WATEROPOLIS

Evaluation of Ceralite-A as an Alternative to Anthracite Filter Media

Project Description

The Golden Heart WTP located in Fairbanks Alaska is a lime softened, ground water treatment plant with five filter basins, with a combined surface area of 1495 ft^2. Typical filter loading rates are in the 2.3 –to 3.1 gpm/ft^2.

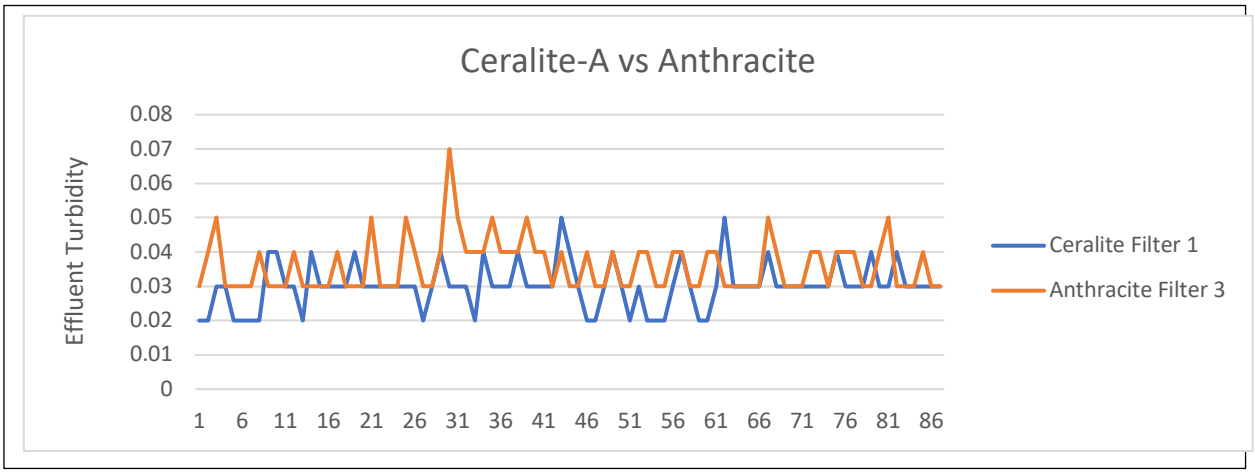
The plant has 16" of 1.0 mm ES anthracite media over 8" of 0.55 mm ES sand which had reached the end of its service life.

Filter Turbidity:

Figure 1 shows the performance of the Ceralite media versus one of the typical anthracite filters It shows that Ceralite performs equally with anthracite of the same effective size.

The effluent turbidity data indicates that Ceralite-A works very much like anthracite in a conventional filtration application.

Figure 1: Operation over 86 days



The utility installed new filter media into all five basins in May of 2016. A 16" upper layer of Ceralite-A media was placed on top of 8" of new filter sand as an alternative to anthracite. The remaining four filter basins had 16" of new anthracite installed over 8" of new filter sand.

The average Ceralite-A turbidity over 86 operational days (Jan – Mar 2018) was 0.030 NTU and the combined effluent average of the 4 anthracite filters over the same period was 0.032 NTU.

Filter Head-loss Assessment

Expanded clay materials like Ceralite-A have minute variations in particle density thereby eliminating fines accumulation at the top of a filter after backwashes. Fines stay more evenly distributed throughout the upper

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portion of the bed until they are expelled during backwash.

This lack of fines layer or "skin" at the top of the filter significantly improves clean head-loss of an expanded clay filter and also improves head-loss development throughout the filter run. This allows for higher filter loading rates and longer filter run volumes (UFRV's).

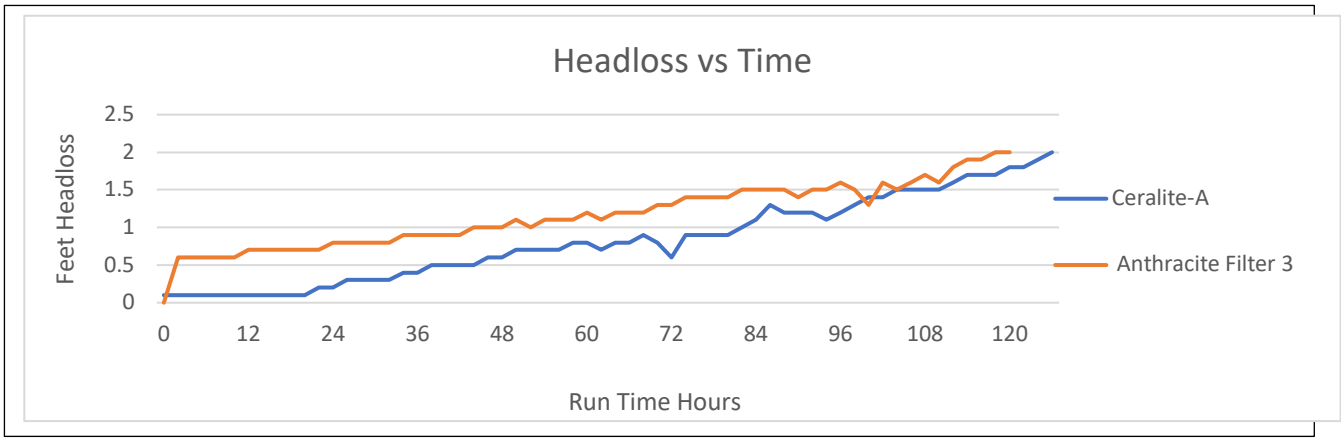
filter was typically equal to or below the dual media filters.

Conclusions:

This pilot testing demonstrated that:

- ***Ceralite-A performs as well or better than anthracite in a side by side comparison.***
- ***After almost 2 years of operation Ceralite-A has not shown any operational degradation.***

Figure 2: Typical head-loss comparison vs filter run time



Filtration Performance:

Filter head-loss over a representative 5-day duration of the pilot tests is shown in Figure 2.

For the pilot operations, the backwash triggers were set as: either a maximum filter effluent turbidity, or a terminal head-loss of 2 feet (of water), whichever is achieved earlier. As seen in Figure 2, both the Ceralite-A and the anthracite media were consistently below the terminal head-loss criteria, but on average the head-loss in the Ceralite-A filter was 10 to 20 percent lower than the conventional anthracite filter. Filtered water turbidity in the Ceralite-A

- ***Ceralite-A filter demonstrated the lowest head-loss.***

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Contact Information:
James Ferris
Water System Foreman
Golden Heart Utilities
1304 1st Ave.
Fairbanks, Alaska 99709
Tel: (907) 455-0118
jim@akwater.com