Regulations on the application of the Pollution Control Act to radioactive pollution and radioactive waste

§ 1 Scope of application

These regulations concern the application of the Pollution Control Act to radiation from radioactive substances which cause or may cause damage or nuisance to the environment.

The regulations also apply to radioactive waste, see section 2.

§ 2 Definitions

In these regulations

(a) *radioactive substance* means any substance that emits alpha, beta or gamma radiation,
(b) *radioactive pollution* means radiation from radioactive substances which cause or may cause damage or nuisance to the environment. This includes also radiation from naturally occurring radioactive substances where human activity leads to increased exposure of humans or the environment to radiation,
(c) *radioactive waste* means objects of personal property or substances that are considered to be waste under the Pollution Control Act section 27 first paragraph and contain or are contaminated with radioactive substances with specific activity that exceeds or are equal to values listed in annex I letter a,
(d) *radioactive waste subject to a disposal requirement* means radioactive waste with values that exceeds or are equal to values for total activity and specific activity listed in annex I letter b.

The Norwegian Radiation and Nuclear Safety Authority determines in cases of doubt what is to be regarded as radioactive waste, including radioactive waste subject to a disposal requirement.

§ 3 Application of the Pollution Control Act to radioactive pollution and radioactive waste

The Pollution Control Act applies to radioactive pollution and radioactive waste with the exception of sections 21 to 26, section 30, section 32a, sections 34 to 37, and sections 43 to 47.

Regulations of 1 June 2004 no. 930 on recycling of waste chapter 16 and chapter 17 and Regulations of 1 June 2004 no. 931 on pollution control (pollution regulations) section 36-1 to section 36-7, section 36-10 to section 36-12 and chapter 41 apply to radioactive pollution and radioactive waste.

§ 4 Permit for radioactive pollution

The Norwegian Radiation and Nuclear Safety Authority may issue a permit under the Pollution Control Act section 11 for activity which lead or may lead radioactive pollution, and may set further conditions under the Pollution Control Act section 16 to prevent pollution from resulting in damage or nuisance to humans or the environment.

Activity that leads to or may lead to the release of radioactive substances whose total or specific activity exceeds or are equal to the values stated in Annex II shall, under the Pollution Control Act section 8 last paragraph, always be considered to result in significant damage or nuisance and may not take place without a permit pursuant to the Pollution Control Act section 11.

Section 5 Handling of radioactive waste
Radioactive waste shall be handled in accordance with regulations of 1 June 2004 no. 930 on recycling of waste chapter 16.

Section 6 Exemption
The ministry, or whomever the ministry authorises, may in special cases grant exemption from the provisions of these regulations.

Section 7 Entry into force
These regulations enter into force on 1 January 2011.

Section 8 Transitional provisions for application for a permit
An activity that requires a permit under the Pollution Control Act section 11, cf. these regulations section 4, shall apply to the Norwegian Radiation and Nuclear Safety Authority for a permit soon as possible and by 1 January 2013 at the latest.

Administrative decisions made and approvals granted pursuant to Regulations of 21 November 2003 no. 1326 on radiation protection and use of radiation section 5 letter o, p or q and chapter V are valid until superseded by permits under the Pollution Control Act, but are in no event valid beyond 1 January 2014.

An activity that requires a permit under the Pollution Control Act section 11, cf. these regulations section 4, which started operations before these regulations enter into force but has not received approval under Regulations of 21 November 2003 no. 1326 on radiation protection and use of radiation section 5 letter o, p or q and chapter V, may continue to operate until it receives approval but in no event beyond 1 January 2004.

The Norwegian Radiation and Nuclear Safety Authority may order an activity as mentioned in the first paragraph to apply for a permit within a shorter time limit and may determine that the activity is unlawful after a stipulated date if the order is not complied with.

Section 9 Concurrent amendments to other regulations
The following amendments are made to Regulations of 1 June 2004 no. 930 on recycling of waste (waste regulations):

The following amendments are made to Regulations of 1 June 2004 no. 931 on pollution control (pollution control regulations): ---

Annex I. Radioactive waste cf. section 2

Annex I letter a sets lower limits for what is radioactive waste. Annex I letter b sets out what is radioactive waste subject to a disposal requirement.

a) Specific activity for radioactive waste

The values in the table below show specific activity (Bq/g) for radioactive waste. Waste with specific activity greater than or equal to the values in the table shall be considered as radioactive waste.

If the waste contains various nuclides the waste is to be considered radioactive if the sum of the ratio between specific activity for each radionuclide and the corresponding value in the table is greater than or equal to 1:

$$\sum_k \frac{C_k}{C_{e,k}} \geq 1$$

where

C_k = specific activity for radionuclide k

C_e, k = limit value for specific activity of radionuclide k from the table.

Radionuclide	***Specific activity (Bq/g)***
H-3	10^{2}
Be-7	10^{1}
C-14	10^{1}
O-15	10^{2}
F-18	10^{1}
Na-22	10^{-1}
Na-24	10^{0}
Si-31	10^{3}
P-32	10^{3}
P-33	10^{3}
S-35	10^{2}
Cl-36	10^{0}
Cl-38	10^{1}
Ar-37	10^{6}
Ar-41	10^{2}
K-40	10^{1}
K-42	10^{2}
K-43	10^{1}

Radionuclide	***Specific activity (Bq/g)***
Ca-45	10^{2}
Ca-47	10^{1}
Sc-46	10^{-1}
Sc-47	10^{2}
Sc-48	10^{0}
V-48	10^{0}
Cr-51	10^{2}
Mn-51	10^{1}
Mn-52	10^{0}
Mn-52m	10^{1}
Mn-53	10^{3}
Mn-54	10^{-1}
Mn-56	10^{1}
Fe-52	10^{1}
Fe-55	10^{3}
Fe-59	10^{0}
Co-55	10^{1}
Co-56	10^{-1}

Radionuclide	***Specific activity (Bq/g)***
Co-57	10^{0}
Co-58	10^{0}
Co-58m	10^{4}
Co-60	10^{-1}
Co-60m	10^{3}
Co-61	10^{2}
Co-62m	10^{1}
Ni-59	10^{2}
Ni-63	10^{2}
Ni-65	10^{1}
Cu-64	10^{2}
Zn-65	10^{0}
Zn-69	10^{3}
Zn-69m	10^{1}
Ga-72	10^{1}
Ge-71	10^{4}
As-73	10^{3}
As-74	10^{1}

Radionuclide	*Specific activity (Bq/g)*
As-76	10^{1}
As-77	10^{3}
Se-75	10^{0}
Br-82	10^{0}
Kr-74	10^{2}
Kr-76	10^{2}
Kr-77	10^{2}
Kr-79	10^{3}
Kr-81	10^{4}
Kr-83m	10^{5}
Kr-85	10^{5}
Kr-85m	10^{3}
Kr-87	10^{2}
Kr-88	10^{2}
Rb-86	10^{2}
Sr-85	10^{0}
Sr-85m	10^{2}
Sr-87m	10^{2}
Sr-89	10^{3}
Sr-90[a]	10^{0}
Sr-91	10^{1}
Sr-92	10^{1}
Y-90	10^{3}
Y-91	10^{2}
Y-91m	10^{2}
Y-92	10^{2}
Y-93	10^{2}
Zr-93[a]	10^{1}
Zr-95	10^{0}
Zr-97	10^{1}
Nb-93m	10^{2}
Nb-94	10^{-1}
Nb-95	10^{0}
Nb-97	10^{1}
Nb-98	10^{1}
Mo-90	10^{1}
Mo-93	10^{1}
Mo-99	10^{1}
Mo-101	10^{1}

Radionuclide	*Specific activity (Bq/g)*
Tc-96	10^{0}
Tc-96m	10^{3}
Tc-97	10^{1}
Tc-97m	10^{2}
Tc-99	10^{0}
Tc-99m	10^{2}
Ru-97	10^{1}
Ru-103	10^{0}
Ru-105	10^{1}
Ru-106[a]	10^{-1}
Rh-103m	10^{4}
Rh-105	10^{2}
Pd-103	10^{3}
Pd-109	10^{2}
Ag-105	10^{0}
Ag-110m	10^{-1}
Ag-111	10^{2}
Cd-109	10^{1}
Cd-115	10^{1}
Cd-115m	10^{2}
In-111	10^{1}
In-113m	10^{2}
In-114m	10^{1}
In-115m	10^{2}
Sn-113	10^{0}
Sn-125	10^{1}
Sb-122	10^{1}
Sb-124	10^{0}
Sb-125	10^{0}
Te-123m	10^{0}
Te-125m	10^{3}
Te-127	10^{3}
Te-127m	10^{1}
Te-129	10^{2}
Te-129m	10^{1}
Te-131	10^{2}
Te-131m	10^{1}
Te-132	10^{0}
Te-133	10^{1}

Radionuclide	*Specific activity (Bq/g)*
Te-133m	10^{1}
Te-134	10^{1}
I-123	10^{2}
I-125	10^{2}
I-126	10^{1}
I-129	10^{-1}
I-130	10^{1}
I-131	10^{1}
I-132	10^{1}
I-133	10^{1}
I-134	10^{1}
I-135	10^{1}
Xe-131m	10^{4}
Xe-133	10^{3}
Xe-135	10^{3}
Cs-129	10^{1}
Cs-131	10^{3}
Cs-132	10^{1}
Cs-134[a]	10^{-1}
Cs-134m	10^{3}
Cs-135	10^{2}
Cs-136	10^{0}
Cs-137[a]	10^{0}
Cs-138	10^{1}
Ba-131	10^{1}
Ba-140[a]	10^{0}
La-140	10^{0}
Ce-139	10^{0}
Ce-141	10^{2}
Ce-143	10^{1}
Ce-144[a]	10^{1}
Pr-142	10^{2}
Pr-143	10^{3}
Nd-147	10^{2}
Nd-149	10^{2}
Pm-147	10^{3}
Pm-149	10^{3}
Sm-151	10^{3}
Sm-153	10^{2}

Radionuclide	*Specific activity (Bq/g)*
Eu-152	10^{-1}
Eu-152m	10^{2}
Eu-154	10^{-1}
Eu-155	10^{1}
Gd-153	10^{1}
Gd-159	10^{2}
Tb-160	10^{0}
Dy-165	10^{3}
Dy-166	10^{2}
Ho-166	10^{2}
Er-169	10^{3}
Er-171	10^{2}
Tm-170	10^{2}
Tm-171	10^{3}
Yb-175	10^{2}
Lu-177	10^{2}
Hf-181	10^{0}
Ta-182	10^{-1}
W-181	10^{1}
W-185	10^{3}
W-187	10^{1}
Re-186	10^{3}
Re-188	10^{2}
Os-185	10^{0}
Os-191	10^{2}
Os-191m	10^{3}
Os-193	10^{2}
Ir-190	10^{0}
Ir-192	10^{0}
Ir-194	10^{2}
Pt-191	10^{1}
Pt-193m	10^{3}
Pt-197	10^{3}
Pt-197m	10^{2}
Au-198	10^{1}
Au-199	10^{2}
Hg-197	10^{2}
Hg-197m	10^{2}
Hg-203	10^{1}

Radionuclide	*Specific activity (Bq/g)*
Tl-200	10^{1}
Tl-201	10^{2}
Tl-202	10^{1}
Tl-204	10^{1}
Pb-203	10^{1}
Bi-206	10^{0}
Bi-207	10^{-1}
Po-203	10^{1}
Po-205	10^{1}
Po-207	10^{1}
Pb-210a	10^{0}
At-211	10^{3}
Pb-212[a]	10^{0}
Bi-210	10^{1}
Bi-212[a]	10^{0}
Po-210	10^{0}
Rn-220[a]	10^{0}
Rn-222[a]	10^{0}
Ra-223[a]	10^{0}
Ra-224[a]	10^{0}
Ra-225	10^{1}
Ra-226[a]	10^{0}
Th-226[a]	10^{3}
Ra-227	10^{2}
Ra-228[a]	10^{0}
Ac-228	10^{0}
Th-227	10^{0}
Th-228[a]	10^{0}
Th-229[a]	10^{-1}
Pa-230	10^{1}
Th-230	10^{0}
Th-231	10^{2}
Th-nat (inkl. Th-232)[a]	10^{0}
Pa-233	10^{1}
Th-234[a]	10^{1}
Pa-231	10^{0}
U-230[a]	10^{1}
U-234	10^{0}

Radionuclide	*Specific activity (Bq/g)*
U-235[a]	10^{0}
U-238[a]	10^{0}
U-nat[a]	10^{0}
U-231	10^{2}
U-232[a]	10^{-1}
U-233	10^{0}
U-236	10^{1}
U-237	10^{2}
U-239	10^{2}
U-240	10^{2}
U-240[a]	10^{0}
Np-237[a]	10^{0}
Np-239	10^{2}
Np-240	10^{1}
Pu-234	10^{2}
Pu-235	10^{2}
Pu-236	10^{0}
Pu-237	10^{2}
Pu-238	10^{-1}
Pu-239	10^{-1}
Pu-240	10^{-1}
Pu-241	10^{1}
Pu-242	10^{-1}
Pu-243	10^{3}
Pu-244	10^{-1}
Am-241	10^{-1}
Am-242	10^{3}
Am-242m[a]	10^{-1}
Am-243[a]	10^{-1}
Cm-242	10^{1}
Cm-243	10^{0}
Cm-244	10^{0}
Cm-245	10^{-1}
Cm-246	10^{-1}
Cm-247	10^{-1}
Cm-248	10^{-1}
Bk-249	10^{2}
Cf-246	10^{3}
Cf-248	10^{0}

Radionuclide	***Specific activity (Bq/g)***
Cf-249	10^{-1}
Cf-250	10^{0}
Cf-251	10^{-1}
Cf-252	10^{0}
Cf-253	10^{2}
Cf-254	10^{0}
Es-253	10^{2}
Es-254	10^{-1}
Es-254m	10^{1}
Fm-254	10^{4}
Fm-255	10^{2}

a Radionuclides in equilibrium with daughter products as mentioned in the table in annex II. The activity limits in the table refer to the mother nuclide alone, but the radiation contribution from the daughter products is taken into account in determining the activity limit for the mother nuclide.

b) Total activity and specific activity for radioactive waste subject to a disposal requirement

The values in the table show specific activity (Bq/g), and the total activity (Bq) per year, for what is considered waste subject to a disposal requirement; see section 2 letter d. To define waste subject to a disposal requirement both total activity and specific activity has to be greater than or equal to the values. It is the activity's expected total waste in the course of a year on which the activity shall base its assessment of the deposition requirement. If the waste contains various nuclides, the waste is subject to a disposal requirement if the sum of the ratio between specific activity for each radionuclide and the corresponding value in the table, and the sum of the ratio between (total) activity for each radionuclide and the corresponding value in the table, is greater than or equal to 1:

$$\sum_k \frac{C_k}{C_{e,k}} \geq 1 \text{ and } \sum_k \frac{A_k}{A_{e,k}} \geq 1$$

where

C_k = specific activity for radionuclide k

C_e, k = limit value for specific activity of radionuclide k

A_k = activity for radionuclide k

A_e, k = limit value for activity of radionuclide k.

Radionuclide	***Total activity (Bq) per year***	***Specific activity (Bq/g)***
H-3	10^9	10^6
Be-7	10^7	10^3
C-14	10^7	10^4
O-15	10^9	10^2
F-18	10^6	10^1
Na-22	10^6	10^1
Na-24	10^5	10^1
Si-31	10^6	10^3
P-32	10^5	10^3
P-33	10^8	10^5

Radionuclide	***Total activity (Bq) per year***	***Specific activity (Bq/g)***
S-35	10^8	10^5
Cl-36	10^6	10^4
Cl-38	10^5	10^1
Ar-37	10^8	10^6
Ar-41	10^9	10^2
K-40	10^6	10^2
K-42	10^6	10^2
K-43	10^6	10^1
Ca-45	10^7	10^4
Ca-47	10^6	10^1

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Sc-46	10^{6}	10^{1}
Sc-47	10^{6}	10^{2}
Sc-48	10^{5}	10^{1}
V-48	10^{5}	10^{1}
Cr-51	10^{7}	10^{3}
Mn-51	10^{5}	10^{1}
Mn-52	10^{5}	10^{1}
Mn-52m	10^{5}	10^{1}
Mn-53	10^{9}	10^{4}
Mn-54	10^{6}	10^{1}
Mn-56	10^{5}	10^{1}
Fe-52	10^{6}	10^{1}
Fe-55	10^{6}	10^{4}
Fe-59	10^{6}	10^{1}
Co-55	10^{6}	10^{1}
Co-56	10^{5}	10^{1}
Co-57	10^{6}	10^{2}
Co-58	10^{6}	10^{1}
Co-58m	10^{7}	10^{4}
Co-60	10^{5}	10^{1}
Co-60m	10^{6}	10^{3}
Co-61	10^{6}	10^{2}
Co-62m	10^{5}	10^{1}
Ni-59	10^{8}	10^{4}
Ni-63	10^{8}	10^{5}
Ni-65	10^{6}	10^{1}
Cu-64	10^{6}	10^{2}
Zn-65	10^{6}	10^{1}
Zn-69	10^{6}	10^{4}
Zn-69m	10^{6}	10^{2}
Ga-72	10^{5}	10^{1}
Ge-71	10^{8}	10^{4}
As-73	10^{7}	10^{3}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
As-74	10^{6}	10^{1}
As-76	10^{5}	10^{2}
As-77	10^{6}	10^{3}
Se-75	10^{6}	10^{2}
Br-82	10^{6}	10^{1}
Kr-74	10^{9}	10^{2}
Kr-76	10^{9}	10^{2}
Kr-77	10^{9}	10^{2}
Kr-79	10^{5}	10^{3}
Kr-81	10^{7}	10^{4}
Kr-83m	10^{12}	10^{5}
Kr-85	10^{4}	10^{5}
Kr-85m	10^{10}	10^{3}
Kr-87	10^{9}	10^{2}
Kr-88	10^{9}	10^{2}
Rb-86	10^{5}	10^{2}
Sr-85	10^{6}	10^{2}
Sr-85m	10^{7}	10^{2}
Sr-87m	10^{6}	10^{2}
Sr-89	10^{6}	10^{3}
Sr-90[a]	10^{4}	10^{2}
Sr-91	10^{5}	10^{1}
Sr-92	10^{6}	10^{1}
Y-90	10^{5}	10^{3}
Y-91	10^{6}	10^{3}
Y-91m	10^{6}	10^{2}
Y-92	10^{5}	10^{2}
Y-93	10^{5}	10^{2}
Zr-93[a]	10^{7}	10^{3}
Zr-95	10^{6}	10^{1}
Zr-97[a]	10^{5}	10^{1}
Nb-93m	10^{7}	10^{4}
Nb-94	10^{6}	10^{1}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Nb-95	10^{6}	10^{1}
Nb-97	10^{6}	10^{1}
Nb-98	10^{5}	10^{1}
Mo-90	10^{6}	10^{1}
Mo-93	10^{8}	10^{3}
Mo-99	10^{6}	10^{2}
Mo-101	10^{6}	10^{1}
Tc-96	10^{6}	10^{1}
Tc-96m	10^{7}	10^{3}
Tc-97	10^{8}	10^{3}
Tc-97m	10^{7}	10^{3}
Tc-99	10^{7}	10^{4}
Tc-99m	10^{7}	10^{2}
Ru-97	10^{7}	10^{2}
Ru-103	10^{6}	10^{2}
Ru-105	10^{6}	10^{1}
Ru-106[a]	10^{5}	10^{2}
Rh-103m	10^{8}	10^{4}
Rh-105	10^{7}	10^{2}
Pd-103	10^{8}	10^{3}
Pd-109	10^{6}	10^{3}
Ag-105	10^{6}	10^{2}
Ag-110m	10^{6}	10^{1}
Ag-111	10^{6}	10^{3}
Cd-109	10^{6}	10^{4}
Cd-115	10^{6}	10^{2}
Cd-115m	10^{6}	10^{3}
In-111	10^{6}	10^{2}
In-113m	10^{6}	10^{2}
In-114m	10^{6}	10^{2}
In-115m	10^{6}	10^{2}
Sn-113	10^{7}	10^{3}
Sn-125	10^{5}	10^{2}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Sb-122	10^{4}	10^{2}
Sb-124	10^{6}	10^{1}
Sb-125	10^{6}	10^{2}
Te-123m	10^{7}	10^{2}
Te-125m	10^{7}	10^{3}
Te-127	10^{6}	10^{3}
Te-127m	10^{7}	10^{3}
Te-129	10^{6}	10^{2}
Te-129m	10^{6}	10^{3}
Te-131	10^{5}	10^{2}
Te-131m	10^{6}	10^{1}
Te-132	10^{7}	10^{2}
Te-133	10^{5}	10^{1}
Te-133m	10^{5}	10^{1}
Te-134	10^{6}	10^{1}
I-123	10^{7}	10^{2}
I-125	10^{6}	10^{3}
I-126	10^{6}	10^{2}
I-129	10^{5}	10^{2}
I-130	10^{6}	10^{1}
I-131	10^{6}	10^{2}
I-132	10^{5}	10^{1}
I-133	10^{6}	10^{1}
I-134	10^{5}	10^{1}
I-135	10^{6}	10^{1}
Xe-131m	10^{4}	10^{4}
Xe-133	10^{4}	10^{3}
Xe-135	10^{10}	10^{3}
Cs-129	10^{5}	10^{2}
Cs-131	10^{6}	10^{3}
Cs-132	10^{5}	10^{1}
Cs-134m	10^{5}	10^{3}
Cs-134[a]	10^{4}	10^{1}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Cs-135	10^{7}	10^{4}
Cs-136	10^{5}	10^{1}
Cs-137[a]	10^{4}	10^{1}
Cs-138	10^{4}	10^{1}
Ba-131	10^{6}	10^{2}
Ba-140[a]	10^{5}	10^{1}
La-140	10^{5}	10^{1}
Ce-139	10^{6}	10^{2}
Ce-141	10^{7}	10^{2}
Ce-143	10^{6}	10^{2}
Ce-144[a]	10^{5}	10^{2}
Pr-142	10^{5}	10^{2}
Pr-143	10^{6}	10^{4}
Nd-147	10^{6}	10^{2}
Nd-149	10^{6}	10^{2}
Pm-147	10^{7}	10^{4}
Pm-149	10^{6}	10^{3}
Sm-151	10^{8}	10^{4}
Sm-153	10^{6}	10^{2}
Eu-152	10^{6}	10^{1}
Eu-152m	10^{6}	10^{2}
Eu-154	10^{6}	10^{1}
Eu-155	10^{7}	10^{2}
Gd-153	10^{7}	10^{2}
Gd-159	10^{6}	10^{3}
Tb-160	10^{6}	10^{1}
Dy-165	10^{6}	10^{3}
Dy-166	10^{6}	10^{3}
Ho-166	10^{5}	10^{3}
Er-169	10^{7}	10^{4}
Er-171	10^{6}	10^{2}
Tm-170	10^{6}	10^{3}
Tm-171	10^{8}	10^{4}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Yb-175	10^{7}	10^{3}
Lu-177	10^{7}	10^{3}
Hf-181	10^{6}	10^{1}
Ta-182	10^{4}	10^{1}
W-181	10^{7}	10^{3}
W-185	10^{7}	10^{4}
W-187	10^{6}	10^{2}
Re-186	10^{6}	10^{3}
Re-188	10^{5}	10^{2}
Os-185	10^{6}	10^{1}
Os-191	10^{7}	10^{2}
Os-191m	10^{7}	10^{3}
Os-193	10^{6}	10^{2}
Ir-190	10^{6}	10^{1}
Ir-192	10^{4}	10^{1}
Ir-194	10^{5}	10^{2}
Pt-191	10^{6}	10^{2}
Pt-193m	10^{7}	10^{3}
Pt-197	10^{6}	10^{3}
Pt-197m	10^{6}	10^{2}
Au-198	10^{6}	10^{2}
Au-199	10^{6}	10^{2}
Hg-197	10^{7}	10^{2}
Hg-197m	10^{6}	10^{2}
Hg-203	10^{5}	10^{2}
Tl-200	10^{6}	10^{1}
Tl-201	10^{6}	10^{2}
Tl-202	10^{6}	10^{2}
Tl-204	10^{4}	10^{4}
Pb-203	10^{6}	10^{2}
Pb-210[a]	10^{4}	10^{1}
Pb-212[a]	10^{5}	10^{1}
Bi-206	10^{5}	10^{1}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Bi-207	10^{6}	10^{1}
Bi-210	10^{6}	10^{3}
Bi-212[a]	10^{5}	10^{1}
Po-203	10^{6}	10^{1}
Po-205	10^{6}	10^{1}
Po-207	10^{6}	10^{1}
Po-210	10^{4}	10^{1}
At-211	10^{7}	10^{3}
Rn-220[a]	10^{7}	10^{4}
Rn-222[a]	10^{8}	10^{1}
Ra-223[a]	10^{5}	10^{2}
Ra-224[a]	10^{5}	10^{1}
Ra-225	10^{5}	10^{2}
Ra-226[a]	10^{4}	10^{1}
Ra-227	10^{6}	10^{2}
Ra-228[a]	10^{5}	10^{1}
Ac-228	10^{6}	10^{1}
Th-226[a]	10^{7}	10^{3}
Th-227	10^{4}	10^{1}
Th-228[a]	10^{4}	10^{0}
Th-229[a]	10^{3}	10^{0}
Th-230	10^{4}	10^{0}
Th-231	10^{7}	10^{3}
Th-nat (inkl. Th-232)[a]	10^{3}	10^{0}
Th-234[a]	10^{5}	10^{3}
Pa-230	10^{6}	10^{1}
Pa-231	10^{3}	10^{0}
Pa-233	10^{7}	10^{2}
U-230[a]	10^{5}	10^{1}
U-231	10^{7}	10^{2}
U-232[a]	10^{3}	10^{0}
U-233	10^{4}	10^{1}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
U-234	10^{4}	10^{1}
U-235[a]	10^{4}	10^{1}
U-236	10^{4}	10^{1}
U-237	10^{6}	10^{2}
U-238[a]	10^{4}	10^{1}
U-nat[a]	10^{3}	10^{0}
U-239	10^{6}	10^{2}
U-240	10^{7}	10^{3}
U-240[a]	10^{6}	10^{1}
Np-237[a]	10^{3}	10^{0}
Np-239	10^{7}	10^{2}
Np-240	10^{6}	10^{1}
Pu-234	10^{7}	10^{2}
Pu-235	10^{7}	10^{2}
Pu-236	10^{4}	10^{1}
Pu-237	10^{7}	10^{3}
Pu-238	10^{4}	10^{0}
Pu-239	10^{4}	10^{0}
Pu-240	10^{3}	10^{0}
Pu-241	10^{5}	10^{2}
Pu-242	10^{4}	10^{0}
Pu-243	10^{7}	10^{3}
Pu-244	10^{4}	10^{0}
Am-241	10^{4}	10^{0}
Am-242	10^{6}	10^{3}
Am-242m[a]	10^{4}	10^{0}
Am-243[a]	10^{3}	10^{0}
Cm-242	10^{5}	10^{2}
Cm-243	10^{4}	10^{0}
Cm-244	10^{4}	10^{1}
Cm-245	10^{3}	10^{0}
Cm-246	10^{3}	10^{0}
Cm-247	10^{4}	10^{0}

Radionuclide	***Total activity (Bq) per year***	***Specific activity (Bq/g)***
Cm-248	10^{3}	10^{0}
Bk-249	10^{6}	10^{3}
Cf-246	10^{6}	10^{3}
Cf-248	10^{4}	10^{1}
Cf-249	10^{3}	10^{0}
Cf-250	10^{4}	10^{1}
Cf-251	10^{3}	10^{0}
Cf-252	10^{4}	10^{1}
Cf-253	10^{5}	10^{2}
Cf-254	10^{3}	10^{0}
Es-253	10^{5}	10^{2}
Es-254	10^{4}	10^{1}
Es-254m	10^{6}	10^{2}
Fm-254	10^{7}	10^{4}
Fm-255	10^{6}	10^{3}

a Radionuclides in equilibrium with daughter products as mentioned in the table in annex II. The activity limits in the table refer to the mother nuclide alone, but the radiation contribution from the daughter products is taken into account in determining the activity limit for the mother nuclide.

Annex II. Release of radioactive substances that always requires a permit, see section 4 second paragraph

Activity that leads to or may lead to the release of radioactive substances with a total activity (Bq) per year, or specific activity (Bq/g) that is greater than or equal to the values in this annex always requires a permit, see section 4 second paragraph.

If the release consists of various radionuclides, a permit is required if the sum of the ratio between specific activity for each radionuclide and the corresponding value in the table, or the sum of the ratio between activity for each radionuclide and the corresponding value in the table, is greater than or equal to 1:

$$\sum_k \frac{C_k}{C_{e,k}} \geq 1 \text{ or } \sum_k \frac{A_k}{A_{e,k}} \geq 1$$

where

C_k = specific activity for radionuclide k

C_e, k = limit value for specific activity of radionuclide k

A_k = activity for radionuclide k

A_e, k = limit value for activity of radionuclide k.

Radionuclide	***Total activity (Bq) per year***	***Specific activity (Bq/g)***
H-3	10^8	10^5
Be-7	10^6	10^2
C-14	10^6	10^3
O-15	10^8	10^1
F-18	10^5	10^0
Na-22	10^5	10^0
Na-24	10^4	10^0
Si-31	10^5	10^2

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
P-32	10^{4}	10^{2}
P-33	10^{7}	10^{4}
S-35	10^{7}	10^{4}
Cl-36	10^{5}	10^{3}
Cl-38	10^{4}	10^{0}
Ar-37	10^{7}	10^{5}
Ar-41	10^{8}	10^{1}
K-40	10^{5}	10^{1}
K-42	10^{5}	10^{1}
K-43	10^{5}	10^{0}
Ca-45	10^{6}	10^{3}
Ca-47	10^{5}	10^{0}
Sc-46	10^{5}	10^{0}
Sc-47	10^{5}	10^{1}
Sc-48	10^{4}	10^{0}
V-48	10^{4}	10^{0}
Cr-51	10^{6}	10^{2}
Mn-51	10^{4}	10^{0}
Mn-52	10^{4}	10^{0}
Mn-52m	10^{4}	10^{0}
Mn-53	10^{8}	10^{3}
Mn-54	10^{5}	10^{0}
Mn-56	10^{4}	10^{0}
Fe-52	10^{5}	10^{0}
Fe-55	10^{5}	10^{3}
Fe-59	10^{5}	10^{0}
Co-55	10^{5}	10^{0}
Co-56	10^{4}	10^{0}
Co-57	10^{5}	10^{1}
Co-58	10^{5}	10^{0}
Co-58m	10^{6}	10^{3}
Co-60	10^{4}	10^{0}
Co-60m	10^{5}	10^{2}
Co-61	10^{5}	10^{1}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Co-62m	10^{4}	10^{0}
Ni-59	10^{7}	10^{3}
Ni-63	10^{7}	10^{4}
Ni-65	10^{5}	10^{0}
Cu-64	10^{5}	10^{1}
Zn-65	10^{5}	10^{0}
Zn-69	10^{5}	10^{3}
Zn-69m	10^{5}	10^{1}
Ga-72	10^{4}	10^{0}
Ge-71	10^{7}	10^{3}
As-73	10^{6}	10^{2}
As-74	10^{5}	10^{0}
As-76	10^{4}	10^{1}
As-77	10^{5}	10^{2}
Se-75	10^{5}	10^{1}
Br-82	10^{5}	10^{0}
Kr-74	10^{8}	10^{1}
Kr-76	10^{8}	10^{1}
Kr-77	10^{8}	10^{1}
Kr-79	10^{4}	10^{2}
Kr-81	10^{6}	10^{3}
Kr-83m	10^{11}	10^{4}
Kr-85	10^{3}	10^{4}
Kr-85m	10^{9}	10^{2}
Kr-87	10^{8}	10^{1}
Kr-88	10^{8}	10^{1}
Rb-86	10^{4}	10^{1}
Sr-85	10^{5}	10^{1}
Sr-85m	10^{6}	10^{1}
Sr-87m	10^{5}	10^{1}
Sr-89	10^{5}	10^{2}
Sr-90[a]	10^{3}	10^{1}
Sr-91	10^{4}	10^{0}
Sr-92	10^{5}	10^{0}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Y-90	10^{4}	10^{2}
Y-91	10^{5}	10^{2}
Y-91m	10^{5}	10^{1}
Y-92	10^{4}	10^{1}
Y-93	10^{4}	10^{1}
Zr-93[a]	10^{6}	10^{2}
Zr-95	10^{5}	10^{0}
Zr-97[a]	10^{4}	10^{0}
Nb-93m	10^{6}	10^{3}
Nb-94	10^{5}	10^{0}
Nb-95	10^{5}	10^{0}
Nb-97	10^{5}	10^{0}
Nb-98	10^{4}	10^{0}
Mo-90	10^{5}	10^{0}
Mo-93	10^{7}	10^{2}
Mo-99	10^{5}	10^{1}
Mo-101	10^{5}	10^{0}
Tc-96	10^{5}	10^{0}
Tc-96m	10^{6}	10^{2}
Tc-97	10^{7}	10^{2}
Tc-97m	10^{6}	10^{2}
Tc-99	10^{6}	10^{3}
Tc-99m	10^{6}	10^{1}
Ru-97	10^{6}	10^{1}
Ru-103	10^{5}	10^{1}
Ru-105	10^{5}	10^{0}
Ru-106[a]	10^{4}	10^{1}
Rh-103m	10^{7}	10^{3}
Rh-105	10^{6}	10^{1}
Pd-103	10^{7}	10^{2}
Pd-109	10^{5}	10^{2}
Ag-105	10^{5}	10^{1}
Ag-110m	10^{5}	10^{0}
Ag-111	10^{5}	10^{2}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Cd-109	10^{5}	10^{3}
Cd-115	10^{5}	10^{1}
Cd-115m	10^{5}	10^{2}
In-111	10^{5}	10^{1}
In-113m	10^{5}	10^{1}
In-114m	10^{5}	10^{1}
In-115m	10^{5}	10^{1}
Sn-113	10^{6}	10^{2}
Sn-125	10^{4}	10^{1}
Sb-122	10^{3}	10^{1}
Sb-124	10^{5}	10^{0}
Sb-125	10^{5}	10^{1}
Te-123m	10^{6}	10^{1}
Te-125m	10^{6}	10^{2}
Te-127	10^{5}	10^{2}
Te-127m	10^{6}	10^{2}
Te-129	10^{5}	10^{1}
Te-129m	10^{5}	10^{2}
Te-131	10^{4}	10^{1}
Te-131m	10^{5}	10^{0}
Te-132	10^{6}	10^{1}
Te-133	10^{4}	10^{0}
Te-133m	10^{4}	10^{0}
Te-134	10^{5}	10^{0}
I-123	10^{6}	10^{1}
I-125	10^{5}	10^{2}
I-126	10^{5}	10^{1}
I-129	10^{4}	10^{1}
I-130	10^{5}	10^{0}
I-131	10^{5}	10^{1}
I-132	10^{4}	10^{0}
I-133	10^{5}	10^{0}
I-134	10^{4}	10^{0}
I-135	10^{5}	10^{0}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Xe-131m	10^{3}	10^{3}
Xe-133	10^{3}	10^{2}
Xe-135	10^{9}	10^{2}
Cs-129	10^{4}	10^{1}
Cs-131	10^{5}	10^{2}
Cs-132	10^{4}	10^{0}
Cs-134m	10^{4}	10^{2}
Cs-134[a]	10^{3}	10^{0}
Cs-135	10^{6}	10^{3}
Cs-136	10^{4}	10^{0}
Cs-137[a]	10^{3}	10^{0}
Cs-138	10^{3}	10^{0}
Ba-131	10^{5}	10^{1}
Ba-140[a]	10^{4}	10^{0}
La-140	10^{4}	10^{0}
Ce-139	10^{5}	10^{1}
Ce-141	10^{6}	10^{1}
Ce-143	10^{5}	10^{1}
Ce-144[a]	10^{4}	10^{1}
Pr-142	10^{4}	10^{1}
Pr-143	10^{5}	10^{3}
Nd-147	10^{5}	10^{1}
Nd-149	10^{5}	10^{1}
Pm-147	10^{6}	10^{3}
Pm-149	10^{5}	10^{2}
Sm-151	10^{7}	10^{3}
Sm-153	10^{5}	10^{1}
Eu-152	10^{5}	10^{0}
Eu-152m	10^{5}	10^{1}
Eu-154	10^{5}	10^{0}
Eu-155	10^{6}	10^{1}
Gd-153	10^{6}	10^{1}
Gd-159	10^{5}	10^{2}
Tb-160	10^{5}	10^{0}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Dy-165	10^{5}	10^{2}
Dy-166	10^{5}	10^{2}
Ho-166	10^{4}	10^{2}
Er-169	10^{6}	10^{3}
Er-171	10^{5}	10^{1}
Tm-170	10^{5}	10^{2}
Tm-171	10^{7}	10^{3}
Yb-175	10^{6}	10^{2}
Lu-177	10^{6}	10^{2}
Hf-181	10^{5}	10^{0}
Ta-182	10^{3}	10^{0}
W-181	10^{6}	10^{2}
W-185	10^{6}	10^{3}
W-187	10^{5}	10^{1}
Re-186	10^{5}	10^{2}
Re-188	10^{4}	10^{1}
Os-185	10^{5}	10^{0}
Os-191	10^{6}	10^{1}
Os-191m	10^{6}	10^{2}
Os-193	10^{5}	10^{1}
Ir-190	10^{5}	10^{0}
Ir-192	10^{3}	10^{0}
Ir-194	10^{4}	10^{1}
Pt-191	10^{5}	10^{1}
Pt-193m	10^{6}	10^{2}
Pt-197	10^{5}	10^{2}
Pt-197m	10^{5}	10^{1}
Au-198	10^{5}	10^{1}
Au-199	10^{5}	10^{1}
Hg-197	10^{6}	10^{1}
Hg-197m	10^{5}	10^{1}
Hg-203	10^{4}	10^{1}
Tl-200	10^{5}	10^{0}
Tl-201	10^{5}	10^{1}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Tl-202	10^{5}	10^{1}
Tl-204	10^{3}	10^{3}
Pb-203	10^{5}	10^{1}
Pb-210[a]	10^{3}	10^{0}
Pb-212[a]	10^{4}	10^{0}
Bi-206	10^{4}	10^{0}
Bi-207	10^{5}	10^{0}
Bi-210	10^{5}	10^{2}
Bi-212[a]	10^{4}	10^{0}
Po-203	10^{5}	10^{0}
Po-205	10^{5}	10^{0}
Po-207	10^{5}	10^{0}
Po-210	10^{3}	10^{0}
At-211	10^{6}	10^{2}
Rn-220[a]	10^{6}	10^{3}
Rn-222[a]	10^{7}	10^{0}
Ra-223[a]	10^{4}	10^{1}
Ra-224[a]	10^{4}	10^{0}
Ra-225	10^{4}	10^{1}
Ra-226[a]	10^{3}	10^{0}
Ra-227	10^{5}	10^{1}
Ra-228[a]	10^{4}	10^{0}
Ac-228	10^{5}	10^{0}
Th-226[a]	10^{6}	10^{2}
Th-227	10^{3}	10^{0}
Th-228[a]	10^{3}	10^{-1}
Th-229[a]	10^{2}	10^{-1}
Th-230	10^{3}	10^{-1}
Th-231	10^{6}	10^{2}
Th-nat (inkl. Th-232)[a]	10^{2}	10^{-1}
Th-234[a]	10^{4}	10^{2}
Pa-230	10^{5}	10^{0}
Pa-231	10^{2}	10^{-1}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Pa-233	10^{6}	10^{1}
U-230[a]	10^{4}	10^{0}
U-231	10^{6}	10^{1}
U-232[a]	10^{2}	10^{-1}
U-233	10^{3}	10^{0}
U-234	10^{3}	10^{0}
U-235[a]	10^{3}	10^{0}
U-236	10^{3}	10^{0}
U-237	10^{5}	10^{1}
U-238[a]	10^{3}	10^{0}
U-nat[a]	10^{2}	10^{-1}
U-239	10^{5}	10^{1}
U-240	10^{6}	10^{2}
U-240[a]	10^{5}	10^{0}
Np-237[a]	10^{2}	10^{-1}
Np-239	10^{6}	10^{1}
Np-240	10^{5}	10^{0}
Pu-234	10^{6}	10^{1}
Pu-235	10^{6}	10^{1}
Pu-236	10^{3}	10^{0}
Pu-237	10^{6}	10^{2}
Pu-238	10^{3}	10^{-1}
Pu-239	10^{3}	10^{-1}
Pu-240	10^{2}	10^{-1}
Pu-241	10^{4}	10^{1}
Pu-242	10^{3}	10^{-1}
Pu-243	10^{6}	10^{2}
Pu-244	10^{3}	10^{-1}
Am-241	10^{3}	10^{-1}
Am-242	10^{5}	10^{2}
Am-242m[a]	10^{3}	10^{-1}
Am-243[a]	10^{2}	10^{-1}
Cm-242	10^{4}	10^{1}
Cm-243	10^{3}	10^{-1}

Radionuclide	*Total activity (Bq) per year*	*Specific activity (Bq/g)*
Cm-244	10^{3}	10^{0}
Cm-245	10^{2}	10^{-1}
Cm-246	10^{2}	10^{-1}
Cm-247	10^{3}	10^{-1}
Cm-248	10^{2}	10^{-1}
Bk-249	10^{5}	10^{2}
Cf-246	10^{5}	10^{2}
Cf-248	10^{3}	10^{0}
Cf-249	10^{2}	10^{-1}
Cf-250	10^{3}	10^{0}
Cf-251	10^{2}	10^{-1}
Cf-252	10^{3}	10^{0}
Cf-253	10^{4}	10^{1}
Cf-254	10^{2}	10^{-1}
Es-253	10^{4}	10^{1}
Es-254	10^{3}	10^{0}
Es-254m	10^{5}	10^{1}
Fm-254	10^{6}	10^{3}
Fm-255	10^{5}	10^{2}

a Radionuclides in equilibrium with daughter products as mentioned below. The activity limits in the table refer to the mother nuclide alone, but the radiation contribution from the daughter products is taken into account in determining the activity limit for the mother nuclide.