

DEPARTMENT: POLLUTION CONTROL AGENCY

STATE OF MINNESOTA  
Office Memorandum

DATE: January 13, 2023

TO: 3M PFC Settlement Priority One Working Group

FROM: Kirk Koudelka  
Assistant Commissioner  
Commissioners Office

PHONE: 651-757-2241

SUBJECT: 2022 Residential Well Sampling for Per - and Polyfluoroalkyl Substances Compounds

As specified in Minn. Stat. 115B.171, the Minnesota Pollution Control Agency (MPCA) is providing the following information to the communities in the East Metropolitan area impacted by per- and polyfluoroalkyl substances (PFAS) groundwater contamination.

The information below describes the private well sampling activities during 2022, broken down by community. Overall, 306 residential wells were sampled in 2022 and, of those, 29 were issued well advisories. These values account for approximately 7% of all residential wells sampled (4,166) and 2% of all advisories issued (1,500) since PFAS sampling began in 2003, although many of the wells sampled this year were also sampled in previous years.

Since 2003, the MPCA and Minnesota Department of Health (MDH) have coordinated efforts to sample and monitor private residential water supply wells in South Washington County. The objective of the sampling is to characterize PFAS impacts and identify wells eligible to receive treatment. An exceedance to MDH's drinking water guidance occurs when an individual PFAS is detected at a concentration above the health-based guidance value or when the mixture of PFAS in a sample exceeds a Health Risk Index (HI) value of 1. The HI is a calculated value that allows MDH to evaluate the additive effect of multiple chemicals in drinking water that have similar health effects with varying toxicities (which is reflected in their different health-based guidance values). In instances when MDH issue a drinking water advisory to a homeowner, the MPCA offers to install a whole-house treatment system or connect that residence to city water. The MPCA also maintains treatment filters installed so long as the drinking water advisory remains in effect.

In addition to wells with a drinking water advisory, wells with an HI greater than 0.5 as a result of samples collected in 2022 were offered a whole-house treatment system, in accordance with the Conceptual Drinking Water Supply Plan (Conceptual Plan). Wells will continue to receive treatment systems if they have an HI of at least 0.5, using the HI equation in the Conceptual Plan and the HBVs/HRLs at the time it was finalized (August 18, 2021). Wells with an HI between 0.25 and 0.5 calculated using data from previous sampling events were re-sampled in 2022 to evaluate their current risk level and other wells were re-sampled to track trends in water quality, evaluate plume movement, and confirm the edges of the advisory areas. A similar number of residential wells are planned for sampling in 2023, although with the increasing number of residences connected to city water supplies and the increase in whole-house treatment system installations, it is expected the number of residential wells sampled each year will slowly decline.

The MDH also samples public drinking water supply wells and non-community water supply wells (i.e., schools, churches, greenhouses) to monitor PFAS impacts to public water supplies. PFAS samples collected, both from public and private drinking water wells, are analyzed by the MDH Public Health Laboratory. The MPCA and MDH coordinate the sampling schedule.

Major focus areas of the 2022 sampling effort included:

- Further defining the edges of the PFAS advisory areas (particularly in West Lakeland Township, Afton, Maplewood, and southwest Woodbury).

- Adjusting the carbon filter change-out timeframe for wells impacted by both PFAS and the Baytown trichloroethene groundwater plume to an annual basis, rather than as-needed for VOC impacts.
- Establishing plume definition by sampling in zones around the advisory areas where no perfluorooctanoic acid (PFOA) or PFOS are detected.
- Evaluating areas where wells unexpectedly exceed the health-based guidance values (see “Anomalous Area Sampling” below).
- Responding to city requests to sampling to evaluate water quality in neighborhoods that may be candidates for city water expansion.
- Compiling data from previously sampled wells with an HI greater than 0.5 to determine eligibility for filtration through the Conceptual Plan and sending letters to 188 residents who qualify for the carbon filtration system. Of those, 142 respondents returned the access agreement for the whole-house filtration system.
- Re-sampling wells with HI greater than 0.25.
- Re-sampling wells in West Lakeland Township, Afton, and Lakeland and Lakeland Shores to evaluate water quality trends.
- Transitioning the East Metro Private Well Sampling program from MDH to the MPCA.

### **Anomalous Area Sampling**

MPCA and MDH continued to sample wells in the affected anomalous areas to identify additional impacted residential wells which exceed health-based values, and further refine our understanding of the PFAS signatures in each area. Private well sampling in 2020-2022 identified six relatively small, unexpected, and isolated areas where the concentrations of PFAS tend to be higher than the surrounding sampling results. These anomalous areas are located in the following areas:

- Lake Elmo (near Ideal Avenue and 38<sup>th</sup> Street North)
- Lake Elmo (immediately north of Lake Jane)
- Lake Elmo (near the Northwest shore of Lake Elmo)
- Southeastern Cottage Grove (central part of the Pine Coulee development)
- Southeastern Denmark Township (along Highway 10)
- Tri-lakes area of Lake Elmo

For the Lake Elmo areas, there are two known nearby sources of PFAS to the environment, the Washington County Landfill and the 3M Oakdale site. However, more investigation is needed into the groundwater and surface water flow direction to determine if there are other sources of PFAS impacting Lake Elmo.

The PFAS signatures at the Cottage Grove and Denmark Township anomalous areas are more consistent with the PFAS signature found in wells around the 3M-Woodbury Disposal Site, but they do not appear to be hydrologically connected to the disposal site. In addition, there are several square miles between these anomalous areas and the disposal site where wells show little or no PFAS detected. This suggests there may be a nearby, but currently unidentified, PFAS source(s). As with the Lake Elmo areas, additional assessment is necessary to determine what, if any, additional response actions may be necessary. The source and overall contamination levels of the tri-lakes PFAS contamination will be a focus of sampling in the coming sampling year.

### **Evaluating PFAS Concentration Trends**

Some private wells have been routinely monitored since the mid-2000s, particularly those that are closest to the known disposal sites and in areas where many wells have advisories. Where multiple years of data exist the MPCA can evaluate PFAS concentration trends. In other areas, such as eastern Lake Elmo, West Lakeland Township, Afton, Lakeland, most wells were first sampled in 2017-2022, making long-term trend analysis difficult. Comparing early sample results to recent results is also difficult, as the lab methods have improved dramatically since 2003.

Despite the limitations of the dataset, some general patterns in PFAS concentrations in private residential wells are emerging.

- **Near the known 3M disposal sites** in Oakdale, Lake Elmo, and Woodbury, PFAS concentrations show slow, steady decreases. In parts of southwest Lake Elmo (Torre Pines development) these decreases are significant (as much as 50%), although the PFAS levels are still well above MDH health criteria.
- **Near the downgradient edges of the plumes** as they approach the Mississippi and St. Croix Rivers, PFAS concentrations appear to be slowing increasing. Some examples include west and southwest Woodbury, southeast Maplewood, south Cottage Grove, and Grey Cloud Island Township. In some isolated areas (near the I-94 corridor in West Lakeland, north Afton, and Lakeland) concentrations may be increasing more rapidly in some aquifers.
- **In the “middle” of the plumes** (most of Lake Elmo, Woodbury, north Newport, and Cottage Grove), concentrations appear to be relatively stable although improved detection limits have allowed for the detection of trace levels of PFOS and PFOA where not previously detected, resulting in higher HI values, giving the appearance of increasing concentrations. There are some exceptions:
  - Downgradient of the Lake Elmo Park Preserve – including the Stonegate development and Woodbury main city wellfield, where concentrations appear to be slowly trending upward.
  - The “old village” area of Cottage Grove (along and east of Lamar Avenue) where concentrations in some wells has increased.
- The PFAS concentrations near the recently identified anomalous areas described above (especially northwest Lake Elmo and southeast Cottage Grove) may be increasing slowly, although more sampling is needed to confirm a trend (except for the Northwest shore of Lake Elmo and Pine Coulee area of Cottage Grove).
- Wells in most of Afton (south of 15<sup>th</sup> Street South), St. Mary’s Point, and most of Denmark Township (aside from the southeast area) appear to be largely unaffected by the PFAS groundwater contamination, but wells in this area may show low levels of PFBA and PFPeA and, occasionally trace levels of PFOA. The concentrations in most cases are similar to levels seen elsewhere in the Twin Cities metro region. Higher concentration in some areas may reflect historic airborne deposition in south Washington County, although more information is needed to definitively make that determination.

In all of the areas mentioned above (if not connected to city water), and in areas of Washington County sampled for the first time in 2018-2022, the MPCA and MDH will continue to monitor levels of PFAS compounds in groundwater and evaluate trends in concentrations.

In response to numerous requests from east metro residents in 2018, MDH developed an on-line sample request form for residents to request that their residential well be sampled for PFAS compounds. In 2020, due to the corona virus pandemic, MDH modified its sample permission request letters to also have residents reply through this online form rather than returning a form by mail (as staff were not in the office to regularly check the mail). In 2022, the MPCA took over the sampling program from MDH and developed its own online request form. The MPCA received 158 sample request/permission forms from Washington County residents through the on-line system. The MDH and MPCA also received requests for well sampling by other means such as phone calls and e-mails. The MDH and MPCA staff evaluated these requests to ensure those in areas of highest priority would be sampled first. A significant number of requests received were for private wells in areas already planned for sampling in 2022. With a few exceptions (non-responsive well owners) all requested wells have been sampled.

Using the sampling results, the MPCA maintains an on-line interactive map (<https://www.pca.state.mn.us/waste/well-sampling-east-metro-area>) which indicates locations of wells sampled, well advisories issued, and planned sampling areas and provides a link to the online sampling request form.

In 2023, MPCA and MDH plan to focus on the following:

- Continue with the long-term monitoring program based on well sampling history, nearby well data, and plume behavior to determine sampling frequencies. Adjust areas sampled and/or frequency of sampling in response to changing health values.
- Adjust sampling frequency as needed into areas with low level PFOS and/or PFOA detections to identify the trends of PFAS levels in wells.

- Establish private wells along the edges of well advisory areas to provide notice of any changes in concentrations that would warrant additional residential well sampling.
- Continue to monitor private wells in affected areas to help determine if connection to municipal water or installation of a home treatment system is needed.
- Continue to provide sampling of other wells within the PFAS sampling area, upon request from residents.
- Continue coordination between the MPCA and MDH of annual residential sampling and determination of drinking water advisories in the East Metro.
- Contacting residences whose private drinking water wells are eligible for treatment, as outlined in the Conceptual Plan, to offer the installation and maintenance of GAC systems.

Report contributors:

Tim Lockrem – Minnesota Pollution Control Agency

Chris Formby – Minnesota Pollution Control Agency

Gary Krueger – Minnesota Pollution Control Agency

Marina Steiner – Minnesota Pollution Control Agency

KK/CF