ECRR radiation doses to the public
Chris Busby, May 2010

ECRR annual doses to members of the public from all sources mSv; ICRP dose is that presented at the Riga symposium May 20th 2010
(http://www.euradcom.org/images/riga2010/stengrevics.pdf).

Source	ICRP dose	ECRR dose	Comment
All sources	2.9	330	
NATURAL			
Cosmic rays	0.27	0.27	
Gamma from natural radionuclides in earth	0.28	0.69	Presentation at the symposium showed mean gamma dose rate of 11microRad/h; this is an annual dose of 0.096Rads or 0.96mSv including cosmic rays
Internal (natural?) Radionuclides	0.39	>20	There are enhancements of natural radionuclides due to anthropogenic activity: Uranium in fertiliser, in drinking water, global depleted uranium particles, radium from oil and gas, radium from clock dials, thorium mantles. Uranium carried a large ECRR weighting
Radons	2.0	0.2	ICRP weights the radon dose by a factor of 20 but the dose is to the lung and not whole body
ANTHROPOGENIC			
Medical exposures	0.53	0.53	This is highly misleading as it results from the averaging of many high dose medical exposures (for cancer therapy, CAT scans etc) into the whole population.
Professional exposures	NA		This is elective: some people get exposed through their work e.g. X-ray technicians
Atomic energy	NA	>100	This includes internal exposures to releases from normal operation of the nuclear fuel cycle and accidents which include many internal exposures which carry high ECRR weightings. The doses are not uniformly distributed in the population
Military activities	NA	>200	Mainly from two sources. 1. Atmospheric Test fallout 2. Uranium weapons
Production of specific radioactive sources	0.109	>10	Depends on the specific source and exposure

Note that the slide nr 18 (over Ionised Radiation Sources in nature and man made) given by Latvian Cancer Registry director Aivars Stengrevics at the conference did not add in the man made exposures or quantify many of those, given in the table as NA (not available). (see http://www.euradcom.org/images/riga2010/stengrevics.pdf)

The mean radiation doses to members of the public include several components which are listed below in the way that they are usually presented by the radiation risk agencies. Unfortunately this way of assessing radiation is incorrect since the concept of absorbed dose which is used is highly misleading. Details of why are to be found in the reports of the European Committee on Radiation Risk ECRR (see www.euradcom.org).

Certain internal (ingested or inhaled) radionuclides exposures are much more harmful than their absorbed dose measurements suggest and have to be multiplied by weighting factors to obtain the ECRR Dose Equivalent. This is mainly for exposures from particles, for elements (Uranium, Strontium, Barium) that bind to DNA and for certain other exposure types. Approximate annual ECRR doses are given in the table below and relate to the presentation given in Riga May 2010 by the Director of the Cancer Registry in Latvia.

The overall ECRR dose of about 330mSv per year would cause a 1.6% increase in cancer per year in overall population which is roughly what has been seen in northern hemisphere countries since the beginning of the atmospheric test exposures in the 1960s. The distribution of the cancers will be non uniform due to the non uniform nature of the exposures (higher in those near sources of internal contamination, rainfall, proximity to nuclear sites and polluted areas etc.)

The ECRR doses predict all the findings of excess cancer and leukaemia following exposures (see ECRR2010).