Amendments

Improving Awareness & Advocacy of the Michigan Biosolids Program

Volume 18, First Quarter February 2014

Biosolids Program Update

MSU Agricultural Exposition

By Sarah Schuch | sschuch@mlive.com
on October 16, 2013 at 5:00 PM, updated October 16, 2013 at 5:12 PM

The Michigan Biosolids Team has the yield results of the **Demonstration Plot** at the 2013 MSU Ag Expo. The **Biosolids** side yielded **226** bushels per acre and the **Fertilizer** side yielded **170** bushels per acre. These unusually high yields for unirrigated corn could have resulted from the corn variety, a high plant population (35,000 plants per acre), the wheat acting as a cover crop, or timely rains and heat, or multiple factors. The summary sheet is attached.

Biosolids Conference

The Michigan Biosolids Team will be hosting the 2014 Biosolids Conference scheduled for **March 11 and 12, 2014**, at the Holiday Inn Conference Center in Big Rapids. The theme for this conference is **"Biosolids Optimization, Focusing on the Product"**. We are finalizing the Agenda as of this writing. A confirmed tour location is the Nestle Ice Mountain bottling facility in Stanwood. Confirmed Speakers are: Dr. Kang Xia, Virginia Tech, and Dr. Lakhwinder S. Hundal, CPSS, Metropolitan Water Reclamation District of Greater Chicago, to discuss PPCPs , etc. in biosolids, Manuel Irujo, NEFCO, and Mike Gerbitz, Donohue and Associates, to discuss sustainability and energy independence, and Valerie Brader from Governor Snyder's Office to discuss renewable energy and beneficial use. A conference brochure is attached.

Biosolids Calendars

The Michigan Biosolids Team Calendars for 2014 are here! Contact Jeff Pugh at jpugh@fveng.com or 616-942-3616; Karlyn Wickham at the MWEA Office at Karlyn@mi-wea.org or 517-641-7377, or Steve Mahoney at mahoneys@michigan.gov or 517-284-5620 to receive one.

Michigan News

Flint population loss leaves Swedish Biogas project at a standstill

FLINT, MI – The director of a company that produces clean, odorless fuel from human waste in Flint says the decline of the city's population is slowing the company's growth.

It was predicted that the biomethane gas produced by the company would fuel buses and other transportation here. However, the amount produced is just enough to offset the company's own cost for natural gas.

"We clean 100 percent of the sewage of the city of Flint today," said Lennart Johansson, Swedish Biogas Director and Consulate General of Sweden. "The problem with the city of Flint is the population has declined. In order to take the next step ... you need to make arrangements to bring in more waste."

In 2009, the Flint City Council approved an operating and development agreement with Swedish Biogas International, located in Sweden.

But the limited amount of waste due to decreased population in the city has put the company in a position to look for new options.

To get more waste to produce more biogas, Johansson said the company would have to bring in more waster from neighboring communities.

Biogas is a sign of potential of technology to produce clean, renewable energy, which was the topic of a roundtable discussion at Kettering University Wednesday.

Johansson was one of three panelists for the discussion, which was hosted by Pew Clean Energy Program.

The discussion was moderated by Phyllis Cuttino, director of clean energy for The Pew Charitable Trusts. Jeff Metts, CEO of Astraeus Wind Energy, Inc. and Peter Milojevic, president and CEO of Midland Cogeneration Venture, were also on the panel.

The forum, which had an audience of roughly 50 Kettering students, faculty, staff and community members, facilitated a discussion on what needs to be done to promote more renewable energy in the state and how it would affect the economy.

"This type of conversation is very important to increase the awareness of the benefits of clean energy," Johansson said after the roundtable discussion. "We have a tremendous new market. It is very good that the Pew organization is taking this initiative."

The Pew Clean Energy Program is working to accelerate the clean energy economy for its national security, economic and environmental benefits. The program promotes the adoption of key changes to U.S. energy policy in four sectors: industry, utilities, transportation and research.

Cuttino said she has been visiting places in Michigan because there's a lot going on and room to grow.

"Michigan is really at the heart of innovation," she said.

The research Kettering is doing for renewable energy and clean energy was also recognized.

Johansson, also a professor of research at Kettering, took over Swedish Biogas in the fall of 2012. The company originally came to Flint to prove that clean energy could help improve a community that has seen decline.

"If this can work in the city of Flint, it can work in any other city in North America," Johansson said. "It's working in the city of Flint but it's working at half capacity."

The original plan was to produce biomethane gas that could help power MTA busses and other things. Currently the operations are not big enough to make that happen.

The next step is work on expanding operations, which includes finding more investors, pulling in waste from neighboring communities and then producing more biomethane gas.

It's still a work in progress, but Johansson said he is hopeful the future will produce more benefits for the city. With more discussion on clean energy and policy changes, more positive steps toward sustainable energy could happen, he said.

Johansson referred to Sweden and its policies often during the roundtable, saying that we could move in the same direction but it takes incentives and regulations from the government. The other panelists were in agreement.

The discussion on how to produce renewable energy and how to reduce energy consumption should be a more common one, said Timo Seitzinger, a German exchange student at Kettering.

"This country isn't thinking about the future," said Seitzinger, 28.

To have renewable and clean energy would help countries be independent of others. The roundtable was a step in the right direction, said Christoph Rindfleisch, a German exchange student at Kettering.

"It's a part of the economy you can change anywhere," he said.

DNR: Man dumped hazardous waste with wastewater in Muskegon, faces felony charge

By Stephen Kloosterman | sklooste@mlive.com

Follow on Twitter

on January 16, 2014 at 7:29 AM, updated January 16, 2014 at 3:30 PM

MUSKEGON, MI – A Kent City man faces felony charges for allegedly mixing hazardous waste into wastewater he dumped at the Muskegon County Wastewater Management System.

Timothy O'Leary has been charged with a felony violation of the Natural Resources and Environmental Protection Act, according to the Michigan Department of Natural Resources. The act is punishable by two years in jail and up to $25,000 in fines for each day the offense occurred.

O’Leary is being charged as a habitual third offender, which could increase his punishment. Lt. Vence Woods of the Michigan DNR declined to comment on O’Leary’s previous offenses, but said they were not environmental-related.

Records at the Muskegon County District Court show that O’Leary was arraigned Jan. 8. He has been released on a bond, with a pretrial conference scheduled for Thursday, Jan. 16 and a preliminary examination scheduled for Tuesday, Jan. 21.

There are no reports of the hazardous waste affecting Muskegon Lake, according to the DNR. The wastewater system itself -- which uses a distinct land treatment process on 11,000 acres -- wasn't harmed, said director Mark Eisenbarth.

The alleged felony took place during 2013 while O’Leary worked for Environmental Waste and Recovery Service Inc. located in Saginaw County, Woods said.

Woods said the waste-disposal company has since closed, but other charges related to the company are likely in the future.

“The storage they were doing in Saginaw County was also illegal,” he said.

Woods said O’Leary is accused of mixing petroleum contact water -- classified as hazardous waste – in with regular storm drain water he dumped at the Muskegon County Wastewater Treatment facility.

Woods said that petroleum contact water often comes from gas station sump pumps. It is a common substance but potentially harmful to aquatic life and is classified as hazardous waste.

O'Leary didn’t record the hazardous waste in a legally-binding manifest waste truck drivers are required by law to sign.

“If you’ve got hazardous (material), it’s more expensive to get rid of it,” Woods said. “He didn’t give us a reason, but you can see where there would be cost saved.”

O’Leary’s attorney -- Brad Groom of Norton Shores -- declined to comment Thursday.

"This is on ongoing matter and we are not, at this juncture of the matter, at liberty to discuss the particulars with the media," he wrote in an email.

The charges are rare.

“We don’t do that much with felony environmental violations,” said Michigan Department of Environmental Spokesman Brad Wurfel.

Arrested at pro-environment conference

The case took another unusual turn when the DNR received warrants for O’Leary, Woods said. O'Leary's employer had shut down, but he had found another job in the waste-hauling industry.

“We like to allow people to turn themselves in,” Woods said. But O’Leary didn’t want to, despite being contacted by phone and mail in mid-December.

“He told the detective he didn’t want to turn himself in over the holidays, but made no other arrangements,” Woods said.

A detective finally caught up to O’Leary Jan. 6 at a pro-environment conference, called No Spills, in Traverse City.

“They had him step out of the class and arrested him there,” Woods said.

The DNR’s investigation started with an anonymous call to the Muskegon Wastewater Treatment Plant.

“Ninety-nine percent of our haulers are great,” said Muskegon County Wastewater Management System Director Mark Eisenbarth. “Sad to say, there are one to two out there that, although they tell us it is storm water, it is really not.”

Stephen Kloosterman covers local government, employment and the outdoors for MLive Muskegon Chronicle. Email him at sklooste@mlive.com or follow him on Facebook, Twitter, and Google+.

Ann Arbor's increasing sewage overflows and aging sewer system a concern of officials

 By Ryan Stanton | ryanstanton@mlive.com

on September 26, 2013 at 5:30 AM

Beneath the ground Ann Arborites walk on and drive their cars on exists a network of hundreds of miles of sewer pipes, some dating back to the early 1900s.

Those pipes function each day to carry an average 18 million gallons of raw sewage to the city's Wastewater Treatment Plant on Dixboro Road.

Decade of Construction	Sanitary Sewer	
	Length (miles)	Percentage of system
1910s	47.82	13%
1920s	28.61	8%
1930s	11.78	3%
1940s	11.40	3%
1950s	54.67	15%
1960s	94.78	26%
1970s	38.62	11%
1980s	26.69	7%
1990s	26.03	7%
2000s	11.85	3%
2010s	1.32	0%
Unknown	9.02	2%
TOTALS	**362.59**	**100%**

Source: City of Ann Arbor

But a recent string of sewage overflows is raising questions about the city's aging sewer system and the city's ability to monitor and maintain those pipes.

"We have a very large system," said **Jennifer Lawson**, the city's water quality manager. "I'd love to have enough manpower to be able to monitor it on a much more frequent basis, but we do work with the budget that is allocated."

Lawson released a report this week in response to recent sewage overflows, explaining the city is challenged by both aging sewer infrastructure and foreign objects clogging pipes.

The city maintains roughly 363 miles of sanitary sewer pipes — more than two-thirds of which were built in the 1960s or earlier.

About 13 percent of the pipes in use today were built in the 1910s, and another 14 percent were built in the '20s, '30s and '40s.

Only about 3 to 4 percent were built since the year 2000, while 25 percent were put in place in the 1970s, '80s and '90s.

City crews clean and inspect the pipes on a seven-year rotation, Lawson said, but updating the system to keep up with modern standards while ensuring it continues to function properly is a major challenge.

More frequent sewage overflows

Lawson said the city has updated standard operating procedures, making it a practice to more broadly circulate public notifications of sewage overflows.

But new reporting practices aside, she said, the perception that the city is experiencing more sewage overflows than usual is accurate.

"We are seeing them more frequently, but it could be an anomaly," she said. "It could be seasonal. We are continuing to evaluate why this is happening."

There are a number of reasons why a sanitary sewer can overflow, causing raw sewage to spill and find its way into the Huron River.

Some of the biggest culprits, Lawson said, are pipe blockages caused by intrusive tree roots, collapsed pipes, “fatbergs” (coagulated oils or grease), and debris that can range from "flushable" wipes to diapers and even plastic grocery bags.

Lawson said it's important for residents and businesses to know that not everything can be disposed of in the sink or flushed down the toilet.

"All of those items flushed down do collect in the pipes underground," she said.

As a regulatory requirement, the city keeps a record of sewage overflows and reports them to the Michigan Department of Environmental Quality.

Since last December, the city has reported eight sewage overflows, including one in the parking lot of Maple Village, two in Nichols Arboretum, one on Pineview Court, one at Pauline/Maple, one on Fuller Court, one at Jackson/Interstate 94, and one at the wastewater treatment plant.

In six of those incidents, raw sewage ultimately found its way into the Huron River, including 10,000 gallons from the June 27 spill at the plant.

Earlier this month, a ball of "grease and oil" caused a sewer line to back up along Pauline Boulevard, spilling about 100 gallons of raw sewage. In other cases, the amount of sewage was reported as minimal or unknown.

In at least two recent cases, the sewage overflow was caused by tree roots clogging a sewer pipe, including one in Nichols Arboretum.

Assessing the system

Though most areas of the sewer system get cleaned out and inspected once every seven years, Lawson said, the city hits some areas more frequently if they're known to be problematic, or if there's higher risk of tree roots growing into the pipes.

She said it's not just the age of the pipes that's a problem, but also the materials used when they were originally built. Many of the pipes from decades ago, she said, are vitreous clay, and tree roots can grow into them more easily.

A construction worker works on the wall of a final clarifier at the Ann Arbor Wastewater Treatment Plant on Dixboro Road on Wednesday, Sept. 25. The west plant is currently being rebuilt. Patrick Record / The Ann Arbor News

She said that's a problem in the Arb where a lot of old sewer lines are buried in forested areas.

Lawson said the city is planning to do a comprehensive analysis of the sewer system that will include taking inventory of pipes, assessing their age and condition, and coming up with a reinvestment and rehabilitation plan to make sure the pipes are being maintained to industry standards.

She said that study should start in the next year or two and could take about 12 to 18 months to complete.

"We're actually just finishing this for the drinking water system and the next ones are going to be the stormwater and sanitary sewer pipes," she said.

Mayor **John Hieftje** said he's heard city administrators complain in the past that not enough reinvestment was made in Ann Arbor's underground utility infrastructure in the '70s, '80s and '90s — that previous administrations "dropped the ball."

But data provided by the city shows the number of miles of new sewers constructed has gone down every decade since the 1960s.

Craig Hupy, the city's public services administrator, said the fact that only 13 miles of new sewer has been constructed since 2000 — compared with 150 miles between the '50s and '60s — doesn't mean the city hasn't continued to reinvest in the system.

"What you're seeing is the age of the original construction, which reflects the development pattern of the community," he said. "We reinvest in the system as we see the need for it, but yes, there are limited dollars for capital reinvestment."

Hupy said everyone would like to have more money to work with, and the city has had to be judicious with its maintenance dollars.

"It's definitely something you have to watch," he said. "You have to look at the backup history and the maintenance history of each pipe, and as you look at that and gather that data, that tells you when the pipe needs to be replaced."

Hieftje said it seemed evident when he took office in 2000 that the city was behind on investing in infrastructure.

He said the city is doing its best to catch up, but dollars are limited and the city has had to prioritize

doing a complete rebuild of half the city's wastewater treatment plant, which dates back to the 1930s. At a cost of about $120 million, that's considered one the biggest capital improvement projects in the city's history.

Due to the aging and deteriorating facilities, the city is undertaking the project to ensure long-term treatment capacity and reliability. Construction already started and is expected to take place over the course of five fiscal years.

Hieftje said the age and condition of the city's underground pipes also remains a concern and has been a concern for a long time.

"It's also a concern that I think is rampant across the state and across the country," he said. "I know there are cities all over the place with very old pipes."

'Something we have to think about'

Hieftje said the city has tried to keep its water and sewer rates in line with other peer communities, and Ann Arbor's annual rate increases in the 3 to 4 percent range have been lower than rate increases seen in other cities.

Without larger utility rate increases, which the city wanted to avoid during the recession, Hieftje said, it's difficult to do any more reinvestment in the water and sewer systems than the city is doing right now.

"I think we've been doing everything that can be done," he said. "Obviously, all the money we are getting to put into this is going into it."

But now that the economy is rebounding, Hieftje said, it might be time to look at adjusting utility rates further upward to raise more revenue for reinvestment in the system. He expects to have that discussion during budget talks next spring.

"We try to do our best to keep costs down for residents," he said. "There may have to be another percent or so increase added on. It's something we have to think about."

Ryan Stanton covers Ann Arbor city hall for The Ann Arbor News. Reach him at ryanstanton@mlive.com or 734-623-2529 or follow him on Twitter.

Around the Great Lakes

Environmental Health News
Published by Environmental Health Sciences

Only half of drugs, other newly emerging contaminants removed from sewage

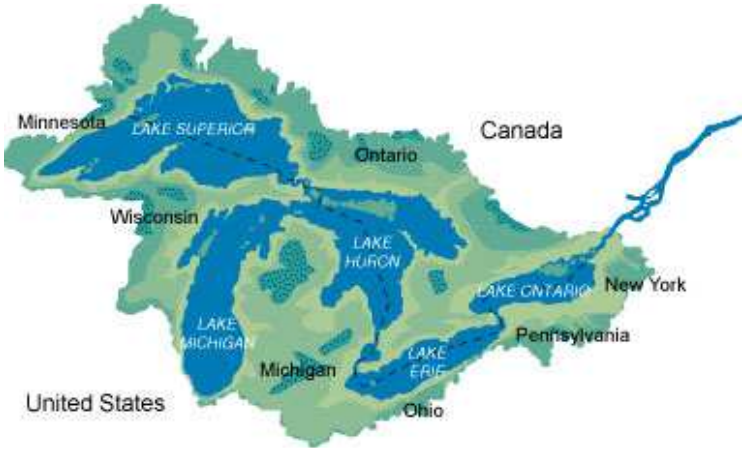
By Brian Bienkowski
Staff Writer
Environmental Health News

November 22, 2013

Only about half of the prescription drugs and other newly emerging contaminants in sewage are removed by treatment plants.

That's the finding of a new report by the International Joint Commission, a consortium of officials from the United States and Canada who study the Great Lakes.

The impact of most of these "chemicals of emerging concern" on the health of people and aquatic life remains unclear. Nevertheless, the commission report concludes that better water treatment is needed.



US EPA

"The compounds show up in low levels – parts per billion or parts per trillion – but aquatic life and humans aren't exposed to just one at a time, but a whole mix," said Antonette Arvai, physical scientist at the International Joint Commission and the lead author

of the study. “We need to find which of these chemicals might hurt us.”

More than 1,400 wastewater treatment plants in the United States and Canada discharge 4.8 billion gallons of treated effluent into the Great Lakes basin every day, according to the study.

The scientists reviewed 10 years of data from wastewater treatment plants worldwide to see how well they removed 42 compounds that are increasingly showing up in the Great Lakes.

Six chemicals were detected frequently and had a low rate of removal in treated effluent; an herbicide, an anti-seizure drug, two antibiotic drugs, an antibacterial drug and an anti-inflammatory drug.

“We need to find which of these chemicals might hurt us.” *–Antonette Arvai, International Joint Commission* Caffeine, acetaminophen and estriol (a natural estrogen) also were frequently detected in sewage but had high removal rates.

The wastewater plants had a low removal rate (less than 25 percent chance of removing 75 percent or more) for 11 of the 42 chemicals.

“The weight of evidence suggests that at least half of the 42 substances examined in the present study are likely to be removed in municipal wastewater treatment plants,” the authors wrote.

Previous research has linked other drugs in fish to slower reaction times to predators, altered eating habits and anxiety.

High detection/Low removal:
Carbamazepine (anti-seizure drug)
Ciprofloxacin (antibiotic)
Clofibric acid (herbicide)
Diclofenac (anti-inflammatory drug)
Erythromycin (antibiotic)
Trimethoprim (antibacterial drug)

Triclosan, an antibacterial and antifungal compound found in some soaps, toothpastes and other consumer products, has proven acutely toxic to algae and can act as a hormone disruptor in fish. Triclosan was found frequently, according to the new report and plants had “medium removal efficiency.”

Also, the anti-inflammatory drug diclofenac bioaccumulates in fish, but its impact is unclear, said Diana Aga, a chemistry professor and researcher at the University of Buffalo who studies emerging chemicals in the Great Lakes.

Aga said even without knowing exact impacts, consistently seeing antibiotics show up in effluent is concerning.

“Even at low levels you don’t want to have people ingest antibiotics regularly because it will promote resistance,” she said.

“Even at low levels you don’t want to have people ingest antibiotics regularly because it will promote resistance.” *–Diana Aga, University of Buffalo*

Chemicals’ showing up in wastewater effluent doesn’t necessarily mean they will be found in drinking water. But some studies have found prescription drugs in drinking water at parts-per-trillion levels. A federal study of 74 waterways used for drinking water in 25 states found 53 had traces of one or more pharmaceuticals.

There are currently no federal regulations of pharmaceuticals in waste or drinking water. However, 12 pharmaceuticals are currently on the Environmental Protection Agency’s list of chemicals under consideration for drinking water standards.

Most researchers expected that the large lakes would dilute pharmaceuticals quickly, but a study this summer found the drugs contaminating Lake Michigan two miles from Milwaukee sewage outfalls.

It’s important to not place blame squarely on wastewater treatment plants, said Michael Murray, a scientist with the National Wildlife Federation’s Great Lakes Regional Center who is on the IJC’s board.

“They weren’t designed to handle these types of chemicals,” Murray said. “And most municipalities in the Great Lakes are under tight budgets and they’re just doing what they can to meet requirements.

Most plants use activated sludge treatment, which uses bacteria to break down solids that come in from the

wastewater. Since the chemicals come into the plants at such low levels, many of them readily break down, said Allison Fore, a spokesperson for the Metropolitan Water Reclamation District of Greater Chicago.

Other newer technologies, such as ozonation or carbon filters, also are effective at removing pharmaceuticals and other new chemicals but are expensive, Arvai said.

Ohio

Ohio seeks limits on phosphorus in streams

By Spencer Hunt

The Columbus Dispatch Monday October 14, 2013 3:16 AM

Ohio could become one of three states to establish limits for farm and sewage-treatment-plant pollution that feeds toxic algae in lakes.

An Ohio Environmental Protection Agency proposal under review by federal officials would establish limits for phosphorus and nitrogen in streams. Both are found in fertilizers, manure and sewage. They're called nutrients because they help plants, including algae, grow.

Phosphorus in fertilizers that rain washes off farm fields feeds blooms of blue-green algae in western Lake Erie and inland lakes across Ohio each summer. The algae produce liver and nerve toxins that can sicken people and animals.

Ohio rivers also carry nutrients to the Gulf of Mexico, where they contribute to a huge oxygen-depleted dead zone off the mouth of the Mississippi River.

Ohio EPA Director Scott Nally said he is optimistic that U.S. EPA officials will approve the proposal, which would be used to set specific limits for each Ohio stream.

Because of the partial government shutdown, federal officials were unavailable to comment. Approval would put Ohio on a path to join Florida and Wisconsin as the only other states setting limits for phosphorus and nitrogen in waterways.

Florida adopted its standards in 2011 after environmental advocates sued the U.S. EPA to demand them. Wisconsin set phosphorus limits in 2010 after environmental groups threatened to sue, said Amanda Minks, a Wisconsin Department of Natural Resources resource specialist.

Wisconsin rivers cannot have phosphorus levels that exceed a concentration of 100 parts per billion. Phosphorus in smaller streams, including creeks, can't exceed 75 parts per billion.

Minks said Wisconsin is enforcing tougher water-pollution restrictions for sewage-treatment plants and is offering farmers grants and incentives to reduce storm runoff from their fields.

Instead of an across-the-board approach like Wisconsin's, Ohio's plan would use a formula that weighs phosphorus and nitrogen in water as well as the amount of algae and fish and other aquatic wildlife. The strategy takes into account that some streams can still be considered healthy at higher concentrations of nutrients, Nally said. "It's not a one-size-fits-all approach."

Groups that represent Ohio's sewage-treatment plants support the plan. Dax Blake, who is Columbus' sewers and drains administrator and president of the Association of Ohio Wastewater Management Agencies, said it's a sound approach.

Blake said he is optimistic that Columbus won't have to install any treatment equipment to meet phosphorus or nitrogen standards for the Scioto River.

Larry Antosch, the Ohio Farm Bureau Federation's environmental-policy director, said his organization needs more details on how the limits might affect farmers.

"It doesn't make a lot of sense to establish a (limit) so low that it's not attainable," Antosch said.

Anthony Sasson of the Ohio Nature Conservancy said the U.S. EPA might not approve of the Ohio EPA's tailored approach. He said streams with higher concentrations of phosphorus might be deemed healthy but still contribute to algae blooms in a lake downstream.

But Ohio EPA spokesman Chris Abbruzzese said the stream limits will help the state's overall efforts to stop algae blooms in lakes. "It's a positive step in the right direction."

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Decades of work and a federal decree -- and still sewage and wastewater pollute the Mill Creek

Elissa Yancey, WCPO Contributing Environmental Editor

Nov 17, 2013

CINCINNATI -- Cincinnati area sewers get scary when it rains.

Think of everything that goes down your drain—in addition to the waste that gets flushed down toilets, there's unused medicines, kitchen grease, food scraps and even goldfish. All that, plus street litter, debris, road salt, car and truck oils and industry runoff can flood Hamilton County's aging sewer pipes when it rains.

That leads to one of two outcomes: Raw sewage backing up in basements or overflows into the Mill Creek and Ohio River -- the source of the regions drinking water.

Just how much of that sometimes-soupy, gaseous-smelling bouillabaisse of overflow?

Conservatively, 11 billion gallons. That's how much sewage and storm water breaches the local system and flows into the 28-mile Mill Creek annually, according to the Metropolitan Sewer District of Greater Cincinnati (MSDGC).

One billion gallons of water, the amount released every year from the city's biggest single overflow pipe in South Fairmount, would fill Paul Brown Stadium from field to rim.

Then from field to rim again. And again.

And again, for a total of four very smelly football stadiums, according to MSDGC estimates. And that's just one pipe.

Combined Sewers Built To Overflow

The overflow problem is as old as the city itself. Much of the city's household plumbing still connects with street and industrial sewage because our system of pipes and drains was built when the city was -- in the 1800s.

Like sewer systems around the country in other older cities—from New York to Chicago—Cincinnati's pipes were designed to get rid of human and industrial waste as quickly as possible. Here, they wound up mixed together in bigger pipes that opened into the Mill Creek, the Ohio River and other tributaries, leading to decades of the kind of water quality that earned the Mill Creek the most endangered urban river title in 1997.

Decades after the Clean Water Act was enacted, and a decade after the Environmental Protection Agency filed civil suits against the City and Hamilton County to clean up our waterways, Hamilton County still has 212 Combined Sewer Overflows (CSOs). Most of them empty into the Mill Creek.

And when it rains, they can pour.

Getting sewer water out of waterways is a major goal of the plans the City, county and a host of community groups and consultants have developed to update the system and meet federal requirements. Dubbed Project Groundwork,

it's a long, and expensive, process.

Paying The Piper

With a cost of more than $3 billion, Project Groundwork includes a variety of efforts to limit sewer overflows, about 25 percent consist of sanitary waste. Those plans include building holding tanks to store excess run-off, known as a grey water solutions, as well as more innovative approaches.

The Ault Park stream restoration, for example, cost just more than $3 million to eliminate about 17 million gallons of overflow into Duck Creek every year.

And the highest profile green solution effort so far, Lick Run will cost more than $120 million and divert more than 620 million gallons of overflow annually, about half of the current amount.

As in other cities around the country, property owners pay the vast majority of sewer updating costs. Since 2006, Cincinnati's sewer rates have climbed more than 76 percent, costing property owners, on average, more than $700 a year in 2012 versus about $400 a year in 2006, according to figures provided by the Metropolitan Sewer District.

And those numbers are likely to keep rising.

But there are other sewer-related costs every year that may not be as big, but are certainly as messy. In 2012,

Cincinnati spent $3.6 million on its "Water in Basement" program, which includes both prevention and clean-up costs when sewage backs up into homes.

All the costs of dirty water don't come with dollar signs, though. Untreated waste, pesticides and pharmaceuticals that flow out of the sewer system carry steep environmental costs along with them.

They endanger the catfish, carp and Blue Herons—not to mention kids who play and fish—along the Mill Creek. "We are embarking on one of the largest public works projects in Hamilton County's 200-plus year history," said Tony Parrott, MSD's executive director, via email. "We are doing everything we can to reduce the financial impact on our ratepayers as we work to make our communities cleaner and healthier."

With sewer projects scheduled to continue for more than another decade, questions remain about how long sewer rates will continue to climb, and by how much. Parrott, though, framed the costs as investments, not burdens.

"It's important to remember that investing in our sewer system not only improves the quality of our lives through cleaner streams and improved public health protection, it also creates jobs . . . .which can help strengthen our local economy."

BIOSOLIDS
An Effort in Fertility

Illinois

From Waste to Resource Recovery

By Neda Simeonova

September 17, 2013

Stickney WRP to upgrade solids removal process, develop a phosphorus recovery system

Owned and operated by the Metropolitan Water Reclamation District of Greater Chicago (MWRD), Stickney Water Reclamation Plant (WRP)—the largest wastewater treatment facility in the world—is subject to continuous rehabilitation and upgrading. Situated on 413 acres, Stickney WRP serves 2.38 million people in a 260-sq-mile area, including the central part of Chicago and 43 suburban communities, processing 1.4 billion gal of wastewater per day.

"Stickney actually consists of two plants: The west side portion of the plant was placed into service in 1930 and the southwest portion of the plant was placed into service in 1939," said Kathleen Meany, board president of MWRD.

Over the course of its service, Stickney WRP has undergone significant improvements to ensure safe and uninterrupted operation.

Solid Improvements

Currently, the solids removal process at Stickney WRP is undergoing a major upgrade, according to MWRD Executive Director David St. Pierre.

"The primary sludge and waste-activated sludge streams, which are currently combined, are being separated for more efficient thickening prior to digestion. Primary sludge will be thickened in a new facility that houses eight 80-ft-diameter gravity concentration tanks with a biofilter for odor control. Waste-activated sludge will be thickened in 16 new high-tech centrifuges that have nearly three

times the throughput and require half of the power draw as the centrifuges being replaced," St. Pierre said.

New raw sewage and sludge screens will remove inorganic debris, protecting downstream equipment and improving the quality of the final biosolids product. These upgrades will reduce solids carryover in the recycle streams, thicken solids with greater operational and energy efficiency, and improve feeding operations to the anaerobic digesters.

Path to Resource Recovery

Charged with ensuring compliance, MWRD also is working to transform Stickney WRP from a waste facility into a resource recovery facility.

"As part of our initiative to reduce phosphorus loads to the Illinois River basin and to comply with future NPDES permits, MWRD began a preliminary investigation in October 2011 and began pilot testing the enhanced biological phosphorus removal process in one battery at the Stickney WRP in May 2012," St. Pierre said.

The pilot test process has operated with remarkable stability, showing that lower phosphorus and total nitrogen concentrations have been achieved in the effluent while maintaining nitrification.

This year, MWRD awarded a contract to Black & Veatch/Ostara to develop a phosphorus recovery system at Stickney WRP.

"We anticipate being able to recover about 1,300 tons per year of phosphorus at the Stickney WRP and convert it into a slow-release fertilizer that is a marketable product," St. Pierre said.

MWRD also has set the ambitious goal of becoming energy-neutral in the next 10 years. In order to accomplish this, the district is studying process changes and conservation measures that will reduce energy consumption, while implementing new technologies to produce energy on site.

For example, the biogas produced by the anaerobic digesters is used to produce steam for heating at Stickney WRP and provides about 31% of MWRD's energy needs. The district currently is studying ways to increase biogas production and alternative uses of the biogas. The district also is studying other ways to generate renewable energy, including thermal energy recovery from the heat present in the wastewater itself.

"Through these initiatives, the Stickney WRP could become one of the largest eco-recovery centers in the world," St. Pierre said.

Funding & Support

Major MWRD capital infrastructure projects are funded through long-term debt via the Capital Improvement Bond Fund, federal and state grants, and state revolving fund (SRF) loans.

"MWRD projects have received significant support from state and regional leadership as the U.S. Environmental Protection Agency (EPA), Illinois Gov. Pat Quinn, Chicago Mayor Rahm Emanuel and MWRD have been working together to reduce untreated storm water overflows into the waterways," Meany said.

In 2012, MWRD was awarded $10 million through the Illinois Jobs Now! capital program, which supplemented the $21 million in engineering and design costs needed to move MWRD's disinfection facilities forward.

"The governor also directed Illinois EPA and Illinois Finance Authority to expand the SRF program as part of the Illinois Clean Water Initiative," Meany said. "Last spring, the governor ear-marked $250 million in low-interest SRF loans for MWRD to move forward with projects crucial for improving the water environment and protecting public health."

Neda Simeonova is editorial director of Water & Wastes Digest. Simeonova can be reached at ***nsimeonova@sgcmail.com*** *or 847.391.1011.*

Michigan Biosolids Team

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Indiana

Hammond vows to appeal ruling forcing it to honor sewage deals

BY MICHELLE L. QUINN Post-Tribune correspondent January 8, 2014

Updated: January 9, 2014 2:00AM

The Hammond Sanitary District will have to honor wastewater treatment contracts with the three towns whose contracts it and the City of Hammond threatened to cancel.

Hammond Mayor Tom McDermott Jr. said in a release issued Wednesday that the city will appeal Lake Superior Court Judge John Sedia's ruling that McDermott and Hammond Sanitary District had no authority to cancel the contracts between it and the Towns of Highland and Griffith, and the City of Whiting. As well, the city will continue to seek to cancel or otherwise modify the contracts that, McDermott says, "unfairly benefit Whiting, Griffith and Highland ratepayers at the expense of the ratepayers in Munster and Hammond."

"As the court has ordered, we will adhere to the contracts pending our appeal," McDermott said. "In doing so, we will strictly perform our contractual obligations; including with respect to excess wastewater flow coming from those communities. The current flow amounts are unrealistic, compared to the actual flows sent by these communities to the Hammond Sanitary District. These unrealistic flow amounts, coupled with the outdated financial formulas used to calculate rates, were two of the reasons we sought to cancel these contracts.

"We simply will not permit the basements of Hammond and Munster residents to become a repository for excessive wastewater from Whiting, Griffith and Highland."

Town of Griffith Vice President Rick Ryfa, R-3, called Sedia's ruling "fantastic" but cautioned it's only a short-term solution. Since Griffith's contract with Hammond Sanitary District is up in 2018, the two entities need to start negotiating as soon as possible.

"While this is nice, it doesn't solve the problem of Hammond's promises of dramatic rate increases," Ryfa said. "We will continue to look at every possible alternative and solution for our residents."

Attorneys for Griffith and Whiting filed complaints in Lake Superior Court in September, calling Hammond's cancellation of the contracts "patently unfair, illegal and outrageous" and that Hammond should be required to abide by the terms.

Whiting, according to Hammond Sanitary District, pays 94 cents per 1,000 gallons to the district while charging its residents $3.50 per 1,000 gallons; while Griffith pays $1.38 per 1,000 gallons while charging its residents nearly $4.50 per 1,000 gallons.

Hammond had also originally threatened to no longer allow new sewer line connections from Whiting but later backed down on the issue, calling it "an item of discussion." Nevertheless, on Aug. 27, the Hammond Sanitary District Board of Commissioners passed a resolution canceling the contracts with Whiting, Griffith and Highland.

McDermott said at the time that Indiana law absolutely allows for governmental units such as the sanitary district to cancel contracts if it can be proved the contracts are no longer financially feasible.

The City of Hammond is facing a $77 million mandate to build a stormwater overflow catch on the Grand Calumet River. Up to this point, McDermott said, Hammond and Munster have been paying the lion's share of that cost, at around $2.50 per 1,000 gallons.

National

Model of Sustainability

By Jason Diamond & R. Dale Richwine

September 17, 2013

Facility expands its conventional activated sludge system with MBR to meet demands

In the upper northwest corner of **Oregon, Clackamas County** is surrounded by frontier wilderness and scenic beauty—it is home to the end of the Oregon Trail, the soaring peaks of Mt. Hood, the largest waterfall in the Pacific Northwest (Willamette Falls) and some of the country's most renowned fishing holes on the Willamette River. Protecting the natural environment and the health of its communities were principal priorities of the county's Tri-City Water Pollution Control Plant's (WPCP) expansion project.

Earlier this decade, rapid growth, tighter regulations and aging infrastructure significantly strained Clackamas County's wastewater systems. The over-capacity Kellogg Creek WPCP was leasing capacity from the Tri-City plant, which was also nearing its operational limits. District planners focused efforts to expand the Tri-City WPCP's conventional activated sludge system with new treatment technology designed to meet the current and future demands of both districts.

To increase capacity at the Tri-City WPCP, located in the Portland suburb of Oregon City, a membrane bioreactor (MBR) was brought online in February 2011 in parallel to the existing conventional system. The project is a success story of many facets, but perhaps the most significant is the collaborative effort of the community and contractors working together, merging old and new technologies.

Voice of the People

The two-year, $90-million construction project commenced after six years of public discussion. Following several public surveys, countless community meetings and input from two advisory committees, it was clear that sustainability—social, environmental and economic—was paramount.

Not only did the plant expansion need to fit within a small footprint—the property is confined by the Clackamas River to the north, Clackamette Cove to the west, a landfill to the south and a major freeway to the east—but it also needed to enhance the neighborhood. With a multimillion-dollar residential development planned nearby, it was critical that the facility looks attractive.

To the citizens of Clackamas County, the most important elements of the project were open space for public access, links to trails and protection of the region's water quality. The end result offered these advantages and more, including living roofs and interactive exhibits in and around the facility.

The MBR Solution

Advanced MBR treatment technology answered the challenges of the Tri-City WPCP project, including limited space, odor control, and new and stringent discharge and reuse limits. Working in parallel with the plant's existing conventional activated sludge facility, GE's ZeeWeed 500 MBR was utilized, resulting in clean, high-quality effluent that meets the state of Oregon's Class A reuse standards. Untreated water is split between the two systems, which work together to meet a 10 biological oxygen demand/10 total suspended solids effluent, improving overall plant effluent quality while also providing a source of reuse water for the surrounding area.

The Tri-City WPCP's new MBR process is completely enclosed, offering an aesthetically pleasing commercial look

that also shields the old plant from the surrounding new residential development. The MBR technology's reduced footprint eliminated the need to construct future facilities in the landfill and provided maximum open space for public recreation—a benefit that will extend into the future as the facility further expands to its ultimate plant capacity of 30 million gal per day (mgd). Additionally, the compact components of the membrane technology minimize the size of the structures, so potential odors can be contained, collected and treated.

Unexpected Value

The Tri-City WPCP is the Northwest's largest MBR treatment system running parallel with a conventional treatment system. Expectations for the project's success were met: compact design, reduced land and construction expenses, enhanced operational efficiency, mitigated noise and odors, and high-quality effluent. It is what was not expected, however, that provided even more value.

Since the addition of the MBR, increased nitrification has been observed from the conventional system, which was a non-nitrifying facility that is now removing more than 60% of ammonia nitrogen from the wastewater at two- to three-day sludge retention times (SRTs)—an important realization given ever more stringent ammonia discharge regulations. The combined effluent of the MBR and conventional system is achieving more than 75% ammonia removal. With a future anticipated effluent ammonia limit for the facility, this enhanced performance eliminated the need for a diffuser modification, avoiding an estimated additional $3 million in capital costs that would have been required to upgrade the existing diffuser.

After a detailed evaluation of the processes, it was determined that the filtrate from the gravity belt thickeners thickening the waste sludge from the MBR system contains nitrifying bacteria that is recycled to the conventional treatment process. There is enough nitrifying bacteria in the filtrate to seed the conventional system with a continuous source of nitrifiers, allowing partial nitrification at extremely short SRTs.

Weathering the Storm

The parallel operation of the conventional activated sludge system and the MBR also is ideal in high-flow situations, a benefit tested annually during the Northwest's wet season. The combined facilities received their first extended exposure to high rain flows in January 2012, requiring the MBR system to perform beyond expectations by sustaining the design peak hour flow of 10 mgd for more than five days, taking a lot of burden off the conventional system. The MBR system successfully processed flows beyond the design, significantly reducing stress on the conventional system without detriment to the membranes. Both of the plant's treatment trains maintained operation and met all effluent requirements during this extreme high-flow event.

Long-Term Solution

The upgraded Tri-City WPCP is a model for sustainable storm water management and treatment. Any rain that falls on the plant site is contained. More than 20,000 sq ft of green roof help curtail rainwater runoff in combination with storage under the pervious and impervious streets and a storm water retention and infiltration basin. No rainwater has left the site since the system began operation, even when the facility experienced a five-day/24-hour storm event.

One of the county's most successful and highly regarded capital improvement projects, the Tri-City WPCP expansion not only received praise from the public, but also from environmental and water industry award programs. It is a focal point of the community, enhancing the area's natural beauty while protecting land values and paving the way for future development throughout Clackamas County. The MBR facility also provides Clackamas County Water Environment Services with a safeguard against future, more stringent water quality regulation while providing the ability to treat increased wastewater flows through phased

expansions with the addition of more MBR tanks to meet the long-term growth needs of the county.

Jason Diamond, P.E., is wastewater process manager of operations, Water & Process Technologies, for GE Power & Water. Diamond can be reached at ***jason.diamond@ge.com*** *or 905.465.3030. R. Dale Richwine, P.E., is president of Richwine Environmental Inc. Richwine can be reached at* ***daler@richenv.com*** *or 503.858.5153.*

Optimized Dewatering

By Steve Hettinger

September 17, 2013

In-line polymer preparation & feed boosts dewatering performance at Colorado WWTP

Optimizing polymer preparation and feed through an enhanced mixing regime has significantly improved the biosolids management program at the city of Greeley, Colo., Water Pollution Control Facility. Switching from conventional batch mixing to an in-line polymer preparation and feed system also has reduced annual polymer expenditures by approximately $12,000.

Operations Overview

Processes for the 14.7-million-gal-per-day (mgd) advanced secondary wastewater treatment plant (WWTP) include primary clarification; activated sludge with fine-bubble diffused aeration and nitrification and denitrification capabilities; secondary clarification; anaerobic digesters with floating covers; thickening and dewatering centrifuges; full SCADA monitoring and control of treatment processes and equipment; and an ultraviolet disinfection system.

A portion of the sludge that settles out in the activated sludge process is returned to the aeration basins. The remaining waste-activated sludge is sent to a thickening centrifuge, where it is thickened to approximately 6% total solids and then pumped to the primary digesters for further processing into biosolids.

In the primary digesters, microorganisms consume about 60% of the sludge and also produce the methane gas that is used to heat the digesters to 98°F and generate heat for the facility's buildings. Primary digester solids are sent to two 500,000-gal holding tanks until processed through a dewatering centrifuge. Biosolids average 2% total dry solids prior to dewatering operations.

The plant dewaters approximately 60,000 to 70,000 gal of sludge per day, four days a week, through a high-speed (about 6,000 rpm) centrifuge, then stores it in a large hopper until it is transported to agricultural sites for beneficial use.

In 2010, the plant's dry solids recovery suddenly dropped and polymer usage skyrocketed. At one point, the plant was using as much as 80 lb of polymer per dry ton while struggling to make 14% to 17% dry solids.

Plant personnel investigated all processes related to the dewatering and solids operation, including the polymer preparation unit. The plant had been using a conventional polymer makedown system comprising two 500-plus-gal tanks that would transfer in liquid coagulant polymer and water simultaneously. Once the required levels in the tanks were achieved, operators then would initiate mixing using a large high-speed mixer.

Using the plant's house-made batch system, one batch was made at a time and aged for a half-hour before being fed into the process with a progressive cavity pump. The plant had been using that system successfully until 2010.

Optimizing Polymer Feed

In polymer preparation, the first moment of initial wetting of polymer with water is most critical because of the high tendency to form large aggregates of polymers ("fish eyes"). Employing high shear for a short time period is required to prevent fish eye formation at this stage.

Once successful initial wetting is achieved, individual polymer molecules gradually dissolve into a homogeneous solution; however, the extended or fully dissolved polymer solution is susceptible to any high shear. Because the polymer chain consists of weak carbon-carbon bonds, a considerable amount of polymer

chains may be broken easily during the activation process when the extended polymer molecules remain in the high-shear environment.

This was determined to be the likely reason for the poor dewatering performance at the Greeley facility. The original freestanding polymer batch mix tank equipped with impellers induced high shear that was fracturing the extending polymer chains, thereby resulting in inadequate flocculation and requiring excessive polymer use to dewater sludge.

Performance Trials

To find a way to alleviate the problem, Greeley plant management decided to conduct performance trials for two different polymer blending designs and compare the results with the plant's original makedown system.

Based on the results of the performance trials, the city elected to install a ProMinent ProMix M system because of the drier cake produced and lower amount of polymer consumed during the three-week trial period. The ProMix M system arrived at the WWTP fully assembled; all that was needed to put it into service was a 10-AWG extension cord. A garden hose was used as a water source during the trial period. Once sufficient flow was determined based on the polymer percent makedown, the plant began dewatering sludge using the polymer prepared by the ProMinent unit. The unit was permanently mounted with hard piping in May 2012.

The new system provides a multi-zone mixing chamber that delivers a tapered energy profile for proper polymer activation. This engineered profile effectively hydrates and mixes the polymer to a homogenous and fully activated solution, providing gentle agitation in the mixing tank to allow for the full extension of polymer chain molecules.

The new system also provides an LCD (including primary and secondary flow display) with touchpad control, remote start/stop and programmable auto-flush, and the unit maintains desired concentration based on primary and secondary dilution water flow.

The plant is now back to using 30 to 35 lb of polymer per ton of sludge. Cake solids also are up and consistently average around 19%.

This calculates to approximately $12,000 in annual savings in polymer use alone. Plus, the lower final sludge water content has greatly reduced the costs to transport biosolids to the field, where they are applied to local dry-land wheat farms by a private firm.

Because better activation results in less polymer needed to do an equal job, the ProMix M system has paid for itself by making full use of the chemical being fed.

Steve Hettinger is plant supervisor for the Greeley (Colo.) Water Pollution Control Facility. Hettinger can be reached at ***steve.hettinger@greeleygov.com****.*

Calendar of Events

MBT Meetings
2014

February 13, 2014, 10:00 a.m.
Delta Township WWTP, Lansing, MI

April 17, 2014, 10:00 a.m.
Wyoming CWP, Wyoming, MI

June 19, 2014, 10:00 a.m.
Manistee WWTP, Manistee, MI

July 24, 2014, 10:00 a.m.
Biosolids Tent @ MSU Agricultural Expo
E. Lansing, Mi

September 18, 2014, 10:00 a.m.
Carl Johnson Wildlife Center, Cadillac, MI

December 11, 2014, 10:00 a.m.
Frankenmuth, MI (Holiday Party)

MBT Annual Biosolids Conference

March 11-12, 2014
Holiday Inn, Big Rapids, MI

MBT Display Events

MWEA/AWWA Joint Exposition
February 4-5, 2014
Lansing Center, Lansing, MI
MSU Agricultural Exposition
July 22-24, 2014
Michigan State University, E. Lansing, MI