

MEMORANDUM

DATE: April 22, 2021
TO: Taunton City Council Members
FROM: Kirstie Pecci
Andrew Yarrows
SUBJECT: Proposed Sewage Sludge Gasification Project

There is proof that gasification of sewage sludge is dangerous to human health. There is no evidence that it is safe. Therefore, based on current available research, the proposed biosolids gasification project should not move forward.

1. Sewage sludge is toxic

- Sewage sludge consists of “the solid, semisolid, or liquid organic materials that result from the treatment of domestic wastewater by municipal wastewater treatment plants [(WWTPs)].”¹ As shown below, whatever toxicants, hazardous materials, and other pollutants that are removed from the water in the process of wastewater treatment, and that are then concentrated in the sludge, will remain in the sludge. Nothing in the processing of sewage sludge “treats”—e.g., detoxifies — the sludge.
- In its 2009 sewage sludge survey, the U.S. Environmental Protection Agency (EPA) took sewage sludge (also called biosolids) samples from dozens of WWTPs in 25 states in order to estimate the national concentrations of certain pollutants in sewage sludge.² It conducted an analysis of sewage sludge samples for 145 compounds, including anions, metals, polycyclic aromatic hydrocarbons, flame retardants, pharmaceuticals, and steroids and hormones.³ Its analysis revealed that every sample was contaminated.⁴ For example, certain steroids and hormones, pharmaceuticals, metals, and flame retardants were present in all samples.⁵

¹ U.S. EPA, Targeted National Sewage Sludge Survey: Statistical Analysis Report, EPA-822-R-08-018 at 1, January 2009, available at: <https://nepis.epa.gov/Exe/ZyPDF.cgi/P1003RNO.PDF?Dockey=P1003RNO.PDF>

² U.S. EPA, Targeted National Sewage Sludge Survey: Sampling and Analysis Technical Report, EPA-822-R-08-016 at v, January 2009, available at: <https://www.epa.gov/sites/production/files/2018-11/documents/tnsss-sampling-anaylsis-tech-report.pdf>

³ *Id.*

⁴ *Id.* at vi.

⁵ *Id.*

- Sewage sludge serves as a significant source of microplastics to the environment.⁶
- Sewage sludge contains perfluoroalkyl and polyfluoroalkyl substances (PFAS), commonly known as toxic forever chemicals. While the EPA did not test its samples for PFAS, independent researchers found that ten PFAS compounds were present in every biosolids composite sample from WWTPs in 32 U.S. States and the District of Columbia.⁷ This includes samples from four WWTPs in Massachusetts (Billerica, Fall River, Medfield, and Pittsfield).⁸
- In a separate survey of biosolids products produced by WWTPs in seven states, 25 contaminants were found in every biosolid product.⁹ These contaminants include pharmaceutical drugs, a steroid, a fire retardant, disinfectants, a preservative, a fecal indicator, polycyclic aromatic hydrocarbons, fragrance compounds, and a plasticizer.¹⁰
- A 2015 study by researchers at Arizona State University reported that "[m]any organics sequestered and concentrated in MSS [municipal sewage sludge] meet the U.S. Environmental Protection Agency's definition of being persistent, bioaccumulative, and toxic."¹¹

2. There is no evidence that burning or gasifying sewage sludge destroys all toxics, including PFAS¹²

⁶ See Rolsky, Charles, et al., Municipal sewage sludge as a source of microplastics in the environment, 14 *Environmental Science & Health*. 16, April 2020, available at:

<https://www.sciencedirect.com/science/article/abs/pii/S2468584419300832?via%3Dihub>

⁷ See Venkatesan, Arjun K., National inventory of perfluoroalkyl substances in archived U.S. biosolids from the 2001 EPA National Sewage Sludge Survey, *J Hazard Mater.* 2013 May 15; 0: 413–418. doi:

[10.1016/j.jhazmat.2013.03.016](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3776589/), available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3776589/>; see also U.S. EPA, 2001 National Sewage Sludge Survey Report, EPA-822-R-07-006 at 5, September 2007, available at: <https://www.epa.gov/sites/production/files/2018-11/documents/2001-tnsss-report.pdf>.

⁸ See U.S. EPA, 2001 National Sewage Sludge Survey Report *supra* at 4.

⁹ See Kinney, Chad A., et al., 2006, Survey of organic wastewater contaminants in biosolids destined for land application: *Environmental Science and Technology*, v. 40, no. 23, 7207, doi:[10.1021/es0603406](https://doi.org/10.1021/es0603406); see also U.S. Department of the Interior, U.S. Geological Survey, "The 25 Chemicals Found in All Nine of the Biosolids Studied," available at: https://toxics.usgs.gov/highlights/compounds_biosolids_study.html.

¹⁰ See U.S. Department of the Interior, U.S. Geological Survey *supra*.

¹¹ Venkatesan, Arjun K., United States National Sewage Sludge Repository at Arizona State University – A New Resource and Research Tool for Environmental Scientists, Engineers, and Epidemiologists, *Environ. Sci. Pollut. Res. Int.* 2015 Feb; 22(3): 1577. doi: [10.1007/s11356-014-2961-1](https://doi.org/10.1007/s11356-014-2961-1), available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4232481/#R29>.

¹² CLF has reviewed the documents provided by Aries regarding the gasification project on the Taunton City website as of April 15, 2021, and the materials provided are either unsubstantiated or irrelevant to the proposed facility. Specifically, the "Temporary Permit - NHDES" and "Thermal Oxidizer Performance Test Report" do not show that Aries' proposed thermal oxidizer would destroy PFAS in air emissions. First, as noted below in Section 4, the EPA has not identified any valid method of measuring PFAS in air emissions. Second, EPA guidance states that "the efficacy of thermal and catalytic oxidizers in destruction of PFAS is currently unknown." See U.S. EPA, Interim Guidance, *infra* at 40. Third, even if thermal oxidization were an accepted method of PFAS destruction, Aries makes no attempt to show that the thermal oxidizer it would construct in Taunton is similar to the thermal oxidizers described in the materials it provided. Fourth, the thermal oxidizer would only have an impact, if

- In December 2020, the EPA released interim guidance on the destruction and disposal of PFAS.¹³ It characterized "pyrolysis/gasification" as a longer term (3+ years) research and development initiative that it is in the process of "developing and evaluating."¹⁴ The interim guidance does not provide any indication of the potential efficacy of gasification for destroying PFAS compounds.
- Gasification does not guarantee the destruction of PFAS. The EPA interim guidance noted, "[i]t is not well understood how effective high-temperature combustion is in completely destroying PFAS or whether the process can form fluorinated or mixed halogenated organic byproducts."¹⁵ Some studies suggest that some PFAS bonds do not break down until 1,400 degrees Celsius (2,550 degrees Fahrenheit).¹⁶ In contrast, the proposed Taunton gasifier would heat sewage sludge to 1,250 degrees Fahrenheit.¹⁷
- In studies that claimed PFOS (a major type of PFAS) were eliminated through thermal destruction, residual PFOS were observed in the ash produced from combusted municipal solid waste.¹⁸
- The length of time that sewage sludge remains in the gasifier (the residence time) influences the toxicity of the final products.¹⁹ Aries has provided little information about residence times, but what is known is that the company will be rewarded financially for moving as much sludge as possible through the gasifiers on a daily

any, on PFAS in flue gases - it would not be used to treat PFAS in the wastewater, biochar, or biosolids. The other materials provided by Aries are of limited relevance to the proposed project, as they pertain to gasification and thermal oxidizer testing of automotive shredder residue, rather than biosolids. The materials are available at: <https://www.taunton-ma.gov/department-public-works/solid-waste-and-recycling/pages/aries-taunton-biosolids-gasification-project>.

¹³ U.S. EPA, Interim Guidance on the Destruction and Disposal of Perfluoroalkyl and Polyfluoroalkyl Substances and Materials Containing Perfluoroalkyl and Polyfluoroalkyl Substances, EPA-HQ-OLEM-2020-0527, December 18, 2020, available at: <https://www.regulations.gov/document/EPA-HQ-OLEM-2020-0527-0002>; *see also* Gibbens, Sarah, Toxic 'forever chemicals' more common in tap water than thought, report says, National Geographic, January 24, 2020, available at: <https://www.nationalgeographic.com/science/article/pfas-contamination-safe-drinking-water-study>.

¹⁴ *See* U.S. EPA, Interim Guidance, *supra* at 96.

¹⁵ *Id.* at 41.

¹⁶ U.S. EPA, Per- and Polyfluoroalkyl Substances (PFAS): Incineration to Manage PFAS Waste Streams, Technical Brief at 1 (February 2020), available at: https://www.epa.gov/sites/production/files/2019-09/documents/technical_brief_pfas_incineration_ioaa_approved_final_july_2019.pdf; *see also* Horst, J., et al., Understanding and Managing the Potential By-Products of PFAS Destruction, 40 Groundwater Monitoring & Remediations, 7, 20-21 (2020). doi: 10.1111/gwmmr.12372 (noting that temperatures up to 900 degrees Celsius (1,652 degrees Fahrenheit) are likely insufficient to destroy PFAS in water).

¹⁷ *See* Certificate of the Secretary of Energy and Environmental Affairs on the Environmental Notification Form, February 12, 2021 at 2, available at: <https://eeaonline.eea.state.ma.us/EEA/emepa/mepacerts/2021/sc/enf/FINAL%2016311%20enf%20Aries%20Taunton%20Biosolids%20-%20Taunton.pdf>

¹⁸ Horst *supra* at 20-21.

¹⁹ *Id.* at 19.

basis,²⁰ reducing residence times and therefore decreasing the treatment of toxics such as PFAS.

3. PFAS compounds have significant and devastating impacts on human and animal health

- A growing body of science has found that there are adverse health impacts associated with PFAS exposure, including liver damage, thyroid disease, decreased fertility, high cholesterol, obesity, hormone suppression, and cancer.²¹
- These chemicals can easily migrate into the air, dust, food, soil, and water. People can also be exposed to them in a variety of ways, for example, through food, drinking water, food packaging, and industrial exposure.²²
- “A new book called Countdown, by Shanna Swan, an environmental and reproductive epidemiologist at Icahn School of Medicine at Mount Sinai in New York, finds that sperm counts have dropped almost 60% since 1973. Following the trajectory we are on, Swan’s research suggests sperm counts could reach zero by 2045.... The chemicals to blame for this crisis are found in everything from plastic containers and food wrapping, to waterproof clothes and fragrances in cleaning products, to soaps and shampoos, to electronics and carpeting. Some of them, called PFAS, are known as ‘forever chemicals’, because they don’t breakdown in the environment or the human body. They just accumulate and accumulate – doing more and more damage, minute by minute, hour by hour, day by day. Now, it seems, humanity is reaching a breaking point.”²³
- This research is consistent with findings from the Endocrine Society that “[Perfluoroalkyl compounds (PFCs)] have a substantial impact on human male health as they directly interfere with hormonal pathways potentially leading to male infertility....[I]ncreased levels of PFCs in plasma and seminal fluid positively

²⁰ Environmental Notification Form, Aries Taunton Biosolids Gasification Program, submitted December 30, 2020, at 3-4 (Biochar and dried solids produced in the gasification process have commercial value). Available at: https://www.taunton-ma.gov/sites/g/files/vyhlf1311f/pages/20201230_enf_ariescleanenergy.pdf.

²¹ See, e.g., NTP (National Toxicology Program). 2016. Monograph on Immunotoxicity Associated with Exposure to Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). Research Triangle Park, NC: National Toxicology Program, available at: https://ntp.niehs.nih.gov/ntp/ohat/pfoa_pfos/pfoa_pfosmonograph_508.pdf [pdf icon](#) [external icon](#); Venkatesan, Arjun K., National inventory of perfluoroalkyl substances in archived U.S. biosolids from the 2001 EPA National Sewage Sludge Survey *supra*..

²² See, e.g., U.S. EPA, Technical Brief *supra* at 1; Di Nisio, Andrea, et al., Endocrine disruption of androgenic activity by perfluoroalkyl substances: clinical and experimental evidence, *The Journal of Clinical Endocrinology & Metabolism*, November 06, 2018, at 2, doi: 10.1210/jc.2018-01855, available at: <https://www.documentcloud.org/documents/5316830-EDCs-Androgenic-Activity-Perfluoroakyl.html>.

²³ Brockovich, Erin, Plummeting Sperm Counts, Shrinking Penises: Toxics chemicals threaten humanity, *The Guardian*, March 18, 2021, available at: <https://www.theguardian.com/commentisfree/2021/mar/18/toxic-chemicals-health-humanity-erin-brockovich>; see also Swan, Shana and Colino, Stacey, Count Down: How Our Modern World Is Threatening Sperm Counts, Altering Male and Female Reproductive Development, and Imperiling the Future of the Human Race, Scribner (February 23, 2021).

correlate with...a reduction of semen quality, testicular volume, penile length and [anogenital distance].”²⁴

- “PFASs [including two major PFASs, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA)] have been shown to persist in the environment, to bioaccumulate in animals and to occur at significant levels even in remote regions like the Arctic.... Results from animal studies have associated PFOS and PFOA with developmental and reproductive toxicity, as well as cancer. In humans, both PFOS and PFOA are shown to cross the placenta readily, and epidemiological studies on fetal exposure have associated high levels of PFOS with reduced growth metrics of newborns. Additionally, both PFASs have been associated with elevated total cholesterol levels in humans” (internal citations omitted).²⁵

4. Currently, there is no sound method for measuring PFAS in emissions from a stack

- The EPA has acknowledged that there are no accepted or validated source and air methods for measuring PFAS, and that research into “analytical methods to detect, identify, and quantify PFAS in emissions and ambient air” is ongoing.²⁶
- Thus, while Aries claims “an extremely low level of PFAS will be emitted from the stack,”²⁷ there is no verified way to prove this statement.

5. The toxicity of biochar/ash, hazardous waste, and water emissions generated by sewage sludge gasification is unknown

- Fly ash and bottom ash produced by solid waste incinerators in Massachusetts is landfilled.²⁸ In the proposed Taunton gasification project, biochar would be a byproduct when the sewage sludge is heated to 1,250 degrees Fahrenheit.²⁹ It is unclear how the char would differ from incinerator ash. According to Aries, this biochar will be used as a feedstock to produce concrete and cement or as a soil amendment, but there is no precedent for sewage sludge ash or other incinerator ash being used this way.³⁰ Coal ash has been used this way in some places, but that ash does not have the same potential dangers that this “char” would. It is not known what

²⁴ Di Nisio *supra* at 8.

²⁵ See Venkatesan, Arjun K., National inventory of perfluoroalkyl substances in archived U.S. biosolids from the 2001 EPA National Sewage Sludge Survey *supra*.

²⁶ U.S. EPA Office of Research & Development, Session 5: Source Emissions Measurement Methods and Modeling Air Emissions, Transport and Deposition, PFAS Science Webinars for Region 1 and New England States & Tribes, at 1-2 (September 23, 2020), available at: https://www.epa.gov/sites/production/files/2020-10/documents/r1-pfas_webinar_day_2_session_5_phelps-murphy_final.pdf

²⁷ Aries Clean Technologies, Presentation to Taunton City Council, March 16, 2021, available at: https://www.taunton-ma.gov/sites/g/files/vyhlf1311/f/pages/aries_taunton_council_presentation_3-16-21.pdf.

²⁸ See MassDEP, Guide: Municipal Waste Combustors, available at: <https://www.mass.gov/guides/municipal-waste-combustors>.

²⁹ See Certificate of the Secretary of Energy and Environmental Affairs *supra* at 2.

³⁰ *Id.*

toxics will be present in this biochar after the heating process, nor are the impacts of mixing biochar with concrete and cement fully understood.

- Tar is also a byproduct of gasification that can threaten a plant's commercial viability.³¹ Aries claims, without providing support, that its gasification-produced syngas will not contain tar.³² In fact, tar is found in syngas produced from the gasification of biomass.³³ It is unclear what would happen to the tar produced at the Taunton gasification plant.
- The complex matrix of sewage sludge, with its high number of different toxicants, will pose a challenge to accurately analyzing the ash and other byproducts.³⁴
- Destruction of PFAS in water involves "mineralizing," a method of breaking down the PFAS molecule into less harmful components.³⁵ Incomplete mineralization of PFAS - whether from inadequate temperatures or insufficient resident times - will result in short chain PFAA and fluoro-organics, which require an even higher temperature to mitigate than long chain PFAS (i.e. PFOA and PFOS).³⁶
- Even complete mineralization of PFAS results in problematic byproducts that must be managed, such as hydrofluoric acid.³⁷
- There are no proven analytical technologies which have been demonstrated to detect all potential fluorinated organic byproducts from gasification.³⁸
- The proposed gasification project will also produce millions of gallons of wastewater per year from drying and cooling the biosolids.³⁹ This wastewater will flow through local sewer lines to the City of Taunton WWTP, which discharges into the Taunton River.⁴⁰ Many toxics will remain in this wastewater, even after it is treated by a WWTP.

³¹ See, e.g., Rios, Martha Lucia Valderrama, et al., Reduction of tar generated during biomass gasification: A review, 108 Biomass and Bioenergy, 345 (2018), available at: <https://doi.org/10.1016/j.biombioe.2017.12.002> (noting a major problem with biomass gasification is tar formation, which could make this technology unsuccessful from a commercial standpoint).

³² Aries Clean Technologies, Presentation to Taunton City Council, March 16, 2021, available at: https://www.taunton-ma.gov/sites/g/files/vyhlif1311/f/pages/aries_taunton_council_presentation_3-16-21.pdf.

³³ See Rios *supra*; see also Abdoulmoumine, Nourredine et al., A review on biomass gasification syngas cleanup, 155 Applied Energy, 294 (2015), available at: <https://doi.org/10.1016/j.apenergy.2015.05.095> ("Gasification of biomass can produce raw syngas which contains CO, CO₂, H₂ and CH₄. In addition, raw syngas contains minor but significant quantities of undesirable impurities – collectively known as syngas contaminants. Syngas contaminants are composed of tars....")

³⁴ See Horst *supra* at 20.

³⁵ *Id.* at 17.

³⁶ *Id.* at 21.

³⁷ *Id.*

³⁸ *Id.* at 24.

³⁹ See Certificate of the Secretary of Energy and Environmental Affairs *supra* at 3.

⁴⁰ *Id.* at 1-2.

- The gasification process will also produce a gas comprised primarily of hydrogen, carbon monoxide, methane and carbon dioxide.⁴¹ As with biochar, the gas is produced through the sewage sludge heating process.⁴² The gas is then used to dry and heat additional sewage sludge, with the air emissions undergoing treatment and then releasing through a stack.⁴³ Aries cannot demonstrate whether the heating and treatment processes will remove the many pollutants found in sewage sludge, including PFAS. Pollution treatment processes are not guaranteed to remove harmful emissions and protect against equipment damage, as illustrated by the collapse of a German waste gasification plant attributable to corrosion from acidic flue gases.⁴⁴
- According to the Environmental Notification Form provided by Aries, if the gasifier is not in operation or there is more sewage sludge than the gasifier can handle, the sludge will be hauled off site and disposed of or sold, adding out-of-state sludge (with no ability to trace its origins) to the state of Massachusetts' sewage sludge disposal problem.⁴⁵

6. Waste gasification facilities carry financial, regulatory, environmental, and reputational risks that have led many to fail

- “[T]he potential returns on waste gasification are smaller and more uncertain, and the risks much higher, than proponents claim.”⁴⁶
- “Promoters of gasification and pyrolysis schemes, sometimes collectively called ‘Advanced Thermal Treatment’ schemes, regularly make bold claims about the technological, environmental and financial performance of their proposed facilities with a mixed waste feedstock. In reality, where such configurations have been attempted they have either failed to live up to these claims or operators remain suspiciously quiet about reporting actual performance.”⁴⁷
- Many gasification facilities have failed due to financial difficulties and such facilities commonly seek public subsidies.⁴⁸
- Gasification facilities, because they are highly controversial, are also vulnerable to changing regulations, permitting delays and denials, lawsuits, public protests, and other forms of backlash that could cause the facility to fail.⁴⁹

⁴¹ *Id.* at 2.

⁴² *Id.*

⁴³ *Id.*

⁴⁴ GAIA, Waste Gasification & Pyrolysis: High Risk, Low Yield Processes for Waste Management, Technology Risk Analysis, at 9 (March 2017), available at: <https://www.no-burn.org/wp-content/uploads/Waste-Gasification-and-Pyrolysis-high-risk-low-yield-processes-march-2017.pdf>

⁴⁵ See Certificate of the Secretary of Energy and Environmental Affairs *supra* at 4.

⁴⁶ *Id.* at 1.

⁴⁷ United Kingdom Without Incineration Network, Gasification Failures in the UK: Bankruptcy and Abandonment, November 2016, at 1, available at: https://www.ukwin.org.uk/files/pdf/UKWIN_Gasification_Failures_Briefing.pdf

⁴⁸ GAIA *supra* at 7, 8.

⁴⁹ *Id.* at 8, 9.

- A GAIA report provides an example from Germany: “The unreliable nature of gasification technology was best demonstrated by the closure, after a problematic operational history, of Europe’s flagship gasifier, the Thermosteel plant in Karlsruhe, Germany. Operational problems included low or no electricity generation in some years, corrosion, water pollution, water consumption, and exceeding air permits for dioxins, NOx, particulates, and HCl. The regional government discovered that the walls of the chamber were so battered that pieces had fallen off and could have caused an explosion. The facility was offline frequently for these problems and during five years of operations, processed 1/5 of contracted waste. This resulted in additional costs of fulfilling municipal waste management contracts with local governments. Energy generation proved a challenge: in 2002 the facility used 17 million cubic meters of natural gas to heat the waste, and did not deliver any electricity or heat back to the grid. Ultimately, the owner of the Karlsruhe facility Energie Baden-Württemberg closed the facility after losing 400 million Euros (approximately \$500 million in 2004)” (internal citations omitted).⁵⁰

7. Organizations that downplay the risks of incineration and thermal conversion of biosolids have a financial interest in advancing projects of this nature

- For instance, the North East Biosolids & Residuals Association (NEBRA) produces reports and presentations touting the benefits of using thermal conversion to generate energy from sewage sludge. NEBRA is a non-profit professional organization whose mission is to advance the recycling of sewage sludge in the northeast.⁵¹ Its members, who pay an annual fee, include many companies that similarly have a financial interest in advancing sewage sludge facilities, such as Casella Organics and Lystek International.⁵²

8. Aries' gasification projects in Tennessee and New Jersey are not comparable

- Although Aries' Linden, New Jersey biosolids gasifier was intended to become operational in 2020, it remains under construction. The local impacts of that gasifier will not be known until the facility has been operational for several years and data has been collected.
- The gasifier in Lebanon, Tennessee is also an inappropriate comparison to the proposed Taunton facility. The Tennessee facility uses a different process so that it can process both woody biomass (such as wood waste) and sewage sludge.⁵³

9. If this gasifier is approved, it may well be active for decades

⁵⁰ *Id.* at 13.

⁵¹ NEBRA, “Who We Are”, available at: <https://www.nebiosolids.org/who-we-are>

⁵² See “NEBRA Membership” at <https://www.nebiosolids.org/membership>; “Member Highlights” at <https://www.nebiosolids.org/member-highlights-1>

⁵³ Reisch, Marc, The race is on to repurpose garbage, Chemical & Engineering News, October 27, 2019, available at: <https://cen.acs.org/business/biobased-chemicals/race-repurpose-garbage/97/i42>.

- Once a waste facility is allowed to operate it is extremely difficult to decommission, even if it is polluting, expensive, disruptive, and unable to comply with environmental regulations. Therefore, there is no assurance that a sewage sludge gasifier in Taunton will cease operations even if it is later found to be toxic and harmful.
- For example, the 45-year-old Saugus, Massachusetts municipal waste incinerator has outlived its useful life and is unable to comply with current environmental regulations, yet it is still permitted to operate. This incinerator has experienced multiple shutdowns and outages in recent years, including 89 days in 2018 on which one or both of the furnaces at the Saugus incinerator were inoperative.⁵⁴ During shutdown operations, the furnaces often emit higher concentrations of pollutants, including carbon monoxide and carbon dioxide, that at times have exceeded the emission limits permitted by the incinerator’s Air Quality Operating Permit.⁵⁵ Prolonged maintenance has also caused noise pollution that interfered with residents’ sleep and enjoyment of the outdoors.⁵⁶ Furthermore, the Saugus incinerator is permitted to comply with certain emission limits by purchasing emissions reduction credits, rather than actually decreasing the emissions it released, in order to comply with state regulations.⁵⁷

10. The Taunton City Council must take responsibility for preventing the harms posed by the gasifier. The EPA and DEP will not necessarily stop this project from moving forward, even though it is dangerous to Taunton’s residents.

- The EPA does not regulate sewage sludge gasification facilities like the proposed project in Taunton; it only regulates sewage sludge incinerators.⁵⁸ Even so, the EPA’s sewage sludge incinerator rules are designed to limit nine pollutants including lead, mercury, carbon monoxide, hydrogen chloride, nitrogen oxides, among others, but not PFAS.⁵⁹ Accordingly, the EPA lacks guidance to regulate the proposed gasification facility under its existing sewage sludge rules.
- In addition, EPA’s standards for regulating the use or disposal of sewage sludge do not (yet) set limits on PFAS as a pollutant that is present in sewage sludge.⁶⁰ Thus it

⁵⁴ Emissions data can be retrieved at <http://eeaonline.eea.state.ma.us/DEP/MWC/facilityReport.aspx>.

⁵⁵ See *id.*; see also Final Air Quality Operating Permit MBR-95-OPP-011A5 at 5, <https://www.mass.gov/files/documents/2019/06/27/op-wheels.pdf>.

⁵⁶ See Kristina Rex, ‘No One Sleeps’: Revere, Saugus Residents Frustrated By Noise From Waste Plant, CBS Boston (July 2, 2019), <https://boston.cbslocal.com/2019/07/02/revere-saugus-wheelabrator-residents-frustrated-loud-noise-waste-plant/>; Mike Gaffney, Wheelabrator Saugus temporarily stops processing waste to address noise complaints, Saugus Wicked Local (June 26, 2019), <https://saugus.wickedlocal.com/news/20190626/wheelabrator-saugus-temporarily-stops-processing-waste-to-address-noise-complaints>.

⁵⁷ See Emission Control Plan Modified Approval at 5-6, <https://eeaonline.eea.state.ma.us/EEA/PublicApp/#>.

⁵⁸ 40 CFR Part 60 Subpart MMMM, available at: <https://www.govinfo.gov/content/pkg/CFR-2015-title40-vol7/pdf/CFR-2015-title40-vol7-part60-subpartMMMM.pdf>

⁵⁹ *Id.*

⁶⁰ 40 CMR Part 503; see also EPA’s page “Biosolids Laws and Regulations”, available at: <https://www.epa.gov/biosolids/biosolids-laws-and-regulations>

is unable to address potential PFAS pollutants in the emissions, wastewater, and biochar generated by the proposed gasifier.

- Unfortunately, currently there is no MassDEP or state plan for containment or disposal of sewage sludge. There are also no state standards for measuring the potential PFAS emissions gasification of sewage sludge would generate, nor are there state standards for measuring PFAS in the ash and tar byproducts. Finally, the MassDEP will be reviewing this site for a determination of site suitability permit under 310 CMR 16.00, because this site was a solid waste facility. MassDEP has only denied issuing that permit twice that CLF is aware of, both times when the existing site was very contaminated. While CLF hopes that MassDEP would not allow this facility to move forward, it is very possible that MassDEP would allow it to be built, even though there is no way MassDEP can ensure that it will be protective of human health. In other words, the presence of many unknowns, though potentially dangerous, may not be enough to compel MassDEP to intervene and stop this project.
- The Taunton sewage system relies on infrastructure that is in some places over 100 years old.⁶¹ Its permitted flow is 8.4 mgd.⁶² The Aries gasification plant will discharge approximately 100,000 gallons per day into the Taunton WWTP.⁶³ That represents approximately a 1.2% increase to the daily flow of the WWTP. This flow increase further strains a system that already has significant combined sewer overflow (CSO) problems, where millions of gallons of untreated wastewater is discharged into the Taunton River. The Taunton WWTP has been under MassDEP administrative consent order and an EPA order of compliance for its frequent sewer overflows, impacting the water quality in the Taunton River and Mt. Hope/Narragansett Bays.⁶⁴ Wastewater from the gasification plant will only exacerbate these problems, which are addressed at taxpayer expense, contradicting Aries' claim that the gasifier will have "no water quality impacts."⁶⁵

Selected resources:

- U.S. EPA, Per- and Polyfluoroalkyl Substances (PFAS): Incineration to Manage PFAS Waste Streams, Technical Brief at 1 (February 2020), available at: https://www.epa.gov/sites/production/files/2019-09/documents/technical_brief_pfas_incineration_ioaa_approved_final_july_2019.pdf
- Gibbens, Sarah, Toxic 'forever chemicals' more common in tap water than thought, report says, National Geographic, January 24, 2020, available at: <https://www.nationalgeographic.com/science/article/pfas-contamination-safe-drinking-water-study>
- Brockovich, Erin, Plummeting Sperm Counts, Shrinking Penises: Toxics chemicals threaten humanity, The Guardian, March 18, 2021, available at:

⁶¹ NPDES Permit No. MA0100897 Fact Sheet at 6.

⁶² *Id.* at 3.

⁶³ See Certificate of the Secretary of Energy and Environmental Affairs *supra* at 1.

⁶⁴ NPDES Permit *supra* at 6.

⁶⁵ See Aries Clean Technologies, *supra*.

<https://www.theguardian.com/commentisfree/2021/mar/18/toxic-chemicals-health-humanity-erin-brokovich>

- GAIA, Waste Gasification & Pyrolysis: High Risk, Low Yield Processes for Waste Management, Technology Risk Analysis, at 9 (March 2017), available at: <https://www.no-burn.org/wp-content/uploads/Waste-Gasification-and-Pyrolysis-high-risk-low-yield-processes-march-2017.pdf>

For an in-depth analysis of PFAS destruction, please refer to:

- Horst, John, et al., Understanding and Managing the Potential By-Products of PFAS Destruction, 40 Groundwater Monitoring & Remediations, 7, 20-21 (2020). (Attached)
- U.S. EPA, Interim Guidance on the Destruction and Disposal of Perfluoroalkyl and Polyfluoroalkyl Substances and Materials Containing Perfluoroalkyl and Polyfluoroalkyl Substances, EPA-HQ-OLEM-2020-0527, December 18, 2020, available at: <https://www.regulations.gov/document/EPA-HQ-OLEM-202>