



Delivering a dose of good service to get a flocculant problem cleared up.

The request

Got a call from Leo today. He wants me to investigate floc carryover in the company's wastewater clarifier. Leo is retiring in a few weeks and wants to stop the light floc carryover before turning the reins over to Mike.

The company contends with hexavalent chrome, which needs to be reduced to trivalent as part of the wastewater treatment. They've been successful with the conversion but noticed that any suspended solids would increase the chrome discharge overall -- and that's a concern.

I've set an appointment for next week to check things out.

The audit

During my on-site visit, I confirmed they have a continuous flow system moving 40 gallons of liquid per minute for 8 hours every day. I learned they were using Aquapure OB Plus and Aquapure FW. These probably aren't the optimal chemicals for what they're trying to do, especially given the lighter weight of the flocculant they're dealing with.

The first issue I found during my inspection was that the AquaPure FW mixer was continuously running, thinning the product far too much. I also learned that Leo was adding 2 gallons of Aquapure OB Plus to a 90gallon day tank. I asked why, and he was unsure how that practice came about.

I walked away, believing they were using the wrong product and were diluting it on top of that.

I tried increasing the concentration of the current chemistry, but it didn't reduce the total suspended solids level, and the water got hazier. This confirmed they were using the wrong product.

Time to put a plan together.

Some jar testing

I decided to start with some jar testing to identify the right dosage the Aquapure OB Plus. I did tests with .25, .5, 1, and 2 ml/gal at pH 8.0. Polymer additions of 2,4 ppm yielded a thin, stringy floc.

Next, I decided to jar test stage 2 with Aquapure FW polymer only. This formed small flocculant, which eventually settled and was similar to what is observed in the clarifier.

It appears the AquapureOB Plus when used as a concentrate, reacted with the FW polymer. Without the OB Plus, the FW worked fine. This is probably why they started diluting the concentrate.

Changing it Up

My first recommendation was to swap in AquaPure I-300 Coagulant, which would produce a heavier flocculant that would be less likely to carry over into the weir.

I asked Leo to let the over diluted polymer they had run out and make up the day tank at 4mls gallon of FW polymer, stopping the mixer after 30 minutes. If he still sees carryover after that, he will need to change the coagulant from OB Plus to the I-300. I've made an appointment to touch base with him later in the week when the new polymer will be in place.

Uh-oh, more floaters

Well, floaters continued with the proper polymer makeup, so I told Leo to try the I-300 and add a pump for seeding the flash mixer.

Leo took my advice and purchased a new chemical metering pump to recirculate the solids into the flash mixer. Upon installation of the I-300, Chrome numbers dipped lower than any previous chemistry. Water clarity improved too. Things are moving in the right direction.

It's been a week since we switched to I-300, and I just got a call for the same issue. Once again, there's flocculant going over the weir and down the sewer.

Time for another on site visit.

When I arrived on-site, we checked the pump feed rate and found that Leo had set it too low - adding only about ¼ ml per gallon. I recommended that they adjust it upwards to 1 ml per gallon -- an easy fix that should help considerably.

While making the adjustments, I learned from Mike that the clarifier they purchased was too big to fit into the building. To get it inside, they wound up cutting off the legs and removing a significant portion of the clarifier's bottom. This did two things:

One, it reduced the amount of solids that can be collected.

And two, it removed the solids collection funnel from the bottom center to the right side of the system, inadvertently changing the flow velocity. Now more solids were building up on the left side of the clarifier than the right.

Down, down, down it goes.

With the chemistry adjustment in place, I pulled another sample from the weir. There was no carryover. Win!

I also tested the water for turbidity. The FAU measurement was 19 ppm. Thirty minutes later, I pulled another sample, and it had dropped to 17 ppm. Twenty minutes after that, it was down to 13 ppm. The floc in the clarifier was also improving with solids recycling.

Pleased with how the Aquapure I-300 is performing now that its dialed-in correctly, Mike placed an order figuring he'll need about two drums per month at the current dosage.

Clearing up the issues

I checked in with Mike today after a few weeks into their new process. He said the water is crystal clear and his chrome numbers are lower than ever.

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He did notice some floc was coming up on the left-hand side of the clarifier- the same place Leo had seen it with the OB Plus -- but realizes this is more than likely due to having cut 2-3 feet off the bottom of the clarifier.

Mike acknowledge the problem and said they are working with an environmental company to upgrade their system. Combined with the Aquapure I-300 -- which Mike now calls "Liquid gold" -- I expect this should get them where they want to be.

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