A Technical Article (sort of)

By Steve Grimm

I'll try and make this as interesting as I possibly can. I know these technical type articles can be real snoozers, but every once in a while, I feel the need to write something worthwhile, something that may help you in the operation of your plant. Actually, I just don't have anything to rant about this quarter, so here goes……

There are three words in the English language that can strike fear into the hearts of many operators. Those words are **"Chlorinate For Filaments!"** Just the mention of chlorinating makes some operators turn and run for the office, barricading the door behind them. Why? Chlorine can be our friend. It is true that in the wrong hands chlorine can be a dangerous weapon, capable of wiping out an entire process in short order. But, in the hands of a knowledgeable, well informed operator, chlorine can be an effective deterrent to the filament threat. The following is my four-step program for recovery from a filament disorder.

STEP 1: ACKNOWLEDGE

It takes a big operator to acknowledge (admit) the fact that they may have a filament problem. A filament problem doesn't make you any less of an operator. These things happen. Accept it. The fact that you have acknowledged the possibility of a problem is good, and means you are on the road to recovery.

STEP 2: IDENTIFY

Once you have taken that big first step, you need to identify the problem in order to effectively treat it. In order to identify the problem, you need to ask yourself some questions. What is my SVI? What is my mixed liquor? Have I checked under the microscope? Do I have a microscope? Remember, not all settling problems are caused by filaments. SVI is a good indicator. It uses the relationship between the mixed liquor and the 30 minute settled sludge volume. Know your optimum SVI. The higher the SVI, the better the chances of the problem being filament related. Or try the dilution test. Some say it is a good, quick way to see if the problem is excessive solids or filaments. Take three settleometers, fill one with straight mixed liquor, one with a 50/50 mix of mixed liquor and **unchlorinated** plant effluent, and one with a mix of 75% mixed liquor and 25% **unchlorinated** plant effluent. Observe the settling. If the diluted samples settle faster than the straight sample, chances are very good that your problem has more to do with excessive solids than with filaments. If, on the other hand, all samples settle about the same, then filaments are indicated. I've always had a bit of a problem with this technique. I find it difficult to determine differences in settling rates. The best way to identify the problem is by examining the mixed liquor under a microscope. If you know what your normal mixed liquor looks like, you will be able to tell if you have filaments, even if all you have is a Wal-Mart special microscope. By using a phase contrast microscope and stains, you can identify the dominant filament and possibly figure out what events led up to its outbreak.

STEP 3: CALCULATE

Once you have determined that you do indeed have a filament problem, determining the proper dosage of chlorine becomes as important as actually starting up the chlorinator. Too little is ineffective, yet too much can wipe out the system. What to

do? Please don't just dump a bunch of bleach into the tank and go home. It doesn't work that way. Trust me. Been there. Done that. Killed it all! When chlorinating, you need to be fairly precise, that's why we have calculation sheets. By calculating the amount of chlorine required, you reduce the risk of over-chlorinating, and keep a handle on costs. The most common dosage for filament control is between 3 and 5 lbs of CL_2 per 1000 lbs of mixed liquor. In order to calculate the dosage, the following data is required:

1. Volume of Aeration Tank and Clarifier (MG)
2. MLSS (mg/l)
3. Desired CL_2 Dose lbs/1000 lbs MLSS

Calculation:

(1) x (2) x 8.34 = lbs MLSS
lbs MLSS / 1000 = 1000 lbs MLSS
1000 lbs MLSS x (3)= lbs CL_2 required/day

The Example:

1. Volume of Aeration Tank and Clarifier: 0.675 MG
2. MLSS: 2750 mg/l
3. Desired CL_2 Dose: 4 lbs/1000 lbs MLSS

0.675 x 2750 x 8.34 = 15481 lbs MLSS
15481 / 1000 = 15 1000 lbs MLSS
15 x 4 = 45 lbs CL_2/day

I still think I have a tendency to confuse people with my examples. I'm trying to keep it short (HA… can't you tell), so just call me if you have any questions. Please NOTE, UNDERLINE, and STAR this sentence (I had a science teacher in high school who said this whenever something was important and most likely on the test). ****CORRECT DOSAGE IS CRITICAL WHEN CHLORINATING FOR FILAMENTS.****

STEP 4: APPLY

Now for the hard part. You have to turn on the chlorinator! Go ahead. You can do it. OK. Let's talk. First of all, you won't get rid of the filaments unless you turn on the chlorinator. You calculated your dosage, now this is what to look for and what to expect. First of all, it's going to get worse before it gets better. This is probably the hardest thing to get through to people. As the supernatant gets cloudy, the first instinct is to pull the plug. That's normal. I did it for some time. That's why it took me so long to get rid of the filaments. This is where knowing your optimum SVI is important. At this point, the process is driven by SVI. Continue chlorinating until the SVI is approximately 50 points higher than your optimum SVI (I call that your target SVI). In other words, if you like an SVI of 125, then pull the plug when it reaches the target SVI of 175. The residual chlorine will continue to kill the filaments, and the SVI will continue to drop after you pull the plug. I don't care what you have to do. Sit on your hands, borrow your sister-in-laws handcuffs, whatever, just monitor the SVI and don't pull the plug until you reach the target SVI. DO YOU HEAR ME? HANDS OFF!!

Most generally you will chlorinate for between 5 and 7 days. I've seen it go as long as two weeks before the filaments broke. Don't panic. Watch the SVI! As I said before, things are going to get worse before they get better. You will start out with a slow settling sludge and crystal clear supernatant. As the filaments begin to die, the

sludge will begin to settle faster, and the supernatant will get cloudy. **HANDS OFF!!!** Don't touch that chlorinator until you hit your target SVI.

Once things start to turn cloudy, increase your wasting a bit. You want to get those dead filaments and bugs (yes, you will kill some good bugs too) out of the system as soon as you can. Be careful not to over-waste, the sludge will become thicker as the filaments die.

I think I've said enough, besides my typing finger now has a blister. If you think you may have a filament problem, please give me a call. If you are just not sure, don't try to go it alone. You have support out there, help is available. Together we can work through it. Now go ahead. Turn on that chlorinator.

Give Steve Grimm a call at (518) 828-3155 if you have any questions regarding filament control or any other process related problems.