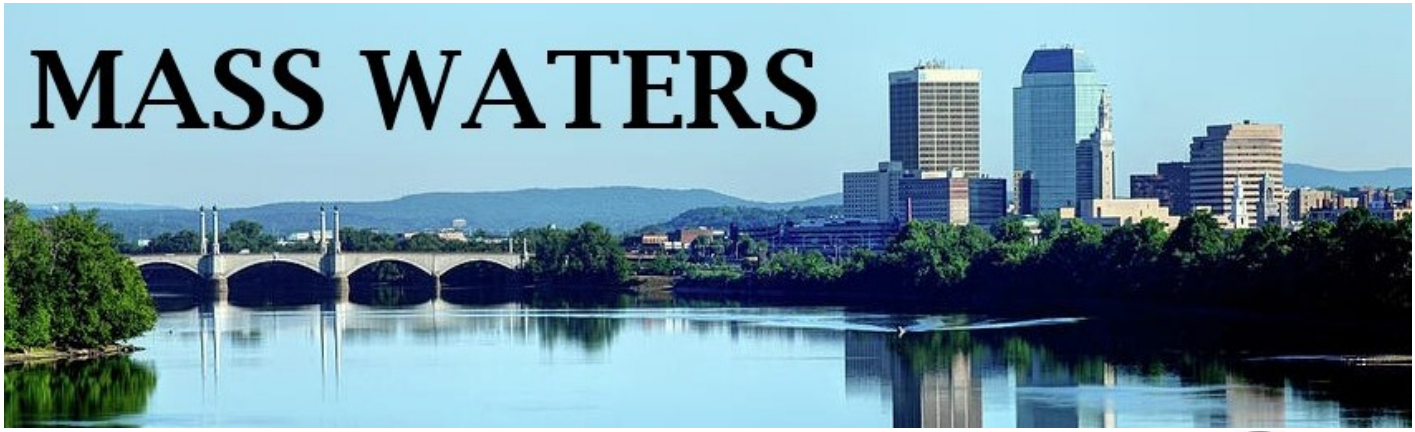
The Newsletter of the Massachusetts Water Environment Association

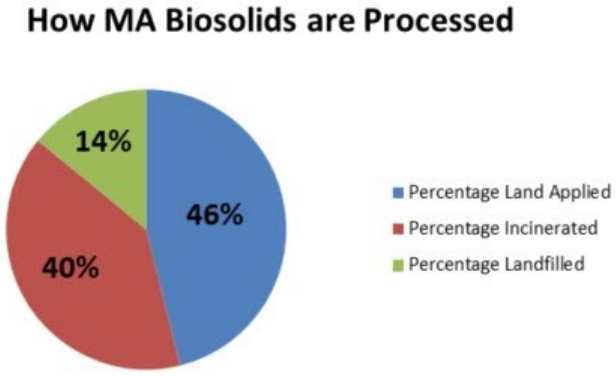


Where Do Our Biosolids Go To?

By Mickey Nowak

Massachusetts wastewater treatment facilities produce approximately 180,800 dry tons of biosolids yearly. That data comes from the 2018 Biosolids Survey and Report by North East Biosolids and Residuals Association (NEBRA) for the Massachusetts Clean Energy Center. When looking at the data submitted by Massachusetts wastewater treatment facilities in the US EPA's Annual Biosolids Report for 2022 (contains 2021 data) MAWEA calculates 164,187 dry tons from the 80 largest treatment facilities in the State. Data from facilities with flows of less than 1 MGD are exempt from reporting so both the NEBRA and MAWEA data when equalized for that factor appear very close. So we're producing these biosolids yearly but how are they processed and where do they go? If you looks through the US EPA Annual Biosolids submissions these questions can be answered. I know that filing these annual US EPA Biosolds reports are problematic. They ask for testing data that is not readily available to wastewater facilities causing an overuse of data submitted as Other Management Practice when it is actually Incineration or Land Application but that can be the subject of and entirely different article. You have to dig a little deeper in the submissions but you can answer how the biosolids are processed and where they go to.

Let's start on how Massachusetts biosolids are processed.



You can see that land application and incineration are the dominant legs of the three legged stool of the biosolids disposal. Don't forget that land application is the disposal route of Massachusetts largest wastewater facility—MWRA Deer Island as well as the Greater Lawrence Sanitary District.

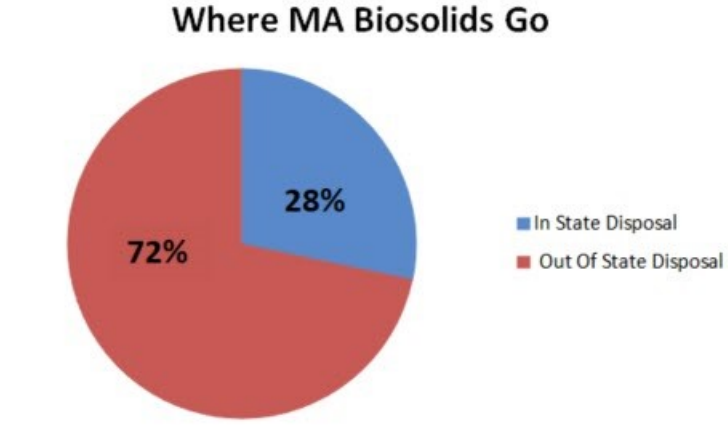
MA Biosolids ... (continued on page 2)

Inside This Issue

MA Biosolids ... (continued from page 1)

Incinerator facilities used by Massachusetts facilities include Upper Blackstone, Lynn, Naugatuck, Hartford, Waterbury, Cranston and Woonsocket. These facilities processed 61,579 dry tons of biosolids. Land application sites are spread throughout the Northeast and the total land applied is 71,332 dry tons. Lastly, landfills which include monofills and municipal solid waste take 21,743 dry tons.

All three legs of the management/recycle/disposal stool are under attack from various environmental advocacy groups about the PFAS issue. Most of these groups have an entirely unrealistic and unscientific goal of a PFAS concentration of zero that they are promoting to the public. PFAS chemicals are so prevalent in our daily lives that it's impossible to have a level of zero in biosolids. Wide spread testing of PFAS in wastewater and biosolids is just beginning (there is still no approved EPA testing method). A US EPA or MA DEP limit is years away and in the meantime we must have management/recycle/disposal options.



Where Massachusetts biosolids go is interesting. 72 percent of biosolids go out of state to to OH, PA, NC, FL, NJ, NY, AL, IN, VA, RI, CT, ME, NH and Quebec. As states become more "territorial" with their biosolids as Maine has done by eliminating land application and directing facilities to the Maine landfills, Massachusetts may find out of state options dwindling. There need to be more in state options but that is doubtful as landfills are unable to expand and incinerators and any new technology such as pyrolysis are impossible to site.

In the meantime costs for facilities continue to skyrocket. The Westfield wastewater facility recently paid $389 per wet ton to dispose of their biosolids while their normal disposal option, the Naugatuck CT incinerator was down for maintenance. The biosolids were trucked to New Jersey and then sent by train to landfills in Alabama and Georgia. The Haverhill wastewater facility recently rebid their disposal contract at $175 per wet ton and the next lowest bid was $244 per wet ton. Haverhills disposal costs have increase by $836,000 per year over the last 5 years. The Montague wastewater facility is paying $215 per wet ton and the biosolids are being trucked to Quebec.

These price increases are not sustainable in the long term and the Massachusetts DEP and Legislature must work with wastewater facilities to increase in-state disposal options and stabilize prices.

Assessing the Impact of Advanced Thermal Processing of Biosolids on PFAS: Industry Updates

John Ross, PE (MA), Brown and Caldwell; jross@brwncald.com

Background

As everyone in the municipal wastewater treatment community in Massachusetts is painfully aware, wastewater solids management costs have risen dramatically in the past few years. Public concern and regulatory uncertainty around per-and polyfluoroalkyl substances (PFAS) further constrict a solids market that was already facing shrinking landfill and incinerator capacity in recent years. Consequently, there is a growing interest in the use of advanced thermal processes to remove PFAS and reduce the mass of solids that need to be managed. Advanced thermal processes run the gambit from established (sewage sludge incineration or SSI), developing (pyrolysis and gasification), and embryonic (hydrothermal treatment), but all share a common means of treating PFAS via thermochemical decomposition. While there is currently a paucity of full-scale data on the fate of PFAS through advanced thermal processing systems with wastewater solids, past technology assessments and ongoing research indicate the technologies show promise as a means of controlling PFAS emissions to the environment.

Thermal Processing Fundamentals

While PFAS is resistant to all forms of degradation, at high temperatures they will break down (USEPA, 2020; Winchell et al., 2021). Early laboratory-scale work at the University of Dayton Research Institute (UDRI) showed that perfluorooctanesulfonic acid (PFOS) will combust at the same temperature range (600 - 900°C) that SSI, pyrolysis, and gasification operate at (Taylor & Yamada, 2003). While the UDRI study showed near complete PFOS removal (over 99.5%) at 600°C, several small combustion byproducts (C1 and C2 compounds) were detected. However, at higher temperatures (750 and 900°C) those byproducts were observed at much lower concentrations or not at all. This study, along with historical precedents set for combustion of halogenated contaminants, provides the underpinning for the general guidance commonly referenced in the industry stating that temperatures of more than 900°C are required for complete destruction of PFAS and decomposition products.

However, temperature is only part of the equation when considering thermal processing. When defining operating conditions, the thermal processing industry follows the three T's: time, temperature, and turbulence (or mixing). The UDRI study was conducted at conservative residence times (1 – 2 seconds) and combustion air mixing. Commercial scale SSI furnaces often operate with gas phase residence times of 6 – 10 sec and have additional reactive species in the feedstock; both features are likely to enhance PFAS destruction. Consequently, it is important to consider the 3 T's as a whole when assessing thermal treatment technologies and that full-scale emissions tests be performed to evaluate destruction at real-world conditions.

Technology Landscape

SSIs can be considered a thermal processing technology with a proven track record with over one hundred years of operational experience. SSIs process wastewater solids and PFAS in a single heated chamber maintained at high temperatures (typically 700 - 900°C) by combusting the feed solids and sometimes auxiliary fuel with ambient air. Common reactor types include fluidized bed and multiple hearth furnaces (FBFs and MHFs). See Figure 1 for a sketch of the two furnace configurations and key components. While FBFs are favored from an energy and emissions standpoint and operate with greater turbulence and residence times, MHFs can operate at higher temperatures, potentially up to 1,000°C. As of the last Northeast Biosolids and Residuals Association survey in 2018, just over half of New England's wastewater solids were managed via SSI.

Thermal Processing ... (continued on page 8)

50 Years of the Clean Water Act: A Reason to Celebrate

By Paul Hogan

The Clean Water Act (CWA- officially known as the *Federal Water Pollution Control Act Amendments of 1972*; the term Clean Water Act came with the 1977 amendments) is approaching its 50th birthday. How is one to celebrate and remember the journey that the CWA has been taken these past 50 years ? The Act had its origins in 1948 and has had numerous amendments to modify and expand its scope and reach. None of these actions was as broad and revolutionary as the 1972 amendments. The law was sponsored by Senator Edmund Muskie of Maine and had dedicated support from both the House and Senate agreeing to its contents on October 4, 1972. President Richard M. Nixon, a self-proclaimed supporter of environmental regulation, vetoed the amendment on October 17, 1972, citing that the estimated cost of the Act of twenty-four billion dollars was four times the amount he felt was acceptable. His veto was overturned the following day by both the Senate (52-12) and the House (247-23), and the 1972 amendments became law on October 18, 1972.

How did we get to that point in 1972? A look at the history of environmental and water pollution regulations up to that point will provide some insight. The first water related law was the *Rivers and Harbors Act of 1899*, in particular Section 13 known as the Refuse Act which prohibited without a valid permit the dumping of material and refuse into waters which would impede navigation. The law was under the purview of the U.S. Army Corps of Engineers and is still an independently viable law today. A few points to be made of the progress of environmental water laws in the first half of the 20th century: the country was transforming from an agricultural society to an industrial society, the population of the country was expanding, political and social factors played a huge role (and still do today) in the impact and importance of environmental regulations such as two world wars and a great depression. In 1924, the Oil Pollution Act was passed which prohibited the discharge of petroleum products into the nation's waters.

The first major water pollution law in almost fifty years was the 1948 *Federal Water Pollution Control Act* which recognized the growing pollution problems; however, it was very limited in scope and limited its jurisdiction to interstate waters. The 1948 Act provided some funding and left most of the work and authority to the states. Its enforcement and scope were limited and had no real authority to require reduction in wastewater discharges. The Act left much of the control of pollution to the state governments. Several amendments to the law were passed between 1956-1970 prior to the landmark 1972 revisions. In 1956, the act strengthened the federal enforcement authority (however it was rarely used) and provided some grants for construction of wastewater treatment facilities (WWTF). The 1961 Act increased the funding ($50,000,000 in 1961 to $100,000,000 in 1965) and applied its jurisdiction to all surface waters. The Water Quality Act of 1965 required states to develop water quality standards and created the Federal Water Pollution Control Administration. In 1966, the Clean Water Restoration Act provided increased federal funds for the construction of wastewater treatment facilities. It is interesting to note that two significant actions outside of amendments to the original Act addressed the problems and played a key role in water pollution history: Congress authorized seven Interstate Water Pollution Control Commissions in the mid-Atlantic and northeastern regions over the period of 1936-1971 (including The New England Interstate Water Pollution Control Commission in 1947). These commissions are still active today and have addressed problems for seventy-five plus years. Secondly, the U.S. Environmental Protection Agency (EPA) was formed in 1970 with the signing by President Nixon of the *Reorganization Plan no. 3* on July 9, 1970, and the installation of EPA's first administrator, William Ruckelshaus on December 4, 1970.

The 1972 amendments set as its objective "…to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The law set goals and policies to: 1. "…eliminate the discharge of pollutants into navigable waters by 1985"; 2. to make all waters "fishable and swimmable" by 1983; 3. discharge of toxic pollutants in toxic amounts be prohibited; 4. provide federal financial assistance to construct POTWs; 5. undertake area-wide a waste management planning process; 6. research and demonstration be made to develop technology to eliminate pollution The law did not cover agriculture stormwater runoff and return flows and did not have authority over groundwater. In addition, the 1972 Act did not specifically address stormwater which would be included in a future amendment in 1987.

Clean Water Act ... (continued on page 5)

Clean Water Act ... (continued from page 4)

Some of the main elements of the 1972 amendments included:

- Grants for the construction of wastewater treatment facilities
- Establishment of effluent standards for municipal and industrial discharges, mandating secondary treatment for municipal treatment plants and best practicable (BPT/BAT) treatment for industrial discharges and the establishment of effluent technology guidelines for numerous industrial categories
- Requirements for planning and waste load allocations for discharges and watersheds including the development of water quality standards by each state
- total maximum daily loads (TMDLs), water quality criteria development, thermal pollution controls and oil and hazardous waste liability were key parts of the "Standards and Enforcement" section
- Discharge permit requirements for any discharge to a surface water would be required under the NPDES permit program and that states would be required to certify that a federal permit met, at a minimum, their state requirements; states had the ability to assume the NPDES permit program (aka delegation); permits for disposal of dredge and fill materials were required and were to be administered by the U.S. Army Corps of Engineers

To address elements not contained in the 1972 act, various amendments have been implemented. Significant ones are: 1977 which addressed toxics, required BAT treatment for industrial sources, included wetlands protection and defined EPA's role in oil spills; in 1987, the Act set forth the stormwater permit program requirements for municipal and industrial sources, transitioned the construction grants program into a state revolving loan program overseen by the states, required numerical criteria for toxics, established the biosolids program and permitting requirements, established the non-point source program; and most recently, in 2020 the amendment proposed changes to the state 401 water quality certification requirements (this element is currently under litigation). Thus, it is apparent that some, but not many, major changes to the Act have occurred in the past thirty-five years.

The CWA has been the subject of numerous litigations since its inception. Initial focus was on the requirements for treatment and the industrial and stormwater elements of the law. For the past twenty years the focus of legal actions has seemed to focus more on the authority of the law, the extent to which its requirements cover, particularly related wetlands and intermittent streams. The CWA court actions have much in a way mirrored the way the Supreme Court of the United States (SCOTUS) have acted in their broader jurisdictions and decisions. A few cases of interest:

1975: Train vs. New York City: court ruled that President Nixon could not encumber funds authorized by Congress for elements of the 1972 Amendments; Nixon has done such did since the law was passed in 1972

2006: Rapanos v. U.S.: the case was a 4-1-4 split which Justice Scalia limiting the CWA jurisdiction to waters of the U.S. which were permanent streams; Justice Kennedy noted that jurisdiction applies if there is a "significant nexus" from the body in question and a permanent stream

2020: County of Maui vs. Hawaii Wildlife Fund: case focused on determining if the interconnection of groundwater and surface water would require a groundwater injection well to have an NPDES permit; the Court determined a permit was required if there was a "functional equivalent" of a direct discharge; the case was remanded to a lower court (which determined in 2021 that a permit was required) and brought a definition of "reasonable distance" into play

The CWA after 50 years is still very much alive- permits are issued, loans are provided, and water quality standards are regularly updated. However, the Act does not address groundwater (even with the Maui case ramifications), still has not got a handle on agricultural contamination and is not really prepared to address emerging contaminants (such as the current "favorite" PFAS) and has not set treatment technologies for the myriad complex chemicals that are around us. There is a movement to update and modernize the Act. However, a look around at the political arena in the country would lead to one saying it may not be the time that it could get done.

Happy Birthday Clean Water Act and congratulations on a job well done!!

WE NEED YOU!

To Join and Support MAWEA

Download your application here

http://mawea.org/index.php/membership/

Office of Technical Assistance & Technology (OTA) for Wastewater Treatment Facilities

The Massachusetts Office of Technical Assistance offers free and confidential pollution prevention technical assistance to all Massachusetts toxic users. The OTA would like to partner with wastewater treatment facilities to engage with industries that use chemicals, such as those in the PFAS family, in order to have upstream pollution prevention interventions. OTA and the Toxics Use Reduction Institute (TURI) were created by the Toxics Use Reduction Act (TURA) of 1989. TURA allows Massachusetts to be uniquely poised to act upon emerging contaminants of concem, as OTA and TURI have been providing free services to industries for more than 30 years. By approaching businesses that have a positive relationship with the TURA program, we are able to have proactive conversations and create effective strategies to reduce the sources of PFAS and other contaminants from entering the wastewater treatment facilities. OTA's staff of engineers and chemists can help your wastewater facility identify and have pollution prevention interventions with businesses within your district. Want More information?

Contact: Tiffany Skogstrom, OTA Outreach & Policy Coordinator - tiffany.skogstrom@mass.gov - 617-

2022 Wastewater Exam Passing Rates

2022 (1/1/22 - 6/7/22)				
	Passed	Failed	Total	% Passed
1M	12	5	17	70.6
2M	11	35	46	23.9
3M	28	20	48	58.3
4M	16	42	58	27.6
1I	19	32	51	37.3
2I	69	110	179	38.5
3I	2	17	19	10.5
4I	3	14	17	17.6
5C	23	36	59	39.0
6C	18	71	89	20.2

MAWEA Online Quarterly Meeting

June 29, 2022 9:00 AM—11:30 AM

Speakers

Charles Tyler (MAWEA) – MAWEA and NEWEA News And Activities

John Murphy (MA DEP) – Certification, Testing, and Renewal News

Jennifer Lichtensteiger – (NEIWPCC) Training News

Safety Minute

Download the Meeting flyer and Verification Form by clicking here

Technical Presentations by Tighe & Bond

- **"Introduction to Thermal Drying of Biosolids"** Presenter: Christopher Bone
- **"Rotary Drum Drying Case Studies: Detroit, MI and MWRA "** Presenter: Ryan Siegel
- **"Climate Change Impacts to Wastewater Infrastructure"** Presenters: Amy Sowitcky & Dan Roop
- **"Move Your Capital Plan Forward Using a Data Driven Process"** Presenter: Michael Schrader

One employee of the facility MUST register online at

https://attendee.gototraining.com/r/5954725600511873538

Additional attendee's can use the flyer form and share the screen of online registrant.

Attendees using this form must also use and submit the attendance verification form.

Thermal Processing - (continued from page 3)

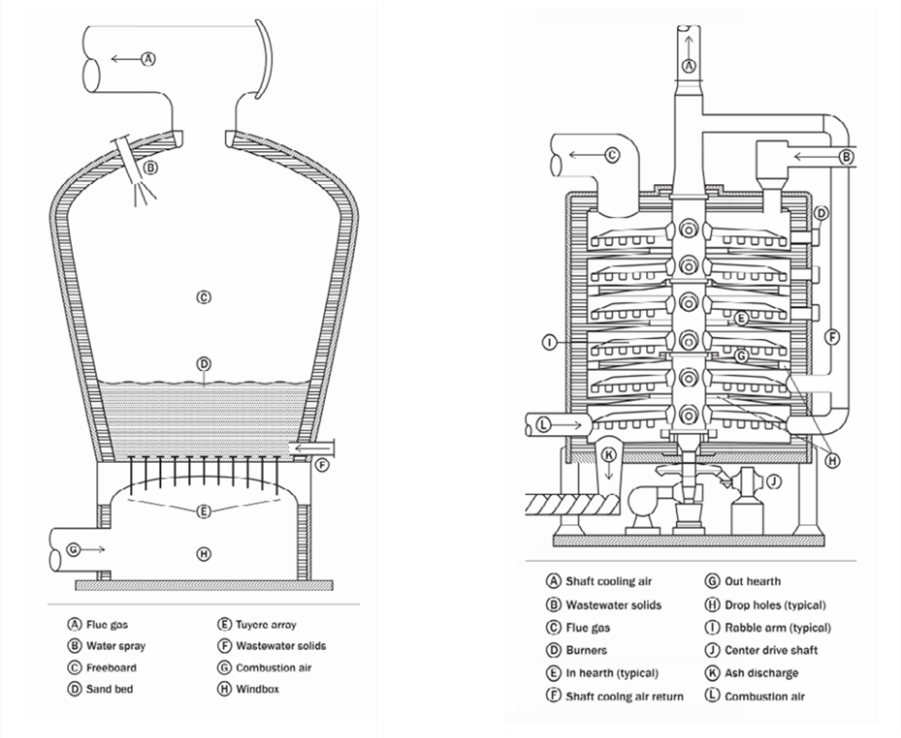


Figure 1: Fluid bed and multiple hearth furnace configurations (adapted from Winchell et al., 2021)

Pyrolysis and gasification submit dried feedstocks to high temperatures (typically 600 - 900°C) at oxygen-free or oxygen starved conditions, respectively. By limiting oxygen, the technologies can thermally degrade organic feedstocks into a hydrogen, hydrocarbon and carbon monoxide rich gas suitable for downstream combustion while retaining a carbon-rich residual called biochar. PFAS in biosolids would be subjected to high temperatures first in the pyrolysis or gasifier reactor and then the downstream combustion device. The technology has been recently operated at commercial scale with wastewater solids in California, Pennsylvania, and Tennessee. These full-scale installations all use a downstream thermal oxidizer to combust the offgas at temperatures of 850 - 950°C.

Thermal Processing - (continued on page 9)

Thermal Processing - (continued from page 8)

When a thermal oxidizer is used for downstream combustion, more rigorous and measurable conditions for the 3 Ts can be achieved in the combustion zone as thermal oxidizers provide a high degree of operational control. A simplified process schematic of pyrolysis and gasification with thermal oxidation is provided below in Figure 2. While interest is growing in pyrolysis and gasification as an alternative to SSI due to simpler permitting requirements and the potential for resource recovery with biochar, their long-term reliability and operational and maintenance demands are yet to be defined (Winchell et al., 2022a, 2022b).

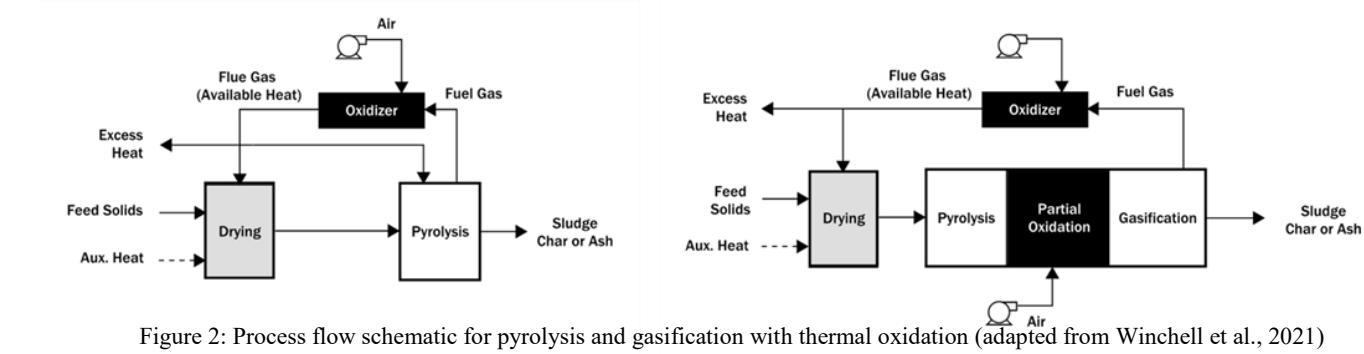


Figure 2: Process flow schematic for pyrolysis and gasification with thermal oxidation (adapted from Winchell et al., 2021)

Hydrothermal treatment represents a category of technologies new to the United States that treats wastewater solids in slurry form at moderately high temperatures (typically 200 - 500°C). Supercritical water oxidation (SCWO) adds high pressure and an oxidant to completely mineralize the organics and potentially destroy PFAS. Hydrothermal carbonization and liquefaction treat the solids under reductive conditions at lower and higher pressures, respectively, and have some PFAS destruction or transformation potential. These technologies are still at bench or demonstration scale and further development will be required before commercial systems are operational and available for PFAS testing. (continued on page 12)

Member Profile- Samantha Santos

Employment and Position Title

I am the Laboratory Chemist for the Water Pollution Control Division in the Town of Barnstable

Personal Information

I am a lifelong resident of Barnstable. I received my BS in Biology from Bay Path University and hold a MA Grade 4 Wastewater Operator's license in addition to a MAWEA Grade 2 Collection Systems Certification.

How did you get into the clean water business?

Growing up on Cape Cod, I was well aware of the needs for environmental protection and natural resources, and water management and conservation in particular. I practiced analytical laboratory science in college with the intention of working in the field of Forensic Science, but changed course midway so that I could use those skills in broader applications. Just before graduating, I earned an internship with the Drinking Water Supply Division for the Town of Barnstable. There, I not only learned a lot about maps and plans, collection and distribution systems, but also groundwater treatment and contaminants of emerging concern. It was around this time that PFOS (& etc.,) became a local concern requiring immediate intervention and treatment. From there, I worked in marine estuary and bathing beach sampling, and with alternative septic systems. When an opportunity became available to work in the laboratory at the Water Pollution Control Division, I applied for the position of Lab Technician. I officially moved over to 'the dark side' in wastewater treatment and in 2019 I became the Laboratory Chemist.

Utilizing Microscopic … (continued on page 12)

Typical workday:

Once I punch in and say good morning to everyone in the control room, I make my way through the lab, waking up all the appropriate equipment on the way to my desk where I set up to review the plan for the day's work and begin the necessary preparations. I will meet with the other plant leadership to discuss our particular priorities and the status of projects and processes at the plant and I will coordinate the daily sampling and analysis for process control and permit compliance, at times participating in those tasks as well. Over the rest of the day, I review our analytical results and prepare reports for state submittals or special projects, organizing data for the operators and process control. I maintain the lab inventory, and our pretreatment and groundwater monitoring programs. I will review quality control compliance for all of our in-house and subcontracted analyses, as well as our standard operating procedures and internal audits. I work closely with the laboratory staff, keeping up with training and research to make sure that our operations are conducted safely and efficiently. At the end of the day, I make sure that everything is in proper order before I say good bye and punch out.

Active PFAS Fate Studies

While no data has been published yet on the PFAS destruction efficiency of these technologies with wastewater solids a wide range of full-scale fate studies are under way. Results are expected in the next one to two years and will provide critical data to answer the question of to what extent these technologies can destroy PFAS and reduce or eliminate byproducts. A summary of active studies is provided in Table 1.

Table 1: Summary of active PFAS studies at full scale thermal processing systems in the US

Study	Status	Features
Battelle SSI PFAS Fate Study	Field Work: Completed 2020 Initial Presentation: Jan 2021 Publication in development	Full-scale PFAS fate study through FBF, includes air emissions
Water Research Foundation 5111: SSI PFAS Fate Study	Awarded: 2021 Full-scale testing completed this summer	Full-scale PFAS fate study through FBF and MHF, includes air emissions
WRF 5107: Understanding Pyrolysis for PFAS Removal	Awarded: 2021 Full scale system in commissioning	Full-scale PFAS fate study through pyrolysis with condenser and internal combustion engine
USEPA Silicon Valley Clean Water (SVCW) Authority Pyrolysis Field Testing	Field Work: Aug 2020 Publication: Feb 2022	PFAS removed to below detection in biochar; limited/inconclusive emissions testing
Water Environment Federation Pyrolysis and Thermal Oxidation Study	Project awarded Summer 2022 Field Work expected Fall 2022	PFAS fate testing through SVCW and calibrated bench scale unit; includes air emissions

Conclusions and Next Steps

Upon completion, results from the PFAS fate studies will provide the industry with a better understanding of the PFAS destruction removal efficiency of these technologies. Historical studies suggest that they will be effective in removing PFAS and degrading byproducts. Additionally, post-combustion air pollution control devices such as wet scrubbers and carbon filters are expected to further remove residual PFAS or decomposition products prior to discharge through the exhaust stack. However, public perception of the study results is difficult to gauge. Therefore, its critical that air emission permit limits be established in parallel to these studies to establish the required treatment level for safe emissions. The recent thermal oxidizer installation at the Saint-Gobain Performance Plastics facility in Merrimack, NH provides an example where state and federal regulators worked collaboratively with industry to establish permit limits that were recently demonstrated through stack testing (Barr, 2022).

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Maine Bans Land Application of Biosolids

Jeff McBurnie, Casella Resource Solutions, Environmental Manager

NEBRA, Regulatory & Legislative Committee Chair

The Maine State Legislature approved, and Governor Janet Mills signed into law on April 20, 2022, LD 1911, codified at Public Law Chapter 641 (1911),"An Act to Prevent the Further Contamination of the Soils and Waters of the State with So-called Forever Chemicals", to take effect August 8, 2022. As enacted the law:

Requires testing of licensed wastewater discharges for perfluoroalkyl and polyfluoroalkyl substances (PFAS);

- Prohibits licensing of new biosolids land application sites and gives the Maine Department of Environmental Protection (DEP) authority to suspend the use of existing sites due to PFAS detection in groundwater or in drinking water supplies in close proximity;
- Prohibits land application of biosolids and the sale and distribution of compost and other agricultural products and materials containing biosolids regardless of PFAS concentration. There is an exemption for certain industrial sludges (food processing, brewery and distillery waste, seaweed and seafood, and others) without regard to the level of PFAS in those materials. This approach results in exempting some products that have detectable levels of PFAS while banning several other products that test de minimis or are non-detect for PFAS.
- Repeals a law assessing a $10 per ton fee on the handling of all sludge or septage intended to fund a comprehensive program to evaluate soil and groundwater for PFAS; and
- Tasks Maine DEP with developing a plan to eventually eliminate land application of septage.

The impacts of 1911's ban on land application of biosolids is significant. Options for biosolids disposal in Maine are limited as there are no local sludge incinerators and only a few landfills with the ability to take in sludge. Despite this, 1911 largely eliminates a long standing and successful alternative to disposal - direct land application and compost which allows for the beneficial recycling of nutrients and organic matter in biosolids. Maine will soon, as of August, lose this important component of waste management that has been in existence for over 3 decades.

Supporters of 1911 praise landfill disposal of biosolids as the prime option to replace land application with disregard for the operational constraints of landfilling sludge. By its nature, sludge is structurally unstable, and must be bulked with other wastes to be safely and securely placed in a landfill cell. This constraint was further complicated by Maine's LD 1639, now Public Law Chapter 626 (1639), which passed this legislative session. This law limits the amount of bulky waste that can be processed in Maine and further limits the definition of in-state waste, and accordingly, which waste is eligible for disposal at the state-owned landfill, Juniper Ridge (JRL), which is only allowed to take in-state waste. JRL relies on these materials as a primary source to bulk sludge, and a reduction in availability correlates to a reduction in the amount of sludge that can be disposed of at JRL. Essentially, due to the biosolids ban of 1911, JRL will be asked to accept more sludge, but less bulking agents will be available, due to the constraints of 1639, leading to less capacity to accept it.

An additional benefit lost as a result of 1911 is greenhouse gas (GHG) emissions reductions. Land application and other beneficial reuse options for sludge and biosolids help lower GHG emissions through sequestration of carbon in soil. Even the best landfill gas recovery systems cannot compare to the reductions in GHG emissions land application can yield. Further, as local outlets for biosolids disposal tighten in capacity and diminish, exportation and hauling will increase, causing larger carbon footprint impacts associated with increased travel.

Unfortunately, we expect Maine's legislation will create problems with managing biosolids disposal that extend well beyond its borders. Biosolids handling is a regional, perhaps even a national issue, that expands beyond sludge, and is a comprehensive waste management issue. PFAS contamination is a national issue, spanning multitudes of media, and not just limited to biosolids. These types of issues are worthy of thoughtful approaches that are practical and take into consideration impacts such as those discussed above, rather than a rushed effort to implement laws and policy, without regard to existing infrastructure and science. True solutions can only be found and implemented looking to guidance that science provides.

Disclosure: Casella Waste Systems is the operator of the State of Maine's Juniper Ridge Landfill in West Old Town, Maine and is the owner/operator of the Hawk Ridge Compost Facility in Unity Plantation, Maine.

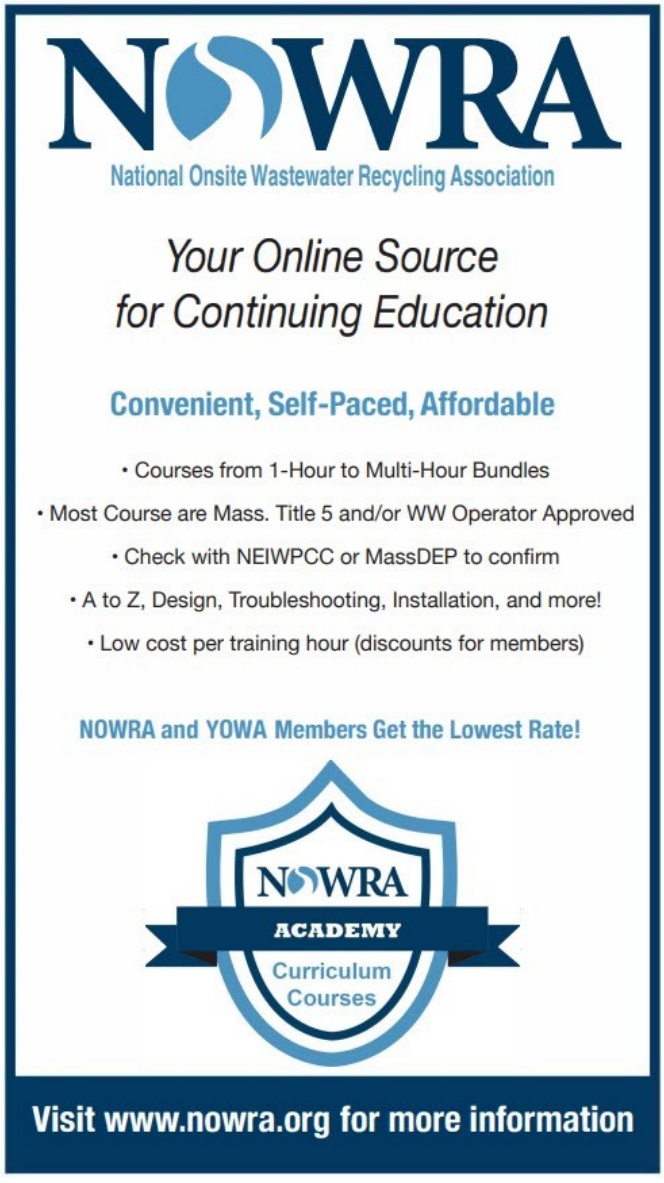
NEIWPCC Remote Learning Opportunities - NEIWPCC continues to offer remote classes for wastewater operators. Efforts focus on essential training for those new to the field and seeking to take a licensing exam. Class topics are modules of our traditional in-person multi-session municipal, industrial, and wastewater laboratory Massachusetts Wastewater Operator Training (MWOT) classes. Additionally, continuing education topics range from basic nutrient removal and new manager fundamentals to advanced process troubleshooting and brewery wastewater pretreatment. NEIWPCC's Operator Training Calendar can be found here: https://portal.neiwpcc.org/training-calendar.asp

Operator Certification Exams – Massachusetts testing locations are open where governmental entities and local COVID-19 requirements allow. Please check PSI's (the contract testing agency for Massachusetts) list found at https://www.psionline.com/openings. This list is updated regularly and serves as the best reference for candidates and stakeholders. It is recommended that you call the selected testing location before your appointment to confirm status.

Operator Renewals – The staff at NEIWPCC thanks all of the operators who have submitted your 2021 renewal. To date, over 4,300 operators have renewed. Did you know that being a MAWEA member gives you 2 TCHs? Attach a copy of your MAWEA membership card to your renewal paperwork for credit. A current list of wastewater operators can be found at https://portal.neiwpcc.org/wwo-search.asp.

If you have any questions about certification or renewal, please e-mail Michelle Jenkins (mjenkins@neiwpcc.org).

MassDEP COVID-19 Resources for Wastewater Operators – MassDEP holds quarterly meetings for wastewater operators, with the next one scheduled for Wednesday, June 15. Recordings of past calls and resources are available here: https://www.mass.gov/lists/covid-19-information-for-drinking-water-and-wastewater-operators.



2022 Northeast Onsite Wastewater Treatment Short Course - The 2022 Northeast Onsite Wastewater Treatment Short Course will be held virtually. The Onsite Short Course has become a reputable forum for sharing information about onsite/decentralized wastewater issues and projects in this region, as well as featured research and case studies from all over the country. This program, which is hosted and coordinated by NEIWPCC in partnership with its member states, will feature live virtual presentations on June 2, 9, 16, and 23, 2022. The Short Course is a "one-stop" training/conference event for wastewater operators, onsite wastewater professionals, and more. The Short Course offers training contact hours for attendees from NEIWPCC states. Be sure to check our website for updates and more information!

For more information or questions about NEIWPCC or the MWOT program, please contact us at training@neiwpcc.org or (978) 323-7929.

Congratulation's to Dennis Pipczynski

Dennis was the Chief Operator at the Hadley MA Wastewater Treatment Plant for Over 40 years! Here's to wishing you a relaxing and wonderful retirement.

Congratulations John Digiacomo !

John Digiacomo was inducted into the "5S-Select Society of Sanitary Sludge Shovelers" at the NEWEA Spring Meeting in May. John is a MAWEA Board Of Directors Member.

The honor of induction into the "5 S" society is bestowed on NEWEA members who contribute outstanding service to the success and progress of their associations by a vote of current members of the NWEA Select Society of Sanitary Sludge Shovelers.

Utiliency Services, LLC

781-605-5519
www.utiliency.com

Over 20 hours of new and approved Utiliency Services wastewater operator training classes are being developed and scheduled for the coming weeks. New training topics include:

Developing Problem-Solving and Decision-Making Skills

Disinfection Fundamentals

pH and Suspended Solids Benchtop Tests

Essential Math Skills Review

Collection System Math Skills Review

Wastewater Operator Math Skills Basic Review

Activated Sludge Math Skills Review

In addition, a free 90-minute class covering the experiences of a new wastewater operator is being offered. If you have ever been interested in checking out a Utiliency Services class, why not check one out for free.

Class schedules, descriptions, and registration information are available at www.utiliency.com All classes start at 6:00 pm.

A Watershed Year for Clean Water Advocates

NEIWPCC CELEBRATING 75 YEARS

IIt may be hard to imagine a time when our waterways were so disregarded and appallingly polluted – with sewage, industrial pollutants and more – that they were unsafe for recreation and devoid of aquatic life. But this was the setting when, in 1947, the U.S. Congress established interstate water pollution control commissions, such as NEIWPCC (originally known as the New England Interstate Water Pollution Control Commission) to address water quality in the Northeast.

NEIWPCC served as the original pioneer during these formative years of water quality classifications and wastewater treatment. These early efforts laid the foundation for the passage of the federal Clean Water Act in 1972, the first major U.S. law to address water pollution. This landmark environmental legislation – now in its 50th year – has defined how we protect and restore our water resources to this day.

Here in Massachusetts, NEIWPCC staff support the Departments of Environmental Protection (DEP) and Public Health (DPH), including coordinating wastewater operator training and certification.

During this anniversary year, learn more about NEIWPCC's rich history through a collection of success stories and personal narratives.

Consider All Consequences When Delivering Safety Reminders

When employees violate safety rules, they might need reminders or refresher training. For a first or second violation, make an effort to identify any barriers that could be addressed, such as uncomfortable PPE or ergonomic design problems. In some cases, however, you might find that an employee is deliberately ignoring the rules (violations continue even after a reminder) and discipline may be necessary.

Before delivering a reminder or reprimand about safety rules, consider two things:

First, consider the how to deliver the reminder. Your reaction could have either positive or negative consequences. There's a significant difference between reminding employees to work safely so they don't get injured, and simply yelling at them for breaking the rules.

How you deliver the message will impact whether the employee recognizes the importance of (and reason for) a rule, or whether the employee feels resentful about the meeting. Delivering reminders (or disciplinary warnings) by highlighting the goal of injury prevention helps employees view safety as an objective. This affects whether they change habits to protect themselves, or whether they follow the rules so they don't get fired.

Second, consider the consequences of your delivery on other employees, including those who consistently follow the rules. The employee given the reminder will likely talk to coworkers about the experience. When the story gets around, will other workers likely feel good that the facility is genuinely concerned about keeping everyone safe? Or will they feel stressed about inadvertently breaking a rule and getting yelled at?

Related, what impact could that story have on their willingness to report problems in the future? Will it motivate them to continue following the rules? Or will they fear getting a similar reprimand in the future?

Actions have consequences

The consequences of delivering safety reminders extend beyond the individuals directly involved and create long-term impressions that influence the attitudes of many employees. When planning a potentially confrontational meeting like this, consider all the cascading consequences that could flow from that interaction. The impression you create could shape the perspectives of many employees.

Although delivering reminders can be uncomfortable, remembering that the goal is preventing injury may help reduce your anxiety. Prepare for these meetings by reminding yourself that the purpose is to protect all workers, not merely to assign blame or enforce rules. If discipline becomes necessary, it should be clear that the employee failed to improve after repeated opportunities, and that discipline was a final effort to protect the worker (and others) from injury.

Noise Induced Hearing Loss

About 22 million workers are exposed to hazardous noise. Occupational hearing loss is one of the most common occupational diseases.

All day, every day we are exposed to normal, safe sounds such as traffic, household appliances, conversations and a TV or radio program. Many of these sounds are not harmful. At work and at home we are also often exposed to dangerous sound levels. A lawnmower, a compressor running, a table saw and even an overhead door rolling up or down. These "everyday" sounds can be very dangerous especially if exposure takes place for an extended period of time.

A screening program focused on construction workers employed at US Department of Energy facilities found 58% with significant abnormal hearing loss due to noise exposures at work. Occupational hearing loss is present in up to 33% of workers overall.[Occupational exposure to noise causes 16% of adult disabling hearing loss worldwide.

Sound vs Noise

It's important to understand the difference between sound and noise. The best definition of noise is Unwanted Sound. An unwanted sound can be defined as any sound that presents at a "too high" level. Unwanted sound could be a siren from an approaching ambulance or fire truck, a sports car or motorcycle passing by or a neighbor using a weed whacker. At work compressed air and machinery are major sources of noise. These sounds can cause temporary and sometimes permanent damage to our hearing.

Here are a few examples of sound and noise:

Sound

Refrigerator 45dB Conversation 60dB City Traffic 85dB

These sounds, even exposure for long periods of time will not likely cause NIHL.

Noise

Compressor Room 100dB Centrifuge Room 90dB Vac Truck 105dB

The louder the noise, the shorter exposure needed to cause damage to your hearing.

NIHL can be caused by a one-time exposure to an impulse sound such as an explosion or continuous exposure to loud sounds over a long period of time. The good news is that NIHL is 100-percent preventable. Protect your hearing now.

Noise Induced Hearing Loss - NIHL

NIHL includes the inability to hear and understand conversation and sounds that present at a "normal" level. NIHL can also include Tinnitus. The characteristics of tinnitus include a constant ringing or buzzing in the ears. Symptoms can vary between mildly annoying to debilitating. People that suffer with tinnitus often need to use a white noise machine or television to mask the ringing in their ears in order to fall asleep. People with tinnitus report a decrease in quality of life due to their condition.

When we are exposed to harmful sounds or noise, sensitive structures, known as CILIA, within the ear can be damaged. These small, sensitive hair cells convert energy into electrical signals that travel to our brain in the form of sound. Once damaged, these hair cells cannot grow back. This condition is known as Noise Induced Hearing Loss

NIHL is a Non-Traumatic injury that includes no blood and leaves no scar - It's also NOT CUREABLE.

A recent study by JAMA indicated that the prevalence of hearing loss among US adolescents increased by 30 % from 1988 to 2006 with 1-in-5 adolescents having hearing loss in 2006

Let's be clear about the types of "noise" that we seek out. Have you ever attended a concert or sporting event in a stadium? The sound level at one of these events can easily exceed and maintain at 100dB or more. At what level do you listen to your iPod? Do you drive a Harley? Do you do woodworking as a hobby? Do you play in a rock band?

Hearing … (Continued on page 18)

Clarifier Ceiling ... (continued from page 20)

In the workplace, the OSHA Permissible Exposure Limit (PEL) to noise is 85-Decibels (dB) for 8-hours. OSHA also states that "exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level. OSHA states that an employer must implement hearing conservation programs for employees if the noise level of the workplace is equal to or above 85 dB(A) for an average eight-hour time period. Hearing conservation goes beyond issuing ear plugs and putting up signs. It may also include training and education of all affected employees to raise awareness of the risk to their hearing.

You should always start with a hazard assessment to determine what your sound levels are. Readings should be taken under all know conditions including the occasion of an impulse sound such as a generator or compressor kicking on. If a pump is exceptionally loud, your readings should be taken with this pump running. Readings should be taken with doors open and closed. Noise dosimeters can be used to get time-weighted averages of the sound levels. As a general rule of thumb, if you are standing an arm's length away from someone and you need to raise your voice to be heard, the ambient noise is hazardous.

If the noise level exceeds 85 dB, mitigation efforts must be taken. Maybe the source of the sound can be isolated or insulated to reduce the level. Exposure can be limited to reduce harm. If not, hearing protection must be worn. Hearing protection might be ear plugs or ear muffs and are rated based on their Noise Reduction Rating or NRR. It's important to understand that the posted NRR of a piece of hearing protection such as a pair of ear plugs is not the amount of noise eliminated.

To understand the actual Noise Reduction you get from a piece of hearing protection, you subtract 7 from the listed NRR and divide by 2. An earmuff with a 29 NRR (-7 = 22 ÷ 2 = 11) will have an actual reduction of 11dB.

If the noise level you are exposed to is 89 dB and you are using hearing protection with an NRR of 29, you would subtract 11 from the noise level to attain an exposure of 78 which would be acceptable for an 8-hour shift.

Ear muffs are fairly easy to use but ear plugs are often misused. Here are a few guidelines for the correct use of ear plugs:

If properly fitted, the plug should not extend beyond the tragus (flap of the ear). When fitted properly, the ear plug should not be visible from a frontal view. When fitted properly, you should be able to cup your hands over your ears and should not be able to detect a difference in noise.

In the workplace, hazard levels must be continually revaluated to be sure you are taking and maintaining the necessary steps to protect workers. As conditions change, your safety plan might change. Ongoing employee training is required to ensure compliance.

In the wastewater industry, it's important to consider hygiene. Rolling and inserting an ear plug with a dirty or damp hand can lead to ear infections which can also damage your hearing. Ear plugs should not be shared or re-used in these environments.

Ear muffs can be cleaned and disinfected between uses and the internal foam can be replaced.

There are many options in hearing protection. There are pros and cons to both ear muffs and ear plugs. You should consult a safety professional to make the best selection based on your work environment and conditions.

In summary:

NIHL is 100%, completely preventable

Start with a thorough hazard evaluation

Preform continual hazard evaluations and employee training

Take steps to reduce the hazard before turning to hearing protection

Consult a safety professional to assist in the proper selection of hearing protection

Protect your hearing at work and at home.

Chris Caron is the Owner and President of American Safety & Supply, Inc. located in Springfield MA. With over 30-years of experience in the Safety Equipment supply business, Chris is a Competent Person with regards to fall protection and a frequent speaker and author on a variety of safety topics.

Wastewater Management Program

Looking to Improve Your Leadership Skills? The Wastewater Management Program application deadline has been extended to July 31, 2022. The program sponsored by NEIWPCC, MassDEP, and MAWEA will begin in September 2022. Look for more details, including the application link here: https://neiwpcc.org/learning-center/massachusetts-wastewater-management-training-program/

Montague Presents at NEWEA Spring Meeting

The NEWEA Spring Meeting was held at the Mount Washington Hotel May 22-25. Chelsey Little and Timothy Little led the presentation titled ***"Innovation and Resiliency-Montague, MA Upgrades Sludge Dewatering to Meet New Demands ".*** The presentation covered the recent biosolids dewatering upgrade at the Montague Water Pollution Control Facility. The facility upgraded from a rotary press to screw press. The screw press manufacturer was PW Tech (pwtech.us). The change in dewatering equipment was due to the recent shutdowns on local paper mills. Without the paper fiber in the biosolids the rotary press preformed poorly and effluent quality suffered. The screw press was installed by the Montague staff without the aid of an engineer or contractors. The facility is now back in permit compliance and putting out 25%+ biosolids.

Chelsey Little and Timothy Little

Chelsey Little presenting at the NEWEA Spring Conference

Springfield's York St Pump Station and River Crossings Project Continues

The York Street Pump Station and Connecticut River Crossing Project will serve 70% of the region's population with a new pump station and three new pipes across the Connecticut River. It is one of the largest wastewater projects to take place in the region in decades.

The project is a culmination and cornerstone of years of planning – specifically through the Commission's Integrated Wastewater Plan (IWP). Adopted in 2014, the IWP was one of the first such plans in the country to integrate project planning for regulatory compliance (specifically, projects that fulfill an unfunded federal mandate to eliminate combined sewer overflows) and for infrastructure renewal (due to aging infrastructure and other challenges).

The result of the IWP are projects such as this that maximize ratepayer dollars by addressing multiple issues at once.

This innovative project is designed to address multiple issues:

Infrastructure Renewal: A new modern station will replace an aging 1938 station nearing the end of its useful life and accommodate future growth in the region.

Environmental Protection: Increased pumping capacity will prevent an additional 100 million gallons of combined sewer overflows from entering the Connecticut River in a typical year.

System Redundancy: Three new pipes under the Connecticut River will add redundancy and improve service reliability for customers in Springfield, Ludlow, East Longmeadow, and Wilbraham.

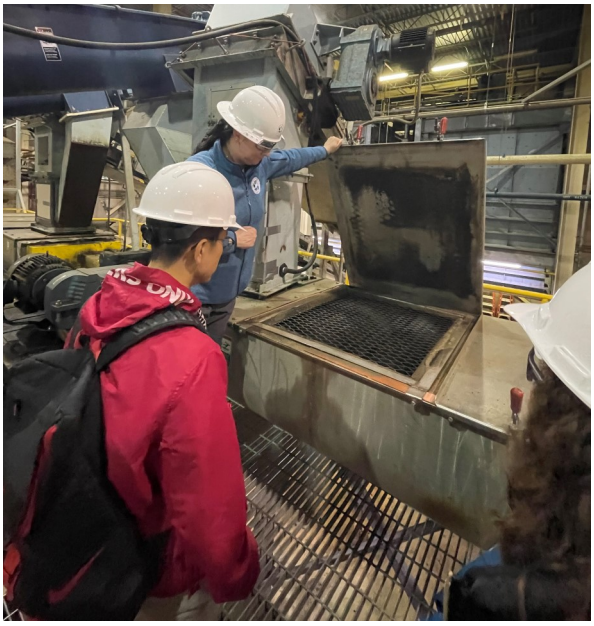
Climate Resiliency: Flood control protection will be increased through re-purposing the old pump station.

NEWEA Plant Operations Committee and Energy Committee Tour the Greater Lawrence Sewer District (GLSD) Facility

The NEWEA Plant Operations Committee and Energy Committee presented a conference on April 14-15, 2022 in Haverhill, MA highlighting best practices for energy efficiency, capital upgrades and plant operations. The event included a facility tour of Greater Lawrence Sanitary District (GLSD) facility on Thursday, April 14th. The tour was led by Executive Director (and recent Hatfield Award winner and MAWEA member) Cheri Cousens and Operations Manager (and MAWEA member) Brett Leavitt. GLSD powers their entire facility with the energy they create converting food waste and biosolids to fuel.

Minimizing their impact on both the environment and municipal budgets. Project Net Zero was undertaken to meet 100 percent of their electricity needs by converting food waste and biosolids to fuel. Starting in 2016, and reaching completion in December 2019, Project Net Zero has allowed GLSD to do exactly that: meet our their electricity needs through self-sufficient energy production. The project also continues to protect the health of residents with back up power capabilities and save millions for ratepayers in GLSD's communities.

Project Net Zero is also expected to reduce — by as much as 20 percent — collective greenhouse gas emissions within the Greater Lawrence Area, equivalent to taking 1,000 cars off area roads every year.



Massachusetts Operations Challenge Team

"Mass Chaos"

Competes at NEWEA Spring Meeting

The "Mass Chaos" consists of Kelly Olanyk, Paul Russell, Scott Urban, Roel Figueroa, and Coach Mike Williams. The team placed 3rd in the competition and will represent Massachusetts, NEWEA, and MAWEA in the national competition in October in New Orleans.

In the competition, teams compete to earn the highest score in five different events. Each team includes four members and a coach. Each event is designed to test the diverse skills required for the operation and maintenance of water resource recovery facilities, collection systems, and laboratories.

Good Luck In New Orleans Team!

MAWEA Editorial On Biosolids

The following MAWEA editorial has appeared in the Greenfield Recorder , Daily Hampshire Gazette, and VT Digger . If you have a local paper please free to send it in to them. You may want to add your facilities experience with biosolids disposal.

I am writing out of concern for a potential environmental and economic disaster that is visible on the horizon. That disaster is the inability of Massachusetts wastewater treatment facilities to manage and dispose of their biosolids, the solid organic matter that results from modern wastewater treatment processes. Wastewater treatment facilities have been a great public health and environmental success story. This is especially true since the passage of the Clean Water Act in 1972, which brought all facilities up to the secondary treatment standard that has produced some amazing environmental results. The largest river in New England, the Connecticut, once described by Jo Beth Mullens and Robert S. Bristow in a 2003 research study as "The Nation's Best Landscaped Sewer" is now enjoyed by boaters, fishers, swimmers, and other water enthusiasts. Many locations along the river are now homes to families of eagles and other wildlife. Rivers across Massachusetts have likewise benefitted and been remarkably improved thanks to modern wastewater treatment.

In order for wastewater facilities to do their job they must be able to manage the biosolids they produce. There are two major wastewater processes, primary treatment and secondary treatment that produce these biosolids. Larger facilities dispose of their biosolids daily while smaller facilities may dispose of theirs once or twice a week. Regardless of size, no facility can hold their biosolids for long periods of time. To do so would result in poor process performance and regulatory violations.

The amount of biosolids produced yearly by Massachusetts wastewater facilities is approximately 180,000 dry US tons. Biosolids are typically 25% percent solids so on a wet basis that is approximately 720,000 wet US tons or 1,440,000,000 pounds. To put that in perspective a typical tractor load holds 30 tons so approximately 24,000 tractor trailer loads of biosolids are produced per year. Of this 720,000 wet ton total 28% is processed and disposed of in state while 72% is shipped out of state to OH, PA, NC, FL, NJ, NY, IN, VA, RI, CT, ME, NH and Quebec.

There is a three-legged stool of biosolids management options for Massachusetts facilities – incineration, land application, and landfilling. Currently, the total capacity of these three options throughout New England is pretty much full – nearly equal with the total biosolids produced by wastewater facilities. There is currently little room for error. If one leg of the stool fails, the results would be devastating for our wastewater facilities.

Presently, two legs of the stool – land application and landfilling – are being restricted due to concerns about PFAS compounds and landfill instability. "PFAS" is short for per- and polyfluoroalkyl substances. Chemicals in this class of more than 5,000 substances are found in products like nonstick pans, food packaging, waterproof jackets, and carpets. They're also used in fire-fighting foam often used on military bases and at commercial airports. Even personal care products like waterproof mascaras and eyeliners, sunscreen, shampoo, and shaving cream can contain PFAS. PFAS are so prevalent in our daily lives that it's easy to see how PFAS compounds would also be in the influent to wastewater facilities. Wastewater facilities do not use or add PFAS; they are receivers of them. Some of the PFAS accumulate in the biosolids.

Prices for biosolids management and disposal have already increased at a rate much higher than inflation as those managing biosolids price in the liabilities of PFAS pollution and uncertainty and the capacity crisis. Costs to dispose of biosolids will continue to skyrocket as options dwindle. As those costs increase so will sewer rates and costs for sewer services across New England. Those not on public sewer systems will also be impacted since PFAS finds its way to on-site septic systems. Septage pumped from septic tanks is usually disposed at wastewater treatment plants. If PFAS and biosolids disposal limitation continue to impact wastewater plants many will have no option but to curtail acceptance of septage. What options are then available to homeowners trying to maintain their on-site systems?

Many environmental advocacy groups maintain that PFAS contamination at any level is unacceptable so that means the neither landfilling, land application or incineration is acceptable. If that is the case where will Massachusetts biosolids go? As other states become more territorial through stricter regulations to prevent the "importation of PFAS" in out of state biosolids Massachusetts stands to be the loser due to a lack of in-state options. We don't seem to have any problem shipping our "problem" out of State – as mentioned earlier Massachusetts sends more than 72% of its biosolids out of state. With all of the smart minds and institutions in Massachusetts shouldn't we be able to come up with a solution to this problem? Isn't that the morally correct thing to do?