PFAS Treatment Technologies Subgroup
Virginia Department of Health Office of Drinking Water
FINAL Meeting Minutes
April 22, 2021
1.5 hours (10:00 a.m. – 11:30 a.m.)

1. Meeting Opening

ODW Southeast Virginia Field Office (SEVFO) Director, Dan Horne called the meeting to order at 10:03 am. The meeting was by electronic communication means because of the ongoing public health emergency. Dan reminded everyone attending the meeting that it would be conducted as a public meeting under FOIA guidance, and would be recorded. Minutes and meeting materials will be posted on Town Hall.

Dan welcomed all Subgroup members and members of the public to the Treatment Technologies meeting and called roll. Members attending the meeting who answered the roll call were:

1. Henry Bryndza (Dupont)
2. Jamie Bain Hedges (Fairfax Water)
3. Wendy Eikenberry (Augusta County Service Authority)
4. Mark Estes (Halifax County Service Authority)
5. Russ Navratil (VA AWWA)
6. Kelly Ryan (Virginia American Water)
7. Jessica Edwards (Loudoun Water)
8. Dan Horne (ODW)

Others noted as being present:
Ellen Egen
Joe DiNardo
Bob Angelotti
Eric Rosenfeldt
Amanda Waters

VDH:
Nelson Daniel (ODW)
Christine Latino (ODW)

2. Review Meeting Agenda

Dan reviewed the agenda proposed for the meeting.

1. Call to order – Member roll-call – Review Agenda – Review draft summary from last meeting
2. Report on assignments from last meeting

3. Update on resources
4. Upcoming Meeting and webinars
5. Preparing for next meeting
6. Public Comments
7. Next Meeting

Dan asked if there were any additions to the proposed agenda. There were no proposed additions. Hearing nothing, he advised that the agenda was accepted as proposed.

Review of the Draft Summary from Last Meeting.

Dan noted that he had forwarded the draft minutes from the March meeting by email on April 16. Henry has noted that he sent the article on incineration. Dan will revise the minutes to reflect that. Dan proposed that the minutes be accepted as final, with Henry's correction. The group agreed to accept the corrected March minutes as final.

Assignments from last meeting:

General assignment for all members:

- Be prepared to start writing and identify what gaps we need to include.
- Be prepared to start synthesizing information and preparing summaries to present to Full Workgroup and other subgroups.

Specific Assignments:

- Mark Estes was going to look at some small systems, as his concerns are for systems serving less than 10,000 persons. There is currently a tremendous amount of litigation going on related to PFAS contamination of water sources. Mark reached out to the National Rural Water Association for assistance. He was connected with Patrick McKeown, with ECT2. Patrick gave Mark information on the Robinson Elementary School in Grand Haven, MI. The school found PFAS in their system. The consultant originally designed a GAC system, but it was found to take up too much space. ECT2 provided an alternate design, which was what was installed. The treatment system is a Sorbix Pure Ion Exchange system, featuring a specialty resin. It took less space and was less expensive, and has a 36-month media life.

- Mark also reported on an ECT2 system installed in Mayesville, NC (population 1,100), to treat PFAS-contaminated well water. The reported levels of PFAS was greater than 70 ppt. The installation cost was $180,000. This system was able to get USDA money to help finance the treatment system. They also interconnected with another system that does not have any PFAS in their system. The question is where the PFAS came from. The origin they suspect was a filling station that caught on fire a while ago – the fire departments used PFAS-containing AFFF. He also spoke with people from New Hampshire who are installing a system currently. Mark will update the committee as soon as he hears back from the system.

- Dan also reported on the Robinson Elementary School system, based on information he had received from Michigan Department of Environment, Great Lakes, and Energy (EGLE). In 2018, Michigan decided to do a statewide survey of PFAS at all community water systems and certain NTNC systems (particularly schools and daycare facilities). During the survey, Robinson Elementary was found to exceed EPA's Lifetime Health Advisory (LHA) for PFOA + PFOS of 70 ppt. The total PFAS was found to be 144 ppt (PFOA, PFOS, and four other PFAS compounds). The results from a daycare center close by tested lower than the LHA. They decided they needed to pursue some sort of treatment process because they could not identify the source of the PFAS. There is no apparent PFAS plume. The school is located at the aquifer divide (the groundwater flow on one side of the school goes in one direction, and the flow on the other side goes in the opposite direction). The school installed their treatment system in 2019. Initially the consultant looked at GAC contactors, but eventually came up with a two-contractor ion exchange system. The construction cost was about $200,000. The State of Michigan has grant program that will cover the cost of treatment systems. It was originally intended just for community systems, but was expanded to cover NTNC systems like the school, because very few waterworks were found to need to install treatment. The intent is that they will dispose of the resin as hazardous waste in a hazardous waste landfill, once they start to see breakthrough.

Mark stated that there are many unanswered questions, especially what to do with the used media. EGLE told Dan that the sorption materials (whether GAC or IX resin) would be treated as a hazardous waste.

Dan noted that Michigan has not approved any reverse osmosis systems for treating PFAS. Reverse Osmosis treatment removes effectively all of PFAS from the feed water, but that leaves a concentrate that contains very high levels of PFAS. Michigan doesn't want the concentrated PFAS discharged to sewer systems, groundwater, or surface water.

It was noted that if a system needs to treat flows higher than the capacity of standard treatment units, it is common to place them in parallel trains for higher capacity.

There was a question about the industry capacity for specialty resins that could be used for PFAS removal. Henry advised that the last time he checked, almost all of the production facilities are already at full production capacity due to high demands. This has resulted in backlogs in providing resins, and can greatly affect costs. He noted that bringing new capacity on line is not easily or quickly accomplished.

Joe DiNardo asked if the treatment systems mentioned also remove PCBs, 1,4-dioxane, and other compounds. Dan said that some treatment processes remove some of these contaminants, but not all processes remove all contaminants (with the potential exception of RO). For example, we know that GAC and IX are effective at removing PFAS and certain other organics (like MTBE or other petroleum products), but there can be issues with competition for sorptive capacity, and issues with preferential sorption/desorption. It may take different specialty resins for some of these compounds. GAC and IX are not effective against 1,4-dioxane at all.

General Assignment –

Dan noted that Henry did a good job of preparing write-ups for GAC, IX, and RO. These will be a good starting point for our summaries. We know that there is a gap with respect to costs, particularly for smaller systems. There is concern about the potential impacts to smaller systems, which could be hit harder proportionally than larger systems.

Mark is concerned about life system cost versus installation costs. The costs Dan was given from Robinson were installation costs not life cycle costs.

Henry stated, "The options and costs might depend upon how many systems need to be installed, what levels of which chemicals get found, and what the funding mechanisms might be. He noted that the Robinson School received State funding because Michigan didn't find as many community systems were affected, so they could send funding to the school. Our recommendations may depend on what we find in the Virginia Sampling Study and when we need to make recommendations versus knowing how big the issue is.

The full PFAS workgroup will meet next week, and we will get a report on the Sampling Study. Sampling may occur as early as the first week of May. We do not know if we will have a lot of time to look at results from samples and we will need to have a fast turnaround to send to the legislator in October.

Dan asked Wendy if she had any thoughts. She was thinking about determining the long-term costs. She has a system with 38 connections. If she has to install this kind of technology, it would be a problem. What would the long-term costs be, and would small systems be able to get programs in place from USDA to help with costs.

Dan stated that Virginia doesn't have a funding program specific to PFAS, like Michigan has (and that was created by the State Legislature). Wendy reported that Minnesota is using a big legal settlement with 3M (which resulted from legal action), for funding treatment installations. It is limited to locations where PFAS contamination has been proven.

Russ noted that one of his concerns is what kinds of waterworks might have to install treatment, and do costs scale up or down. How big are the plants where treatment has been installed – one of the plants talked about $3.00 a gallon installed, but would that be the same cost for an 80-mgd plant?

Dan noted that the Cape Fear Water System is putting in a 42 MGD surface water plant (Mike Hotaling shared the article previously). Carl from Cape Fear was one of the speakers in AWWA's webinar last month on the PFAS selection guide. The cost for adding 8 GAC contactors is very pricy addition to a plant already there. Russ noted that the real estate that will be involved is a major issue - not all plants have room for the additional equipment. Cape Fear will also incur a rate increase. They are currently suing the contaminator, hoping to recoup costs. There is an unknown when you can't identify the source of the PFAS and there is no clear contaminator.

Mark asked about waste streams and disposal. ODW will need to discuss with DEQ. For example, would DEQ not allow an RO discharge? There are currently no water quality standards for PFAS. EPA has recently has issued some guidance on water quality standards, and are looking at the potential of declaring PFAS as a hazardous waste. This could potentially impact what utilities could do with used GAC or IX resins.

Wendy noted that Minnesota just released their PFAS blueprint. They have issued a statement under the State CERCLA that PFAS is a hazardous contaminant. Wendy will send link. Minnesota's PFAS Blueprint: https://www.pca.state.mn.us/sites/default/files/p-gen1-22.pdf

Additional Resources:

Dan suggested that the group members take a look at the handout from the March 31 AWWA webinar on the PFAS Selection Guide (posted to the SharePoint site). It is a very good resource.

He also noted that ITRC has posted a series of ten training videos regarding PFAS located at https://pfas-1.itrcweb.org (segments from an online ITRC training webinar). He suggested that members look at these ITRC videos

Also, please look at Henry's paper on incineration posted to the SharePoint Page.

Upcoming meetings and webinars

The next meeting of the Full Workgroup will be next Thursday, April 29. Invitations have gone (or will soon go) out.

Preparing for next meeting:

It is time to start preparing summaries of the three major treatment processes (GAC, IX, and RO). As we have discussed, we have found some gaps regarding funding, handling wastes, etc. VDH will contact DEQ who can hopefully provide information on waste handling. Henry indicated that we need some scalability regarding systems (up or down – it's likely not linear, and perhaps not related to footprint).

Dan asked for suggestions on how to start writing, and noted that he is looking for volunteers. Henry and Russ indicated that they can assist in the writing. Henry's paper is a great starting point. Dan will look to develop a template to identify what each process should cover. Henry will assist Dan with that. Once that is done, we'll look to assign different sections to different people.

Public Comments

There were no public comments

Next Meeting:

The next meeting will be Thursday, May 27, at 10:00 a.m. The meeting will last no more than 90 minutes.

Dan adjourned the meeting at 11:02 a.m.

PFAS Treatment Technologies Subgroup
Virginia Department of Health Office of Drinking Water
DRAFT Meeting Agenda
April 22, 2021
1.5 hours (10:00 a.m. – 11:30 a.m.)

1. Meeting Opening
    a. Call to order
    b. Member roll-call
    c. Review draft agenda
    d. Review of draft minutes from March meeting

2. Reports on assignments from last meeting (Estes)
    a. Presentation
    b. Discussion

3. Update on resources

4. Upcoming meetings and webinars

5. Preparing for next meeting, assignments

6. Public Comments

7. Next Meeting: Thursday, May 27, 10:00 a.m.

Establishing Regulatory Limits for PFAS in Virginia Drinking Water

Treatment Technology Subgroup

Dan Horne
Virginia Department of Health
April 22, 2021

Subgroup Members

Henry Bryndza (DuPont)
Jessica Edwards (Loudoun Water)
Wendy Eikenberry (Augusta County Service Authority)
Mark Estes (Halifax County Service Authority)
Chris Harbin (City of Norfolk)
Jamie Bain Hedges (Fairfax Water)
Jack Hinshelwood (VDH – ODW)
Mike Hotaling (Newport News Water Works)
Mike McEvoy (Western Virginia Water Authority)
Russ Navratil (Virginia Section AWWA)
Kelly Ryan (Virginia American Water)

Dan Horne (VDH – ODW) Team lead

PFAS Subgroup Meeting Agenda
22 Apr 2021

1. Call to order - Member roll-call – Review agenda – Review draft summary from last meeting
2. Report on assignments from last meeting
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5. Preparing for next meeting
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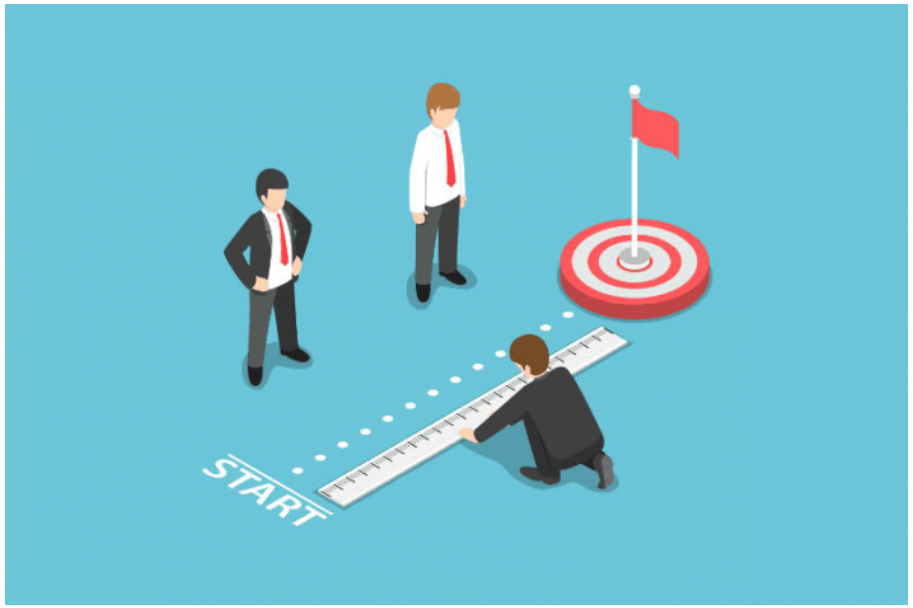

Review of Draft Summary from Last Subgroup Meeting

- Distributed to Subgroup members on Apr 16
- Any comments, suggestions for changes/edits?
- Consensus for accepting summary as final (vote in Chat)

Report on Assignments from last meeting

- **General assignment for all members:**
  - Be prepared to discuss format of treatment process summaries, information to include
  - Be prepared to start synthesizing information and preparing summaries to present to Full Workgroup and other subgroups

- **Specific assignments:**
  - **Mark Estes:** information on installed small systems
  - **Dan Horne:** contact Michigan EGLE about report on treatment system installed at school water system

Robinson Elementary School, MI

Information obtained from Michigan Dept of Environment, Great Lakes & Energy (MI EGLE) – PFAS website and phone conversations on 20 Apr 2021

- Robinson ES was sampled for PFAS in Sept 2018 as part of state-wide sampling effort of all community and NTNC systems. PFOA+PFOS = 110 ppt (ng/L) - total PFAS = 144 ppt
- Follow-on sampling: other samples collected from GW sites in vicinity, plus an adjacent daycare facility (twice). Results from daycare: total PFAS ranged 23 to 32 ppt
- No source of PFAS has yet been identified
- Treatment system installed: IX system – 2 contactors, lead-lag operation – construction cost of $200K (paid for by State grant) – will dispose of resin as hazardous waste when see breakthrough – more information to come

Update on Resources

- Handout from 31 Mar AWWA webinar "Staying Ahead of PFAS Using AWWA's Drinking Water Treatment for PFAS Selection Guide" – posted to Sharepoint

- Series of ten ITRC training module videos (from an online training course held in March 2020) - the videos are posted on YouTube – links to the videos are found at: https://pfas-1.itrcweb.org/

- Paper from Karlsruhe Institute of Technology (Germany) about ability of incineration to destroy PFAS – posted to Sharepoint

Upcoming meetings and webinars

- Next meeting of the Full PFAS Workgroup – 29 Apr

Preparing for next meeting

- Time to start preparing summaries of treatment processes – to include information previously collected, ID gaps where we need additional info

- **Assignment(s):**

Public Comments

Next Meeting of Subgroup

- **Subgroup will meet on fourth Thursday of the month, at 10:00 a.m.**
- **Target is for meetings to last no more than 90 minutes (end early if possible)**

Next meeting: May 27, 2021

Have any Questions, Comments, or Suggestions? Contact

Daniel B. Horne

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