



Uranium Treatment for the Private Well Owner

The EPA has set the maximum contamination level (MCL) for uranium at 30ug/L (ppb). Although uranium is radioactive, the MCL was set based on its chemical toxicity. At elevated concentrations, uranium affects kidney function and can cause cancer.

Uranium in drinking water is odorless, tasteless and colorless. The only way to tell if uranium is present is to test for it.

Treatment options-

The ability of the homeowner to monitor the performance of the system is one of the most critical considerations in determining the appropriate choice of a reduction technique for health related contaminants.

There are only two practical treatment techniques available for residential applications.

- Ion exchange with anion resin
- Reverse osmosis(RO)

Ion exchange with anion resin-

Ion exchange with anion resin works well to remove uranium but has the following disadvantages:

- The removal capacity of the system will decrease over time because of other minerals in the water.
- The homeowner must add salt to the system.
- If not properly maintained, low level nuclear waste will be produced.
- The only way to monitor the performance of the system is to continually pay to send samples to a lab for testing.
- It will lower the pH of the water causing it to become corrosive and create lead and copper problems.

- Requires that the system be followed by an acid neutralizing contact tank that will cause a significant rise in hardness. This will result in scaling of the hot water heating devices.
- In almost all cases, the system should have the water pretreated with a water softener to prevent system fouling.

Reverse osmosis-

Reverse osmosis systems perform well to remove uranium and have the following advantages over ion exchange:

- The performance of the system can be easily monitored.
- The equipment does not require the addition of chemicals or salt.
- The system does not require any special skills to operate.
- No radiation can build up in the system.
- They will remove other dissolved contaminants that may not have been tested.

Experience-

Air & Water Quality has extensive experience in reducing uranium concentrations in excess of 1,000 ug/L. In commercial applications, we have used both techniques for the removal of uranium. Anion exchange should only be used when a licensed operator is responsible for monitoring the system. We **do not recommend** the use of anion exchange in a residential application for the reasons stated above.

Some water treatment companies will try to design systems that combine softening with anion exchange in what is called a mixed bed system. In doing this, they are insuring



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fouling of the anion resin and mechanical parts of the system.

As when treating any health related parameter, testing of raw and treated water should be done on a regular basis. We recommend that initial testing be done within a week after installation again in six months and then each year thereafter. In addition, testing should be done when there is any observable change in the quality of the water.

Conclusion-

If ingestion is the only concern, uranium should be treated by a point-of-use (POU) RO system.

Whether a POU or a point-of-entry (POE) system is chosen, we recommend RO for the following reasons -

- RO systems provide for performance checks on a regular basis by the homeowner. A total dissolved solids (TDS) meter can provide these checks and can be a permanent part of the system.
- Uranium is typically only considered a problem if ingested, and, therefore, only enough water for drinking is necessary.
- There are no operator skills required.
- There are no chemicals to handle.
- RO systems reduce all other dissolved contaminants found in water.