Arsenic Questions and Answers

Arsenic presence and treatment in Lewis County

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<u>Question 1:</u> When does Lewis County require arsenic treatment?

<u>Answer 1:</u> Lewis County has responsibility to assure a safe water supply in reference to building permits, land development, and certain public water supplies. The safe water standards are established by the Federal Environmental Protection Agency (EPA) and adopted by state and local government. The standards, Maximum Contaminant Levels (MCLs), are determined based on health risk balanced with the economic viability of treatment.[1] These baselines are then adopted and/or applied by the Washington State Department of Health (WSDOH) and local governmental agencies.

Lewis County applies the arsenic MCL of 10 parts per billion (ppb) to process permits and applications that require proof of a potable water supply, for example a building permit or land division. To date, Lewis County has only established this standard in areas of known arsenic presence in particular the town of Mineral and the surrounding area[2]. To determine if the water meets arsenic standards, it must be tested. If the water exceeds 10 ppb arsenic an effective treatment method must be installed that will reliably produce water below the MCL.

Currently all single-family residential (SFR) wells that apply for permits in Mineral and the surrounding area are required to test for arsenic and install treatment if the water is above the arsenic MCL. Proposed shared and or public water supply wells in the area are also required to test for arsenic. Consistent with Lewis County Code 8.55[3] proposed Group B source(s) that exceed the arsenic MCL may not be approved. There are two existing Group B water supplies in the Mineral area. One operates with a 2004 state approved treatment system and routine monitoring. The other is grandfathered with arsenic ranging from 15 to 25 ppb and is required to monitor and conduct frequent consumer notifications. Arsenic is also present in several Group A Transient Non Community (TNC) water systems in the area. These systems are exempt from the arsenic MCL per EPA[4] and WSDOH[5] and serve a limited number of employees and residences.

<u>Question 2:</u> What are the basic arsenic treatment options? What happens to the removed arsenic?

<u>Answer 2:</u> Treatment options for arsenic removal have improved in both efficacy and affordability since the MCL reduction in 2001. These improvements also include easier maintenance and improved environmentally friendly waste management. Ultimately, treatment choices are driven by several factors including: volume of water required, costs, operation and maintenance, feasibility, type of arsenic, water chemistry and quality.

- Distillation: Applicable to SFR only, collects the steam, which is then used for potable water. Cleaning the boiler pan flushes the precipitate into the onsite septic system. This system is efficient but low production, effectively removes arsenic and other contaminants.

- Reverse Osmosis (RO): Applicable to SFR and possibly Group B point of use. Forces water through a membrane that strips the arsenic off the water molecule. The resultant wastewater is plumbed to the onsite septic system. This type of system must be routinely maintained, ineffective at the higher arsenic levels, and inefficient as it produce approximately 1 gallon of water for each 5 gallons processed.

- Sorption: Applicable to Group A Public Water Supplies, sorption is a physical chemical/ process where one substance adheres to another. An arsenic removal adsorption system routes water through a cartridge with a tailored filter media that the arsenic sticks to and comes out of solution. At the end of its life time the loaded cartridge can be disposed of in the garbage. Sometimes this process requires pre-media chemical changes in the water such as pH adjustments or altering the arsenic to improve the attraction to the media. Once a design is approved, a small prototype is built and tested. If it meets the treatment parameters, the system is installed. This is a very efficient type of arsenic treatment as it does not create wastewater, is cost effective, and is low maintenance. This type of system was recently installed in a Skamania County Group A Transient Non Community Water System that was serving water that was exceeding the arsenic MCL.

- Precipitation /Filtration Process: Applicable to Group A Public Water Supplies when other forms of treatment are also required. It includes a series of treatments altering water chemistry and physical parameters to allow precipitation, coagulation, and filtration. This type of system is costly, high maintenance, and must include waste stream management.

- Ion Exchange Process: Applicable to Group A and Group B water supplies arsenic is removed by passing water under pressure through charged resins. Low maintenance but does create a waste stream that must be disposed of properly akin to RO. Is cost effective for high levels of arsenic but not for large systems with high water use.

Question 3: Do we regulate how the arsenic is disposed?

Answer 3: Currently Lewis County does not regulate SFR arsenic treatment waste disposal. Washington State Department of Health reviews waste disposal in public water supplies during the review process confirming treatment waste is lawfully disposed of and routes the water system design to the Washington State Department of Ecology for comment.

Question 4: What is the preferred method of arsenic treatment to protect the environment?

Answer 4: The preferred method of arsenic treatment is a system that removes arsenic and does not generate a waste product. The system should bind the arsenic such that the risk of environmental contamination is minimized and disposal is inexpensive and readily attainable. **Based on available technology, recent installations and successful operation a Sorption treatment system should be considered.** It is relatively inexpensive, efficient, low maintenance, and effective if properly designed and maintained. It has the added advantage of pilot testing to confirm efficacy prior to full installation.

Citations:

1. National Primary Drinking Water Regulations; Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring https://www.federalregister.gov/documents/2001/01/22/01-1668/national-primary-drinking-water-regulations-arsenic-and-clarifications-to-compliance-and-new-source#p-763
2. Feasibility Study to Determine if a Community Water Supply in the Mineral Area Can be Created to Replace Private Wells and Small Water Systems, December 12, 2004, Lewis County Public Health & Social Services https://lewiscountywa.gov/documents/10530/Arsenic_Final_Study_Report_2004.pdf
3. Lewis County Code Chapter 8.55.140 Group B Public Water Systems https://www.codepublishing.com/WA/LewisCounty/#!/LewisCounty08/LewisCounty0855.html#8.55.140
4. National Primary Drinking Water Regulations; Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring https://www.federalregister.gov/d/01-1668/p-3
5. Washington Administrative Code 246-290-130 https://app.leg.wa.gov/wac/default.aspx?cite=246-290-310