

# Steve Hulsman

1) Thank you for using the results from samples from public drinking water sources from only 2003 through 2010.

As noted in the study, prior to 2003 the reporting level for laboratories analyzing for arsenic in public drinking water sources was 10 parts per billion (ppb).

The reporting level was lowered by 2003 to 2 ppb (in response to the lowering of the federal maximum contaminant level (MCL) from 50 ppb to 10 ppb, which became effective in January of 2006).

So there is more precise reporting of arsenic levels in public drinking water wells starting in 2003. And after 2010, many of the approximately 165 active sources with levels of arsenic above the MCL began consistently treating to remove the arsenic. And because DOH requires Group A water systems that treat to remove arsenic to monitor the treated water for arsenic on a monthly basis, most of those sources have an increasing number of samples after 2010 that would be less than 10 ppb, and would skew their average lower.

2) From 30 years of reviewing arsenic results from drinking water wells, I have observed the following:

a) Arsenic levels have more to do with the aquifer from which the well draws than well depth per se. Many areas of the Puget Sound basin and Island County have aquifers that span large areas but have varying levels of overburden. Wells drawing from the same aquifer containing arsenic have deeper depths if the well is drilled where there are thicker layers of deposits overlying that aquifer. I believe many of the wells in Island County that have arsenic levels greater than the MCL are drawing from the 'sea level aquifer'. However, many of the county's wells would need to be 200 to 300 feet in depth to reach that aquifer. That may account for why there appears to be an increasing arsenic concentration with well depth in Island County.

b) Wells drawing from the top versus the bottom of the same aquifer same aquifer can have slightly different arsenic levels ♦ likely depending on the oxidation/reduction conditions in different portions of the aquifer, as mentioned in the report.

c) Because of arsenic's affinity for oxidized iron, some portions of aquifers that have mobile microparticulate oxidized iron may yield higher concentrations of arsenic as well.

d) Many of the public water system wells in Washington state serve water systems with less than 500 connections, and many of those wells west of the Cascades have screened intervals of 25 feet or less in length and are not pumping huge volumes of water on an annual basis.

All of the above conditions can contribute to differing levels of arsenic in wells geographically close to one another.

So while the calculated average 'background' concentration of arsenic for Island County is around 13 ppb, there are localized areas where wells in that area commonly have more or less than the calculated average. For instance, around Oak Harbor and Whidbey Island Naval Air Base Ault Field, there are some drinking water wells (public and private) that consistently have 20 to 25 ppb naturally occurring arsenic whereas other wells have 7-9 ppb. Many of these wells are drawing from the "sea level aquifer" and have the top of their open intervals ranging from 30 to -10 ft MSL.

For these reasons, when updating the MTCA rule, please consider allowing for an assessment of a very localized background level relative to the average background level for the geographic area identified in this report.

Thank you for the opportunity to provide these comments.

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