

# Radiation - Drinking Water Treatment Overview

Radiation is a naturally occurring phenomenon that happens when radionuclides (radioactive materials) break down and decay. The radiation is the release of sub-atomic particles, which is categorized into three types: alpha, beta, and gamma. The most common is alpha radiation, which is weak enough to be blocked by a piece of paper. The second most common is beta, which can be stopped by protective clothing. The least common is the strongest, gamma radiation. This will pass through most protective clothing and construction materials.

## Health Effects of Radiation

- The health risks of radiation are dependent on three factors: source, total dose, and length of time exposed.
  - Source: There are three types of radiation (alpha, beta, and gamma). The different types come from different sources and have different protective guidelines.
  - Total Dose: There are OSHA standards which dictate the total dose which is acceptable for workers. Each radiation type has a different total acceptable dose.
  - Length of Time: Do not spend unnecessary time near sources of radiation. Try to work efficiently and minimize the length of time exposed.
- The combination of the above factors effects the severity of the health risks. Lifetime exposure to unsafe levels of radiation can increase your risk of cancers and damage your kidneys.

## Typical Treatment Process

In Minnesota, approximately 80 water systems treat for naturally occurring radiation. The broad strokes of the process are these: First, the incoming water is oxidized. This can be done with air or with chemical addition. Second, the treated water is filtered through a media to remove the radioactive materials. Third, the finished water enters the system. Fourth, periodically the filter media is subject to a backwash to remove the contaminants.

## Links

- EPA's Guide to Radiation in Treatment Plants: [TENORM: Drinking Water Treatment Residuals \(https://www.epa.gov/radiation/tenorm-drinking-water-treatment-residuals\)](https://www.epa.gov/radiation/tenorm-drinking-water-treatment-residuals).
- CDC's Guide to What Radiation is: [Radiation Studies - Properties of Radioactive Isotopes \(https://www.cdc.gov/nceh/radiation/isotopes.html\)](https://www.cdc.gov/nceh/radiation/isotopes.html).
- CDC's Guide to Water Treatment: [Water Treatment \(https://www.cdc.gov/healthywater/drinking/public/water\\_treatment.html\)](https://www.cdc.gov/healthywater/drinking/public/water_treatment.html).

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