Journal of Pollution and Effects and control

OPEN ACCESS Freely available online

Commentary

Effects and Causes of Radioactivity and Nuclear Energy

Julia Russell*

Department of Biotechnology, University of Delft Technology, Van der Maasweg, The Netherlands

DESCRIPTION

A type of energy emitted by an atom's nucleus, which is composed of protons and neutrons, is known as nuclear energy. Fission, which occurs when atom nuclei split into several pieces, and fusion, which occurs when nuclei fuse together, are the two methods in which this type of energy can be created. Nuclear fusion technology is still in the research and development stage, whereas nuclear fission energy is currently used to create electricity throughout the world.

An atom's nucleus splits into two or more smaller nuclei during a reaction known as nuclear fission, which also releases energy. For instance, the nucleus of an atom of uranium-235 splits into two smaller nuclei, such as a barium and a krypton nucleus, as well as two or three neutrons when hit by a neutron. A chain reaction will be set off in a split second as a result of the extra neutrons hitting nearby uranium-235 atoms, which will split and produce more neutrons in a multiplying effect.

Energy is released as heat and radiation each time the reaction takes place. Similar to how heat from fossil fuels like coal, gas, and oil is used to generate electricity, the heat from nuclear power plants may also be transformed into electricity.

Nuclear reactors and related machinery are used in nuclear power plants to limit and regulate chain reactions that produce heat through fission and are typically powered by uranium-235. The heat causes the cooling agent in the reactor, usually water, to warm up and produce steam. After that, the steam is directed to turbines that spin, turning on an electric generator to provide low-carbon electricity.

Uranium mining, enrichment, and disposal

The metal uranium is present in rocks all across the planet. There are numerous naturally occurring isotopes of uranium, which are variations of an element with the same chemical composition but different masses and physical characteristics. The two original isotopes of uranium are uranium-238 and uranium-235. The bulk of uranium in the world is uranium-238, which cannot start a fission chain reaction. Uranium-235, on the other hand, can start a fission chain reaction and makes up less than 1% of all uranium in the world.

It is necessary to raise the amount of uranium-235 in a given sample by a procedure known as uranium enrichment in order to improve the likelihood that natural uranium will undergo fission. After uranium has been enhanced, it can be used as nuclear fuel in power plants for three to five years before it becomes radioactive and needs to be disposed of in accordance with strict regulations to safeguard people and the environment. Additionally, spent fuel, also known as used fuel, can be recycled into new fuel for use in specialized nuclear power reactors.

Effect to environment

Nuclear power plant operations generate radioactive waste with variable levels of activity. Depending on their level of radioactivity and use, these are handled differently. The new advanced reactors, also known as the next generation of nuclear power plants, will produce a lot less radioactive waste than the current generation of reactors. By 2030, they might already be under development. Because nuclear power stations effectively emit no CO_2 while operating, they are a low-carbon source of energy compared to coal, oil, or gas-fired ones. Nearly one-third of the world's carbon-free electricity is produced by nuclear reactors, which are essential for achieving climate change objectives.

Role of the International Atomic Energy Agency (IAEA)

- To safeguard people and the environment, the IAEA develops and supports global standards and guidelines for the safe and secure use of nuclear energy.
- The IAEA provides technical assistance and knowledge management to support both new and ongoing nuclear programs around the world. The IAEA offers technical assistance and direction to nations who want to establish nuclear power programs as well as those that are dismantling their existing ones through the Milestones Approach.
- The IAEA ensures that nuclear materials and technologies are not taken away from their intended uses for peaceful purposes through its safeguards and verification efforts.
- The IAEA's review missions and advisory services offer direction on the tasks required throughout the lifecycle of nuclear energy production, from uranium mining to nuclear power plant building, maintenance, and decommissioning, as well as the management of radioactive waste.

Correspondence to: Department of Biotechnology, University of Delft Technology, Van der Maasweg, The Netherlands, E-mail: juliarussell@hotmail.com

Received: 02-Sep-2022, Manuscript No. JPE-22-19837; **Editor assigned:** 06-Sep-2022, PreQC No. JPE-22-19837 (PQ); **Reviewed:**20-Sep-2022, QC No. JPE-22-19837; **Revised:** 27-Sep-2022, Manuscript No. JPE-22-19837; **Published:** 04-Oct-2022, DOI: 10.35248/2375-4397.22.10.347.

Citation: Russell J (2022) Effects and Causes of Radioactivity and Nuclear Energy. J Pollut Eff Cont.10:347