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Contamination of the Environment With Radioactive Substances and Effect on the Human Body

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Annotation: Exposure to radiation does not immediately make a person radioactive. The only type of radiation that is capable of directly causing other material to become radioactive is neutron radiation, which is generally only found inside nuclear reactors or in a nuclear detonation. Anyone in those conditions is, put plainly, going to have bigger problems. However, the ingestion of radioactive material does have the potential of making a person radioactive, at least on a temporary basis. This is the principle behind the medical use of many radioactive materials, as it aids in imaging, diagnosis, and other areas. Between the short half-lives of the elements involved and the body's natural means of disposing of many radioactive elements, a person's individual radioactivity is usually short-lived. However, certain types of contamination, depending on the isotopes involved and the availability of treatment, can become more permanently deposited in a person's organs or bones.

Key words: radioactive contamination, radioactive pollution, gamma rays, nuclear explosion, hydrosphere, lithosphere, atmosphere, including cancer, leukemia, genetic mutations, osteonecrosis, cataracts.

Radioactive pollution occurs when radioactive elements are present in the atmosphere or environment, especially when their presence is unexpected and creates an environmental threat due to radioactive decay. Radioactive materials cause devastation by emitting dangerous ionizing radiation (radioactive decay) like beta or alpha particles, gamma rays, or neurons into the environment where they exist. Since the substances are characterized by radiation because the particles found in radioactive materials are very unstable. They have the potential to disturb, modify, and even kill the plant, animal, and human life. The level of environmental harm or hazard is determined by the radioactive material concentration, the energy emitted by the radiation, the closeness of the radioactive materials to people exposed, and the kind of radiation Nuclear weapon research, nuclear disasters, nuclear power plants, and radioactive waste disposal are the primary anthropogenic causes of contamination, whereas radioisotope usage in industry and scientific labs is a minor source. Radioactive pollution is defined as a form of physical, nuclear pollution to living organisms and the environment (hydrosphere, lithosphere, and atmosphere) arising from exposure to the release of ionizing radiation from radioactive elements such as uranium. Such releases occur as a result of radioactive decay of radioactive elements during:

- Nuclear explosions and testing
- Disposal of nuclear waste
- Mining radioactive ores
- Accidents at nuclear power plants

An atom is said to be "radioactive" if it is unstable due the excess of either energy or mass, and is therefore likely to decay at some point and give off radiation. A substance or material is said to be

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“radioactive” if it is made up of or contains a large quantity of a radioactive material. These radioactive materials, such as bananas, the uranium glaze in vintage fiestaware, or NORM generated in the process of natural gas exploration, give off radiation over time as the radioactive atoms in them decay. Over time, as the number of unstable atoms decreases, the material becomes less radioactive. This time is measured by the “half life” of different radioactive elements. This is the amount of time it takes for half of the atoms in a given sample to decay and give off radiation. For example, carbon-14 has a half-life of 5730 years, so after that amount of time, a quantity of 100 atoms of C-14 would have turned into 50 C-14 atoms and 50 Nitrogen-14 atoms. Indium-111, a radioactive isotope used in medicine as a tracer, has a half-life of 2.8 days; whereas another isotope of iridium at the other end of the scale, Indium-115 has a half-life of 441 trillion years. It’s commonly held that a sample of radioactive material will be completely decayed after 7 half lives, though after that time there would still be about 0.78% left, which with a large enough starting sample would still be significant. For smaller samples like those typically used in medicine, though, it’s a good rule of thumb. Put simply, radioactive contamination is just radioactive material somewhere it shouldn’t be. This could be anything from nuclear fallout from a dirty bomb (the whole purpose of which would be to disperse radioactive contaminant), to a lab worker splashing some of a radioactive solution on his pants and taking them home. The most common source of contamination is from mistakes or accidents in the production of radionuclides, like those used in the medical field. Contamination on or in a surface can be either “fixed” or “removable.” An example of fixed contamination, or contamination that isn’t able to be removed, would be in metal recycling: If a batch of recycled metal included something with radioactive material in it, the final product would have that radioactive material mixed in and permanently part of it. Removable contamination is, of course, removable, such as a loose powder or something that can be cleaned and safely disposed of. Disposal of radioactive waste can consist of reprocessing it for commercial use, though in some cases where this isn’t possible the best solution is burying it in concrete, rock, as this helps prevent the spread of the contamination any further.

In the postmodern period, several forms of energy can be found. The deployment of nuclear missiles and atomic bombs, both forms of nuclear energy. Children born with mental retardation, as well as diseases such as autism and other abnormalities, have been affected by the impacts of the two strikes in Hiroshima and Nagasaki that triggered the conclusion of the war in 1945. Radioisotopes are employed in detectors and other industrial processes. Radiation concentrations in isotopes such as uranium are high. Common isotopes, on the other hand, such as carbon containing radioactive substances, are easily detected in streams *via* sewage pipes.

The mining component includes the mining of mineral ores, which are subsequently broken down into smaller, more manageable bits. Radium and uranium, for example, are naturally occurring radioactive elements in the environment. Spills across oceans have occurred when ships collide with glaciers or coral reefs, spilling pollutants into rivers and the atmosphere. The bulk of these substances, including petroleum products, contain considerable amounts of radiation, which can be harmful to the environment. Radiation has been discovered to have a variety of intriguing qualities, prompting many scientists to perform experiments to understand more about it. It is an important component in the prevention and treatment of cancer. Chemotherapy, a cancer curative health programme, employs radiation to limit cancer cell development while also strengthening the immune system. Despite this, scientists have been exposed to radiation, which has resulted in their deaths or other harmful impacts. Cosmic Rays from outer space arrive on our world with high levels of radiation, generating radioactive contamination. The quantity with which the rays reach the earth is determined by the earth's height and geographical location.

Terrestrial radiations from radioactive materials in the earth's crust may exist. These radioactive elements are found in rocks, soil, and water and include potassium 40, radium 224, radon 222, thorium 232, uranium 235, uranium 238, and carbon 14. Radioactive waste is classified into three types: high level, low level, and transuranic. They mostly include nuclear weapons disposal, cleaning products from nuclear reactors and military installations, plutonium processing emissions, and other radioisotopes from hospitals and laboratories.

Over time, nuclear waste management and disposal can result in low to medium quantities of radioactivity. Their consequences are not only difficult to predict, but they may also be difficult to detect since radioactivity may contaminate and spread via the air, water, and soil. Furthermore, locating specific nuclear waste sites is challenging.

Conclusion

Radioactive elements affect the environment and can cause a risk to human health if inhaled, injected, or exposed. Human tissues absorb radiation through polluted water and foodstuff, which can cause serious health risks. High radiation exposures can result in acute radiation syndrome or cutaneous radiation damage. Exposure to radiation causes various disorders in human physiology, including cancer, leukemia, genetic mutations, osteonecrosis, cataracts, and chromosomal disruption. A secure water supply now necessitates proper analysis and monitoring of radioactive contaminants. Anthropogenic causes of radioactive contamination in water resources can be reduced by prevention and precautionary measures.

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