

Nuclear Hazards

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Nuclear or Radioactive Environmental contamination seems to be one of the most dangerous kind of pollutions. This invisible, odorless contamination can cause different type of severe health hazards including the most fatal one- cancer.

Environmental Nuclear Pollution is created by the presence of radioactive substances (radio-nuclides) in air, water and soil etc. These radio-nuclides emit high energy particles (alpha/beta) and electromagnetic waves(gamma rays).

Sources of Radioactive Environmental Pollution

Our world is radioactive and has been so since it was created. Radio-nuclides are found naturally in our environment. They are even found in human body. Every day we ingest and inhale radio-nuclides through the air, food and water.

Sources of radioactive contamination are broadly classified into two categories:

- i. Naturally occurring radioactive contamination**
- ii. Man-made radioactive contamination**

Roughly, 87% of the contamination is natural and only 13% is man-made.

Naturally occurring radioactive contamination consists of:

- a) *Primordial Radio-nuclides*: They are left over from when the earth was created. Common examples- Uranium 238, Uranium 235, Thorium 232, Potassium 40.
- b) *Cosmogenic Radio-nuclides*: They are formed in the atmosphere by the interaction of the Cosmic Rays(rays coming from outer space).

Man-made radioactive contamination mainly consists of:

- a) Radio-nuclides produced in Particle Accelerator.
- b) Radio-nuclides produced in different non-nuclear industries like ceramic industries, phosphate industries, mining industries etc.
- c) Radio-nuclides produced in nuclear weapon tests
- d) Radio-nuclides produced in Nuclear Power Plants: Although a nuclear power plant cannot explode like an atom bomb, accidents can result in serious radioactive pollution. Moreover, disposing of the large amount of radioactive waste generated by the plants is another serious problem because the waste will remain radioactive for many thousands of years

Radioactive Health Hazards

Radioactive rays are highly energetic and can deposit large amount of energy in human tissues. End point effect is to produce biological damages causing different types of health problems.

The most common type of health hazards that are caused by radiation exposures are:

- i. Cancer is considered to be the most primary health effect from radiation exposure
- ii. Radiation can cause changes in DNA, which is known as mutation.
- iii. Acute exposure appears quickly as burns and radiation sickness. Symptoms of radiation sickness includes- nausea, hair loss, weakness etc.

Maximum allowable Exposure Limit

It is difficult to set a safe limit of radiation exposure. Even very low level exposure over a prolonged period can cause severe health problems. However, based on certain philosophy, International Commission on Radiation Protection (ICRP 60) and National Council on Radiation Protection(NCRP 116) have specified some limits:

Annual average effective dose limit: 1 mili Sievert (for public)