SCHEDULE Regulation 7

New Schedule 1A to the Act

"SCHEDULE 1A Section 1A-D

Tables of NORM industrial activities, radionuclides and summation rules

Table 1

NORM Industrial Activities

Part 1

Production and use of thorium, or thorium compounds, and the production of products where thorium is deliberately added
Production and use of uranium or uranium compounds, and the production of products where uranium is deliberately added

Part 2

Extraction, production and use of rare earth elements and rare earth element alloys
Mining and processing of ores other than uranium ore
Production of oil and gas
Removal and management of radioactive scales and precipitates from equipment associated with industrial activities
Any industrial activity utilising phosphate ore
Manufacture of titanium dioxide pigments
The extraction and refining of zircon and manufacture of zirconium compounds
Production of tin, copper, aluminium, zinc, lead and iron and steel
Activities related to coal mine de-watering plants
Water treatment associated with provision of drinking water and the remediation of contamination from other NORM industrial activities
China clay extraction

Table 2

Concentration of radionuclides: NORM industrial activities

Radionuclide	**Solid or relevant liquid Concentration in becquerels per gram (Bq/g)**	**Any other liquid concentration in becquerels per litre (Bq/l)**	**Gaseous concentration in becquerels per cubic metre (Bq/ m3)**
U-238sec	0.5	0.1	0.001
U-238+	5	10	0.01
U-234	5	10	0.01
Th-230	10	10	0.001
Ra-226+	0.5	1	0.01
Pb-210+	5	0.1	0.01
Po-210	5	0.1	0.01
U-235sec	1	0.1	0.0001
U-235+	5	10	0.01
Pa-231	5	1	0.001
Ac-227+	1	0.1	0.001
Th-232sec	0.5	0.1	0.001
Th-232	5	10	0.001
Ra-228+	1	0.1	0.01
Th-228+	0.5	1	0.001

1. "The table 2 summation rule" means the sum of the quotient A/B where—
   (a) "A" means the quantity of each radionuclide listed in column 1 of Table 2 that is present in the substance or article; and
   (b) "B" means the quantity of that radionuclide specified in (as appropriate)—
      (i) column 2 of Table 2 where the substance or article is a solid or a relevant liquid;
      (ii) column 3 of Table 2 where the substance or article is any other liquid; or
      (iii) column 4 of Table 2 where the substance or article is a gas.

Table 3

Concentration of radionuclides

Radionuclide	*Concentration in becquerels per gram (Bq/ g)*
H-3	10^2
Be-7	10

2. "The table 3 summation rule" means the sum of the quotient A/B where—
   (a) "A" means the concentration of each radionuclide listed in column 1 of Table 3 that is present in the substance or article, and
   (b) "B" means the quantity of that radionuclide specified in column 2 of Table 3.

Radionuclide	*Concentration in becquerels per gram (Bq/g)*
C-14	10
F-18	1
Na-22	0.1
Na-24	0.1
Si-31	10^2
P-32	10^2
P-33	10^2
S-35	10^2
Cl-36	1
Cl-38	1
K-42	10
K-43	1
Ca-45	10^2
Ca-47	1
Sc-46	0.1
Sc-47	10
Sc-48	0.1
V-48	0.1
Cr-51	10
Mn-51	1
Mn-52	0.1
Mn-52m	1
Mn-53	10^3
Mn-54	0.1
Mn-56	1
Fe-52+	1
Fe-55	10^2
Fe-59	0.1
Co-55	1

2. "The table 3 summation rule" means the sum of the quotient A/B where—
   (a) "A" means the concentration of each radionuclide listed in column 1 of Table 3 that is present in the substance or article, and
   (b) "B" means the quantity of that radionuclide specified in column 2 of Table 3.

Radionuclide	*Concentration in becquerels per gram (Bq/g)*
Co-56	0.1
Co-57	1
Co-58	0.1
Co-58m	10^2
Co-60	0.1
Co-60m	10^3
Co-61	10^2
Co-62m	1
Ni-59	10^2
Ni-63	10^2
Ni-65	1
Cu-64	10
Zn-65	1
Zn-69	10^2
Zn-69m+	1
Ga-72	1
Ge-71	10^4
As-73	10^2
As-74	1
As-76	1
As-77	10^2
Se-75	1
Br-82	0.1
Rb-86	10
Sr-85	1
Sr-85m	10
Sr-87m	10
Sr-89	10
Sr-90+	1

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   (a) "A" means the concentration of each radionuclide listed in column 1 of Table 3 that is present in the substance or article, and
   (b) "B" means the quantity of that radionuclide specified in column 2 of Table 3.

Radionuclide	*Concentration in becquerels per gram (Bq/g)*
Sr-91+	1
Sr-92	1
Y-90	10^2
Y-91	10
Y-91m	1
Y-92	10
Y-93	10
Zr-93	10
Zr-95+	0.1
Zr-97+	1
Nb-93m	10^2
Nb-94	0.1
Nb-95	1
Nb-97+	1
Nb-98	1
Mo-90	1
Mo-93	10
Mo-99+	1
Mo-101+	1
Tc-96	0.1
Tc-96m	10
Tc-97	10
Tc-97m	10
Tc-99	1
Tc-99m	10^2
Ru-97	1
Ru-103+	1
Ru-105+	1
Ru-106+	1

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Radionuclide	*Concentration in becquerels per gram (Bq/g)*
Rh-103m	10^4
Rh-105	10
Pd-103+	10^3
Pd-109+	10^2
Ag-105	1
Ag-108m+	0.1
Ag-110m+	0.1
Ag-111	10
Cd-109+	10
Cd-115+	1
Cd-115m+	10
In-111	1
In-113m	10
In-114m+	1
In-115m	10
Sn-113+	1
Sn-125	1
Sb-122	1
Sb-124	0.1
Sb-125+	1
Te-123m	1
Te-125m	10^2
Te-127	10^2
Te-127m+	10
Te-129	10
Te-129m+	10
Te-131	10
Te-131m+	1
Te-132+	0.1

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Radionuclide	*Concentration in becquerels per gram (Bq/g)*
Te-133+	1
Te-133m+	1
Te-134	1
I-123	10
I-125	1
I-126	1
I-129	0.1
I-130	1
I-131+	1
I-132	1
I-133	1
I-134	1
I-135	1
Cs-129	1
Cs-131	10^3
Cs-132	1
Cs-134	0.1
Cs-134m	10^3
Cs-135	10
Cs-136	0.1
Cs-137+	1
Cs-138	1
Ba-131	1
Ba-140	0.1
La-140	0.1
Ce-139	1
Ce-141	10
Ce-143	1
Ce-144+	10
Pr-142	10

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   (b) "B" means the quantity of that radionuclide specified in column 2 of Table 3.

Radionuclide	*Concentration in becquerels per gram (Bq/g)*
Pr-143	10^2
Nd-147	10
Nd-149	10
Pm-147	10^2
Pm-149	10^2
Sm-151	10^2
Sm-153	10
Eu-152	0.1
Eu-152m	10
Eu-154	0.1
Eu-155	10
Gd-153	10
Gd-159	10
Tb-160	0.1
Dy-165	10^2
Dy-166	10
Ho-166	10
Er-169	10^2
Er-171	10
Tm-170	10
Tm-171	10^2
Yb-175	10
Lu-177	10
Hf-181	1
Ta-182	0.1
W-181	10
W-185	10^2
W-187	1
Re-186	10^2

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Radionuclide	*Concentration in becquerels per gram (Bq/g)*
Re-188	10
Os-185	1
Os-191	10
Os-191m	10^3
Os-193	10
Ir-190	0.1
Ir-192	0.1
Ir-194	10
Pt-191	1
Pt-193m	10^2
Pt-197	10^2
Pt-197m	10^2
Au-198	1
Au-199	10
Hg-197	10
Hg-197m	10
Hg-203	1
Tl-200	1
Tl-201	10
Tl-202	1
Tl-204	10
Pb-203	1
Pb-210+	0.01
Pb-212+	1
Bi-206	0.1
Bi-207	0.1
Bi-210	10
Bi-212+	1
Po-203	1

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Radionuclide	*Concentration in becquerels per gram (Bq/g)*
Po-205	1
Po-207	1
Po-210	0.01
At-211	10^2
Ra-223+	1
Ra-224+	1
Ra-225	1
Ra-226+	0.01
Ra-227	10
Ra-228+	0.01
Ac-227+	0.01
Ac-228	1
Th-226+	10^2
Th-227	1
Th-228+	0.1
Th-229+	0.1
Th-230	0.1
Th-231	10^2
Th-232	0.01
Th-232+	0.01
Th-232sec	0.01
Th-234+	10
Pa-230	1
Pa-231	0.01
Pa-233	1
U-230+	1
U-231	10
U-232+	0.1
U-233	1

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   (b) "B" means the quantity of that radionuclide specified in column 2 of Table 3.

Radionuclide	*Concentration in becquerels per gram (Bq/g)*
U-234	1
U-235+	1
U-235sec	0.01
U-236	1
U-237	10
U-238+	1
U-238sec	0.01
U-239	10^2
U-240+	10
Np-237+	0.1
Np-239	10
Np-240	1
Pu-234	10^2
Pu-235	10^2
Pu-236	0.1
Pu-237	10
Pu-238	0.1
Pu-239	0.1
Pu-240	0.1
Pu-241	1
Pu-242	0.1
Pu-243	10^2
Pu-244+	0.1
Am-241	0.1
Am-242	10^2
Am-242m+	0.1
Am-243+	0.1
Cm-242	1
Cm-243	0.1

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Radionuclide	*Concentration in becquerels per gram (Bq/g)*
Cm-244	0.1
Cm-245	0.1
Cm-246	0.1
Cm-247+	0.1
Cm-248	0.1
Bk-249	10
Cf-246	10
Cf-248	1
Cf-249	0.1
Cf-250	0.1
Cf-251	0.1
Cf-252	0.1
Cf-253	1
Cf-253+	1
Cf-254	0.1
Es-253	1
Es-254+	0.1
Es-254m+	1
Fm-254	10^2
Fm-255	10
Any other solid or non-aqueous liquid radionuclide that is not of natural terrestrial or cosmic origin	0.01, unless the concentration which gives rise to the same 10 μSv/year dose criteria as used in column 2 of this table can be calculated using guidance by Euratom in RP 122 part 1(**1**)or any successor Euratom guidance or decision applying to the derivation of the concentrations in this

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(**1**) EC 2000. Radiation Protection 122: Practical use of the concepts of clearance and exemption. Report RP122 Luxembourg. European Commission.

Radionuclide	*Concentration in becquerels per gram (Bq/g)*
	table, in which case that concentration.

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Table 4

Radionuclides in Secular Equilibrium

Parent radionuclide	*Daughter radionuclides*
Ac-227+	Th-227, Fr-223, Ra-223, Rn-219, Po-215, Pb-211, Bi-211, Tl-207, Po-211
Ag-108m+	Ag-108
Ag-110m+	Ag-110
Am-242m+	Np-238
Am-243+	Np-239
Bi-212+	Tl-208
Cd-109+	Ag-109m
Cd-115+	In-115m
Cd-115m+	In-115m
Ce-144+	Pr-144, Pr-144m
Cf-253+	Cm-249
Cm-247+	Pu-243
Cs-137+	Ba-137m
Es-254+	Bk-250
Es-254m+	Fm-254
Fe-52+	Mn-52m
I-131+	Xe-131m
In-114m+	In-114
Mo-99+	Tc-99m
Mo-101+	Tc-101
Nb-97+	Nb-97m
Np-237+	Pa-233
Pb-210+	Bi-210, Po-210
Pb-212+	Bi-212, Tl-208

Parent radionuclide	*Daughter radionuclides*
Pd-103+	Rh-103m
Pd-109+	Ag-109m
Pu-244+	U-240, Np-240m, Np-240
Ra-223+	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-224+	Rn-220, Po-216, Pb-212, Bi-212, Tl-208
Ra-226+	Rn-222, Po-218, Pb-214, Bi-214, Po-214
Ra-228+	Ac-228
Ru-103+	Rh-103m
Ru-105+	Rh-105m
Ru-106+	Rh-106
Sb-125+	Te-125m
Sn-113+	In-113m
Sr-90+	Y-90
Sr-91+	Y-91m
Te-127m+	Te-127
Te-129m+	Te-129
Te-131m+	Te-131
Te-132+	I-132
Te-133+	I-133, Xe-133m, Xe-133
Te-133m+	Te-133, I-133, Xe-133m, Xe-133
Th-226+	Ra-222, Rn-218, Po-214
Th-228+	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208
Th-229+	Ra-225, Ac-225, Fr-221, At-217, Bi-213, Tl-209, Pb-209
Th-232+	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208
Th-232sec	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Po-212, Tl-208
Th-234+	Pa-234m, Pa-234
U-230+	Th-226, Ra-222, Rn-218, Po-214
U-232+	Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208
U-235+	Th-231
U-235sec	Th-231, Pa-231, Ac-227, Th-227, Fr-223, Ra-223, Rn-219, Po-215, Pb-211, Bi-211, Tl-207, Po-211
U-238+	Th-234, Pa-234m, Pa-234

Parent radionuclide	*Daughter radionuclides*
U-238sec	Th-234, Pa-234m, Pa-234, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
U-240+	Np-240m, Np-240
Zn-69m+	Zn-69
Zr-95+	Nb-95m
Zr-97+	Nb-97m, Nb-97”