



# Radiation

**The levels of radiation emitted from nuclear power stations are insignificant relative to naturally occurring background radiation.**

Radiation comes in different forms such as: alpha particles (helium nuclei), beta particles (electrons) and gamma rays (high energy photons). Alpha particles are stopped by the skin or by paper; beta particles are stopped by aluminium foil; gamma rays require metres of concrete.

- A nuclear worker receives an average additional dose from his work of less than 1mSv per year.
- Moderate-High levels of radiation (15mSv/year) ie 4-70 times background radiation may actually have a **preventative** effect against cancer. [1]

The biological effect of radiation is measured in Sieverts(Sv) and milliSieverts (mSv)

- High levels of natural background radiation (200mSv/year) are found in many parts of the world, and these areas have in some cases *higher* life expectancy than similar lower radiation.

$$1000\text{mSv} = 1 \text{ Sv}$$

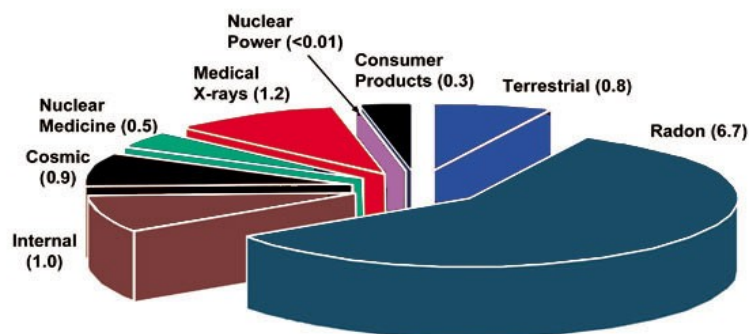
Total background radiation is approximately 3.6mSv per year of which 3.0mSv per year is natural, the rest almost entirely from medical sources

- Only very large doses of radiation in a short time are harmful.

(X-rays etc.)  
0.01mSv per year from Nuclear Fuel and Nuclear Power Plants

- **Ingested alpha emitters** (e.g. Polonium-210 from cigarette ash) may be harmful in moderate doses.

## Sources of Radiation Around Us



Total is 11.4 times the amount of radiation emitted by human body

[1] <http://www.jpands.org/vol9no1/chen.pdf>  
Also, 'Underexposed' by Ed Hiserodt