

# Transcript

Bill Pollock

And we're back on Show Me Today. I'm Bill Pollack. We were at the Grand Glaze Wastewater Treatment Plant in Valley Park, just outside of St. Louis, where we were exploring a unique approach to public health, wastewater surveillance. This has been a program that's been going on since 2020. They collect samples of wastewater from around the state for the Missouri Department of Health and Senior Services to look for possible viruses such as COVID-19, the flu, or RSV. This is one of seven locations in the St. Louis metropolitan area and one of a network of 41 facilities across the state. While at the Grand Glaze Treatment Plant, we shot a video and I visited with Kim Duke and Chris Pfeuffer to find out how this process works, how they collect samples, and how the work they're doing is helping your community be safer. For this segment, It's the audio portion of the video. And I will say this, I felt like I was on a field trip. Some of the things that I learned were interesting. And so let me play that for you. Hey, Chris, how are you? All right, so you're the plant manager here at Grand Glaze. I am one of seven.

Chris Pfeuffer

One of seven treatment plants. I actually oversee the operations here. our Fenton treatment plant and our Lower Merrimack plant. So we're in the control room. This is the central operation for the entire facility. It's kind of a blast from the past, a time capsule.

Bill Pollock

Yeah.

Chris Pfeuffer

You can see the original technology back from 1985. This whole panel was buttons and lights. Over time, we've modernized. As things happen, we get alarms, we get a lot of measurements from instrumentation, you can see what's happening. It's been a dramatic path.

Bill Pollock

So nothing will happen 'cause I hit an off button over here.

Chris Pfeuffer

I think we're good. Okay, all right. You didn't hit that button, did you?

Bill Pollock

I don't think so, no.

Chris Pfeuffer

All right, we should be all right.

Bill Pollock

All right. What are you going to show us today?

Chris Pfeuffer

You're gonna see a little bit of everything. We're gonna walk the process on the water side, start to finish, and then you're gonna see the solids.

Bill Pollock

As we begin our tour, Chris explained that water comes to the Grand Glaze plant through a collection system, that's the sewers and pipes in the ground. MSD has about 6,500 sanitary lines flowing to them every day. Their total pipe inventory is about 10,000 miles of tubing. After moving through the collection system, three source mains then pump water to the first of seven major steps in the Grand Glaze cleaning process. Chris introduces me to the process. So what are we looking at then? Whoa, that is a long way.

Chris Pfeuffer

We're looking at about 40 feet, so yeah. That's where the water comes in. The next step is our influent pumping, where we raise the level of the water and let it fall through the plant. You can see the operation of our Boscar unit. It goes all the way down. You'll see the claw engage the screen. It'll raise, kind of hold there a little bit, let any water fall out as much as possible, and then ultimately it comes up. Heads over to the dumpster and the claw opens. Yeah. So very much like the vending machines. Right, yeah.

Bill Pollock

Except you're not getting a plushy stuffed animal as the prize.

Chris Pfeuffer

That is true. Yeah. That is true. Yeah, it'll pause there for a few minutes just to let the water fall out. Drain out, yeah.

Bill Pollock

I better tighten my hard hat. I could just see this falling, and you'll be scooping this up next. Once the bosker claw is done separating any larger solids, water is moved via the influent pumps. These tall pumps take the water to the highest point at the Grand Glaze facility, where the water then encounters the fine screens. Chris details how the fine screens work.

Chris Pfeuffer

So the water's pumped from down low up high. This is the highest water spot in the plant. There's channels underneath us, they flow through these fine screens. You can see the debris they're catching and pulling out.

Bill Pollock

Yeah.

Chris Pfeuffer

So that's a moving screen. It's got a brush, kind of like a car wash on the backside. It cleans all the debris off the screen, and it's slurry down. We put it into dumpsters. Dewater it and put it into dumpsters.

Bill Pollock

And the process continues outside.

Chris Pfeuffer

So after the fine screens, the water comes through channels into these tanks. Again, very quick process. Lets any remaining solids, say grit, rock, stuff like that, fall out. The water keeps on going. The water and the organics keep on going. Yeah.

Bill Pollock

And by organics, you mean?

Chris Pfeuffer

Poop. It's the biosolids.

Bill Pollock

Ask a simple question, get a simple answer. After the grit handling system, we moved on to a quartet of large round pools for primary treatment.

Chris Pfeuffer

So the water comes up through the center, that area inside that ring, the ring knocks out any eddies or currents, and that's where we slow things down. The solids sink to the bottom, any floatables come to the top. You can see the arm at the top, it wraps itself around, so that centrifetal force puts everything to the outside over time. And this brush system, it cleans the weir so we don't have any algae, and it captures those solids into a scum pit. After the water's gone through primary treatment, it spills over the weir to the outer ring, where it's collected at the far side, ultimately ends up in our aeration tanks, which you can see in the distance there. That'll be our next stop.

Bill Pollock

And we've made our way over to the aeration tanks.

Chris Pfeuffer

So these are aeration tanks. After primary treatment, it comes to aeration. That's where the biological side really kicks in. We have mixed liquor, which is those microorganisms in the water. You can see the color is a little bit different. It's more of a brown chocolate milk look, as opposed to the green in the primaries. That's that biology happening. At the bottom of these tanks, we have hundreds of these small pods that bubble air up. That's that foam pattern you're seeing on the top. We'll walk by the blowers that are providing air here. We have five blowers, three large, a medium, and a small. And we use different ones based on the time of the year and what sort of air flows we need.

Bill Pollock

There are so many moving parts at a place like Grand Glaze Treatment Plant, I asked Chris if they've ever had to deal with any major equipment failures. Has there ever been an instance where everything has shut down on you?

Chris Pfeuffer

We had some challenging years in the 2017 with all the flooding that was going on in the Merrimack.

Bill Pollock

Yeah.

Chris Pfeuffer

We did experience some interruptions in process, yes.

Bill Pollock

But nothing too long that we were able to make it through. Yeah, that's good. That's good work.

Chris Pfeuffer

Long days.

Bill Pollock

Yeah, I bet. It's pretty impressive the effort that goes into making sure our water is safe, but this cleaning process isn't done quite yet. Next is secondary settling.

Chris Pfeuffer

So after the aeration process, the water comes here to our final clarifiers. It's at that point in time we let that mixed liquor from aeration. It settles to the bottom. Any floatables go to the top. We capture the top floatables, and the mixed liquor in that sludge blanket, we recycle back to the aeration tanks.

Bill Pollock

Is this the water that ends up going out to the Merrimack, or are we not done yet?

Chris Pfeuffer

Almost. We're not quite done yet.

Bill Pollock

Still more?

Chris Pfeuffer

Still more. Disinfection's the last part of our process.

Bill Pollock

All right, let's see that.

Chris Pfeuffer

All right.

Bill Pollock

After the secondary settling step, microorganisms are recycled from the water and sent back to the aeration tanks. This process is accomplished by using a hydraulic machine

called an Archimedes screw pump. In non-Greek terms, it separates the water from the sludge. Finally, the water is disinfected. Chris explains what goes into that process.

Chris Pfeuffer

Sodium hypochloride. bleach, but it's a lot more powerful than what you have at home. So you might smell a bit of a pool smell here.

Bill Pollock

Yeah.

Chris Pfeuffer

So that mixes with the water. From there, we need contact time. The water flows out of this to our chlorine contact basins, where we let that chlorine do what it needs to do. After we introduce the chlorine at that previous structure, it comes over here, and you can see it kind of worms back and forth. That allows for contact time for that chlorine to interact with the wastewater. Any remaining impurities are neutralized. We have meters to determine if there's any residual chlorine in the water. We introduce enough bisulfite to neutralize that. From here, it spills under the weirs into a channel that we're standing over and ultimately heads out to the river.

Bill Pollock

As you're going through all of this, I keep thinking about what did people do when there wasn't sewer and water treatment and...

Chris Pfeuffer

So, that's an excellent question. Back when the bubonic plague was going on, a lot of folks attribute that to poor sanitation. All that sewage, all that mess was there in the streets, a breeding ground for disease.

Bill Pollock

I've never been more thankful for clean running water. But what was it Chris said at the start of this tour?

Chris Pfeuffer

We're going to walk the process on the water side, start to finish, and then you're going to see the solids.

Bill Pollock

Yes, the biosolids. Should I be excited about this part? After the water cleansing process we've just observed, there are leftover biosolids that need to be dealt with, a daily average of 40 tons, in fact. Chris explained that 75% of that mass is typically reduced by incinerators, and whatever ash is left over is discarded in an MSD-owned landfill. The building we're entering now houses trailers, which take any remaining waste to outlying public landfills when needed. It also houses a specialized belt press. I got to tell you, I'm trying to feel tough. I got my hard hat on, but this smell is getting to me. I'm trying to do my best.

Chris Pfeuffer

We'll be quick. After the flow goes to the gravity thickeners and we thicken it up, we try to squeeze a little bit more water out of it. So we go from about 7% solids. The goal is 25% coming off the press. It's a consistency of Play-Doh. So as the presses are going, those screws are turning. You'll see it occasionally drop into the top of the trailer. There's four gates, so you can open the gates so it'll fill the front, the middle, and the end.

Bill Pollock

But this probably starts later in the day, though, right?

Chris Pfeuffer

Depending on our solids volumes, we will run this 24/7. So a lot of times in the afternoon, over the night, so when you get here in the morning, We have two full trailers. Yeah. So everybody talks about flushing the toilet at halftime. Yeah. It might move the needle for our water about that much. That's it. We've had questions in the past about with COVID going on and everybody at home, did that change? No, people still went to the bathroom. It was just at home, not at work. So. Yeah.

Bill Pollock

Now that we know what Grand Glaze Treatment Plant does, I wanted to know more about how they're helping the Missouri Department of Health and Senior Services with their wastewater surveillance program. For that, I spoke to Kim Duke. Kim, hello.

Kim Duke

Hi, how are you?

Bill Pollock

Thank you for having us. I'm doing well. This is Kim Duke. Tell us what you do here at the plant.

Kim Duke

So I am the laboratory operations manager for MSD, the whole system.

Bill Pollock

How did MSD get involved with the Missouri Wastewater Surveillance Program?

Kim Duke

So the state approached MSD about monitoring the wastewater and we were happy to partner with them. Part of the mission of MSD is to protect public health. Partnering with us is sharing that information and allowing us to know like heads up because there will be a public impact on those results that the state sees. We pull Samples like this, like the sample container, we get these daily, multiples of these daily from each of the treatment plants. And we will pour off some of the sample twice a week to send it to the Mizzou lab that you guys toured. And they actually do the testing at the Mizzou lab for those viruses.

Bill Pollock

I asked Kim what specifically the state is asking her to investigate at Grand Glaze.

Kim Duke

Right now, the state is asking us to monitor three specific viruses, COVID, the flu virus A and B, and RSV. And those are important. A healthy individual is going to recover from those pretty quick, but those are specifically targeted because those affect our vulnerable populations significantly more than it would a healthy individual. RSV is a pretty significant pediatric virus. And we want to know and see if there's peaks in that so that we can prepare the community at large to say this is going around, do the appropriate things to keep your family and community well.

Bill Pollock

What is your hope moving forward as this program continues and the work that MSD is doing with them?

Kim Duke

Sure, so we are hoping to continue our partnership with the state We ultimately all have the same goal, that we want to improve health outcomes for our community. So if we can provide some, you know, simple wastewater that they can do testing on, we want to continue that partnership.

Bill Pollock

Yeah, wastewater surveillance offers an early warning system that can guide responses to viral outbreaks, track trends over time, and even explore new public health questions. For more information on the program and the ongoing efforts across the state, visit [health.mo.gov/wastewater](https://health.mo.gov/wastewater). The science happening behind the scenes in facilities like the one at Grand Glaze shows how innovative approaches can make a real difference in public health every day. I'm Bill Pollack. This is Show Me Today.