DEPARTMENT OF HEALTH

Getting the Most out of Your Filter Media

FACT SHEET FOR WATER SYSTEMS/OPERATORS ON FILTER MAINTENANCE

How long is the typical media life?

Typical media life is between 10 and 15 years, depending on how long filters run and how many gallons are filtered each day. Many systems in Minnesota may have filter media that is near the end of its useful life. If systems are not proactive in maintaining or replacing filter media that is removing regulated contaminants, they may see an increase in violations for their water system.

Why is it important to maintain your filter media?

Many systems have filter media for iron and manganese removal. That filter media may also be removing arsenic or radium if it is present in the water. While filters help clean the water, contaminants can build up on the media over time. Sometimes these contaminants can build up on the media enough to re-enter the drinking water and contaminate it. Filter media have an effective size. The media can become too small from years of abrasion from backwashing or become too big from adsorption or other means. Regular maintenance of filter media can extend the life of media based filters and ensure optimal function of the filters.

How can you maintain your filter media?

Know what the purpose of each chemical feed is

Sometimes a system will stop using a chemical that is designed to help with the removal of manganese or radium. Without this chemical, the media has to do all the work to remove those contaminants. This can shorten the life of the media and could cause an exceedance of a standard for a regulated contaminant. (Remember that changes in treatment are required to be approved by the Minnesota Department of Health before they are implemented.)

Monitor backwashes (or reverse-flow cleaning)

Backwash frequency should be based on monitoring results. Backwashing alone may not get rid of all the built up contaminants however. Make sure to follow specifications for rate, duration, and frequency needed to clean the media. In some cases, filter media may be lost during backwashes, more media may need to be added, and action may need to be taken to reduce media loss.

Factors that indicate a backwash is required:

- Significant or predetermined head loss has occurred (based on engineering design)
- Filter has reached its predetermined filter run time (based on engineering design)
- Floc or contaminant breakthrough
- Return of a filter to service (after being taken offline)

During a backwash, the media should be adequately raised and mixed to get rid of contaminants. This movement should be uniform and even. Any irregularities or unevenness after a backwash may indicate an issue with the backwash operation. Boils during a backwash can also indicate an issue.

Backwashing should allow full expansion of the filter media, which is typically around 20 to 40 percent over the normal filter bed volume. Settled media should be clearly separate. Compaction or shrinkage of the media may indicate ineffective backwashing.

More information: Minnesota Water Works Operations Manual - Filtration (PDF) (http://mrwa.com/WaterWorksMnl/Chapter%2018%20Filtration.pdf)

Clean the media

A periodic cleaning with a cleaning product, such as potassium permanganate, can prolong the filter media life and reduce downtime of the filter. The process typically includes allowing the cleaning solution to saturate the media for up to 24 hours. Specialty cleaning products are also available. The filter backwash water can be recycled to the head of the plant or discharged to the sanitary sewer.

At a minimum, a comprehensive filter inspection and evaluation should include:

- Observation of filter backwash
- Visual inspection of filters and filter media
- Inspection of the underdrain and plenum from the manway in the filter pipe gallery
- Determination of media depth
- Filter media sampling and analysis

More information: Treatment Plant Operator - Not to be Neglected (https://www.tpomag.com/editorial/2013/04/not_to_be_neglected_wso)

Dispose of the media if arsenic or radium is present in the media

Test the media to determine what type of disposal is necessary. Be aware of disposal criteria. More information about how to dispose of filter media containing radium and arsenic:

- Radon and Operator Safety in Drinking Water Treatment Plants (https://www.health.state.mn.us/communities/environment/water/factsheet/radonsafety.html)

Know when it's time to replace your filter media

Believe it or not, sand can and does wear out. Through long-term filter operation, the originally rough edges on sand grains that help catch floc particles may become smooth and less adept at stopping particulate matter. This can result in higher filter bottom turbidity readings and increased head-loss readings, both of which will contribute to increased backwash cycles. Over time, this may contribute to increased operating costs.

In terms of media condition, look for media that is fouled. If the media has become rounded (like a pebble), then its effective filtering capacity may be diminished. Note if the media still meets the

effective size originally specified. Finally, media replacement is required if the support gravel has been disrupted so that significant media has been lost through breakthrough to the filter bottom.

It is recommended that the media depth be measured regularly to determine whether an adequate amount is present. The recommended media depth for your plant's filters can be found on the facility plans and specifications. Since media depths can vary with the quality and quantity of water being filtered, it is important to see if the media has changed significantly from the configuration installed during start-up.

The type of media that yields the best filtering results will vary from plant to plant and will depend somewhat on water volume and clarity.

Media replacement is recommended or required at the point where the media size has changed significantly (becoming smaller or larger) from the original specification. When significant changes occur, filter cleaning with an acid solution may prolong media life in some cases. If fouling continues, cleaning may have to be repeated, and eventually you may have to decide if media replacement will be more cost-effective in the long run.

Filter media sampling and analysis should be performed to quantitatively determine the life-cycle of the media and effectiveness in filtering capability.

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