Republic of the Philippines
Department of Science and Technology
PHILIPPINE NUCLEAR RESEARCH INSTITUTE
Commonwealth Avenue,
Diliman, Quezon City

ADMINISTRATIVE ORDER NO. 4
Series of 2004

AMENDMENT TO CPR PART 3, "STANDARDS FOR PROTECTION AGAINST RADIATION"

Whereas, the PNRI recognizes the need to amend CPR Part 3, "Standards for protection Against Radiation", by inserting Section 43-A, "Repealing Clause" and the Appendices "A" to "D", inclusive of same Standards published in the Official Gazette(Volume 100, No. 36) dated September 6, 2004, as follows:

Section 43-A. Repealing Clause.

All PNRI issuances, rules, orders, regulations, and parts thereof inconsistent herewith, are hereby deemed repealed, modified, or amended accordingly."

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Director, PNRI

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APPENDIX A

EXEMPTION LEVELS: EXEMPT ACTIVITY CONCENTRATIONS AND EXEMPT ACTIVITIES OF RADIONUCLIDES

Nuclide	Activity concentration (Bq/g)	Activity (Bq)
H-3	1 E+06	1 E+09
Be-7	1 E+03	1 E+07
C-14	1 E+04	1 E+07
O-15	1 E+02	1 E+09
F-18	1 E+01	1 E+06
Na-22	1 E+01	1 E+06
Na-24	1 E+01	1 E+05
Si-31	1 E+03	1 E+06
P-32	1 E+03	1 E+05
P-33	1 E+05	1 E+08
S-35	1 E+05	1 E+08
Cl-36	1 E+04	1 E+06
Cl-38	1 E+01	1 E+05
Ar-37	1 E+06	1 E+08
Ar-41	1 E+02	1 E+09
K-40	1 E+02	1 E+06
K-42	1 E+02	1 E+06
K-43	1 E+01	1 E+06
Ca-45	1 E+04	1 E+07
Ca-47	1 E+01	1 E+06
Sc-46	1 E+01	1 E+06
Sc-47	1 E+02	1 E+06
Sc-48	1 E+01	1 E+05
V-48	1 E+01	1 E+05
Cr-51	1 E+03	1 E+07
Mn-51	1 E+01	1 E+05
Mn-52	1 E+01	1 E+05
Mn-52m	1 E+01	1 E+05
Mn-53	1 E+04	1 E+09
Mn-54	1 E+01	1 E+06
Mn-56	1 E+01	1 E+05
Fe-52	1 E+01	1 E+06
Fe-55	1 E+04	1 E+06
Fe-59	1 E+01	1 E+06
Co-55	1 E+01	1 E+06
Co-56	1 E+01	1 E+05
Co-57	1 E+02	1 E+06
Co-58	1 E+01	1 E+06
Co-58m	1 E+04	1 E+07
Co-60	1 E+01	1 E+05
Co-60m	1 E+03	1 E+06
Co-61	1 E+02	1 E+06
Co-62m	1 E+01	1 E+05
Ni-59	1 E+04	1 E+08
Ni-63	1 E+05	1 E+08
Ni-65	1 E+01	1 E+06
Cu-64	1 E+02	1 E+06
Zn-65	1 E+01	1 E+06
Zn-69	1 E+04	1 E+06
Zn-69m	1 E+02	1 E+06
Ga-72	1 E+01	1 E+05

Nuclide	Activity concentration (Bq/g)	Activity (Bq)
Ge-71	1 E+04	1 E+08
As-73	1 E+03	1 E+07
As-74	1 E+01	1 E+06
As-76	1 E+02	1 E+05
As-77	1 E+03	1 E+06
Se-75	1 E+02	1 E+06
Br-82	1 E+01	1 E+06
Kr-74	1 E+02	1 E+09
Kr-76	1 E+02	1 E+09
Kr-77	1 E+02	1 E+09
Kr-79	1 E+03	1 E+05
Kr-81	1 E+04	1 E+07
Kr-83m	1 E+05	1 E+12
Kr-85	1 E+05	1 E+04
Kr-85m	1 E+03	1 E+10
Kr-87	1 E+02	1 E+09
Kr-88	1 E+02	1 E+09
Rb-86	1 E+02	1 E+05
Sr-85	1 E+02	1 E+06
Sr-85m	1 E+02	1 E+07
Sr-87m	1 E+02	1 E+06
Sr-89	1 E+03	1 E+06
Sr-90*	1 E+02	1 E+04
Sr-91	1 E+01	1 E+05
Sr-92	1 E+01	1 E+06
Y-90	1 E+03	1 E+05
Y-91	1 E+03	1 E+06
Y-91m	1 E+02	1 E+06
Y-92	1 E+02	1 E+05
Y-93	1 E+02	1 E+05
Zr-93*	1 E+03	1 E+07
Zr-95	1 E+01	1 E+06
Zr-97*	1 E+01	1 E+05
Nb-93m	1 E+04	1 E+07
Nb-94	1 E+01	1 E+06
Nb-95	1 E+01	1 E+06
Nb-97	1 E+01	1 E+06
Nb-98	1 E+01	1 E+05
Mo-90	1 E+01	1 E+06
Mo-93	1 E+03	1 E+08
Mo-99	1 E+02	1 E+06
Mo-101	1 E+01	1 E+06
Tc-96	1 E+01	1 E+06
Tc-96m	1 E+03	1 E+07
Tc-97	1 E+03	1 E+08
Tc-97m	1 E+03	1 E+07
Tc-99	1 E+04	1 E+07
Tc-99m	1 E+02	1 E+07
Ru-97	1 E+02	1 E+07
Ru-103	1 E+02	1 E+06
Ru-105	1 E+01	1 E+06
Ru-106*	1 E+02	1 E+05
Rh-103m	1 E+04	1 E+08
Rh-105	1 E+02	1 E+07
Pd-103	1 E+03	1 E+08
Pd-109	1 E+03	1 E+06
Ag-105	1 E+02	1 E+06

Nuclide	Activity concentration (Bq/g)	Activity (Bq)
Ag-110m	1 E+01	1 E+06
Ag-111	1 E+03	1 E+06
Cd-109	1 E+04	1 E+06
Cd-115	1 E+02	1 E+06
Cd-115m	1 E+03	1 E+06
In-111	1 E+02	1 E+06
In-113m	1 E+02	1 E+06
In-114m	1 E+02	1 E+06
In-115m	1 E+02	1 E+06
Sn-113	1 E+03	1 E+07
Sn-125	1 E+02	1 E+05
Sb-122	1 E+02	1 E+04
Sb-124	1 E+01	1 E+06
Sb-125	1 E+02	1 E+06
Te-123m	1 E+02	1 E+07
Te-125m	1 E+03	1 E+07
Te-127	1 E+03	1 E+06
Te-127m	1 E+03	1 E+07
Te-129	1 E+02	1 E+06
Te-129m	1 E+03	1 E+06
Te-131	1 E+02	1 E+05
Te-131m	1 E+01	1 E+06
Te-132	1 E+02	1 E+07
Te-133	1 E+01	1 E+05
Te-133m	1 E+01	1 E+05
Te-134	1 E+01	1 E+06
I-123	1 E+02	1 E+07
I-125	1 E+03	1 E+06
I-126	1 E+02	1 E+06
I-129	1 E+02	1 E+05
I-130	1 E+01	1 E+06
I-131	1 E+02	1 E+06
I-132	1 E+01	1 E+05
I-133	1 E+01	1 E+06
I-134	1 E+01	1 E+05
I-135	1 E+01	1 E+06
Xe-131m	1 E+04	1 E+04
Xe-133	1 E+03	1 E+04
Xe-135	1 E+03	1 E+10
Cs-129	1 E+02	1 E+05
Cs-131	1 E+03	1 E+06
Cs-132	1 E+01	1 E+05
Cs-134m	1 E+03	1 E+05
Cs-134	1 E+01	1 E+04
Cs-135	1 E+04	1 E+07
Cs-136	1 E+01	1 E+05
Cs-137*	1 E+01	1 E+04
Cs-138	1 E+01	1 E+04
Ba-131	1 E+02	1 E+06
Ba-140*	1 E+01	1 E+05
La-140	1 E+01	1 E+05
Ce-139	1 E+02	1 E+06
Ce-141	1 E+02	1 E+07
Ce-143	1 E+02	1 E+06
Ce-144*	1 E+02	1 E+05
Pr-142	1 E+02	1 E+05
Pr-143	1 E+04	1 E+06

Nuclide	Activity concentration (Bq/g)	Activity (Bq)
Nd-147	1 E+02	1 E+06
Nd-149	1 E+02	1 E+06
Pm-147	1 E+04	1 E+07
Pm-149	1 E+03	1 E+06
Sm-151	1 E+04	1 E+08
Sm-153	1 E+02	1 E+06
Eu-152	1 E+01	1 E+06
Eu-152m	1 E+02	1 E+06
Eu-154	1 E+01	1 E+06
Eu-155	1 E+02	1 E+07
Gd-153	1 E+02	1 E+07
Gd-159	1 E+03	1 E+06
Tb-160	1 E+01	1 E+06
Dy-165	1 E+03	1 E+06
Dy-166	1 E+03	1 E+06
Ho-166	1 E+03	1 E+05
Er-169	1 E+04	1 E+07
Er-171	1 E+02	1 E+06
Tm-170	1 E+03	1 E+06
Tm-171	1 E+04	1 E+08
Yb-175	1 E+03	1 E+07
Lu-177	1 E+03	1 E+07
Hf-181	1 E+01	1 E+06
Ta-182	1 E+01	1 E+04
W-181	1 E+03	1 E+07
W-185	1 E+04	1 E+07
W-187	1 E+02	1 E+06
Re-186	1 E+03	1 E+06
Re-188	1 E+02	1 E+05
Os-185	1 E+01	1 E+06
Os-191	1 E+02	1 E+07
Os-191m	1 E+03	1 E+07
Os-193	1 E+02	1 E+06
Ir-190	1 E+01	1 E+06
Ir-192	1 E+01	1 E+04
Ir-194	1 E+02	1 E+05
Pt-191	1 E+02	1 E+06
Pt-193m	1 E+03	1 E+07
Pt-197	1 E+03	1 E+06
Pt-197m	1 E+02	1 E+06
Au-198	1 E+02	1 E+06
Au-199	1 E+02	1 E+06
Hg-197	1 E+02	1 E+07
Hg-197m	1 E+02	1 E+06
Hg-203	1 E+02	1 E+05
Tl-200	1 E+01	1 E+06
Tl-201	1 E+02	1 E+06
Tl-202	1 E+02	1 E+06
Tl-204	1 E+04	1 E+04
Pb-203	1 E+02	1 E+06
Pb-210*	1 E+01	1 E+04
Pb-212*	1 E+01	1 E+05
Bi-206	1 E+01	1 E+05
Bi-207	1 E+01	1 E+06
Bi-210	1 E+03	1 E+06
Bi-212*	1 E+01	1 E+05
Po-203	1 E+01	1 E+06

Nuclide	Activity concentration (Bq/g)	Activity (Bq)
Po-205	1 E+01	1 E+06
Po-207	1 E+01	1 E+06
Po-210	1 E+01	1 E+04
At-211	1 E+03	1 E+07
Rn-220*	1 E+04	1 E+07
Rn-222*	1 E+01	1 E+08
Ra-223*	1 E+02	1 E+05
Ra-224*	1 E+01	1 E+05
Ra-225	1 E+02	1 E+05
Ra-226*	1 E+01	1 E+04
Ra-227	1 E+02	1 E+06
Ra-228*	1 E+01	1 E+05
Ac-228	1 E+01	1 E+06
Th-226*	1 E+03	1 E+07
Th-227	1 E+01	1 E+04
Th-228*	1 E+00	1 E+04
Th-229*	1 E+00	1 E+03
Th-230	1 E+00	1 E+04
Th-231	1 E+03	1 E+07
Th-nat (incl.Th-232)	1 E+00	1 E+03
Th-234*	1 E+03	1 E+05
Pa-230	1 E+01	1 E+06
Pa-231	1 E+00	1 E+03
Pa-233	1 E+02	1 E+07
U-230*	1 E+01	1 E+05
U-231	1 E+02	1 E+07
U-232*	1 E+00	1 E+03
U-233	1 E+01	1 E+04
U-234	1 E+01	1 E+04
U-235*	1 E+01	1 E+04
U-236	1 E+01	1 E+04
U-237	1 E+02	1 E+06
U-238*	1 E+01	1 E+04
U-nat	1 E+00	1 E+03
U-239	1 E+02	1 E+06
U-240	1 E+03	1 E+07
U-240*	1 E+01	1 E+06
Np-237*	1 E+00	1 E+03
Np-239	1 E+02	1 E+07
Np-240	1 E+01	1 E+06
Pu-234	1 E+02	1 E+07
Pu-235	1 E+02	1 E+07
Pu-236	1 E+01	1 E+04
Pu-237	1 E+03	1 E+07
Pu-238	1 E+00	1 E+04
Pu-239	1 E+00	1 E+04
Pu-240	1 E+00	1 E+03
Pu-241	1 E+02	1 E+05
Pu-242	1 E+00	1 E+04
Pu-243	1 E+03	1 E+07
Pu-244	1 E+00	1 E+04
Am-241	1 E+00	1 E+04
Am-242	1 E+03	1 E+06
Am-242m*	1 E+00	1 E+04
Am-243*	1 E+00	1 E+03
Cm-242	1 E+02	1 E+05
Cm-243	1 E+00	1 E+04

Nuclide	Activity concentration (Bq/g)	Activity (Bq)
Cm-244	1 E+01	1 E+04
Cm-245	1 E+00	1 E+03
Cm-246	1 E+00	1 E+03
Cm-247	1 E+00	1 E+04
Cm-248	1 E+00	1 E+03
Bk-249	1 E+03	1 E+06
Cf-246	1 E+03	1 E+06
Cf-248	1 E+01	1 E+04
Cf-249	1 E+00	1 E+03
Cf-250	1 E+01	1 E+04
Cf-251	1 E+00	1 E+03
Cf-252	1 E+01	1 E+04
Cf-253	1 E+02	1 E+05
Cf-254	1 E+00	1 E+03
Es-253	1 E+02	1 E+05
Es-254	1 E+01	1 E+04
Es-254m	1 E+02	1 E+06
Fm-254	1 E+04	1 E+07
Fm-255	1 E+03	1 E+06

* Parent nuclides and their progeny included in secular equilibrium are listed in the following:

Sr-80	Rb-80
Sr-90	Y-90
Zr-93	Nb-93m
Zr-97	Nb-97
Ru-106	Rh-106
Ag-108m	Ag-108
Cs-137	Ba-137m
Ba-140	La-140
Ce-134	La-134
Ce-144	Pr-144
Pb-210	Bi-210, Po-210
Pb-212	Bi-212, Tl-208 (0.36), Po-212 (0.64)
Bi-212	Tl-208 (0.36), Po-212 (0.64)
Rn-220	Po-216
Rn-222	Po-218, Pb-214, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208(0.36), Po-212(0.64)
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Ra-228	Ac-228
Th-226	Ra-222, Rn-218, Po-214
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
Th-229	Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209
Th-nat	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
Th-234	Pa-234m
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 (0.36), Po-212 (0.64)
U-235	Th-231
U-238	Th-234, Pa-234m
U-nat	Th-234, Pa-234m, 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-237	Pa-233
Am-242m	Am-242
Am-243	Np-239

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[36] The guidance exemption levels set forth in Appendix A (**Table I-I** of Schedule I - IBSS) are subject to the following considerations: (a) They have been derived using a conservative model based on (i) the criteria of para. I-3 and (ii) a series of limiting (bounding) use and disposal scenarios. The values of activity concentration and total activity represent the lowest values calculated in any scenario for a moderate quantity of material. (See COMMISSION OF THE EUROPEAN COMMUNITIES, Principles and Methods for Establishing Concentrations and Quantities (Exemption Values) below Which Reporting Is Not Required in the European Directive, Radiation Protection 65, Doc. XI-028/93, CEC, Brussels (1993). (b) The application of exemption to natural radionuclides, where these are not excluded, is limited to the incorporation of naturally occurring radionuclides into consumer products or their use as a radioactive source (e.g. Ra-226, Po-210) or for their elemental properties (e.g. thorium, uranium). (c) In the case of more than one radionuclide, the appropriate sum of the ratios of the activity or activity concentration of each radionuclide and the corresponding exempt activity or activity concentration shall be taken into account. (d) Unless the exposure is excluded, exemption for bulk amounts of materials with activity concentrations lower than the guidance exemption levels of Appendix A (Table I-I) may nevertheless require further consideration by the Regulatory Authority.

APPENDIX B

RADIATION DOSE QUANTITIES

Absorbed dose

The fundamental dosimetric quantity D, defined as:

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

where $d\varepsilon$ is the mean energy imparted by ionizing radiation to matter in a volume element and dm is the mass of matter in the volume element. The energy can be averaged over any defined volume, the average dose being equal to the total energy imparted in the volume divided by the mass in the volume. The SI unit of absorbed dose is the joule per kilogram (J/kg), termed the gray (Gy).

Collective dose

An expression for the total radiation dose incurred by a population, defined as the product of the number of individuals exposed to a source and their average radiation dose. The collective dose is expressed in man-sieverts (man.Sv). (See collective effective dose.)

Collective effective dose

The total effective dose S to a population, defined as:

$$S = \sum_i E_i \cdot N_i$$

where E_i is the average effective dose in the population subgroup i and N_i is the number of individuals in the subgroup. It can also be defined by the integral:

$$S = \int_0^\infty E \frac{dN}{dE} dE$$

where $\frac{dN}{dE} dE$ is the number of individuals receiving an effective dose between E and E+dE.

The collective effective dose S_k committed by an event, a decision or a finite portion of a practice k is given by:

$$S_k = \int_0 \dot{S}_k(t) dt$$

where $\dot{S}_k(t)$ is the collective effective dose rate at time t caused by k.

Committed absorbed dose

The quantity $D(\tau)$ defined as:

$$D(\tau) = \int_{t_0}^{t_0+\tau} \dot{D}(t)\,dt$$

where t_0 is the time of intake, $\dot{D}(t)dt$ is the absorbed dose rate at time t, and τ is the time elapsed after an intake of radioactive substances. When τ is not specified it will be taken to be 50 years for adults and to age 70 years for intakes by children.

Committed dose

Committed effective dose and/or committed equivalent dose.

Committed effective dose

The quantity $E(\tau)$ defined as:

$$E(\tau) = \sum_T w_T \cdot H_T(\tau)$$

where $H_T(\tau)$ is the committed equivalent dose to tissue T over the integration time τ and WT is the tissue weighting factor for the tissue T. When τ is not specified, it will be taken to be 50 years for adults and to age 70 years for intakes by children.

Committed equivalent dose

The quantity $H_T(\tau)$ defined as:

$$H_T(\tau) = \int_{t_0}^{t_0+\tau} \dot{H}_T(t)dt$$

where t_0 is the time of intake, $\dot{H}_T(t)$ is the equivalent dose rate at time t in an organ or tissue T and τ is the time elapsed after an intake of radioactive substances. When τ is not specified it will be taken to be 50 years for adults and to age 70 years for intakes by children.

Effective dose

The quantity E, defined as a summation of the tissue equivalent doses, each multiplied by the appropriate tissue weighting factor:

$$E = \sum_T w_T \cdot H_T$$

where H_T is the equivalent dose in tissue T and w_T is the tissue weighting factor for tissue T. From the definition of equivalent dose, it follows that:

$$E = \sum_T w_T \cdot \sum_R w_R \cdot D_{T,R}$$

where w_R is the radiation weighting factor for radiation R and $D_{T,R}$ is the average absorbed dose in the organ or tissue T. The unit of effective dose is J/kg, termed the sievert (Sv).

Equivalent dose

The quantity, $H_{T,R}$ defined as:

$$H_{T,R} = D_{T,R} \cdot w_R$$

where $D_{T,R}$ is the absorbed dose delivered by radiation type R averaged over a tissue or organ T and w_R is the radiation weighting factor for radiation type R.

When the radiation field is composed of different radiation types with different values of w_R the equivalent dose is:

$$H_T = \sum_R w_R \cdot D_{T,R}$$

The unit of equivalent dose is J/kg, termed the sievert (Sv).

Personal dose equivalent

The quantity defined for both strongly and weakly penetrating radiations as $H_p(d)$, the dose equivalent in soft tissue below a specified point on the body at an appropriate depth d. The relevant depths for the purposes of the Standards are generally d = 10 mm for strongly penetrating radiation and d = 0.07 mm for weakly penetrating radiation.

Radiation weighting factor

Multipliers (as follows) of absorbed dose used for radiation protection purposes to account for the relative effectiveness of different types of radiation in inducing health effects.

Type and energy range of radiation		Radiation weighting factor w_R
Photons, all energies		1
Electrons and muons, all energies *		1
Neutrons, energy	< 10 keV	5
	10 keV to 100 keV	10
	> 100 keV to 2 MeV	20
	>2 MeV to 20 MeV	10
	> 20 MeV	5
Protons, other than recoil protons, energy >2 MeV		5
Alpha particles, fission fragments, heavy nuclei		20

* Excluding Auger electrons emitted from nuclei to DNA, for which special microdosimetric considerations apply.

If calculation of the radiation weighting factor for neutrons requires a continuous function, the following approximation can be used, where E is the neutron energy in MeV:

$$w_R = 5 + 17e^{-(\ln(2E))^2/6}$$

For radiation types and energies not included in the table, w_R can be taken to be equal to $\overline{Q}$ at 10 mm depth in the ICRU sphere and can be obtained as follows:

$$\overline{Q} = \frac{1}{D}\int_0^\infty Q(L) D_L \, dL$$

where D is the absorbed dose, $Q(L)$ is the quality factor in terms of the unrestricted linear energy transfer L in water, specified in ICRP Publication No. 60 [49], and D_L is the distribution of D in L.

$$Q(L) = \begin{cases} 1 & \text{for } L \le 10 \\ 0.32L - 2.2 & \text{for } 10 < L < 100 \\ 300/\sqrt{L} & \text{for } L \ge 100 \end{cases}$$

where L is expressed in $\mathrm{KeV}/\mu\mathrm{m}$.

[49] INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION, 1990 Recommendations of the International Commission on Radiological Protection, Publication No. 60, *Ann. ICRP* **21** 1-3, Pergamon Press, Oxford and New York (1991).

Tissue weighting factor

Multipliers (as follows) of the equivalent dose to an organ or tissue used for radiation protection purposes to account for the different sensitivities of different organs and tissues to the induction of stochastic effects of radiation.

Tissue or organ	**Tissue weighting factor** w_T
Gonads	0.20
Bone marrow (red)	0.12
Colon (a)	0.12
Lung	0.12
Stomach	0.12
Bladder	0.05
Breast	0.05
Liver 0.05	
Oesophagus	0.05
Thyroid	0.05
Skin	0.01
Bone surface	0.01
Remainder (b)	0.05

(a) The weighting factor for the colon is applied to the mass average of the equivalent dose in the walls of the upper and lower large intestine;

(b) For the purposes of calculation, the remainder is composed of adrenal glands, brain, extrathoracic region, small intestine, kidney, muscle, pancreas, spleen, thymus and uterus. In those exceptional cases in which the most exposed remainder tissue receives the highest committed equivalent dose of all organs, a weighting factor of 0.025 shall be applied to that tissue or organ and a weighting factor of 0.025 to the average dose in the rest of the remainder as defined here.

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NOTICE TO EMPLOYEES

(AS REQUIRED BY CPR PART 3, STANDARDS FOR PROTECTION AGAINST RADIATION)

WHAT IS THE PHILIPPINE NUCLEAR RESEARCH INSTITUTE (PNRI)?

The Philippine Nuclear Research Institute (PNRI), formerly the Philippine Atomic Energy Commission (PAEC), is an agency of the Department of Science and Technology (DOST) organized by virtue of Executive Order No. 128, issued in 1987. It is the national authority competent in nuclear energy matters particularly in the peaceful utilization of atomic energy materials and facilities. PNRI retains the licensing and regulatory authority of PAEC pursuant to R.A. No. 2067, as amended by R.A. No. 3589, and R.A. No. 5207 as amended by P.D. 1484

WHAT DOES THE PNRI DO?

PNRI regulates the uses of radioactive materials in agriculture, medicine, industry and research. This function is performed according to the mandate of the above Acts and the requirements established in the Code of PNRI Regulations (CPR) which ensure the protection of radiation workers and the public from unnecessary exposure to ionizing radiation.

WHAT RESPONSIBILITY DOES YOUR EMPLOYER HAVE?

Any licensed employer that conducts activities authorized by the Institute must comply with the condition of the license and with the requirements pursuant to the regulations in Parts 2, 3, 4, 11, 12, 13, 14, and 15 of the Code, as may be applicable. If a licensee violates the requirements of the Institute, it can have its license modified, suspended or revoked.

Your employer thru your RHSO or other designated persons, must be responsible for informing you about the requirements of the Institute which apply to your work and must post PNRI Notices or Bulletins involving radiological working conditions.

WHAT IS YOUR RESPONSIBILITY?

For your own protection and the protection of your co-workers, you should know how these requirements relate to your work and should follow them. You should report any violations of the requirements immediately.

HOW DO YOU REPORT VIOLATIONS?

If you believe that a violation of the regulations and conditions of the license or unnecessary exposure to radiation or radioactive materials have occurred, you should report them promptly to the Radiological Health and Safety Officer (RHSO) and the licensee. If you believe that no adequate corrective action is being done by the licensee, you may request for an inspection by giving notice of the alleged violation to the Director, Philippine Nuclear Research Institute, or its duly designated representative.

WHAT IF YOU WORK IN A RADIATION AREA?

If you work with radioactive materials or in a radiation area, the amount of radiation exposure in a year shall be limited so that the licensee shall allow you to receive an effective dose-equivalent or a committed effective dose-equivalent or a committed dose-equivalent not in excess of 50 mSv (5 rem) to the whole body, or a dose-equivalent or a committed dose-equivalent for individual organs and tissues in excess of 500 mSv (50 rem) except the lens of the eye which shall not exceed 150 mSv (15 rem). While these are the regulatory limits, the licensee shall maintain radiation exposures, contamination levels and releases as low as is reasonably achievable (ALARA).

HOW DO YOU GET A RECORD OF YOUR RADIATION EXPOSURE?

At the request of any employee, the licensee shall advise such employee annually of the employee's exposure to radiation as shown in records maintained by the licensee pursuant to the regulations and orders issued by the Institute.

HOW ARE VIOLATIONS OF INSTITUTE REQUIREMENTS IDENTIFIED?

The Institute conducts regular inspections of licensed materials, activities, premises, records and facilities to assure compliance with the requirements of the Institute and license conditions. In addition, your employer should conduct its own inspections. to assure compliance with the same requirements. They are further required to submit inspection reports periodically to the Institute.

HOW DO YOU CONTACT THE INSTITUTE?

Notify the Institute through any available means of communication at the following address, telephone and fax numbers or telegram:

The Director
PHILIPPINE NUCLEAR RESEARCH INSTITUTE
Diliman, Quezon City, Metro Manila
Tel. Nos. 97-60-11 to 15 loc. 221
and 97-47-19
Fax. No. 95-16-46

or

The Chief
Nuclear Regulations, Licensing and Safeguards Division
Philippine Nuclear Research Institute
Diliman, Quezon City, Metro Manila
Tel. Nos. 97-60-11 to 15 loc. 244
and 96-73-43

Appendix D-1

Derived Generic Clearance Levels for Airborne Releases

Radionuclide	Annual Release Rate (Bq per annum)	Main Exposure Pathways and Limiting Age Group
H-3	1×10^{11}	Ingestion
C-14	1×10^{10}	Ingestion
Na-22	1×10^{6}	External from deposit (Adults and Infants)
Na-24	1×10^{9}	External from deposit (Adults and Infants)
P-32	1×10^{8}	Ingestion (Infants)
S-35	1×10^{8}	Ingestion (Infants)
Cl-36	1×10^{7}	Ingestion (Infants)
K-42	1×10^{10}	External from deposit (Adults and Infants)
Ca-45	1×10^{8}	Ingestion (Infants)
Ca-47	1×10^{9}	External from deposit and ingestion (Adults and Infants)
Cr-51	1×10^{9}	External from deposit (Infants)
Fe-59	1×10^{8}	External from deposit (Adults and Infants)
Co-57	1×10^{9}	Ingestion (infants)
Co-58	1×10^{9}	Ingestion (infants)
Ga-67	1×10^{10}	External from deposit (Adults and Infants)
Se-75	1×10^{8}	External from deposit (Adults and Infants)
Sr-85	1×10^{8}	External from deposit (Adults and Infants)
Sr-89	1×10^{8}	Ingestion (infants)
Y-90	1×10^{10}	Inhalation and Ingestion (Infants)
Mo-99	1×10^{9}	External from deposit (Adults and Infants)
Tc-99	1×10^{7}	Ingestion (infants)
Tc-99m	1×10^{11}	External from deposit (Adults and Infants)
In-111	1×10^{9}	External from deposit (Adults and Infants)
I-123	1×10^{10}	External from deposit (Adults and Infants)
I-125	1×10^{8}	Ingestion (infants)
I-131	1×10^{8}	Ingestion (infants)
Xe-127	1×10^{11}	External from cloud (Adults and Infants)
Xe-133	1×10^{12}	External from cloud (Adults and Infants)
Pm-147	1×10^{10}	Inhalation (Adults and Infants)
Er-169	1×10^{10}	Inhalation and ingestion (Infants)
Au-198	1×10^{9}	External from deposit (Adults and Infants)
Hg-197	1×10^{10}	External from deposit (Adults and Infants)
Hg-203	1×10^{8}	External from deposit and ingestion (Infants)
Tl-201	1×10^{10}	External from deposit (Adults and Infants)
Ra-226	1×10^{6}	Inhalation and Ingestion (Adults and infants)
Th-232	1×10^{5}	Inhalation (Adults)

Reference: IAEA TECDOC 1000
Notes:

(a) The calculations on which these values are based assume releases from a building vent or window. The closest individual is located 20 m from the release point and gets his food, 100 and 800 m from the release point. Doses are evaluated via inhalation, ingestion and external exposure routes.

(b) Significant differences in these values are possible for different source to receptor distances.

Appendix D-2

Derived Generic Clearance Levels for Liquid Releases

Radionuclide	Annual Release Rate (Bq per annum)	Main Exposure Pathways
H-3	1×10^{12}	River - Ingestion
C-14	1×10^{10}	River - Ingestion
Na-22	1×10^{5}	Sewage – External
Na-24	1×10^{8}	Sewage – External
P-32	1×10^{6}	River – Ingestion fish
S-35	1×10^{9}	River – Ingestion fish
Cl-36	1×10^{10}	River – Ingestion fish and water
K-42	1×10^{9}	Sewage – External
Ca-45	1×10^{10}	River – Ingestion fish and water
Ca-47	1×10^{8}	Sewage – External
Cr-51	1×10^{8}	Sewage – External
Fe-59	1×10^{6}	Sewage – External
Co-57	1×10^{9}	Sewage – External
Co-58	1×10^{8}	Sewage – External
Ga-67	1×10^{8}	Sewage – External
Se-75	1×10^{6}	Sewage – External
Sr-85	1×10^{6}	Sewage – External
Sr-89	1×10^{9}	River – Ingestion fish and water
Y-90	1×10^{10}	River – Ingestion fish and water
Mo-99	1×10^{8}	Sewage – External
Tc-99	1×10^{10}	River – Ingestion fish and water
Tc-99m	1×10^{9}	Sewage – External
In-111	1×10^{8}	Sewage – External
I-123	1×10^{9}	Sewage – External
I-125	1×10^{8}	Sewage – External
I-131	1×10^{7}	Sewage – External
Xe-127	Not applicable	
Xe-133	Not applicable	
Pm-147	1×10^{10}	Sewage – External and River - Ingestion fish and water
Er-169	1×10^{10}	River - Ingestion fish and water
Au-198	1×10^{8}	Sewage – External
Hg-197	1×10^{9}	Sewage – External
Hg-203	1×10^{7}	Sewage – External
Tl-201	1×10^{8}	Sewage – External
Ra-226	1×10^{6}	Sewage – External
Th-232	1×10^{6}	Sewage – External

(Reference: IAEA TECDOC 1000)

Note:

The values are the most restrictive of those calculated following discharge to a river or discharge to a sewer.

Appendix D–3

Generic Clearance Levels for Solid Waste (Bq/g)

Radionuclide	Clearance Level for Moderate Quantities (a)	Radionuclide	Clearance Level for Moderate Quantities (a)
H-3	1×10^{6}	Sr-89	1×10^{3}
C-14	1×10^{4}	Y-90	1×10^{3}
Na-22	1×10^{1}	Mo-99	1×10^{2}
Na-24	1×10^{1}	Tc-99	1×10^{4}
P-32	1×10^{3}	Tc-99m	1×10^{2}
S-35	1×10^{5}	In-111	1×10^{2}
Cl-36	1×10^{4}	I-123	1×10^{2}
K-42	1×10^{2}	I-125	1×10^{3}
Ca-45	1×10^{4}	I-131	1×10^{2}
Ca-47	1×10^{1}	Pm-147	1×10^{4}
Cr-51	1×10^{3}	Er-169	1×10^{4}
Fe-59	$1x\ 10^{1}$	Au-198	1×10^{2}
Co-57	1×10^{2}	Hg-197	1×10^{2}
C0-58	1×10^{1}	Hg-203	1×10^{2}
Ga-67	$1\ x10^{2}$	Tl-201	1×10^{2}
Se-75	1×10^{2}	Ra-226	$1\ x10^{1}$
Sr-85	1×10^{2}	Th-232	$1\ x10^{0}$

(Reference: IAEA TECDOC 1000)

(a) Moderate quantity means less than 3 tonnes per year and per facility. For larger quantities the clearance level is one tenth of the levels in Appendix D - 3.

Note:

The clearance levels for moderate quantities are identical to the BSS (1) exemption levels.