Minnesota 3M PFC Settlement

Notes for Drinking Water Supply Technical Subgroup 1 Meeting

Wednesday, May 19, 2021
1:00 p.m. – 2:30 p.m.
Virtual WebEx Meeting

Group members in attendance:

Brian Davis	Chris Hartzell	Dan DeRudder	Gary Krueger
Greg Johnson	Jack Griffin	Jim Westerman	Karla Peterson
Lucas Martin	Marian Appelt	Richard Thron	Ryan Burfeind
Ryan Stempski	Stephanie Stouter	Steve Love	Stu Grubb

Presenters:

- Gary Krueger, Minnesota Pollution Control Agency (MPCA)
- Mark Lorie, Abt Associates
- Ryan Capelle – Stantec
- Joe Jacangelo - Stantec
- Ryan Burfeind – Cottage Grove

Welcome

Mark Lorie (Abt Associates) welcomed Subgroup 1 to the meeting. Mark reviewed the agenda. The purpose of the meeting was to update the Subgroup 1 members and the public on the ion exchange (IX) pilot study in Cottage Grove. Gary Krueger (MPCA) then welcomed Subgroup 1. He said that MPCA and DNR staff received an update on the pilot study a few weeks ago and thought it would be helpful for the entire Subgroup 1 to hear the updates. The Co-Trustees are planning to have work group meetings in June as they work toward finalizing the Conceptual Plan.

Cottage Grove Ion Exchange Pilot study update

Ryan Capelle and Joe Jacangelo from Stantec gave a presentation on the IX pilot study. The study objectives are to test IX operability to remove PFAS, provide the policy basis for IX as an alternative treatment for PFAS, and compare costs for granular activated carbon (GAC), IX, and mixed treatment. The pilot study takes place within the temporary treatment building at Well #3 in Cottage Grove. Ryan and Joe explained the pilot study treatment process. The pilot tests both IX treatment only and IX treatment with GAC pre-treatment. There are four IX columns that are used for testing. Water is pumped into the system. Some water goes through a GAC filter and then into two IX columns and some water is pumped directly into two IX columns. The water is tested from multiple points across the system.

Ryan and Joe explained the pilot timeline. The pilot started in January 2020. One key takeaway from the pilot is the need for iron and manganese pre-treatment. Within a few weeks, the system was shut down due to iron and manganese build-up in the treatment media. The team installed a Birm media that could remove iron and manganese, which worked for a few months before it was exhausted. The media was replaced with a different media (Filox). Filox worked for approximately three times longer and is just now starting to show some signs of exhaustion. One key indicator that a media needs to be replaced is the differential pressure profile of the system (where water is in the system). One major event that impacted results for a period of time was flooding in the building. However, the team was able to remedy the issue and get the study running again.

The samples collected from the system are sent to Johns Hopkins to be analyzed, as they are able to provide results in approximately 3-4 days, versus commercial laboratories that take approximately 3-4 weeks. This is important for making quick changes and adjustments. The team has taken precautionary measure to ensure the testing facility is PFAS-free. The team wear clothes without PFAS to sample and analyze the water; the lab was fitted with test tubes that do not contain PFAS; and all shipping materials are PFAS-free.

Ryan and Joe then explained the sampling results. The samples are analyzed for 32 PFAS compounds. Not all these compounds impact the Health Index (HI), but they can be helpful for monitoring breakthrough. The team uses the sampling results to calculate the HI of the incoming water and treated water. Even if PFAS compounds are present in the treated water, the HI is typically less than 0.2, well below HI of 1 which triggers a health advisory from the Minnesota Department of Health (MDH). The most prevalent PFAS compound in the water (of those that affect HI) is PFBA. PFBA broke through the earliest throughout the pilot testing. In general, there was more breakthrough of shorter-chain PFAS compounds. However, these compounds generally have less toxicity associated with them compared to longer-chain PFAS compounds. Overall, the IX treatment and IX plus GAC pre-treatment systems appear to be working effectively.

The team has been reviewing different models to analyze how this pilot study may continue to treat water into the future and predict future HI levels. This is important because the team expects the treatment system to remove sufficient PFAS so treated water will not exceed HI of 1 before the pilot study concludes. There are some caveats to using models because they are static and only represent the water at the time of sampling. However, models can still be a good indicator. The team decided to use their own model so they could account for desorption (which has been observed in the GAC system in this pilot study). Using the model they created, the team expects to have better comparisons between IX and GAC treatment soon.

Ryan and Joe also discussed next steps. The team will give another presentation to Co-Trustees in a few months with updated data. The pilot study is expected to end in September 2021. The team then expects to have a report ready by December 2021.

Feedback

One subgroup member asked if the pilot study had used a cartridge pre-filter. They also asked Ryan and Joe to comment on the levels of dissolved iron and manganese in the water. Ryan and Joe explained that the pilot study includes a large tank with a cartridge filter. It was installed at the same time as the Birm filter. All the water that enters the system is pre-treated by the cartridge filter. They also looked at the dissolved iron and manganese in the water. The filter is designed to capture anything larger than 1 micron, so most of the iron and manganese is caught; however, there may be some small particles that they are not able to capture and categorize.

Another subgroup member asked about the model used. Ryan and Joe reiterated that the model was important because they did not expect to have breakthrough in the timeframe of the pilot study.

Another subgroup member asked about the possibility of regenerating resins. Ryan and Joe explained that resins are generally not amenable to regeneration. However, there has been much interest in this topic (e.g., food-grade regenerable resins). Most regeneration is occurring at large remediation sites where there are large amounts of a compound. It is much more cost-effective at sites like these.

A Government-3M work group member asked if the key takeaway points were accurate: IX is comparable to GAC but Minnesota is waiting for more information to approve the use of IX; and pre-treatment is very important. Ryan and Joe agreed about the importance of pre-treatment. However, they said they needed more information before saying that IX and GAC are comparable.

A Citizen-Business work group member asked if IX was primarily for short chain removal. Ryan and Joe explained that they initially thought that would be the case, but the pilot has shown breakthrough of the shorter PFAS compounds. The work group member stressed the need for a detailed understanding of water throughout the East Metro to target pre-treatment and PFAS removal most effectively. A Subgroup member from the Department of Health explained that Minnesota does have detailed water data. They explained that typically they do not test for iron and manganese but have started doing so knowing that it would be relevant to pre-treatment needs. Ryan and Joe also explained that it would be easy for communities to get relevant sampling data (e.g., sulfates, nitrates) as these would be important before deciding on a long-term treatment decision.

Public Comments and Questions

There were no questions from the public at this time.