CONVERSION FACTORS FOR RADON UNITS

INTRODUCTION

The following conversion factors are useful for converting between units commonly used for the measurement of radon and radon decay products. For some conversion factors the following assumptions have been made and are indicated in parentheses beside the units.

(a) the equilibrium ratio between radon progeny and the parent radon is 0.5

(b) the dwelling occupancy factor is 100%

(c) the dose conversion coefficient is
1×10^{-5} mSv per Bq.h.m.$^{-3}$ EER (equilibrium equivalent radon concentration - ICRP-50, sec. 3.3.)

(d) 1 WLM is 1 WL for 170 h

1 WLM	$= 6.3 \times 10^5$ Bq.h.m.$^{-3}$ EER
1 Bq.h.m.$^{-3}$ EER	$= 1.60 \times 10^{-6}$ WLM

(ICRP-50, section A.5)

ACTIVITY

1 becquerel (Bq)	= 1 disintegration per second (s^{-1})
1 curie (Ci)	$= 3.7 \times 10^{10}$ Bq
1 picocurie (pCi)	= 0.037 Bq
1 becquerel (Bq)	$\approx$ 27 pCi

RADON CONCENTRATION

becquerel per cubic metre

1 Bq.m^{-3}	$= 2.7 \times 10^{-2}$	pCi.L^{-1}	
	$= 1.35 \times 10^{-4}$	WL	(a)
	$= 0.5$	Bq.m^{-3} EER	(a)

picocurie per litre

1 pCi.L^{-1}	$= 37$	Bq.m^{-3}	
	$= 5 \times 10^{-3}$	WL	(a)
	$= 18.5$	Bq.m^{-3} EER	(a)

RADON PROGENY CONCENTRATION

Working Level

1 WL	$= 7.4 \times 10^3$	Bq.m^{-3}	(a)
	$= 3.7 \times 10^3$	Bq.m^{-3} EER	
	$= 2.0 \times 10^2$	pCi.L^{-1}	(a)
0.02 WL	$= 1.48 \times 10^2$	Bq.m^{-3} EER	(a)
	$= 4$	pCi.L^{-1}	(a)

becquerel per cubic metre, EER

1 Bq.m^{-3} EER	$= 2$	Bq.m^{-3}
	$= 5.4 \times 10^{-2}$	pCi.L^{-1}
	$= 2.7 \times 10^{-4}$	WL

POTENTIAL ALPHA ENERGY CONCENTRATION

1 Working Level (WL)	$= 1.3 \times 10^5$	MeV.L^{-1}
	$= 2.08 \times 10^{-5}$	J.m^{-3}

1 WL corresponds to radon progeny concentration in equilibrium with 100 pCi.L^{-1} radon (3700 Bq.m^{-3})

RADON, RADON PROGENY EXPOSURE

Average of 1 becquerel per cubic metre Rn for a year

1 Bq.m.$^{-3}$y	$= 4.38 \times 10^{-2}$	mSv	(a,b,c,d)
	$= 7.0 \times 10^{-3}$	WLM	(a,b,d)
	$= 8.76 \times 10^3$	Bq.h.m^{-3}	

Average of 1 picocurie per litre radon for a year

1 pCi.L^{-1}y	$= 1.62$	mSv	(a,b,c,d)
	$= 0.26$	WLM	(a,b,d)
	$= 3.24 \times 10^5$	Bq.h.m^{-3}	

Average of one Working Level for a year

1 WLy	$= 51.53$	WLM	
	$= 6.48 \times 10^7$	Bq.h.m^{-3}	(a,b,d)
	$= 3.24 \times 10^7$	Bq.h.m^{-3} EER	(a,b,d)
	$= 1.75 \times 10^6$	pCi.h.L^{-1}	(a,b,d)
	$= 324$	mSv	(a,b,c,d)

Average of 1 becquerel per cubic metre, equilibrium equivalent Rn concentration for a year

1 Bq.m^{-3}EER.y	$= 8.76 \times 10^{-2}$	mSv	(a,b,c,d)
	$= 1.4 \times 10^{-2}$	WLM	(a,b,d)
	$= 1.75 \times 10^4$	Bq.h.m^{-3}	(a,b,d)
	$= 8.76 \times 10^3$	Bq.h.m^{-3}EER	(a,b,d)