

# Common Questions About Radium



**DENTON**

## What Is Radium?

Radium (Ra) is a naturally occurring radioactive element that is present in varying amounts in rocks and soil within the earth's crust. Small amounts of radium also can be found in groundwater supplies. Radium can be present in several forms, called isotopes. The most common isotopes in groundwater are Ra-226 and Ra-228. The main type of radiation emitted by radium is the alpha particle.

## Why Is Radium An Issue For Denton?

In 2000, EPA revised the radionuclides regulation which had been in effect since 1977. The resulting lowering of the EPA's maximum contaminate level (MCL) for Radium went into effect in 2003. The Public Water Systems were required to complete monitoring by December 31, 2007 and increased sampling is required if results are near or above the MCL. Refer to attached EPA Quick Reference Guide.

## Is Radium In Water Harmful To My Health?

Radium in water may pose a hazard to human health when the water is used for drinking or cooking. Only a small portion of ingested radium is absorbed from the digestive tract and distributed throughout the body. The rest is passed unchanged from the body. Some absorbed radium is excreted in urine. Absorbed radium behaves similarly to calcium and is deposited in the tissues of the body, especially bone. Any radiation received externally through showering, washing, or other uses is not a hazard since alpha particles do not travel through your skin.

Internally deposited radium emits alpha particles that may then damage surrounding tissue. Studies of workers exposed to high levels of radium and other sources of alpha radiation for extended periods show that high levels of radium may cause depression of the immune system, anemia, cataracts, and fractured teeth. Exposure to high levels of radium also has shown an increased incidence of bone, liver and breast cancer.

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## Is There A Safe Level Of Radium In Drinking Water?

Based upon our current knowledge, it is assumed that any radiation exposure carries some degree of risk. However, the U.S. Environmental Protection Agency (USEPA) has established a maximum contaminant level (MCL) for radium in public water supplies of 5 picoCuries per liter (pCi/L). The MCL for radium has been set well below levels for which health effects have been observed and is therefore assumed to be protective of public health. Public water supplies whose radium levels exceed 5 pCi/L are required to notify the public that the water exceeded the MCL. They also must evaluate ways to reduce the radium levels in the water.

## Can Radium Be Removed From Water?

A number of treatment methods are available to remove radium from water. Ion exchange, lime softening, media filters (green sand and others), and reverse osmosis are the most common and can remove up to 90 percent of radium present. Ion exchange (i.e. water softeners) can often remove 90 percent of radium present along with water hardness. For some people, an undesired effect of ion exchange is the addition of sodium to the treated water. Those on low sodium (salt) diets should consider this before installing a softener. Reverse osmosis does not add sodium to the water but produces a large volume of waste stream water to be disposed of.

# Denton's Plan



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## What Steps Will The Village Take To Comply With The Regulations?

The presence of Radium in the water and the actions taken by the State are not the result of the operations of the utility or anything that could have been avoided. Denton has always had Radium in their water, changing to a more stringent regulation has resulted in a requirement for Denton to address the Radium in its water. There are various methods available to remove Radium from the water or to find a new water supply source. The Village is prepared to address this issue and meet State and Federal Regulations.

### The Village's plan is as follows.

- 1) Conduct a study of various treatment options vs. a new water supply source and recommend the most viable option.
- 2) Determine available funding sources including SRF and USDA Loans, grants, bonds, and others...
- 3) Design a water treatment facility or new water supply source.
- 4) Construct the new facilities.

These steps will be taken in a time frame that follows a Compliance Schedule issued by the State of Nebraska Department of Health and Human Services.