	$^{198}_{82}$Pb	$^{199}_{82}$Pb	$^{201}_{82}$Pb
$^{202m}_{82}$Pb	$^{205}_{82}$Pb	$^{209}_{82}$Pb	$^{200}_{83}$Bi	$^{201}_{83}$Bi	$^{202}_{83}$Bi	$^{203}_{84}$Po	$^{205}_{84}$Po
$^{207}_{84}$Po	$^{220}_{86}$Rn	$^{227}_{88}$Ra	$^{235}_{92}$U	$^{238}_{92}$U	$^{239}_{92}$U	$_{92}$U nat	
$_{92}$U depleted (*)			$^{233}_{93}$Np	$^{240}_{93}$Np	$^{235}_{94}$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 ($5{,}4 \cdot 10^{-2}$ Ci), $1 \cdot 10^8$ Bq of ^{147}Pm ($2{,}7 \cdot 10^{-3}$ Ci) or $5 \cdot 10^5$ Bq of ^{226}Ra ($1{,}4 \cdot 10^{-5}$ Ci) and where this paint is kept or used for the manufacture or repair of the instruments and timepieces referred to in Article 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.

(*) The ratio between the activity of $^{234}_{92}$U and $^{238}_{92}$U must not exceed 1.